A comparison between selected aspects of the National Curriculum in England and Wales and the common curriculum in Ontario, with particular reference to the science programs in both systems.

Bernard. Taylor

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A COMPARISON BETWEEN SELECTED ASPECTS OF THE NATIONAL CURRICULUM IN ENGLAND AND WALES AND THE COMMON CURRICULUM IN ONTARIO, WITH PARTICULAR REFERENCE TO THE SCIENCE PROGRAMS IN BOTH SYSTEMS

by

Bernard Taylor

A Thesis
Submitted to the Faculty of Graduate Studies and Research through the Faculty of Education in Partial Fulfillment of the Requirements for the Degree of Master of Education at the University of Windsor

Windsor, Ontario, Canada
1995
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ABSTRACT

This study argues that the Transition Years science programs in Ontario, when compared with the National Curriculum science programs for Key Stage 3 in England and Wales, are being implemented in ways which: are less assessment driven, promote a wider variety of teaching methods, give teachers more ownership of the curriculum, and are less centralised.

In investigating these hypotheses the researcher looked at the historical background to recent curriculum changes in Ontario, and in England and Wales, as well as interviewing teachers, principals and headteachers, and administering questionnaires, in both Ontario and England and Wales.

The study showed that the education system in Ontario was more forward-looking and less centralised, with school boards playing an important role in curriculum development. The education system in England and Wales was more traditionalist and more centralised, with Local Education Authority advisers playing less of a role in curriculum development. The study also found that the education system was more assessment driven in England and Wales than in Ontario. The hypotheses that the science programs in Ontario were being implemented in ways which promote a wider variety of teaching methods, and which give teachers more ownership of the curriculum than in England and Wales, were found to be partially supported.
ACKNOWLEDGEMENTS

I would like to thank the teachers, headteachers, and principals in Ontario and England who kindly agreed to take part in this study, and who responded with warmth and professionalism. My thanks also to Jim Dawson and Dave Newman for getting me started, and for insights into the education system in Ontario.

I would also like to warmly thank my thesis committee, Dr. Richard Frost, Dr. Erica Kuendiger, Dr. Donald Laing and Dr. Ian Crawford for their assistance, suggestions and encouragement during the course of this study.

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My special thanks to Dr. Wilfred Innerd, Dr. Jane Innerd, and to Jane, Charlotte and Andrew, for their warmth, hospitality, and patience; fons et origo.

And to Geordie, for just being there.
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VITA AUCTORIS
CHAPTER 1
INTRODUCTION

General Background

Around the world many political jurisdictions are critically examining their education systems, and of these, two have been selected to be the focus of this study, England and Wales, and the Province of Ontario in Canada. Within the broad scope of educational studies particular reference is made to the science curriculum experienced by students between the ages of twelve and fourteen.

The researcher has, for a number of years, taught science classes at a variety of schools in England which have included students between the ages of twelve and fourteen, and has been given leave of absence to study for a Master's Degree in Ontario. It soon became clear to the researcher that the education system in Ontario was undergoing a period of change which seemed at first sight to be similar to that experienced by England and Wales. Based on the researcher's subject background, and, in order to narrow the focus of the study, the science curriculum experienced by twelve to fourteen year olds was taken as a starting point for a comparison (see Appendix A).

Within the United Kingdom there are three education systems: those of Northern Ireland, Scotland, and England and Wales. The education system in England is very similar
to that in Wales; educational documents typically refer to both systems and are issued by the Welsh Office in Wales and by the Department for Education (DFE) in England. It is proposed to treat England and Wales as a single unit since curriculum pronouncements cover both kingdoms.

In England and Wales the Education Reform Act of 1988 set out for the first time a National Curriculum which described what every student from five to sixteen should be able to achieve at each stage of their education. The National Curriculum included a system of national testing (Standard Assessment Tasks or SATs) which would be carried out when the students were 7, 11, 14 and 16 years old. A system of teacher assessment of student's progress was also to be implemented. There have, however, been some subsequent changes to the detail of the National Curriculum which will be discussed later.

Details of the current version of Key Stage 3 science SATs are shown in Appendix B. Details of the teacher assessed component of the current Key Stage 3 science SATs, also known as 'Science 1' or SC1, are shown in Appendix C.

The National Curriculum is divided into four Key Stages which are the four phases of a student's education (see Appendix A). Key Stage 3 is for students aged 12 to 14, which is the same age range as the Transition Years in Ontario.

The ten subjects comprising the National Curriculum
(see Appendix D) are being phased in gradually, and will not be fully in place until 1996, although guidelines for each subject were completed in 1992. Most subjects were already on offer in schools in an unrevised format. A revised programme of study for science was issued by the Department of Education and Science (DES) in 1991, which described five Attainment Targets (see Appendix E). Initially each Attainment Target had 10 levels (see Appendix F), and students progressed from level to level as they moved through school. Although diverse in levels of ability, students in Key Stage 3 were expected to be between levels 3 and 7. A similar structure of Attainment Targets and levels was put in place for other subjects.

After the pressure from teachers, who claimed that the National Curriculum was unworkable, finally became overwhelming, a review of the entire National Curriculum was commissioned by the Education Secretary, and carried out by Sir Ron Dearing with a final report released in November 1994 (School Curriculum and Assessment Authority, 1994a). This report led to a rationalisation of the National Curriculum enshrined in the National Curriculum Orders for each subject area which were distributed to schools in January 1995 (School Curriculum and Assessment Authority, 1995a).

Each Province in Canada has responsibility for its own education system. There have been widespread educational
reforms in all Provinces in the last ten years (see Appendix G). In Ontario the Common Curriculum is being introduced for Grades 1 to 9. The curriculum document published by the Ministry of Education and Training (1993a) superseded previous guidelines, and was envisaged as a working document subject to future revisions. This document outlined the principles underlying learning, teaching, curriculum, and assessment and evaluation (see Appendix H). It described learning outcomes which "form the basis of the programs, learning activities, and specific outcomes that school boards develop for each grade" (p. 1).

The document also outlined ten cross-curricular learning outcomes, and the four core program areas:

Language
The Arts
Self and Society
Mathematics, Science, and Technology

More specific learning outcomes in each core program area were described for Grades 3, 6 and 9.

The release of the report of the Royal Commission on Learning (Ministry of Education and Training, 1995a) in January 1995 was followed by the release of the updated version of the Common Curriculum (Ministry of Education and Training, 1995b) and by a series of announcements by the then Education Minister, Dave Cooke.

In England and Wales the transition from primary school
to secondary school takes place at the end of Year 6 (see Appendix A). In Ontario the transition from elementary school to secondary school takes place later, at the end of Grade 8. Whilst Ontario has a non-streaming policy for Grades 7, 8, and 9, England and Wales typically has some form of streaming for students of the same age, often dividing students into two broad ability bands at Grades 8 and 9, but with movement possible between the two bands.

Research Hypotheses

The hypotheses are that the Transition Years science programs in Ontario, when compared with the National Curriculum science programs for Key Stage 3 in England and Wales, are being implemented in ways which:

- are less assessment driven....Hypothesis A
- promote a wider variety of
  teaching methods.............Hypothesis B
- give teachers more ownership of
  the curriculum ..............Hypothesis C
- are less centralised.........Hypothesis D
The Significance of the Study

There have been differences in approach to curriculum change between Ontario, and England and Wales. If this study supports the research hypotheses then it will offer reassurance to teachers, schools, Boards of Education, and the Ministry of Education and Training in Ontario that they should be optimistic about the journey on which they have embarked. It may also suggest alternative directions to teachers and schools, and especially to the Department for Education, in England and Wales.

In saying that there are differences in approach between the two systems, it is not meant to suggest that one system is somehow 'better' than the other. Difference does not imply deficit. The reader must decide for him or her self whether one system leads to a more effective learning environment than another system.
Chapter II
DESIGN AND METHODOLOGY

Subjects

In England and Wales the subjects were headteachers and science teachers in five secondary schools (two rural and three urban - including one Roman Catholic). In Ontario the subjects were the principals and science teachers in five high schools (including one Roman Catholic school), and six elementary schools.

Instrumentation

The elements of instrumentation included:

Interviews - teachers, headteachers, principals, science consultants.

Questionnaires - on teaching methods asking teachers to rate their current practise on a bipolar rating scale (see Appendix I).

- asking teachers to rate how often they use particular teaching methods (see Appendix J).

Document analysis - programs of study for science from schools, curriculum documents from school boards, the Ministry of
Education and Training, and the Department for Education, newspapers and articles which discuss the recent historical background.

Procedures

Following submission of a thesis petition, permission to carry out this study was obtained from the Graduate Committee of the Faculty of Education (see Appendix K) and from the Research Ethics Committee of the Faculty of Education (see Appendix L).

Ontario

The researcher telephoned science consultants from nearby school boards in Ontario, who agreed to help with the study. A letter, including supporting documentation, was then sent to the relevant Directors of Education (see Appendix M) requesting permission to visit schools in liaison with the science consultant. Permission was received orally from one board, and in writing from another (see Appendix N).

The researcher met with the science consultants who suggested suitable schools to visit, and who kindly agreed to telephone the principals of those schools to let them know that they would be contacted very soon. The researcher wrote to the principals (see Appendix O) explaining the
nature of the study, and enclosing a specimen questionnaire and an interview outline. Telephone calls were made, and suitable times to visit schools were arranged for April and May 1995.

**England**

Outline permission had already been obtained informally from headteachers of the schools that the researcher intended to visit. When permission to carry out the study was obtained from the Graduate Committee of the Faculty of Education, the researcher wrote to headteachers and heads of science departments indicating the nature of the study, and probable time frame for a visit. The researcher visited England between April 22nd and May 13th, 1995, to conduct interviews and administer questionnaires.

Interviews covered a number of main areas (see Appendix P), and were tape-recorded after written permission was obtained from the interviewees, who were assured of anonymity. The main points made by interviewees were summarised on a log sheet by the researcher who kept as close to the original words and phrases as possible.

The questionnaire on implementation indicators (see Appendix I), and the questionnaire on teaching methods (see Appendix J), were either left with the teacher to post back to the researcher, or had already been completed in advance. The questionnaires were coded to ensure anonymity of the
informants.

The document analysis involved obtaining programs of study and other documentation covering the science curriculum for Transition Years/Key Stage 3 students. The purpose was to analyse the content and processes of the curricula in the two systems.
CHAPTER III
BACKGROUND AND ISSUES

Definition of Terms

**England and Wales**

**A-Level:** Advanced level courses in different subjects taken by students in the sixth form, the final two years of secondary school (Appendix A).

**Attainment Targets:** the topics within each National Curriculum subject. There are now four Attainment Targets in science, (see Appendix Q).

**DFE:** Department for Education, previously the Department for Education and Science (DES).

**GCSE:** General Certificate of Secondary Education; courses, in a range of subjects, taken by students in Years 10 and 11 (replaces O-levels and CSEs).

**GNVQs:** General National Vocational Qualifications. Recent alternatives to 'A' levels and GCSE examinations, with a vocational emphasis (see Appendix S).

**Grant Maintained schools:** schools which have opted out of Local Education Authority control and are funded directly from central government.

**Key Stage 3:** this is the phase of education for students aged 12 to 14, and is equivalent to the Transition Years, (see Appendix A).

**Levels of Attainment:** there are ten levels for each
subject at Key Stage 3 (and eight levels at Key Stage 4).
Level 1 is the lowest; level 10 is achieved by the most able
students.

**Local Education Authority (LEA):** a branch of local
government, usually part of a County Council, that is
responsible for the day-to-day running of the state
education service in a particular geographical area (except
for Grant Maintained schools).

**NCC:** National Curriculum Council (from 1988 until
September 1993).

**National Curriculum:** sets out what every student from
the age of five to sixteen should know, understand, and be
able to achieve at every stage of their education.

**OFSTED:** Office for Standards in Education. The new
inspectorate for overseeing the inspection of schools that
replaced Her Majesty's Inspectorate of Schools.

**Orders:** legal directives from the government,
referring to the specifications of Attainment Targets and
Programmes of Study in each National Curriculum subject.

**Programmes of Study:** syllabus that specify what
students must be taught during each Key Stage.

**SC1s:** teacher-assessed science practicals (see
Appendix C).

**SCAA:** School Curriculum and Assessment Authority
(England, from October 1993).

**SEAC:** Schools Examination and Assessment Council
(England and Wales, from 1988 until September 1993).

**Standard Assessment Tasks (SATs):** written tests for all students, originally intended to be taken at the end of each Key Stage, i.e. at the ages of 7, 11, 14, and 16.

**TGAT:** Task Group on Assessment and Testing (England and Wales, 1987)

**Ontario**

**Activity-based Learning:** involves structured learning in settings where the student is provided with objects to manipulate, problem-solving activities or materials related to the learning objectives.

**Benchmarks:** Standards of achievement for Ontario students (see Appendix R).

**Cooperative Learning:** involves students working in small groups to cover prescribed material. Students learn from each other in these heterogenous groupings.

**FWTAO:** Federation of Women Teachers' Associations of Ontario.

**OISE:** Ontario Institute for Studies in Education.

**Orbit:** A publication of the Ontario Institute for Studies in Education.

**OSSTF:** Ontario Secondary School Teachers' Federation.

**Outcomes:** observable, measurable levels of achievement (see Appendix R).

**SAIP:** School Achievement Indicators Program. A
Canada-wide assessment of student achievement which samples students from all provinces.

Transition Years: the years covering Grades 7, 8, and 9 (see Appendix A).
England and Wales

From its inception, and beforehand, the National Curriculum has been dogged by controversy. It was introduced by a government which had sought more centralised control over many aspects of policy in education and other areas, and in doing so had weakened the powers of local councils, and put the concept of 'competition' more firmly on the political agenda. To most dispassionate, though involved, observers the government has sought to impose the National Curriculum with a minimum of consultation, with little in the way of research or pilot studies, and with little consideration of the wider aims of education.

At the same time teachers seemed to be at the periphery of events. To many teachers it seemed that the National Curriculum was being imposed regardless of their opinions, that they were no longer partners in the educational enterprise, and when their voices were raised against the National Curriculum, claiming that it was content-heavy and put too much emphasis on assessment, they were ignored. Indeed it seemed that the government was interested in a return to so-called 'traditionalist' values, and was not prepared to trust the professionalism of teachers, particularly not those teachers who espoused more progressive values, including a wider variety of teaching methods. This was especially ironic given that the implementation of the National Curriculum was marked,
initially, by progressive values, and then by the retreat from those values to a more traditionalist position. These are some of the themes which emerged, time and time again, as the National Curriculum emerged from a process of constant and piecemeal revision.

The term 'progressive' is used here in a general sense indicating a forward-looking approach to education which embraces a process-oriented, student-centred perspective as used by Blenkin and Kelly (1981). The term 'traditionalist' is also used in a general sense indicating a reluctance to accept such change.

There is of course a wider perspective which is to do with the extent to which the curriculum perpetuates the social structures from which the dominant groups in society benefit, and the extent to which the curriculum actually sustains these dominant groups. There is also a perspective according to which academic subjects develop as a result of political conflict and compromise as their adherents pursue status and benefits, which may not always be in the best interests of students.

Goodson (1994) discussed curriculum history and suggested that academic subjects have evolved from more lowly precursors which promoted pedagogic and utilitarian purposes, to those that are now defined as university disciplines. Successful subjects are those whose definitions of knowledge are promulgated by universities.
Successful subjects will retain the more able students, have better staffing ratios, higher capitation allowances, and more lucrative salaries for their practitioners, but will also, as examinable school subjects, stress academic and abstract features or theories which are very different from the interests and backgrounds of most students. Goodson summarises this view by saying:

the more occupational groups and their representative associations have pursued the material incentives offered by the state - the more abstract and decontextualised professional knowledge has become. (p. 41)

Education has a rôle in the social construction of knowledge, but who benefits? Goodson's analysis of recent curriculum history in Britain acknowledges the role of politics (the struggle by competing interest groups for control over scarce resources) in defining the curriculum. Goodson, whose roots are in Britain, sees Britain as a society divided by social class, by race, by gender, by region, and by country. Goodson described how in the 1960s and 1970s, Labour governments introduced comprehensive schools and began phasing out grammar and secondary modern schools and ending the pernicious division of children into the able and successful, and those destined for the educational scrap-heap at the tender age of eleven.

Comprehensive schools encouraged the egalitarianism of
mixed ability grouping, and the reduction of both streaming and whole class teaching. Subjects such as general science, social science, and integrated studies began to develop new forms of interconnectedness to the interests and experiences of the majority of students. Teaching unions also had a progressive influence on the curriculum.

During the Thatcher years there was a great deal of suspicion of these new subject areas, and indeed the National Curriculum assigned them to the margins. Goodson described the Right as seeking to 'reinvigorate' the old grammar school subjects during the 1980s, claiming a need for economic renewal as a pretext; questions of national identity, and of government control were perhaps more predominant. The increased emphasis on British history in both primary and secondary schools which was imposed by the government, much to the displeasure of historians, was one example of this. The attack on the powers of Local Education Authorities was to be understood, according to Goodson, because they represented 'the Community' and not 'the Nation'.

Goodson also described two general directions that curriculum design could take. One direction would involve the specification of a common set of goals and objectives, as well as a certain amount of common content, and in general terms is exemplified by the 'localised' and 'progressive' Common Curriculum in Ontario. The second
direction would prescribe in detail what is to be taught, learned, and tested, and again in general terms is exemplified by the 'centralised' and 'traditionalist' National Curriculum in England and Wales. Whilst the researcher would disagree with some of the details of Goodson's analysis, it is a useful framework, a framework within which the actual events resonate with meaning.

In reviewing the development of the National Curriculum, John Patten, a former Secretary of State for Education, stated that until the mid-1980s central government had taken no responsibility for the school curriculum, and had little influence on standards of performance. The National Curriculum established by the Education Reform Act of 1988 was intended to raise expectations by setting demanding standards, and was to establish a curriculum entitlement for all students. National tests were to be instituted to check whether these standards were being met, and to sound the alarm if they were not. A new, independent, schools inspectorate, OFSTED, was set up in a further effort to raise standards. Data were to be published on the performance of students in each school so as to inform parental and student choice, and to stimulate action to raise standards (Patten, 1994).

According to Hymas (1993) one of the explicit reasons for the introduction of the National Curriculum was that the government thought that there were gaps in academic
standards between different schools in different parts of the country, and also that there were problems when students moved home from one part of the country to another (Hymas, 1993). Although there seemed to be little evidence supporting the validity of these claims, it was thought that a more uniform curriculum should ensure coherence and continuity of learning.

These views did not arise from a vacuum. Throughout the late 1970s and early 1980s there had been debate as to whether 'standards' were falling, and over the efficacy of methods of monitoring 'standards'. Nuttall (1986) put this debate succinctly in context:

In Britain, there has been a persistent campaign, most obviously in the Black Papers on education...to discredit so-called progressive methods of education by pointing to an alleged decline in standards of educational performance, especially in reading and mathematics. (p. 154)

At the same time there was much respect, amongst teachers and others, with the quality of work of Her Majesty's Inspectorate of schools (HMI) (Nuttall, 1992). The HMI reported on individual schools, and on more general matters such as the quality of science education in England and Wales, and so the announcement that they were to be abolished and replaced by OFSTED led to astonishment amongst teachers.
A major concern underlying the development of the National Curriculum was the assessment of student performance in a manner that was politically acceptable to the government.

Prior to the National Curriculum, Local Education Authorities had some arrangements for monitoring standards, as did the GCSE and 'A' level examination boards which set national examinations for 16 and 18 year olds. Some Local Education Authorities would test every student of a particular age group, others would test 10% of the age group.

Another major influence in providing information on standards prior to the National Curriculum was the Assessment of Performance Unit (APU) which had been set up as a section within the Department of Education and Science in 1974. The APU managed the surveying of student performance in English, mathematics, science and foreign languages, once every five years in each subject. This sampling of student performance, involving 2% of the student population, was very different from the sheer breadth of testing under the National Curriculum.

Part of the brief of the APU was to provide information on standards, and monitor changes in performance over time. Gipps (1986) acknowledged some of the statistical difficulties in achieving these aims, but noted that APU surveys had been useful to teachers in alerting them to
areas of weakness in terms of content and method. An editorial in the *Times Educational Supplement* (July 13, 1990) found it ironic that the government had abolished the APU just as it was beginning to provide increasingly useful information on the performance of 7 and 11 year olds over time. The editorial noted that the great strength of the APU was "that it provided detailed information in a way that did not burden children, teachers or schools" (p.17).

The National Curriculum Task Group on Assessment and Testing (Department of Education and Science, 1987) had reviewed the then existing practices of assessment within schools. The report stated that effective assessment was already being carried out, but that there was a limited range of assessment instruments available to teachers, although the then recently introduced GCSE exams had improved the situation. Local Education Authorities were criticised for having rarely achieved an integrated assessment system.

Contrary to Hymas's position, there was little or no evidence that movements of students from one part of the country to another was a significant problem for the education system. The argument that there should be some continuity of learning seemed inherently sensible, but it was probably not such an important factor as the government claimed, and was probably merely a useful view for the government to promote. Such a view went hand in hand with
the government's dissatisfaction with existing methods of monitoring standards, and determination to make changes.

There seemed little evidence that these changes involved a consideration of the wider aims of education. For example, Nuttall (1988) described the complex system of assessment that has been put in place, and the framework of National Curriculum levels: "There is no empirical basis for this model; no theory of learning, no theory of curriculum was invoked to justify any of these figures - they are, to an extent, arbitrary" (p. 231).

In a similar vein, White (1991) maintained that in the National Curriculum knowledge was seen as central to the educational process, and that little thought had been given to fundamental aims and values: "the more rational way to construct a national curriculum is to begin with aims and then to ask how best these aims might be realised" (p. 114). White went on to question the aims and purposes of education in a liberal democratic society, and to discuss the ethical dimensions of the learning process, and noted that the National Curriculum excluded personal and social education.

Another critic, Rudduck (1992), also stressed the shaky foundations of the National Curriculum. Rudduck described the diversity of institutions and agencies contributing towards educational research, which also meant that there were a lot of different emphases resulting in a lack of clear influence on the decision-making process. Rudduck
also stated: "the introduction of the National Curriculum is an example of the way in which a government which has been in office for some time is able to move towards legislation on highly controversial policy issues and on the basis of a 'consultation' procedure which has low validity and low credibility and without taking much account of research" (p. 2).

Even the detailed way in which science was defined and implemented in the National Curriculum without due research and development was criticised. Shayer (1991) analysed the science Attainment Targets in terms of quasi-Piagetian levels of development, and after re-working survey data from the 1970s showing the wide range of intellectual development of 10 to 16 year olds, concluded that only some 20% of Key Stage 3 students would reach the levels specified in the Attainment Targets, rather than the 50% which was planned. Shayer criticised the notion that improved instruction alone could improve both standards in schools, and levels of attainment in students, suggesting that the limiting factor to achievement would be the inability of students to process information at a particular level of development. Shayer suggested a number of types of intervention which would offer some hope of overcoming the mismatch, all of which would "require the development of fresh teaching skills which do not at present form part of the good science teacher's repertoire" (p. 23). These interventions were
essentially activities to accelerate the intellectual development of students such as those of the Children's Learning in Science Project (Driver, 1983), and the Cognitive Acceleration through Science Education project (Shayer and Adey, 1981).

In addition to setting standards, it became clear that the government ideology was that higher standards could be reached by promoting a competitive ethos in relation to them. The introduction of formula funding, and subsequent events, showed how determined the government was to introduce the competitive ethos into education, and also to restrict the powers of local councils.

Until the mid 1980s schools were controlled by local democratically elected Education Committees which were part of County Councils. The funding came from the Local Education Authority (a branch of the County Council), although much of this funding was distributed from central government. The Education Reform Act of 1988 limited some of the powers of Local Education Authorities to determine the level of funding for schools. The introduction of "formula funding" meant that central government now specified how much money schools were to receive, an amount determined by a formula based on the number of students attending the school. The intent was to introduce the ethos of the market: "the belief is that if a school produces what consumers want, they will send their children there, and
funding will increase accordingly" (Armstrong, 1991, p. 7).

A further indication of how prepared the government was to implement competition came in February 1995 when the Welsh Secretary, John Redwood, announced the start of the Popular Schools Initiative in which £40 million in capital grants was made available for 'popular' schools to enable them to expand to meet demand. To obtain funds under this scheme, schools would have to show that student numbers exceeded the physical capacity of the school, that applications for admissions consistently exceeded the number the school was allowed to accept, and that there was evidence of continuing pressure that would justify an extra class or form of entry (Passmore, 1995). There were worries that this scheme would take strategic planning away from local councils who would no longer be able to calculate infrastructure support costs for such schools, or even to plan for a rational, overall provision of schools in an area. Although there appeared to be no sign of a similar scheme in England, Passmore has suggested that the Welsh scheme may have been designated as a pilot scheme by the government.

Further erosion of the powers of local authorities was implicit in the 1988 Act, which gave more powers and responsibilities to school governors and headteachers, allowing them to determine, for the first time, financial priorities for their schools. Field (1992) noted that, in
the main, power for running schools had shifted from Local Education Authorities to headteachers and not to governing bodies, as had been the legislative intention. The vast majority of governing bodies seemed content to support the way in which headteachers managed their schools, and seldom challenged the direction of school policy. Field observed that the government seemed content with the running of schools simply having been removed from Local Education Authorities, especially those which were Labour controlled.

According to Johnston (1992), the 1988 Education Act demolished the infrastructure of a decentralised educational system and abandoned a consultative partnership between central government, Local Education Authorities, and teachers. Johnston argued that it was the case that:

while the goals of education are being centrally determined, the methods and means to the ends are intended to become more decentralised and amenable to local determination. (p. 167)

Further eroding the powers of local authorities, the 1993 Education Act introduced the concept of schools opting-out of Local Education Authority control and becoming grant-maintained (Hymas, 1993). A grant-maintained school is no longer under the local democratic control of the County Council, but is under the control of a new governing body which consists of a majority of non-elected members. A governing body would typically include elected or appointed
parent governors, teacher governors elected by the staff, co-opted governors chosen by other governors, and foundation governors who represent the interests of the church authority or voluntary organisation which provides or supports the school. Funding is directly from central government (J. Price, personal communication, transcribed interview, July 1994).

Johnston also described teachers as feeling that what independence and self-determination they had was under threat. Caldwell and Spinks (1988) suggested that it is important within a self-managing school that teachers feel their professionalism is valued if the school is to function effectively. The importance of a shared set of values amongst teachers was stressed by Ryan (1992) as being a vital factor in guiding the behaviour and decision-making of teachers.

In July 1987 the Secretary of State for Education, Kenneth Baker, convened the Task Group on Assessment and Testing (TGAT) to advise on the practical considerations governing assessment within the National Curriculum. The TGAT report, which espoused a number of progressive values, was published in December, 1987, and recommended that any system of assessment should be criterion-referenced, formative, and should enable comparisons to be made between classes in the same school, and between different schools, and should give some continuity to a student's progress at
different ages (Department of Education and Science, 1987).

The TGAT Report noted fears that league tables of results could lead to unfair comparisons between schools, and recommended that publication of results for any school should only be done "in the context of reports about that school as a whole, so that it can be fair to that school's work and take account so far as possible of socio-economic and other influences" (paragraph 18).

The TGAT report recommended the use of a national system of tests, to be called "standard assessment tasks", which were conceived of as being broader in scope than the more traditional paper and pencil tests. The report recognised the need to keep burdens on teachers and students within reasonable bounds, and proposed that the tests would reflect the usual range of classroom activities so that students would not be aware of any departure from normal classroom work. It went on to propose that "standard assessment tasks" be developed with this in mind:

We recommend that the national system should employ tests for which a wide range of modes of presentation, operation and response should be used so that each may be valid in relation to the attainment targets assessed. These particular tests should be called "standard assessment tasks" and they should be so designed that flexibility of form and use is allowed wherever this can be consistent with national
compatibility of results. (TGAT report, paragraph 50). The report recognised that use of a broad range of assessment instruments would have the added advantage of discouraging "teaching to the test". The report recommended that national assessment should take place at the ages of 7, 11, 14 and 16, and that there should be a ten level scale for attainment targets, the details of which would be determined by different subject working groups. The report also recognised that a number of conditions would have to be met to ensure smooth implementation of the National Curriculum:

Clear acceptance that the aim is to support and enhance the professional skills that teachers already deploy to promote learning.

Clear recognition that the focus of responsibility for operation of a new system lies with teachers within schools.

Stress on the formative aims and on giving clear guidance about progress to pupils and to their parents.

Widespread consultation and discussion before proposals are put into effect.

A realistic time-scale for phasing in a new system.
Adequate resources, including in-service provision.

Help with moderation procedures so that the system contributes to communication within schools, between schools, parents and governors, and to the community as a whole about the realisation and evaluation of the aims of schools.

Sensitive handling of any requirements for outside reporting, recognising that simplistic procedures could mislead parents, damage schools, and impair relations between teachers and their pupils.

(TGAT report, paragraph 225)

In general, the response to the TGAT report was favourable. However, some concerns were expressed that the TGAT proposals would give rise to an elaborate and complex system, and it was questioned whether there had been a pilot scheme on sufficiently large a scale to justify the proposals. Downing Street was concerned that assessment was not primarily summative, but was viewed by TGAT as having more important diagnostic and formative functions. In addition, the costs were a problem. The TGAT proposal that the system not be implemented in under five years also concerned Downing Street. According to Daugherty (1995), Margaret Thatcher, the Prime Minister at the time, favoured
something cheaper, quicker, and less complex. Despite
evident tensions, and after a delay of six months, the
government accepted most of the TGAT recommendations in June

The new national assessment system, recommended by the
TGAT report was implemented following the 1988 Education
Act. It was to be overseen by two bodies: the National
Curriculum Council (NCC) and the School Examination and
Assessment Authority (SEAC).

Some saw the TGAT report as having struck a useful
balance. The *Times Educational Supplement* (1989, August 4),
for example, described the TGAT report as skilfully taking
into account the government's demands for accountability and
measurable assessment whilst avoiding the crude kind of
testing which would have subordinated teaching to the tests.
The editorial went on to note that, given the limitations of
time and other resources, some TGAT recommendations would
have to go. A particular example was the proposal by SEAC
to give the SATs precedence over teacher assessment, which
would appear to downgrade teachers' judgements.

Brighouse and Hunter (1990), professor of education at
Keele University and chief education officer for
Staffordshire respectively, described the TGAT report as
offering to the traditionalists certainty as to what
students were being taught, and as to whether or not they
were learning, and to the progressives enough flexibility so
that students would benefit from formative, diagnostic and criterion-referenced assessment. The reality was much different from that set out in the report: continuous, detailed recording across all attainment targets had quickly become unwieldy, bureaucratic, and time consuming for teachers. They called for the resolution of flaws in both the National Curriculum itself, and in the system of assessment used in the National Curriculum.

Another area of criticism was the subject working groups. Daugherty (1995) saw these as being thoroughly fragmented. Separate working groups in each National Curriculum subject shared very few ideas about the interpretation of their particular briefs. Although there was subsequent reshaping of the subject groups' proposals as policy developed, these proposals remained eleven different interpretations of the TGAT recommendations. Daugherty also described policy making as becoming somewhat diffuse as a result of separating the functions of the three bodies advising on curriculum and assessment: the National Curriculum Council (for England), the Curriculum Council for Wales, and the School Examination and Assessment Council. Fragmentation of policy making was also to be found in the subject-by-subject, regulation-by-regulation schedule for implementing the National Curriculum and the national assessment arrangements that went with it.

It is important to put the introduction of the National
Curriculum into a wider context. The early 1990s were a particularly difficult time for teachers in England and Wales. The annual conference of the National Union of Teachers (NUT) had voted for a national strike if any of its members were made redundant as a result of formula funding or poll tax cuts by local councils, but stated that government spending curbs were really to blame. There were other problems, other concerns, that were very deeply felt by teachers. Fred Jarvis, the former general secretary of the National Union of Teachers, described the problems of low teacher morale in the 1980s as being related to a need for better pay, to stress due to the implementation of the many changes in the education system, and to unfair criticism of teachers by Conservative politicians. The National Union of Teachers had called for the voice of the teaching profession to be better heard, and for the formation of a General Teaching Council, as well as for an increased supply of teachers (Jarvis, 1989).

A survey on occupational stress among teachers in the United Kingdom, commissioned by the National Association of Schoolmasters and Union of Women Teachers (NASUWT), and carried out by researchers from the Manchester University Institute of Science and Technology, showed that teaching was near the top of the occupational league table for stress, and that 41% of teachers wanted to leave the profession. Teachers were dissatisfied with the lack of
opportunity to use their abilities, with their working hours and conditions, with relations between management and teachers, with their chances of promotion, and most of all with their pay (Blackburne, 1990a). The extra burdens on teachers as a result of the National Curriculum also led to high levels of stress (Watkinson, 1991; Ryan, 1992; and Price, personal communication - transcribed interview, July, 1994).

Teacher shortages were another factor complicating the introduction of the National Curriculum. Headteachers found it difficult to recruit and retain full-time staff and supply teachers (Hofkins and Blackburne, 1990). A report from the HMI on the progress of science in the National Curriculum noted that teacher shortages had resulted in science being taught badly in 20% of primary schools and in 15% of secondary schools (Times Educational Supplement, 1991).

Brighouse (1990) noted the budget difficulties facing schools as a result of Local Management in Schools (LMS) as well as teacher shortages, the overcrowding of the Key Stage 4 curriculum, and the "ticks and crosses" clutter of a bureaucratic recording system which was testing the patience and optimism of teachers. Brighouse called for planning to start on what would become a much-needed new Education Act.

The late 1980s and early 1990s also saw the introduction of Standard Assessment Tasks (SATs), followed
by changes in the number of subjects in which students would take SATs, as well as changes in the format of the SATs themselves. At the same time teachers questioned the usefulness of spending what seemed to be inordinate amounts of time preparing for, administering, and marking SATs.

The original TGAT report had envisaged the use of a variety of forms of assessment including externally provided tasks and normal forms of classroom activity, to be decided upon by the teacher. TGAT did not envisage all students taking the same test at the same time, but did envisage that marking would be standardised through careful moderation. Daugherty (1995) described how the pilot Key Stage 1 tests for seven year olds were attacked by traditionalists who derided them as not being "real tests", and by teachers who found them very time-consuming. An editorial in the Times Educational Supplement (1990, May 5) described the pilot SATs as being complicated and time-consuming, and demanding unrealistic attention to detail. This was despite the decision to restrict Key Stage 1 SATs to the core subjects of English, mathematics and science (Blackburne, 1990b). There had been some changes to the SATs but teachers were still required to record levels reached in all attainment targets in the core subjects. Some of the practical activities used in the actual SATs for seven year olds in 1991 were similar to those used in the pilots and involved using dice in a maths game, reading aloud from a story book,
and predicting which objects would float or sink in water, and hypothesizing why this happened. Children also had a number of pencil and paper tasks in maths to complete, and a story to write. Children were assessed individually or in small groups, which made the exercise very time consuming. In subsequent SATs some of the practical tasks were dropped in an attempt to make the tasks more manageable (Gipps, 1994).

The results of these modifications were described by Daugherty who noted that assessment at Key Stage 1 had gradually changed "until it bore only a very loose resemblance to the broad, varied, cross-curricular, classroom activities originally conceived. There had been a growing emphasis on written, subject-based tests administered to the whole class at the same time. And the curriculum coverage of those tests had increasingly focused on the 'three Rs' " (p. 48).

Mortimore (1990), professor of educational research at the University of Lancaster, noted the decision to restrict SATs at Key Stages 1 and 2 to the core subjects of English, mathematics and science, whilst commending SATs as being a notable improvement over traditional pencil and paper tests. Mortimore was critical of this decision, despite the relief of hard-pressed teachers, because it was made before any evaluation of pilot studies that were still running. Mortimore called for a general moratorium on SATs so as to
sort out the problems of assessment, which would involve a
debate with teachers rather than against them. Mortimore
envisaged this as a chance to develop a national plan for
improvements to the education system, but noted that right-
ing wing pressure groups would probably resist such a move.

Meanwhile Key Stage 3 SATs for 14 year olds were being
developed in English, mathematics, science, technology and
Welsh, broadly following TGAT proposals, but being
influenced by developments at Key Stage 1. Hackett (1991a)
described how at one school Key Stage 3 SATs were built
around practical activities in English, mathematics and
technology. In English, after discussing "The Ancient
Mariner" by Coleridge, students wrote and performed their
own poetry. In mathematics, the students used octagonal
tiles in practical work, which led on to Pythagoras' Theorem
and the use of sines, cosines and tangents. In technology,
students had to design and build a device that would help
teach other students about the weather. Students spent more
than 30 hours on tasks in these three subjects.

In November 1990 a new Secretary of State for
Education, Kenneth Clarke, was appointed, who brought with
him a reputation as a political "bruiser". According to
Daugherty (1995), after seeing the materials for the Key
Stage 3 pilot SATs in mathematics and science, Clarke
decided on a major change of policy. There was to be a move
away from "tasks" towards short, written examinations which
would be answered by all students in a fixed time period on the same day. Future SATs would be more straightforward to conduct and to mark, and would take less time than the pilot SATs, but there would have to be practical work in technology and as part of science and mathematics tests. To many observers it seemed that what little consultation there had been, had resulted in proposals that were overturned overnight by the Secretary of State. Additionally, Hackett (1991a) noted that if the pilot SATs were to be replaced by short written tests then some $26 million in development costs would have been wasted.

In the event the Key Stage 3 pilot SATs went ahead in the summer of 1991, in the original format, so as not to cause embarrassment to the Department of Education and Science or to SEAC, but it was clear that they were redundant in format and spirit.

Key Stage 3 SATs went ahead in June 1992 and according to Daugherty received continuing criticism from teachers and headteachers, but more favourable comment from the media. Blackburne (1992a) reported that teachers and headteachers considered the sheer volume of 1992 SATs to be too stressful for 14 year olds. Students took six one-hour tests in mathematics and science in two days.

Key Stage 4 developments over the same years were equally complex and were debated with the same degree of passion. Daugherty noted several factors which set Key
Stage 4 apart from the earlier Key Stages:

- devolved administration of examinations to independent examination boards, a long established feature of public examinations for 16 and 18 year olds in England and Wales;

- flexibility for each school to add to the statutory requirements and shape its curriculum provision at Key Stage 4 in a distinctive way;

- choice for pupils within that provision. (p.122)

The nature and extent of "flexibility and choice" became the subject of much debate with the introduction of a number of short courses and vocational courses (see Appendix S). Examination boards developed GCSE syllabuses which were based on the Key Stage 4 programs of study, and subject to approval by SEAC. Much debate focused on the extent to which the needs of high and low attainers would be met by differentiated courses so that all had access to broadly the same National Curriculum. At the same time there was increasing recognition that the newly introduced GCSE courses (see Appendix A) were not accessible to the whole age range of students. The resolution of these differences tested successive Secretaries of State for Education, and led to the basic core curriculum, and the 'academic' and 'vocational' divide proposed by the Dearing report and accepted by the Secretary of State for Education, John Patten (Daugherty, 1995).
A number of developments at Key Stage 4 were of interest. In July, 1991, the Prime Minister, John Major, stated that there was too much coursework, project work, and teacher assessment contributing towards the final GCSE grades, and in future only 20% of the final grades would be obtained from coursework (Daugherty, 1995). Once again it seemed that established policies that were in operation in schools were overturned overnight, presumably because they were too progressive.

In 1988 a major debate had started over the Secretary of State's insistence that, in the interest of choice, there should be two programs of study in science at Key Stage 4 operating in every comprehensive school. The 'double option' was to be a balanced science course taking up 20% of curriculum time; the 'single option' was a course taking about 12.5% of the time.

Many worries were expressed about the 'single option' science course. The Institute of Physics noted that this single science option might be taken by students at the age of 14 when they were not in a position to judge properly whether it would be suitable for careers they might choose later. This point was seen as particularly relevant to girls who were critically under-represented in scientific professions. The single science option was also thought to be poor preparation for a sixth form course. The existence of two distinct science courses at Key Stage 4 would also
have posed resourcing problems, and would have gone against the spirit of a National Curriculum which was not meant to be different for different students. A broad, balanced science course occupying 20% of curriculum time was believed by the Institute to be the minimum needed for future scientists and for all members of a scientifically literate community (Ebison and Davies, 1988).

The reality that emerged over the following six years was that most schools chose to offer only the double science option: a broad, balanced science course that integrated physics, chemistry and biology. Some schools, mainly private schools, continued to offer the three separate sciences because they were reluctant to change to a new and untried science course. Both of these routes were seen as an eminently suitable preparation for 'A' level courses in the Sixth Form (see Appendix A). The official position became clear:

The government firmly believes that double science or the three separate sciences should be taken by the great majority of pupils. Single science is intended for a minority of pupils who have good reason to spend more time on other subjects.

(Department For Education, 1995, p.vi)

A significant speech made by the former Chair of TGAT, Professor Paul Black, to the annual meeting of the British Association for the Advancement of Science in August 1992,
highlighted the retreat from the original progressive values enshrined in the TGAT report. Black attacked the present form of the SATs, and blamed political pressure for changing the original tests which were designed to be part of normal classroom activities, before going on to say that teacher assessment was not trusted in the way it used to be. Black also noted that the original Orders had included large numbers of attainment targets which had proved to be unworkable and had had to be reduced, disrupting the work of many science teachers, and others (Young, 1992a).

A number of criticisms of science in the National Curriculum were made by progressives who attacked the retreat from progressive values. Boyle (1991) argued for a fresh view of science education which would involve a dynamic interaction between learner, objectives, and teacher, and a move away from whole-class teaching towards a classroom where a number of differentiated activities are going on at the same time. Boyle was critical of the National Curriculum science program which was described as overloaded with factual information, and as a subject-focused program that is confined by predetermined outcomes.

Brown (1992) also observed that science teaching and learning seemed to be moving backwards towards more conventional methods in use in the 1970s. Brown described the government's acceptance of the TGAT report and of the report of the science working group as being positive steps,
but then noted that these developments were reversed for political and financial reasons; pencil and paper tests appeared to be cheaper than an assessment scheme designed to meet the needs of students and the subject.

Criticism that was less subject specific, but equally trenchant, was made by the National Association of Head Teachers and Secondary Heads Association who called for "a fundamental reshaping of the whole of Key Stage 3", and by a group of grammar school headteachers calling Key Stage 3 testing "an unnecessary bureaucratic monster". Their complaints were that the tests were too long, too prescriptive and too complex to administer, teacher assessment was given too little status, and the tests were poor preparation for GCSE (Blackburne, 1992b).

The warnings had been there for some years. England and Wales have had a system of public exams for a number of years in which students take GCSE exams (previously GCE 'O' levels and CSEs) at the age of sixteen, and 'A' level exams at the age of eighteen. Nuttall (1988) suggested that this tradition of formal assessment had led to the view that the National Curriculum was "only there to justify the massive assessment system that is also being put in place" (p. 229).

Whatever warnings had been given were not listened to, and the reality of SATs as felt by teachers led to boycotts of SATs at Key Stages 1, 2, and 3 in 1993 and 1994. Parental opinion was very largely on the side of the the teachers, as
was evinced by the large numbers of students who were kept at home, rather than being sent to school to take SATs. An organisation of concerned parents, Campaign Against SATs, which disapproved of league tables of SAT results, which was sceptical of SATs revealing more than would be already known by the teacher or by a parental glance through exercise books, and which believed SATs put too much pressure on students was also active during these years (Young, 1992b). A larger body of opinion was represented by the National Confederation of Parent-Teacher Associations, which claimed 8 million members. This organisation did not oppose local league tables of exam results, but was against national publication which it said would "set school against school and pupil against pupil" (Dean, 1993).

There were also concerns that the SATs were too narrow in terms of the knowledge, understanding, and skills that they tested. Kyriacou and Wilkins (1993) conducted a study of teachers in a secondary school in the North of England. They found that the National Curriculum had had a positive influence on teaching methods, with more variety and a move towards more active learning methods. However, they noted that "most teachers felt that the National Curriculum had legitimated the recent changes in this direction that had already been adopted" (p. 275). Kyriacou and Wilkins also found concern among teachers that the SATs were too narrow in terms of what they tested, and concern also that there
was a danger of the variety of teaching methods declining as they felt more pressure to teach to the tests. Guidance from the National Curriculum Council and the DES suggested that teachers should utilise a variety of teaching methods including problem-solving activities, and both independent and collaborative tasks (DES, 1991). This advice was low-key and was not backed-up by handbooks or a national campaign, perhaps reflecting a recognition by the DES that teachers were already using a variety of teaching methods.

In a study of a comprehensive school in the English Midlands, Ryan (1992) found that there was a conflict between the values of the school and the demands of the National Curriculum. The school had introduced cross-curricular themes, whereas the National Curriculum emphasised traditional subject boundaries. The demands made by the National Curriculum for the assessment and testing of students at regular intervals were perceived, by teachers, as going counter to the more sensitive and caring methods of assessment and testing already developed by teachers in the school. A majority of teachers in one faculty did not welcome the introduction of the National Curriculum. Whilst not all schools had developed cross-curricular themes to the same extent, an overwhelming majority of schools had similar methods of assessment and testing and, it can be surmised, would not have welcomed the more inflexible and time-consuming assessment and testing schemes of the National
Curriculum. According to Watkinson (1991) many teachers perceived assessment, and attainment targets, as driving the curriculum and subsequently leading to teachers "teaching to the tests". Kyriacou and Wilkins (1993) had also found teachers expressing concerns about becoming too syllabus-focused.

It was not just teachers who were feeling the strain. Freedman (1995) described some of the frustrations of British students in coping with GCSE coursework, and suggested that the pressure from exams can take over and detract from the quality of work completed by students. Freedman also noted that when exams are used to sort students into occupational slots, or to determine access to higher education, then the high stakes involved put pressures on the classroom, and the exam can have a negative effect on the curriculum.

Madaus and Kellaghan (1993) discussed the use in Britain of Standard Assessment Tasks (SATs), which they described as being broader in scope than traditional written tests. They noted that whilst amongst the stated purposes of the SATs was the provision of diagnostic and formative information, "the reality has been an emerging system with a more clearly defined emphasis on the use of assessments for comparison between schools and for the generation of a national picture of educational standards" (p. 4). They noted that the more dominant purpose was to encourage "free
market" competition within the educational system.

Madaus and Kellaghan observed that the administration of SATs required extra help within schools, and caused disruption of normal school activities. The original intention of assimilating testing into the normal routine of the classroom had soon been abandoned. There appeared to be increased teacher stress, although teachers were reported as doing much to protect students from stress. Teachers were also subjected to parental anxiety about the performance of their children. Madaus and Kellaghan also noted that some parents viewed SATs as a means of checking on or testing teachers and possibly also of getting rid of poor teachers.

Sweetman (1995) suggested that if the SAT assessment and the teacher assessment of a student are different, the school governors and parents will be inclined to assume that the test gives the truer measure, and that a mismatch is indicative of poor teacher performance, assuming that the data could be trusted.

The reliability of the data that SATs provide was called into question by Madaus and Kellaghan who described differences between schools in how they administered the SATs, and also in how students were prepared for the SATs. They also suggested that the SATs did not tell teachers anything that they did not already know about individual students, but surmised that in most schools SATs had led to positive reflections on curriculum content and the
educational process.

Schools in England and Wales have published examination results at GCSE and 'A' level for over a decade. The more recent discussion of league tables of schools based on the results of National Curriculum standard assessment tasks has focused attention on the extent to which it can be said that one school is "better" than another, and also on the extent to which fair comparisons are being made. St. John Brooks (1990) noted that educational achievement is closely associated with social class, and that factors such as the percentages of students who are from ethnic minority, manual working-class, one-parent or very large families, and who take free school meals or live in poor housing conditions, have to be taken into account in any attempt to identify and isolate the effects of schools on student achievement. McPherson (1992) described the "added value" of a school as being the boost that it gives to a student's level of attainment on entry to the school; raw results of tests should be accompanied by an assessment of the contribution made by the school to students' progress. McPherson called for the development of an indicator system to measure "added value" which would allow for differences between individual students and between schools, and which would be based on repeated measurements of students and schools, rather than on a single snapshot.

St. John Brooks (1990) also noted work by Goldstein,
professor of statistics at London University's Institute of Education, which showed that as statistical techniques became more sophisticated, small adjustments to the model used to measure the effectiveness of schools could cause large but meaningless movements up and down the league table of exam results grouped according to Local Education Authority. Similar work by Jessop and Gray (St. John Brooks, 1990) at the Performance Indicators Unit of the University of Sheffield showed eight different league tables as the result of eight different analyses on the same data by different teams of statisticians.

Despite criticism about the usefulness, and reliability, of league tables of SAT results, as well as of GCSE and 'A' level results, the government has shown no sign of backing down. According to MacLeod (1995) the government wanted tests to set schools and Local Education Authorities in competition with each other. On the other hand the Local Education Authority of Nottinghamshire, controlled by Labour, wanted assessment to provide only diagnostic information to be shared between teachers, parents, and student. With a majority of Local Education Authorities in England and Wales being Labour-controlled the scene is set for continuing conflict on this issue, although legal sanctions can be applied if LEAs or individual schools refuse to publish results.

Madaus and Kellaghan acknowledged that the financial
costs of developing and administering SATs were difficult to calculate, but gave two estimates, one of $132 million and another of $200 million, over a four year period.

Although the implementation of the National Curriculum has been a difficult and stressful time, there have been very many positive developments as teachers worked together to develop programs of study, methods of assessment, and a wider variety of teaching methods, as well as putting whole-school policies on topics such as bullying, racism, and report cards into action. Lidstone (1991), for example, described a procedure for recording the different Attainment Targets reached by science students based on a variety of evidence collected by the teacher. The procedure had been tried out in a number of schools in Avon County, and the evaluation was positive. Lidstone found that the use of a teacher's professional judgement was crucial in evaluating evidence, and recommended that a variety of learning strategies be used in the classroom so as to provide ample opportunities for generating evidence. Lock (1991) described the achievements of a secondary school science department in working together on planning and recording assessments. Watkinson (1991) suggested that schools were doing much more than just coping, and with the help of inservice training were developing and refining their classroom based schemes of assessment.

The Program of Study for Attainment Target 1 stated:
"Pupils should be encouraged to develop their investigative skills and understanding of science.....within the everyday experience of pupils.....Teachers must take account of the ethnic and cultural diversity within their school population.....The curriculum should reflect the contributions from different cultures" (Department of Education and Science, 1991). Brophy (1991) described a proactive program implemented by a secondary school science department which included "challenges to prejudices, stereotyping, and racism" (p. 61). Brophy stressed the need for full debate and understanding of the issues within the science department and said that "the identification of limitations of the present curriculum and possible solutions needs to be owned by the departmental members" (p. 66).

There have been a number of changes to the National Curriculum since 1988, some of which have already been mentioned. In science there were originally 24 Attainment Targets (Nuttall, 1988). These were changed to 17, and in 1991 they were further reduced to 5 Attainment Targets (Department of Education and Science, 1991). Many of these changes represented ad hoc revisions to parts of the National Curriculum, without reference to the whole edifice, and as such were inadequate.

This situation appeared to move closer to a resolution in 1993 when the former Education Secretary, John Patten, commissioned Sir Ron Dearing, chair of the School Curriculum
and Assessment Authority (SCAA), to review the whole National Curriculum. The pressure for change had become too great. Amongst all the many criticisms of the National Curriculum there had been voices calling for fundamental changes, but the political cost of change seemed to be a price that the government was reluctant to pay -- until it was finally left with no other option. The Dearing review was to address four key issues:

i) slimming down the curriculum

ii) simplification of the testing arrangements

iii) improved administration of the National Curriculum and national tests

iv) the future of the ten-level scale of 'levels'

(School Curriculum and Assessment Authority, 1994b).

The review began in April 1993, leading to an Interim Report in July 1993, and a Final Report which was released in November 1994. Over 57 000 responses were received during the consultation phase. The new National Curriculum Orders for each subject were distributed to schools in January 1995 (School Curriculum and Assessment Authority, 1994b).

The Interim Report was accepted immediately by the Secretary of State for Education, like a lifebelt by a drowning person, and limited the national tests to the core subjects of English, mathematics and science for 1994 and 1995. In 1994 the following tests were to be carried out:

- Key Stage 1: tests in English and mathematics only;
science to be covered by teacher assessment
- Key Stage 2: a voluntary national pilot scheme for English, mathematics and science
- Key Stage 3: English, mathematics and science tests.

A highly effective teachers' boycott of the national tests at Key Stages 1, 2 and 3 in 1993 and 1994 embarrassed the government (MacLeod, 1995). In 1995 the tests went ahead with the government funding 60% of the cost of supply teachers to enable primary school teachers to carry out Key Stage 1 assessments. External examiners marked the tests at Key Stage 2 and 3, so limiting teachers' workload. Both these developments were seen as a great step forward by teachers and teaching unions (see Appendix T).

The revised National Curriculum, based on the Dearing Final Report, included the following general points:
- for each attainment target the ten-level scale has been reduced to eight levels plus a description of "exceptional performance". This applies to Key Stages 1, 2 and 3 only.
- there is no need for the detailed ticklists developed by schools showing the level reached by students for each attainment target
- content and prescription have been reduced to increase scope for teachers' professional judgement
- how, and in what depth, to teach the material for
each subject is for schools to decide
- in moving away from detailed statements of attainment
to slightly broader level descriptions, the
expectation is that teachers will have the
flexibility to make a rounded judgement which best
fits the overall performance of the individual
student
- the intention is to make no major change to the
National Curriculum for five years from 1995.
(School Curriculum and Assessment Authority, 1995b)

In science more specific points were made in the revised
National Curriculum (see Appendix U) which included:
- a reduction from 5 to 4 Attainment Targets
- prescribed content and duplication between subjects
  have both been reduced, e.g. the study of weather is
  included in geography and not now in science
- some topics are now placed completely at a more
  appropriate Key Stage, e.g. radioactivity is at Key
  Stage 4 and not also at Key Stage 3
- at Key Stage 4 most students are expected to take
double science courses (20% of curriculum time) or
separate GCSEs in physics, chemistry, and biology.
Single science courses (12% of curriculum time) are
not regarded as a suitable base for "A" level
physics, chemistry or biology
- more emphasis on chemistry at Key Stages 3 and 4
gives a better balance

- Experimental and Investigative Science now reflects a broader range of investigations, and gives more flexibility in terms of assessment.

(School Curriculum and Assessment Authority, 1995b)

An editorial in the Times Educational Supplement (1994, November 11) welcomed the review for its success in streamlining the curriculum, and in producing a curriculum model that was clearly professionally rather than politically driven, and stated that the National Curriculum was now back in the hands of the teachers.

Ontario

Whilst the education systems of England and Wales, and of Ontario may seem to have broadly similar goals there are a number of important differences, one of which is that of size. In 1992-93 total expenditure on education in England and Wales was approximately £64 billion, whilst in Ontario the figure was approximately £14 billion. In England and Wales in the same period some 7.2 million students attended some 25,000 state schools, whilst in Ontario some 2 million students attended some 5,000 schools (Ministry of Education and Training, 1994; MacKinnon et al., 1995). These figures indicate that the education system in Ontario is four to five times smaller than that of England and Wales.

Despite the smaller size there is as great, if not
greater, concern over many educational issues in Ontario, some of which have been resolved quite differently than in England and Wales.

In Ontario there has been considerable devolution of powers and responsibilities to school boards. Indeed the Program Departments are active in running workshops on aspects of the Common Curriculum such as cooperative learning, integrated curricula, and multiple intelligences, and actively involve teachers in planning and developing the curriculum and in writing curriculum materials. There appears to be much more curriculum development at the local level in Ontario, and the Common Curriculum documents are fairly broad and amenable to interpretation at the local school board and school level (see Appendix V). Ontario does not have anything similar to SATs in terms of a centrally imposed edifice of testing. On the contrary, testing and assessment are carried out according to parameters defined at the school and school board level.

Perhaps because of this greater involvement of teachers in the curriculum, and perhaps also because the pace of change was more acceptable, it seemed to the researcher that teachers in Ontario were more willing and more able to accept the process of change than teachers in England and Wales. Certainly morale amongst teachers in Ontario seemed higher than in England.

Elementary schools in Ontario that were visited by the
researcher seemed very similar to primary schools in England in having a less subject-specific, and more integrated, more process-oriented curriculum. High schools, like secondary schools, seemed more subject-based, and more content-driven, apart from in Grade 9.

Part of the Transition Years philosophy has been to ease the process of change from elementary school to high school for the student, and to have a commonality of approaches to curriculum between Grades 7 and 8 in the elementary school, and Grade 9 in the high school. This has begun to make Grade 9 in the high school very different from Grades 10 to 13, a transition which has not been easy for some high school teachers.

In England the move from primary school to secondary school is at the beginning of Grade 7, and streaming of students does not usually begin until Grade 8. This is very different from Ontario where it is an article of faith, and the law, that streaming does not begin until Grade 10. This situation in England seems to exist for utilitarian reasons; most teachers find it easier to have streamed classes. In Ontario, destreaming seems to be part of a wider egalitarian philosophy which is concerned that less able students not be discriminated against. Indeed the education system in Ontario seems to be much more predicated upon progressive values, and to embrace a wider philosophy of education, and to take more account of research than has been the case in

The roots of many of these developments lay in the 1988 report by the Select Committee on Education to the Liberal government of Ontario. A number of its recommendations were announced as policy in the Speech from the Throne in April 1989. Among the recommendations were:

- a core curriculum for Grades 7, 8, and 9
- destreaming in Grade 9
- improvements in the transition of students from elementary to secondary school
- improvements in the transition of students from early secondary school to the later years of specialization

(Hargreaves et al. 1993).

The Ministry of Education and Training then commissioned a number of research studies, and also initiated sixty-four two year Transition Years pilot projects.

One of these studies, Rights of Passage (Hargreaves & Earl, 1990), was based on a wide variety of detailed research from Canada and around the world. The study was a review of literature and research guided by these assumptions:

- Programs for the Transition Years should be based on the characteristics and needs of early adolescents. The curriculum should not be determined by doing things the way they have
always been done, nor should the curriculum be primarily shaped by what happens in Grades 10 to 13.

- The different aspects of schooling - curriculum, teaching methods, staff development, the characteristics of the learner - should be regarded as an integrated system, in order to best support the learning and development of early adolescents.

- The implementation of any change should be based upon, and take account of, theories of educational change. Such change is effective where teachers, and the school community as a whole, are committed to a continuing improvement.

In this study, Hargreaves and Earl described the National Curriculum in England and Wales as being ambiguous in its academic emphasis: "its designers claim that it is not wholly knowledge-based and that it also deals with attitudes, skills, and experiences. In addition, they claim that it encourages cross-curricular work in the development of skills, personal and social development, and the like. Nonetheless, in terms of time allocations, conventional subjects predominate" (p. 114). Hargreaves and Earl also criticised the National Curriculum for being too content-oriented, and also for leaving too little of the curriculum
for teachers to develop themselves. They viewed a content-oriented curriculum as being designed to cover the required subjects and to make sure that subject-specific information is provided to students. Such a curriculum is primarily geared to the teaching of subjects, and not to the teaching of students. Hargreaves and Earl were also critical of the status quo in Ontario claiming that "secondary schools are deeply entrenched in an academic orientation [which] creates a curriculum that is unbalanced, is content-driven, has limited relevance for many students, and results in fragmentation of student experience and balkanization of secondary schools and their departments" (p. 209).

They also stressed the importance of team teaching, interdisciplinary courses, and cooperative learning, as well recognising that students have a number of different learning styles. All of these factors are in the progressive tradition, and their approach can best be seen as a highly influential attack on traditionalist values.

Although Hargreaves and Earl examined a wide range of educational practice from around the world, it is arguable that they cast their net too wide, and that the argument that so many practices are suited to Ontario is superficially plausible, but not wholly convincing. Too much of what they say is predicated upon their assumptions and sounds more like a credo than a piece of objective research. Nonetheless it is important to recognise that
they are in the mainstream of the progressive tradition, and are particularly student-centred in their approach, and have been very influential in determining the direction of educational policy in Ontario. Indeed, in the introduction to Studying Curriculum (Goodson, 1994), Hargreaves discussed how the distribution of power in society determines how educational knowledge is selected, classified and distributed, and made his basic position very clear:

Curriculum here became clearly tied to social class. Much of the mainstream curriculum, it transpired, was alien to working-class interests and experiences in both its academic content and its didactic, subject-based form. (p. 5)

Hargreaves and Earl examined the positive and negative aspects of traditional assessment strategies, and surveyed a wide range of alternative strategies including portfolios, diagnostic tests, personal records, and records of achievement. They recognised that some of these strategies were used successfully in England and Wales, although they also noted that the secondary education system in England and Wales was heavily dominated by academic values and preoccupations. Like the TGAT report, which they mentioned in positive terms, Hargreaves and Earl thought that assessment should be an integral part of the learning process, and not something to be administered once the learning is over. They came out in favour of a broad and
balanced range of assessment strategies which they thought would best promote: accountability to the public, certification of students for employers and higher academic institutions, diagnosis of specific points where students may require assistance, and motivation of students.

Having analysed the situation in Ontario they determined that mistakes made in other countries should be avoided, and change should proceed carefully: "we must move slowly and plan wisely in acting upon our considered judgement of the research evidence and of our professional experience" (p. 215). Hargreaves and Earl also recommended that there should be proper inservice training to help teachers adjust to a new framework for education.

A similar commitment to student-centred, progressive values is evident in another Ministry of Education and Training publication which is a multi-disciplinary look at the profiles of 15 to 18 year olds in a world that is changing both socially and technologically (Anisef and Johnson, 1993). This work is similar in style to that of Hargreaves and Earl, and, interestingly, gives the aims of educational reform as being to produce a more student-centred, more democratic education system with stronger and more effective links to the community, so as to equalise educational opportunity for Ontario's increasingly diverse population.

Hargreaves et al. (1993) studied the effectiveness of
the Transition Years pilot projects commissioned by the Ministry of Education and Training, and described the range of policies and practices being developed in six main areas: core curriculum; assessment, evaluation and reporting; school organisation; student support services; community involvement; and in-service education for teachers. They also examined how Transition Years policies affected practices in the classroom, including teaching styles and teacher-student relationships. Their methodology comprised two approaches: one quantitative and survey-based; the other qualitative and case-study based. They recognised that change can pose problems for teachers: "restructuring offers teachers opportunities to experiment and innovate. It also threatens positions that are familiar and strategies which they may regard as having worked in their careers to date" (p. 38). Hargreaves et al. recognised that students also tend to resist changes which may disrupt their proven strategies for coping with school.

Amongst the pilot project schools, Hargreaves et al. (1993) found that a number of strategies received high ratings in terms of frequent use. These included: use of a broad repertoire of teaching strategies, use of mixed-ability student groups, assessing of a variety of student products, and explaining evaluation procedures to students. Perhaps unsurprisingly, inservice training of teachers in Transition Years philosophy and methods also received a lot
of attention. The report acknowledged that the implementation of change in the Transition Years would be a gradual process, and that building a commitment of teachers to the Transition Years effort would be a crucial task, but concluded that:

evidence from the study paints a fairly optimistic picture of pilot site staffs' commitment to their Transition Years work, as well as, more generally, high levels of job satisfaction. (vol. 2, p. 113)

Teachers may well have had cause to be satisfied with the level of consultation for Transition Years pilot projects, and the avowed aim to involve all of the partners in education in the process (Ministry of Education, 1990a). The Ministry of Education and Training also made a clear statement of the timing, though not the detail, of aspects of the restructuring of education such as consultation, research, pilot projects, funding, inservice provision and school board implementation (Ministry of Education, 1990b).

Manning et al. (1992) reported the results of a detailed study of Ministry of Education pilot projects in four schools, commissioned by the Scarborough Board of Education from its Program Department. The study described the schools in detail and documented the process of implementation of the Transition Years development phase, including staff development and collaboration, student participation, and parental involvement. The research team
also measured individual concerns towards change using a series of questionnaires, and identified future directions for organisational change. The report noted that in some instances staff involvement and commitment to the projects were difficult to foster, and also found that it was difficult to provide the same curriculum to all students and at the same time provide specialised training for English as a Second Language (ESL) students. The report was positive about the level of collaboration that had been achieved between elementary and secondary school teachers, but noted that a lot of time was needed for liaison. The real usefulness of the report at the school board level was felt to be that it gave a framework for examining planned educational change in relation to the Transition Years, and reminded educators that renewal of people or of institutions requires motivation, as well as systematic and systemic evolution, and time.

The Ministry of Education and Training (1993a) published a provisional document The Common Curriculum, Grades 1 - 9, intended to be revised from time to time, which described the key features underlying education in Ontario (Appendix H). The purpose of the document was to provide the policy direction needed to design education programs, and it gave schools and school boards responsibilities for organising programs "in a wide variety of ways in order to accommodate the varying needs of their
students" (p. 2). The Ministry also published a version of the Common Curriculum at the same time which was slightly shorter, and with non-technical language, which was suitable for those not having a background in education (Ministry of Education and Training, 1993b). The Common Curriculum was introduced by the New Democratic Party (NDP) government.

The Ontario Secondary School Teachers Federation (OSSTF) (1993) made a number of observations about the Common Curriculum:
- some of the "outcomes" are actually goals
- there are too many outcomes
- resource materials based on exemplary programs should be developed and made widely available.

The OSSTF called for more clarity about the proposed changes for educators, parents, and students, and specifically for more information about curriculum and evaluation changes. It was suggested that this could be achieved by inservice sessions, clear documentation, and by providing enough time for development and implementation. The Ontario English Catholic Teachers' Association (OECTA) (1993) was critical of the Ministry of Education and Training for taking so long to provide direction in implementing Transition Years reforms. However the OSSTF, the OECTA, and the Ontario Public School Teachers' Federation (OPSTF) have all published special reports or collections of articles on the Transition Years reforms. The tone of these articles has
been overwhelmingly positive, and most have focused on practical strategies for teachers to implement Transition Years policies. They include articles on cooperative learning, peer evaluation, integrating the curriculum, and timetabling strategies (OSSTF, 1992; OECTA, 1993; OPSTF, 1993; OPSTF 1994). Boards of Education have also produced very detailed guidelines for teachers. For example, the London Board of Education has published curriculum guidelines which incorporate ideas on Transition Years strategies which science teachers may wish to use in the classroom (see Appendix W). O'Connor (1993) reported that school boards had also established Transition Year teams, and secondary schools had created multi-disciplinary transition implementation teams.

The overwhelmingly positive response to the Common Curriculum by the teachers' organisations in Ontario was very different from the hostile attitude of beleaguered teachers' organisations in England and Wales. Part of the reason for the warm embrace of the Common Curriculum by most of the teachers' organisations may have been that they were politically in thrall to the NDP government. Individual teachers may not have embraced the Common Curriculum quite so closely (personal communication, W. Innerd).

Additionally, since the 1960s elementary schools had followed the tenets of the progressive Hall-Dennis Report (Ontario Department of Education, 1965), but the high
schools had not followed suit. Amongst over 100 recommendations this report had called for destreaming, and for a theme-oriented approach to be used in elementary and high schools, as well as stressing the importance of equal access to education. There may be a real difference in attitude to restructuring between elementary school teachers and high school teachers, which has had deep historical roots in Ontario.

There were indications from other sources that classroom teachers had difficulty dealing with educational reform. Hewitt (1993) described the years following the Speech from the Throne as being a turbulent time for teachers, with educational reforms being debated in the media by critics with varying degrees of knowledge, and the issue of destreaming being loudly challenged by high school teachers. Hargreaves et al. (1993) had described destreaming as being fait accompli. Hargreaves (1993) noted that destreaming was much more than a simple management problem, and stated that if teachers recognised that there are multiple intelligences (Gardner, 1983) and multiple forms of achievement then they would be much more likely to acknowledge, recognise and stimulate the diversity of what students from different cultural backgrounds can do within a destreamed setting. According to Hargreaves this would require fundamental changes in teaching, and in curriculum organisation, and would not be easy for all teachers. This
point of view may seem arrogant, but behind it is a clear political agenda, which may not be as explicit as in England and Wales, and is certainly progressive as opposed to traditional, but nonetheless is part of a political process of change.

The nature of assessment, particularly SATs, has also been a politically contentious issue in England and Wales. In discussing assessment, Larter (1991) noted the strongly held belief, in Ontario, that standardised tests were inadequate for giving information about the achievements of individual students because they utilise a narrow band of curriculum objectives, as well as the strongly held belief that teacher observation of students should be an important part of the evaluation process. Both beliefs are in juxtaposition to the prevailing view of assessment held by the government in England and Wales, but are similar, in the view of the researcher, to the prevailing view amongst teachers in England and Wales of what assessment should be like. Larter did not discuss why these beliefs came to be strongly held in Ontario, but it may well be because of a prevailing climate of progressive opinion.

Larter continued by describing how the Toronto Board of Education had developed standards (or benchmarks) for Language and Mathematics at Grades 3, 6 and 8 (see Appendix R). These benchmarks are not tests, but provide, through performance based assessment "a very comprehensive look at
what students at Grades 3, 6 and 8 can do across all schools of the Toronto Board of Education. In this regard, Benchmarks have provided system standards against which the achievements of any individual student can be compared". There is a very marked similarity between 'benchmarks' and the performance based assessment which the TGAT report in England and Wales promulgated.

The Royal Commission on Learning was established on May 4th 1993 by Dave Cooke, the former Minister for Education and Training, and its report was published in January 1995 (Ministry of Education and Training, 1995a). The Royal Commission made 167 recommendations which included that: teacher training should be doubled to 2 years, Grade 13 should be phased out, schooling should be extended to 3 year olds, 90% of the curriculum should be determined by the Province and not by school boards, report cards should be standardised across the Province, and Community Councils should be set up at every school.

The Royal Commission noted that curriculum writing in Ontario had been more decentralised than in other provinces, and that valuable resources had been developed and shared by school boards. The report called for a more centralised curriculum development so that fewer teachers would be taken out of schools and classrooms, but local curriculum development was to be allowed if there was sufficient reason.
The report also acknowledged that relatively small numbers of elementary school teachers have a science background and suggested that this might be the cause for there not being enough science teaching in elementary schools. On a more positive note the report stated that the gender gap in mathematics and science achievement and participation had disappeared before the end of high school, but urged continuous efforts to show students that science is relevant and important to them, and stated that an integrated curriculum, showing the multi-faceted nature of real-life problems, was one way of achieving this. The report suggested that the Ministry of Education and Training should work with teachers and others to create examples of integrated curricula. The report recognised that destreaming in Grade 9 had been difficult for some teachers to accept, but stated that research did not support streaming in Grade 9, and that delaying specialisation until Grade 10 was probably most beneficial for students, although no evidence was cited for this latter claim.

The Royal Commission recognised the problems of using league tables of test results as indicators of the quality of schools. The situation in Britain, where SAT results were used to rank schools without indicating the contribution of the school to student learning, without indicating the "value added", was also discussed. The Royal Commission even quoted the warning from a prominent British
statistician, Professor Goldstein, that it was not possible to give a rank ordering of schools with any degree of certainty, and that it was important to avoid the trap of supposing that some such information was better than no information, before going on, curiously enough, to recommend that the Ministry of Education and Training should develop a procedure "for collecting and reporting province-wide data on student achievement (marks, and Grade 3 and Grade 11 literacy test results) for groups identified according to gender, race, ethno-cultural background, and socio-economic status" (p. 156, volume II). The Royal Commission went on to recommend the setting up of an Office of Learning Assessment and Accountability which would have responsibility for the Grade 3 and Grade 11 tests and for developing performance indicators for school boards and for the Province.

and 10 (Ontario Schools, Intermediate and Senior Divisions) (Ministry of Education, 1987).

There were a number of news releases throughout February and March 1995 from the Ministry of Education and Training which indicated important policy decisions by the Minister (Ministry of Education and Training, 1995e).

On February 7th 1995 the Ministry of Education and Training stated that it would assume responsibility for curriculum development and so eliminate costly duplication of effort by Ontario school boards. The Ministry would draw on existing curriculum materials and involve teachers in the production of high-quality, classroom-ready teaching materials.

At the same time the Ministry announced the development of a standard report card for use throughout Ontario, which would mean that no matter where a student attended school, the mark obtained would mean the same and be readily understood. The standard report card was envisaged as being flexible enough for local school needs, and would be developed with liaison between the Ministry, school boards, teachers and parents, to be in use in the 1996 school year.

In England and Wales, whilst the Department for Education has had responsibility for developing a very prescriptive curriculum, it has not produced classroom ready materials, leaving individual schools to organise their own teaching materials, with relatively little help from the LEA
advisers. There is also enormous variation between schools in England and Wales in the format of report cards, although there is a legal obligation for schools to report a student's National Curriculum level for each subject.

On February 10th 1995 the Ministry announced the formation of School Councils for the 1995-96 school year. School Councils were to comprise parents, community members, a student, the principal, a teacher, another staff member, and would be chaired by a parent, with parents forming a majority. School Councils were to meet at least 4 times a year and give advice to school principals, and sometimes to school boards, on:

- curriculum and program priorities
- assessment and accountability
- selection of principals
- budget priorities
- community use of school facilities
- a school code of behaviour.

The purposes of School Councils were stated as being to give parents a greater say in the running of schools, to make schools more accountable to parents, and to strengthen partnerships within the community. School Councils are very similar in function to governing bodies of schools in England and Wales, although their composition is different. Governing bodies have a wider range of representation, and often do not have a majority of parents.
On February 17th 1995 the Ministry announced that all students in Grades 3, 6, 9, and 11 would be tested every year in reading, writing and mathematics, and that a new body - the Education Quality and Accountability Office - would develop and carry out the tests, and report the results to the public. This body would also manage Ontario's participation in Canada-wide and international tests. Province-wide testing would start in September 1996. The Education Quality and Accountability Office would use the data collected and any other relevant findings to make recommendations on how to improve the quality and accountability of the education system at all levels. The Ministry also announced the timetable for Canada-wide testing under the School Achievement Indicators Program (SAIP) commissioned by the Council of Ministers of Education (see Appendix X). The Council of Ministers of Education is also moving towards agreement on the Pan-Canadian Protocol, which is essentially a national science curriculum based on learning outcomes agreed between the provinces (private communication, Ministry of Education and Training, May 1995).

The edifice of testing that was introduced as part of the National Curriculum in England and Wales has already been described, but it would seem that Ontario is taking some steps in a similar direction, although it is difficult to envisage the education system in Ontario becoming as
assessment driven as in England and Wales, given that it is more decentralised.

On February 24th 1995 the Ministry announced that the number of school boards would be cut by amalgamating existing boards, and that controls would be imposed on the amount spent on administration by school boards.

On March 2nd 1995 the Ministry announced a major program to put more computers into classrooms. Computers would be networked, and schools would be connected to the Ontario Education Highway which would link with world-wide computer networks. The Ministry would provide funding but was also keen to involve private companies in sponsorships and partnerships.

In a response to the news releases from the Ministry of Education and Training, the Federation of Women Teachers' Associations of Ontario (FWTAO) welcomed the standards of excellence already achieved in schools, but noted a number of concerns (FWTAO, 1995). The FWTAO questioned whether it was reasonable for every school in Ontario to have a School Council in place by September 1995, and whether any costs incurred would have to come from already over-stretched school board budgets. Noble (1995) described one school's attempt to include parents, teachers, and students in a committee which discussed a number of school goals including Safe Schools, home and school communications, evaluation in literacy and mathematics, and the school code of behaviour.
Noble noted that the composition of the committee differed from the proposed Ministry guidelines for School Councils in having equal numbers of teachers and parents, in including both principal and vice-principal, in having two Grade 8 students, and in being chaired by the principal. Noble questioned how the proposed School Councils would relate to present Parent-Teacher Associations, how the non-teaching members of the Council would be financially compensated for their time, how training for Council members would be organised, and what the Council would actually do other than offer advice.

The FWTAO also expressed concerns over the costs of province-wide testing and the bureaucracy which would administer the program, and also as to whether such a program of testing would really benefit learners, or be able to cope with cultural, socio-economic and gender differences between students in different schools and school boards.

The FWTAO also questioned whether more centralised curriculum development would give teachers enough flexibility to meet specific local needs. Concerns were expressed that the standard report card initiative would be costly, and again lacking in flexibility to meet local needs. The FWTAO claimed that the education system was already underfunded, that the Minister had made it clear that new initiatives would be financed by the reallocation of existing funds, and so what was really needed was an
influx of new funds into the education system.

Wideman et al. (1995) evinced a number of concerns following the report of the Royal Commission on Learning and the subsequent announcements from the Minister. One concern was that a provincially developed curriculum would take creativity away from teachers, and be too prescriptive. Another concern was that testing of every student at the end of Grades 3, 6, 9, and 11 would be expensive and time-consuming, and that various forms of authentic assessment would provide a more realistic assessment of student abilities. The amount of stress already being faced by teachers was noted. One contributor stated that increased accountability could have a positive effect with teachers communicating much more to the public about their work and gaining more pride in their profession. On the other hand, there was always the possibility that increased accountability could result in a minority of teachers blaming the faults of the education system on integration of the curriculum, and becoming very negative about teaching and learning. Casas and Meaghan (1995) attacked standardised achievement tests for offering inaccurate assessments of the effectiveness of educational programs. According to Casas and Meaghan such tests are usually designed by white middle-class individuals, and are normed on students who are white and middle-class, which gives rise to cultural bias. Test scores could be influenced by
problems at home, by health problems, and by the wording or layout of test items. Well-learned test items were also described as being excluded from tests, since test designers prefer questions that discriminate between students. An item that was answered by 50% of students would help give a spread of scores. So if teachers were to teach a concept particularly effectively, then it would become less likely that a future test item measuring that concept would be used. Casas and Meaghan described diversity in the curriculum as leading to a mismatch between the test and what different teachers were teaching. Such a situation could also give misleading assessments of the effectiveness of a particular program or teacher.

Certainly all of these concerns have arisen in England and Wales, where it also appears to the researcher that there are higher levels of stress amongst teachers.

Redican (1995) criticised the Minister for Education and Training for apparently rushing to implement changes to the education system, and for going against a number of the Royal Commission's recommendations, and stated that the announcements were politically motivated with a provincial election only a few months away. Redican briefly noted the financial cost and educational consequences of frequent system-wide testing, and also noted the Royal Commission's conclusions that school boards in Ontario were already larger than in other provinces, and that there was no reason
to suppose that Ontario had too many school boards, although the Minister was still determined to reduce the number.

Whilst this determination to reduce the number of school boards is not directly comparable to the government's weakening of the powers of local authorities in England and Wales, it could be regarded as a move in the same direction. Despite this and other moves towards increased centralisation, encouragement of a wide variety of methods of teaching and assessment has continued.

Encouragement and elucidation of performance-based assessment has also continued. For example, Drake (1995) emphasised that one of the basic premises of outcome-based learning is that all students can reach mandatory outcomes, but that they may not all do this in the same way or at the same speed. Drake linked this with the need for teachers to recognise different ways of learning, different ways of assessing students, and the need for an integrated curriculum. Drake continued by defining outcomes as the "observable, measurable results that students are expected to achieve at an acceptable level" (p. 29). Assessment of performance then becomes the way in which what the student does can be measured. Standards mark or define what constitutes an acceptable level for an outcome.

Earl and Cousins (1995) observed that the word "standards" has two main meanings: "standards" implies attention to quality or excellence; a "standard" is a marker
against which some kind of performance is measured. Earl and Cousins went on to describe three different standards used in classroom assessment:

- norm-referenced standards - comparing the performance of an individual with the performance of others in a particular group
- criterion or outcome-referenced standards - comparing a performance to some predetermined criterion
- self-referenced standards - comparing the performance of an individual with his or her previous performance.

Earl and Cousins outlined a wide variety of ways in which students can be evaluated or assessed including teacher observation, anecdotal records, portfolios, peer evaluation, interviews and conferences with students, demonstrations and presentations, as well as examinations, tests, quizzes, and essays. Drake suggested a model for outcome-based learning in which the teacher begins with the ten essential learning outcomes, and designs the structure of daily lessons down from several of these outcomes (see Appendix Y).

Coghill (1995) also stressed the importance of an integrated curriculum, and added that the sequencing of outcomes and standards in The Common Curriculum: Policies and Outcomes Grades 1-9, 1995 should provide development and reinforcement throughout the student's experience of school:

Rather than treating learning as a series of hurdles
to be got over and, once mastered successfully, never repeated, outcomes-based learning builds on skills, knowledge, and values developed and reinforced in a variety of learning experiences throughout the student's schooling. (p. 14)

Coghill also noted that outcomes should provide a clear picture of where students are in the curriculum - a picture that is very useful to teachers, students and parents.

Other positive developments in Ontario have included the sharing of curriculum materials. Sharratt and Langley (1995) described how the Ontario Curriculum Clearinghouse (OCC) was set up in 1994 to act as a central agency coordinating the sharing of curriculum and resource materials among school boards and teachers. The OCC was instituted as a non-profit, independent organisation funded by the Ministry of Education and Training and operated in partnership with a number of Ontario educational associations. The OCC focused on the Common Curriculum generally, and the Transition Years in particular, and has produced general guidelines as well as detailed lesson plans in both print and electronic media.

Indeed, much has been achieved in Ontario in developing the curriculum within a progressive and student-centred framework. New forms of interconnectedness to the interests and experiences of students continue to be developed. There is perhaps a threat to some of these developments from
increased centralisation, and possibly from a recent change of provincial government in Ontario, but the strong and continuing tradition of local autonomy at the school and school board level may well counter these threats.
CHAPTER IV
INTERVIEW RESULTS AND DISCUSSION

Interview Results

Twelve teachers and 7 principals from 2 School Boards in Ontario, and 12 teachers and 3 headteachers from 3 LEAs in England, were interviewed. No distinction was made between elementary and high school teachers in Ontario in reporting the results, although some differences in outlook were apparent in the comments made by some teachers. All the teachers from England were secondary school teachers. All teachers from England and Ontario were responsible for teaching Key Stage 3/Transition Years students. All the teachers who were interviewed also completed a questionnaire, although no links were made between interview results and questionnaire results for individual teachers.

At the start of each interview the researcher emphasised that the study, and the questions, referred to Key Stage 3/Transition Years programs. The interviews were structured according to interview outlines for teachers and headteachers/principals (see Appendix P), and quotations were kept as close to the original as possible, with occasionally a minimum of editing to reduce the volume, but care was taken to preserve the original meaning.
Table 4.1
The Number of Interviews Conducted in Ontario and England

<table>
<thead>
<tr>
<th>Ontario</th>
<th>High School</th>
<th>Elementary School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers Interviewed</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Principals Interviewed</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>England</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers Interviewed</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Headteachers Interviewed</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Questions 1 to 5

Questions 1 and 2 showed that the sample of teachers from England and the sample from Ontario were very similar in having the same average numbers of years service in their present schools (8 years), and almost the same average number of years teaching experience (18 and 20 years respectively). According to the responses to Question 4, in the last seven years both groups of teachers had completed a similar average number of inservice or other courses of at least a week in duration (1.6 and 2 courses respectively). Question 3 was relevant only in England where a number of
teachers in a science department would have additional responsibilities for specific areas of the curriculum such as 'A' level biology, and would be paid accordingly. Question 5 merely confirmed that teachers taught Key Stage 3/Transition Years classes and was not felt to be worth reporting.

**Question 6**

Question 6 was in 4 parts, and asked:

Have you attended any Common Curriculum/National Curriculum training sessions?

Any specifically for science?

Were these training sessions useful?

Who organised these training sessions?

**Table 4.2**

Responses to: "Have you attended any training sessions specifically for science"

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>91.7%</td>
<td>50.0%</td>
</tr>
<tr>
<td>No</td>
<td>8.3%</td>
<td>50.0%</td>
</tr>
</tbody>
</table>

The much larger proportion of teachers in England who had attended training sessions for science, as shown in Table
3.2, can perhaps be explained by such sessions having been mandatory. This has not been the case in Ontario, although teachers have been encouraged to attend training sessions.

Table 4.3

Responses to: "How useful were these training sessions?"
(For science and others)

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>18.2%</td>
<td>63.6%</td>
</tr>
<tr>
<td>Mixed/neutral</td>
<td>63.6%</td>
<td>27.3%</td>
</tr>
<tr>
<td>Negative</td>
<td>18.2%</td>
<td>9.0%</td>
</tr>
</tbody>
</table>

The larger proportion of teachers giving a positive response in Ontario, as shown in Table 3.3, may indicate that courses run by the Program Departments were well run. The smaller proportion of teachers giving a positive response in England may well reflect the uncertainties, and changes in direction with regard to the curriculum, which were experienced by science advisers running courses, as well as by teachers.
Table 4.4

Responses to: "Who organised these training sessions?"

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local advisers mentioned</td>
<td>83.3%</td>
<td>100%</td>
</tr>
<tr>
<td>Others (exam boards, conferences, in-school training)</td>
<td>58.3%</td>
<td>25%</td>
</tr>
</tbody>
</table>

According to Table 4.4, local advisers clearly played a major role in both systems. The larger proportion of 'others' mentioned in England may well reflect a larger commitment to 'in-school' training organised by the teachers themselves, and also to training sessions organised by the examination boards.
Question 7

Question 7 asked firstly: "Has your style of science teaching changed as a result of the National Curriculum/Common Curriculum?"

Table 4.5

Responses to: "Has your style of science teaching changed as a result of the National Curriculum/Common Curriculum?"

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>45.5%</td>
<td>54.6%</td>
</tr>
<tr>
<td>Unsure</td>
<td>18.2%</td>
<td>9.0%</td>
</tr>
<tr>
<td>No</td>
<td>36.4%</td>
<td>36.4%</td>
</tr>
</tbody>
</table>

There was little difference between teachers in England and teachers in Ontario in each category of response in Table 4.5. In England, 3 teachers mentioned the assessed practicals, known as Science 1 or SC1s, as being a change to previous practice. These practicals, which are completed during class time and marked by the teacher who gives them National Curriculum levels, constitute the teacher assessed component of the Key Stage 3 SATs (see Appendix C). One teacher reported not much change in the style of science teaching, and added:

"I've resisted the narrowing effect of the National
Curriculum."

Three other teachers mentioned that there was no chance to follow interesting topics in more depth, with a typical comment being:

"At the moment things are too prescriptive and there's no chance to divert and follow interesting tangents."

Most science teachers in England thought that their style of science teaching had changed but not always for the better:

"Yes, I've changed. My lessons are more didactic, more boring and we miss out the interesting things."

In Ontario, 3 of the high school teachers and 2 principals observed that destreaming had been a significant impetus to the change of teaching style. As one teacher said:

"Yes, it's had to. Becoming destreamed was a challenge - and difficult at times."

Three teachers and 4 principals thought that teaching styles had charged as a result of other things. One principal noted:

"...Successful teachers always use a variety of teaching styles..."

Question 7 further asked: "Do you use a wider variety of teaching methods than previously?" When this more specific question was asked the following results were obtained:
Table 4.6

Responses to: "Do you use a wider variety of teaching methods than previously?"

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>More</td>
<td>41.7%</td>
<td>36.4%</td>
</tr>
<tr>
<td>Same</td>
<td>0%</td>
<td>54.6%</td>
</tr>
<tr>
<td>Less</td>
<td>41.7%</td>
<td>0%</td>
</tr>
<tr>
<td>Unsure</td>
<td>16.7%</td>
<td>9.0%</td>
</tr>
</tbody>
</table>

In England, most teachers mentioned that with increased curriculum content, and a prescriptive National Curriculum, there was not enough time to follow more interesting tangents to the course. Three of these teachers said that they used less variety of teaching methods now than prior to the National Curriculum. There were comments such as:

"We're more constricted to do specific things within the time - no flexibility"

"The National Curriculum has been too prescriptive - there's been no chance to divert - you legally have to cover it all"

"I've cut out a variety of teaching methods and I've gone back to more chalk and talk - the aim is to get through the material".
The latter teacher also raised the question of teaching to the test:

"Knowing that there is a test at the end of the Year 9 means: reduced practical work, teaching for some topics we wouldn't normally teach, practicals are more prescriptive."

In Ontario, a large proportion of teachers indicated that they used the same variety of teaching methods now, as before the introduction of the Common Curriculum. A common comment was:

"We were already using a variety of methods."

Two high school teachers mentioned dstreamed classes as having been a spur to using a wider variety of teaching methods, with one saying:

"We have one long theory lesson which enforces variety!"

Overall, cooperative learning or small group work by teachers in Ontario was mentioned by 4 teachers; all made positive comments.

Question 8

Question 8 asked: "Do you find information about the science program from the Program Department/LEA advisers useful?" This was followed by: "How detailed is this information?" and "Do you feel remote from the science consultants/advisers?"
Table 4.7
Responses to: "Do you find information about the science program from the Program Department/LEA advisers to be useful?"

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0%</td>
<td>75.0%</td>
</tr>
<tr>
<td>Unsure/other</td>
<td>30.0%</td>
<td>16.7%</td>
</tr>
<tr>
<td>No</td>
<td>70.0%</td>
<td>8.3%</td>
</tr>
</tbody>
</table>

Table 4.8
Responses to: "How detailed is this information?"

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very detailed</td>
<td>0%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Varies in detail/Not sure</td>
<td>70.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Not detailed</td>
<td>30.0%</td>
<td>8.3%</td>
</tr>
</tbody>
</table>
Table 4.9

Responses to: "Do you feel remote from the science consultant/advisers?"

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>60.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Unsure/other</td>
<td>20.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>No</td>
<td>20.0%</td>
<td>50.0%</td>
</tr>
</tbody>
</table>

According to Table 4.9, a much greater proportion of teachers in England than in Ontario indicated that they were remote from the science consultants/advisers, and that the information provided was neither useful nor very detailed (Table 3.8). In England, most teachers simply acknowledged that the science consultants/advisers did not feature at all prominently in their week by week teaching for a variety of reasons:

"The number of advisers has decreased"

"The usefulness of information depends on the strengths and interests of advisers"

Three teachers were particularly scathing in their criticism which included these comments:

"The information is from people who haven't had enough teaching experience"
"Information from advisers can lack a sense of perspective - they should have said that the logistics for the SATs were crazy".
There was no such criticism of science consultants in Ontario.

One of the schools in England was a Grant Maintained school which had opted out of Local Education Authority control. One teacher from this school commented:

"The advisory service has been decimated by advisers leaving. We had an excellent team of advisers, but as a Grant Maintained school we are now more isolated; we now have to pay to send teachers on LEA courses."

The headteacher of this school held a more optimistic view:

"Links with the LEA are stronger than you would imagine. We can have links if we pay for them - being a Grant Maintained school. The Secondary Headteacher's Association is very helpful - there is good liaison, at this level, in the County between Grant Maintained schools and the rest. The LEA still runs Heads of Department Days and there are still links with the previous advisers. Grant Maintained schools are not lepers in this county."

This view ran counter to the views of the science teachers at the school who felt more remote than did the headteacher. The headteacher of a non-Grant Maintained school introduced a sense of historical perspective:

"The advisers have tried to advise - but they have been
in the same muddled situation as the rest of us with the continuous change there has been over the years. The LEA tried to help by introducing their own subject guidelines - but even this initiative was overtaken by events, by changes nationally. I've never felt remote from the LEA advisers; they have always been very supportive, with visits and telephone calls."

In Ontario, the response to the science consultants was very positive from both teachers and principals:

"We do a lot of planning using material from the school board; we design our own curriculum"

"Excellent. They are constantly presenting workshops"

"Consultants assist with implementation, they will help out when needed."

One principal recognised how busy the consultants were:

"I only feel remote from the standpoint that our consultants don't get enough of a chance to get to see us - but that's the way their job has evolved - they don't have enough time."

One teacher commented on the good work done by the consultants and continued:

"How do you get other teachers involved in training sessions? Training isn't mandatory - we need a professional training day."

This contrasted with England where many National Curriculum training sessions were mandatory.
Question 9

Question 9 asked: "Do you welcome the introduction of the National Curriculum/Common Curriculum? - Why?"

Table 4.10

Responses to: "Do you welcome the introduction of the National Curriculum/Common Curriculum? - Why?"

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>33.3%</td>
<td>58.3%</td>
</tr>
<tr>
<td>Yes, with reservations</td>
<td>41.6%</td>
<td>0%</td>
</tr>
<tr>
<td>No</td>
<td>25.0%</td>
<td>0%</td>
</tr>
<tr>
<td>Not sure/mixed feelings</td>
<td>0%</td>
<td>41.6%</td>
</tr>
</tbody>
</table>

Table 4.10 shows that an affirmative response was obtained from more teachers in England than in Ontario. This was surprising, but the National Curriculum is in a more advanced state of implementation than the Common Curriculum, and so teachers in England may be in a better position to give a more complete professional judgement. Certainly no teachers in the sample from England had mixed feelings or were unsure in response to the question. Most teachers in England (41.6%) welcomed the National Curriculum, but with reservations:
"I welcome the idea of the National Curriculum, but not the way it has been implemented"

"I do welcome the way the National Curriculum has turned out, but there has been a lot of teething problems, a lot of pain."

The problems were spelt out by most teachers:

"The disadvantages have been: the level of prescription, the outrageous 10 level-ness with non-sequential levels of attainment, the complexity of the initial drafts, the short time for introduction, the rapid rate of change, with initially no consultation, the minimal, and not firm, guidelines, and the political battles"

"Teachers should have been consulted more. Not enough consultation between Geography, Science and Mathematics subject working groups led to some duplication of material. It's content heavy - not enough pruning has been done"

"Your job as a teacher is to minimise the harm it can do, and to make it work - for the pupils sake. There wasn't enough thought at the beginning - then it's been a remedial process ever since"

"It limits curriculum development, but it has focused teachers on a broader set of subjects - particularly primary teachers. There has been a political, dogmatic approach to the de-professionalisation of teaching - the National Curriculum has been a tool to control, not a tool to enable."
The views of two headteachers completed the picture:

"Yes. It's good in principle, but there is not enough time. It narrows students' choices - you have to do science. There has been a lot of pain, plus a loss of face by the government, and bad feeling. Dearing is more balanced and user-friendly"

"In some ways, but not the way it was introduced. There was some previously lacking structure which the National Curriculum has put in place. It has become a straitjacket at Key Stage 4, and seems to outgrow its usefulness at Key Stage 3. It should look at the whole curriculum and not just at subjects. There is no coherent educational philosophy behind it."

Whilst Question 9 had a more directly affirmative response in Ontario, a number of concerns were expressed, albeit with not the same depth of feeling as in England:

"Doing the same thing in different schools gives a common base. I'd feel better about it if it weren't politically motivated"

"Yes. We're forced to look at how we teach; things are more relevant, there's less emphasis on content. It makes teachers think. Older teachers are having a hard time"

"Yes. Standardisation, doing the same thing in different schools is a good idea, but we do a lot of group work and project work in Grades 7 and 8, and then when the students go to high school it's a different approach - it's
'sit down and read this'

"I think it's necessary. We have to change with the times. There is a need for change, but such a major revision should have been proved first. One teacher only, questioned what it would mean for students:

"I'm not allergic to it. It puts responsibilities on everyone except the students. There's nothing about the consequences for the students if they don't achieve."

Principals expressed a similar range of opinions:

"Yes. Teachers want direction and flexibility. We are concerned about it being Toronto-based"

"Yes. Politically it had to be done. It's not prescriptive for curriculum goals. It mustn't restrict the flexibility of local boards and schools."

One principal expressed reservations about the subject content:

"No. Some good aspects but more detail is needed on subject specialisation. Integration is good, but there is too much emphasis on technique. The system, and the community is not ready for it."

Question 10

Question 10 was not thought to be relevant to the study, but in both systems almost all teachers felt valued within their schools, but did not feel valued within the
wider community. Prejudice against teachers in newspapers was commonly quoted as a reason for this.

**Question 11**

Question 11 asked: "Has the amount of testing you do changed as a result of the Common Curriculum Transition Years/National Curriculum Key Stage 3 program?"

**Table 4.11**

Responses to: "Has the amount of testing you do changed as a result of the Common Curriculum Transition Years/National Curriculum Key Stage 3 program?"

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Ontario</th>
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</thead>
<tbody>
<tr>
<td>Yes</td>
<td>8.3%</td>
<td>18.2%</td>
</tr>
<tr>
<td>Unsure</td>
<td>25.0%</td>
<td>9.0%</td>
</tr>
<tr>
<td>No</td>
<td>66.7%</td>
<td>73.0%</td>
</tr>
</tbody>
</table>

Table 4.11 shows that in England, a majority of teachers believed that the amount of testing had not changed with the introduction of the National Curriculum. Common responses were:

"The amount hasn't changed; teachers have always tested. The types of test are different - SCIs, and also
each question has to have a National Curriculum level that goes with it"

"We've always tested, but the National Curriculum has formalised it a lot more. The external marking of SATs will improve things a lot."
One teacher appeared to have already welcomed the Dearing report with its emphasis partly on reducing the burden of testing:

"Panic testing, in order to determine National Curriculum levels, increased, as did box-ticking, but we're at about the same level of testing as before the introduction of the National Curriculum."

In Ontario, a majority of teachers also said that the amount of testing had not changed with the introduction of the Common Curriculum. Teachers appeared to be anticipating Question 12, and often mentioned assessment generally rather than testing, but there were similar responses:

"Not the amount, but the way we do it - the variety of methods used has increased"

"No. We still have test units, but we use more authentic methods"

"Not overly. We'd already changed our methods."
**Question 12**

Question 12 asked: "Do you use a wider variety of assessment methods now, or roughly the same as before (the introduction of the National Curriculum/Common Curriculum)?"

**Table 4.12**

Responses to: "Do you use a wider variety of assessment methods now, or roughly the same as before (the introduction of the National Curriculum/Common Curriculum)?"

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Ontario</th>
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</thead>
<tbody>
<tr>
<td>More</td>
<td>8.3%</td>
<td>70.0%</td>
</tr>
<tr>
<td>Same</td>
<td>66.7%</td>
<td>30.0%</td>
</tr>
<tr>
<td>Less</td>
<td>8.3%</td>
<td>0%</td>
</tr>
<tr>
<td>Unsure</td>
<td>16.7%</td>
<td>0%</td>
</tr>
</tbody>
</table>

In Ontario, a majority of teachers said that they used a wider variety of assessment methods, but 4 teachers suggested that the Common Curriculum was not the cause, and that they had changed some time ago:

"We use a wider variety - but we changed from content to skill about 10 years ago."

Some mention was made of approaches and innovations related to the Transition Years:
"More. Helping kids to learn - peer evaluation and other methods are useful"

"Yes. We use more authentic methods and assignments" and somewhat paradoxically:

"The same. Cooperative learning, group work is new." According to Table 3.12, a majority of teachers in England said that they used the same variety of assessment methods:

"The same as before. We're back to tests and SCI practical assessments"

"The same. Still have written tests, but staff are more aware of the need to gauge a level when talking to pupils"

"We could pretend that we do, but we don't. We have a Knowledge, Understanding and Applications test, plus end of module tests. We also have SCI, which is new."

The educational value of some of the assessment methods was questioned by 3 of the teachers. One comment was:

"The same. The same variety, but now you have to collect certain types of evidence, SC1s, in a formal way. You have virtually to train children...which is a shame because if it was a true open-ended investigation, how they present it should be their own way. There is now less box-ticking though."
Question 13

Question 13 asked: "To what extent do you think the National Curriculum/Common Curriculum science program is assessment driven, if at all?"

Table 4.13

Responses to: "To what extent do you think the National Curriculum/Common Curriculum science program is assessment driven, if at all?"

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Ontario</th>
</tr>
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<tbody>
<tr>
<td>It is assessment driven</td>
<td>66.7%</td>
<td>27.3%</td>
</tr>
<tr>
<td>It is not assessment driven</td>
<td>16.7%</td>
<td>45.5%</td>
</tr>
<tr>
<td>Not sure</td>
<td>16.7%</td>
<td>27.3%</td>
</tr>
</tbody>
</table>

As Table 4.13 shows, a majority of teachers in England said that the science program was assessment driven, and of these, 3 teachers mentioned streaming:

"Totally assessment driven in that you have an exam at the end of each Key Stage. SC1 practicals are all assessment driven. You have to stream - in order to be able to teach faster to the higher ability levels, and to cover more topics"

"It depends on the school, but all are very assessment
driven; over the top; planned in detail to cover the content. It's hard in science to teach mixed ability classes where you have pupils from level 3 to level 7 in the same class. It needs individualised learning schemes, which is beyond the scope of most schools. Most schools are streamed."

One teacher was critical of the SATs, and of the attitude of other teachers to the SATs:

"Yes, it is broadly assessment driven with some people sadly fixated that doing SATs is the main point...SATs are there to convince the public that the government is doing something about education. They are expensively produced - good quality paper and packaging. They don't really have a diagnostic purpose..."

One teacher was happier about SATs:

"Early on - very much so. Now we are curriculum driven. SATs are not regarded with any dread in this school - they are just tests"

Another teacher also focused on the curriculum, more specifically curriculum content:

"My teaching is not assessment driven. My teaching is content driven...Nationally, value added tables should be used with SATs."

In Ontario, as shown in Table 4.13, a majority of teachers said that the science program was not assessment driven. The comments of teachers included:
"Not too much. There is enough flexibility"

"It is assessment driven to the extent to which the school or department chooses to fix it. We have the ability to set local tests; some exams are worth only 30% of the term's mark; for some departments this is 50%. Good, solid students can be damaged by an exam"

"The outcomes we are looking towards are broad, and we are focused on processes not content."

Other teachers concurred, but thought that there should be more emphasis on assessment:

"It's not. It's up to each high school to decide what to do with those students who don't pass a course. It needs to be more assessment driven. Students go to summer school in courses they fail, and then they usually pass."

Principals were concerned that schools could become increasingly assessment driven, for example:

"The Ministry is wanting us to teach to a test, so we could become completely assessment driven"

"I'm worried that this is what we're moving towards."
Discussion of Interview Results

The results are discussed generally in light of each research hypothesis.

**Hypothesis A:** the implementation of the Key Stage 3 science programs in England and Wales has been more assessment driven than the Transition Years science programs in Ontario.

**Interview Results**

In England, a majority of science teachers (66.7%) said that the National Curriculum science program was assessment driven. The existence of streaming and SATs were cited as evidence for this. A majority of science teachers in England said that the amount of testing had not changed since the introduction of the National Curriculum (66.7%), and a common addendum was that what testing there was, tended to have changed in kind rather than amount. The implementation of SATs and SCIs, which were introduced as part of the National Curriculum, were cited in support of this statement. Most teachers in England said that they used the same variety of assessment methods now, that they used before the introduction of the National Curriculum.

It may seem paradoxical that the amount of testing was the same, and yet the National Curriculum was perceived as assessment driven. It may also seem that testing and
assessment are being confused. However, formal testing introduced under the National Curriculum, utilising SATs and SCIs, and a variety of 'box-ticking', is there to assess the National Curriculum levels of students. There was general agreement by teachers that the framework of the science program of study at Key Stage 3, from which SATs and SCIs are drawn, was content-heavy and thereby time-consuming. Since a major teaching goal is to enable students to achieve as high a level as possible in the SATs and SCIs, under such pressures it is not surprising that teachers see the National Curriculum science programs as being assessment driven. With league tables of results being used to compare schools, this effectively means that schools are being assessed, individual science departments are being assessed, and, perhaps more indirectly, individual teachers are being assessed.

In Ontario, a majority of teachers said that the Transition Years science programs were not assessment driven (45.5%). Teachers' comments indicated that there was enough flexibility in the science programs, which were more process-oriented than content-oriented. There seemed to the researcher to be more emphasis on process rather than content in elementary schools, and as 7 out of 12 teachers interviewed were elementary school teachers, the results might be expected to be skewed in this direction. A further study might well show that high schools are more content-
oriented and assessment-driven than elementary schools, even in Grade 9. However, as the Transition Years philosophy and methods are more fully embraced by high school teachers this might change, at least for Grade 9 teachers.

**Conclusion**

The evidence of the interviews supports the hypothesis that the implementation of the Key Stage 3 science programs in England has been more assessment driven than the Transition Years science programs in Ontario.

**Hypothesis B:** Transition Years science programs in Ontario are being implemented in ways which promote a wider variety of teaching methods than do the National Curriculum Key Stage 3 science programs in England.

**Interview Results**

In England, 42% of teachers interviewed said that they used more or the same variety of teaching methods as they did before the introduction of the National Curriculum. In Ontario, 91% of teachers said that they used more or the same variety of teaching methods as they did before the introduction of the Transition Years program.

In England, 42% of teachers said they used less variety of teaching methods, none said they used the same variety.
In Ontario, 55% of teachers said they used the same variety of teaching methods, none said they used less. There was a small number of teachers in England who indicated that they used a reduced variety of teaching methods due to the pressure of getting through the curriculum content. Such a situation is perhaps indicative of the extreme pressures that teachers have been under.

On the face of it this evidence tends to support the hypothesis, but there were a number of teachers in both England and Ontario who noted either, that they had already used a wide variety of methods previously, or, that their teaching style, and presumably variety of teaching methods, had changed because of other factors. Further study would be required, for example, to determine whether only successful teachers develop a wider variety of teaching methods, and indeed how such a variety would be measured in the first place.

Another factor of interest here is the much larger proportion of teachers in Ontario who said that the information offered by the Program Department was useful (63.6% in Ontario, 18.2% in England) and very detailed for the science programs (66.7% in Ontario, 0% in England), and who did not feel remote from the science consultants (50% in Ontario, 20% in England). Seven of the teachers mentioned the value of workshops on teaching methods and theories of learning associated with the Transition Years philosophy
which had been offered by the Program Department. It would be interesting to see a wider survey of the provision of courses by Program Departments in Ontario, and LEA advisers in England and Wales. The researcher would speculate that provision is much more frequent, and of a higher quality in Ontario, as LEA advisory services in England and Wales have been reduced in recent years. The underlying assumption is of course that teachers who attend such workshops would use what they learn, back in their own classrooms.

**Conclusion**

The interview results provide some support for the hypothesis that the Transition Years science programs in Ontario are being implemented in ways which promote a wider variety of teaching methods than do the National Curriculum science programs in England, but further research is needed. There may only be a wider variety of teaching methods used in Ontario, because there is less variety of teaching methods used in England.

**Hypothesis C:** the Transition Years science programs in Ontario are being implemented in ways which give teachers more ownership of the curriculum than do the National Curriculum Key Stage 3 science programs in England.


**Interview Results**

Three teachers concurred in pointing out that the National Curriculum was imposed with very little consultation of teachers or teachers' organisations, and was imposed too quickly. The high level of prescription was also commented on by a number of teachers. The formal nature of SATs and SCIs has led to a majority of teachers saying that the Key Stage 3 science program is assessment driven. It took several years before the Dearing report recommended a number of changes which were widely acknowledged as being long overdue, and in this time teachers and teachers' organisations felt that they were being ignored by those in power. All of this suggests that teachers in England have had little ownership of the curriculum.

In Ontario, the Common Curriculum document does not spell out the required content in the same detail as does the National Curriculum program of study for science. The outcomes are broader and are there to be developed by the teachers in schools working with school board Program Departments. A majority of teachers interviewed welcomed the flexibility which they enjoyed to develop their own curriculum. Certainly a majority of teachers welcomed the implementation of the Common Curriculum Transition Years science program unreservedly. Comment was also made about the wider degree of school based autonomy in deciding the level of continuous assessment in Ontario.
However, concerns were expressed that some older teachers and some high school teachers felt alienated from the changes which are taking place in Ontario, because they were not prepared or not willing to adopt the restructuring philosophy. Further research may be able to determine the validity of this claim.

Conclusion

Teachers were not questioned directly about their experience of 'ownership' of the curriculum. The evidence from the interviews does suggest, indirectly, that teachers in England have experienced little ownership of the curriculum. Further research may be needed to determine the level of ownership of what is actually taught in the classroom. The evidence from the interviews also suggests that teachers in Ontario enjoy greater ownership of the curriculum, but further research may also be needed. A cautious, but fair, conclusion would be that the evidence from the interviews neither supports nor disproves the hypothesis that the Transition Years science programs in Ontario are being implemented in ways which give teachers more ownership of the curriculum than do the National Curriculum Key Stage 3 science programs in England.

Hypothesis D: the Transition Years science programs in Ontario are being implemented in ways which are less
centralised than the National Curriculum Key Stage 3 science programs in England.

**Interview Results**

The National Curriculum in England was imposed by government, the Department of Education and Science, and government agencies such as the National Curriculum Council, and the School Curriculum and Assessment Authority, with little consultation with teachers or teachers' organisations, or even between the subject working groups. Final authority rested with the Secretary of State who at one point decided that SATs should no longer be classroom based tasks but should be short written exams. The National Curriculum science program was content-heavy, prescriptive, and with little local flexibility. Teachers overwhelmingly acknowledged these points in the interviews.

In Ontario, at the level of the local school board the work of the Program Department was regarded as useful and detailed, and teachers did not feel remote from the science consultants and welcomed the variety of workshops that were on offer. In England, a much greater proportion of teachers said that they were remote from the LEA advisers, although the advisory service appeared to show more vital signs under some LEAs rather than others. The very fact of some schools having opted out of LEA control, and become funded directly from central government, appeared to reduce the level of
support from advisers, and to weaken the advisory service that still remained in place. It appears that a whole layer of the educational service intermediary between government and government agencies on the one hand, and schools and teachers on the other, is under threat and this was acknowledged by teachers in interviews. This is effectively further centralising control over the curriculum.

In Ontario, the Program Departments appeared to be playing a very useful role in encouraging and advising of new developments in the Transition Years science program. The Program Departments also played a major role in developing the curriculum in partnership with serving teachers. Five of the teachers interviewed had been involved in working with the science consultants in developing the science curriculum, and felt that they had made a useful contribution and were professionally valued. It would be interesting to investigate further what proportion of teachers are involved in developing curriculum with the science consultants/advisers in Ontario compared to England.

By its very nature the Common Curriculum document demands interpretation at the local level. There are opportunities to integrate local issues and concerns into the curriculum. In England, teachers design their courses with the National Curriculum program of study for science as a much more prescriptive guideline. The evidence of the
interviews is that this latter document is content heavy, assessment driven, and that teachers can make some input, but that pressure of time is against them. There is simply not enough time to pursue some of the more interesting local issues, and to interpret a centrally directed curriculum.

**Conclusion**

The evidence from the interviews supports the hypothesis that the Transition Years science programs in Ontario are being implemented in ways which are less centralised than the National Curriculum Key Stage 3 science programs in England.
Summary of Interview Results

The hypotheses are that the Transition Years science programs in Ontario, when compared with the National Curriculum science programs for Key Stage 3 in England and Wales, are being implemented in ways which:

- are less assessment driven.....Hypothesis A

This hypothesis is supported

- promote a wider variety of
teaching methods.............Hypothesis B

This hypothesis is partially supported

- give teachers more ownership of
the curriculum ...............Hypothesis C

This hypothesis is neither supported nor disproved

- are less centralised...........Hypothesis D

This hypothesis is supported
Recent Developments

Teachers in England were also asked about the Dearing report being implemented for September 1995, and teachers in Ontario were asked about several of the Minister's announcements in the Spring of 1995.

Question 14

Question 14 asked: "What do you think about the Dearing report?"

Comment - England: Teachers

"Dearing is a positive step forward, but I object because it is dishonest to say that everything has been trimmed down. Nothing has been trimmed down in biology. There is no real syllabus for Key Stage 3 - just a vague outline of topics - and any questions can appear on the SAT exam - not like at Key Stage 4. I was disappointed the SC1 wasn't modified drastically - it's just the same as it was before Dearing but without levels - the teacher has to "feel" what level the pupils are operating at."

"Mixed feelings. The jury is still out. The idea of no change for 5 years is not necessarily a good thing because they could have tackled the problem of overload. In any
case there are still changes happening in schools, GNVQ included. It shows that there has been too much political interference over the years, and league tables are another contentious issue."

"The questioning of teacher professionalism will need to be tackled. But it's a chance to get the context and relevance back in science teaching, and to give teachers the time to assimilate what they are doing, time to plan. Money will be needed to promote smaller classes. Overworked teachers aren't being given the chance to do a quality job."

"No change for 5 years means no change at Key Stage 3 - not elsewhere. People are keen to implement change - but not too much at once - the hurry to implement the National Curriculum seemed to have a lot to do with the political life of the government. But Dearing is the first time that teachers have been listened to."

"Towards improving a total disaster."

"Dearing was like a breath of fresh air. It took so many views and came to some very sensible conclusions. It stated that there should be double science - so that pupils get a decent scientific background."
"A politically conducted cosmetic exercise; a good quick fix. It has politically pacified the teaching unions who had forced the government into the position they were in. If money hadn't been put forward to fund external marking then the SATs would have been boycotted again. The fundamental question of a curriculum for the 21st century has not been addressed. We are still looking at a subject-led curriculum. We are not looking at a broad, balanced, entitlement curriculum."

"The National Curriculum had been making absurd demands on teachers and pupils. An unworkable National Curriculum is introduced and Dearing comes along - not really a great achievement."

"Dearing has not gone far enough - some changes are still needed with GNVQs and 'A' levels. A face-saving measure by a government on the defensive. League tables using crude data are still a nonsense for comparisons between schools."

Comment - England: Headteachers

"We welcomed it, and responded to it as a school. It had made improvements it seemed; but when looked at more closely it left a lot of problems. It is not a curriculum for the 21st century, but it could lead us back into the 19th
century.

Key Stages 1 and 2 - admirable.

Key Stage 3 - not too many problems; but I would want to deliver IT across the curriculum. Dearing suggests some stand-alone, taught IT, which I see as a retrograde step.

Key Stage 4 - children should have some control over what they learn, and should have some choices. I'm worried by the concept of short courses - they are not very worthwhile or meaningful and introduce timetable problems.

- vocational courses will only be for the less able, but should be for all."

"We have a more balanced curriculum now. Slimming down has been good, as far as it went (originally there was no discussion between the subject working groups), but there is still not enough time to deliver the curriculum. We're supposed to have 20% more time to do what we want, but the reality is different."

Conclusions

These comments very much speak for themselves. The Dearing report was welcomed, in so far as it went, but there were many serious reservations. Teachers acknowledged that the report was a face-saving measure for the government,
which ensured that SATs would go ahead in June 1995, because
of funding for external marking. Previously teachers had
had the added burden of marking the SATs themselves.

The implementation of the Dearing report introduced
some minor rationalisation of the science curriculum, but
the so-called slimming-down of the science curriculum at Key
Stages 3 and 4 was not thought to be very great; one teacher
commented that the biology syllabus had not been touched,
and there had not been enough changes to SCIs, the teacher
assessed component of the SATs.

The Dearing report claimed that there would be no more
change in schools for 5 years; one teacher clarified this
misleading statement as actually meaning that there would be
no change at Key Stage 3. Other teachers explained that
continuing major changes related to vocational courses
(GNVQs), and to 'A' levels, would continue to put pressure
on teachers. There were also major reservations about the
amount of curriculum time Dearing claimed had been freed for
schools to use as they wished.

However, two teachers noted that fundamental curriculum
change had been avoided, and that the National Curriculum
was still a subject-led curriculum, which was not a
curriculum for the 21st century. One teacher added: "we
are not looking at a broad, balanced, entitlement
curriculum". This contrasts sharply with the Transition
Years approach taken in Ontario.
Question 15 (a)

Question 15 (a) asked: "What are links like between elementary schools and high schools that you have experience of?"

Comment - Ontario: Teachers

"We have some events together, but not a constant liaison."

"We have good links, a good rapport. I know what they expect in Grade 9."

"The links are weak. There is not a lot of communication with the teachers in the high schools. I have a daughter in high school and things there are very content oriented. The 'work to rule' put things back a year. The intent is there, it just hasn't been implemented."

"The links started off well, but we need more."

"Grade 7, 8, and 9 teachers came together a couple of times a year ago. It's starting again this year."

"Two years ago - very strong, but there was the problem with the strike. We've made visits and things seem loose and
unstructured and undisciplined in the elementary schools. And you see this when the kids get here. Kids in Grade 9 haven't faced tests yet - we've gone down to the elementary level. It's too hard to integrate by content in this school; we have tried to integrate by skills."

"There's not much contact with our feeder school."

"We've had a couple of very positive meetings - then we dropped it. There is the attitude that high school is above elementary school."

"Secondary school teachers are a bit arrogant and look down at elementary schools."

Comment - Ontario: Principals

"We have a joint information sharing project. We have a lot better respect for each other as a result."

"The Transition Years are critical years in the development of kids. We need to have a coming together of elementary and secondary school teachers. Secondary schools are blaming the elementary schools for kids having poor reading skills, but elementary schools are faced with the same problem. Have Grade 9 teachers adapted well to destreamed"
classes? Kids with lots of ability may not be being challenged enough."

"There is not a lot of liaison. We could do more. There is some on an individual teacher basis, and principal to principal."

Conclusion

There was general acknowledgement that liaison between elementary and high school teachers should be improved, although some schools had already instituted continuing liaison meetings. Liaison may well encourage increased mutual respect between elementary and secondary school teachers.

Question 15 (b)

Question 15 (b) asked: "What do you think about the Minister's announcement about school councils?"

Comment - Ontario: Teachers

"A good idea - if the parents are concerned about all students in the school and not just their own. Parents should have some input on things like dress codes."

"Great. I have no problems working with parents, and where
they can offer input - fine, but they shouldn't be able to dictate curriculum."

"We've always had a lot of parental involvement and so I don't have a problem with it."

"OK, as long as an interest group doesn't take over."

"Parents should have a voice; teachers could be more welcoming though. Parents could learn more about what goes on inside schools."

"It may be viable in some schools. There is little involvement by parents in this area in this school. Other schools might have parents fighting to be involved. It's a great idea - as long as they know what it's like to be in the classroom."

"Those parents with private agendas will stir the pot - and not be really interested in educational issues."

Comment - Ontario: Principals

"Wonderful; we struggle through to have a parent organisation. Some parents might get involved for the wrong reasons. It might make some teachers more accountable."
"Parents have the right to know and the right to come in. We have to make them feel comfortable as well. There are some sensitive issues - hiring of principals, and the budget, for example - and there had better be some good training. Many parents just don't have the experience - and that's a fact not a criticism."

"What will the relationship be with the current Parent Teacher Associations? The Minister has said they will be separate, with separate functions."

**Conclusion**

There was general acknowledgement that parents do have a right to be more involved in schools, but there was considerable concern that any possible involvement of parents in School Councils should be within clearly defined parameters, and that a particular clique of parents should not be able to dictate their own agenda.

In England and Wales, school governing bodies have a wider range of powers than those proposed for School Councils, and also a broader representation which, despite being less egalitarian in composition, could provide a useful model for Ontario.
Question 15 (c)

Question 15 (c) asked: "What do you think about the Minister's announcement about an increase in standardised testing?"

Comment - Ontario: Teachers

"You have to have testing. As adults we are tested. More localised testing would be better."

"There is not much value in standardised testing. The socio-economic status of the students may result in some test material not being relevant to them. There are dangers that it could lead to comparisons between schools - which may send people shopping around for schools."

"Good, but needs to handled carefully."

"Ministry tests are on a 2 week time block on a particular unit. It's a good idea if implemented properly. Students get to know what they are doing based on levels."

"I've not experienced it. I don't know what it would be like. Teaching to the test might be a problem. If results were published in a newspaper it could become a competition,
a game, possibly between public and separate schools."

"I look forward to it. I'm not afraid of standardised testing - it let's us know whether we're doing our job or not."

"I don't mind standardised testing if you are testing skills and not just knowledge. If it sets school against school then we'll have to teach to the test unfortunately."

Comment - Ontario: Principals

"We are already using board-wide standardised tests; I don't have a problem with this. We can identify problems."

"Another political football?"

"The NPD are trying to do too much too quickly in testing at 4 different levels rather than the two recommended by the Royal Commission."

"Using standardised testing to compare schools is ridiculous; schools differ so much in terms of the socio-economic background of the students, and as to whether English is a second language. We use standardised testing firstly to check our curriculum - if one area is weak we can
improve it. Secondly, to check that a student is showing the usual pattern of achievement from Grade 2 to 4 to 6. If something red flags then you find out why. We don't use standardised testing to say how intelligent a child is; it's a snapshot on a particular day."

**Conclusion**

Principals and teachers were generally happy with the level of standardised testing presently being carried out, and were well aware of the dangers of teaching to the test, and of using test results to compare school with school. Some concern was expressed that the proposed increase in standardised testing was simply too much.

**Question 15 (d)**

Question 15 (d) asked: "What do you think about the Minister's announcement that curriculum development be more centralised?"

**Comment - Ontario: Teachers**

"We need a standardised curriculum - it helps when kids move here from another area. Educators at a local level should develop it - and not the Ministry - keep the politics out of it."
"How are they going to do this in such a short time?"

"Could be very helpful as long as teachers are involved."

"A good idea but we'll wait to see if it happens. We're already moving away from textbooks, but should we publish our own to make some money? The Ministry need to know what is already happening in schools."

"I would like a little more direction. Our board has always been excellent in producing resource documents."

"I like the idea of everybody working on the same themes and topics. Local flexibility will be there - but this may depend on your principal."

"How are they going to police the system? Do people in Toronto know about local features of interest to the curriculum?"

"There is some value to some standardisation. We need local flexibility though."

Comments - Ontario: Principals

"As long as they recognise the needs of individual areas and
have flexibility, I don't have a problem."

"It could free up teachers."

"Does the world end outside Toronto?"

"Can it be justified for economic reasons?"

**Conclusion**

Principals and teachers were broadly in favour of some increase in standardisation, but recognised that there were practical difficulties in achieving this within the time-frame specified by the Minister of Education. There was very strong concern that any increased centralisation should not go too far, and that schools and school boards should retain a considerable amount of local autonomy.
CHAPTER V

QUESTIONNAIRE RESULTS AND DISCUSSION

Introduction

Each questionnaire comprised two instruments (see Appendix I and J). The first instrument (items ALL1 to EV18) was published by the Board of Education for the City of York, Ontario in 1989 for use in the public domain. The researcher modified a few items to aid comprehensibility, and changed it from a three choice Likert-type scale to a five choice scale, to allow a wider range of possible responses and to make it more compatible with the second instrument. The original purpose of this instrument was to investigate implementation of Transition Years policies, but there was no response to further enquiries as to its original use.

The second instrument (items M1 to M20) was developed at the University of York, England, by C. Kyriacou and M. Wilkins, from whom permission to use it was obtained. This instrument already utilised a five choice, 20 item, bi-polar rating scale (Kyriacou and Wilkins, 1993). The instrument was originally used to explore the impact of the National Curriculum on teaching methods amongst a group of 12 teachers in a comprehensive school. The researchers concluded that the use of a variety of teaching methods, and the use of a more active and investigatory approach, had
been generally supported by the National Curriculum, but warned that this emphasis might not be sustained because of the content and methods of SATs.

Questionnaires were returned from 22 teachers (out of 26) from 3 LEAs in England, and 21 teachers (out of 27) from 3 School Boards in Ontario. The questionnaires were either mailed in advance of a visit to the school by the researcher, or were handed to teachers personally, often before or after an interview. In only a handful of cases were the questionnaires mailed to teachers and mailed back with little personal contact, due to unforeseen circumstances. The questionnaires were coded to ensure anonymity of the informants.

The teachers who were interviewed had all completed questionnaires, and so could be regarded as a sub-set of the teachers who completed the questionnaires. No links were made between the information teachers gave during interviews, and the information given by the same teachers in the questionnaires.
Table 4.1

The Numbers of Teachers Responding to the Questionnaires

<table>
<thead>
<tr>
<th></th>
<th>Urban schools</th>
<th>Rural schools</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontario</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers in</td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Elementary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers in</td>
<td>9</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>High Schools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>England</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers in</td>
<td>14</td>
<td>8</td>
<td>22</td>
</tr>
<tr>
<td>Secondary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schools</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data analysis was carried out using the 'Systat' software package. Comparisons between the two education systems were carried out at the item level. In accordance with the quality of the data, Mann-Whitney U-tests were performed. 'Systat' uses the $\chi^2$ -distribution with 1 degree of freedom as a test-statistic, which is the squared normal distribution. A significance level of 1% was chosen throughout the data analysis. With regard to the $\chi^2$ -distribution the significance level is one-sided, with regard to the normal distribution it is two-sided.
The First Instrument (ALL1 to ALL9)

Table 4.2

Results for questionnaire items ALL1 to ALL9

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>More frequent usage in:</th>
<th>$\chi^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students are allowed to choose:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALL1 questions on tests</td>
<td>Ontario</td>
<td>8.071</td>
<td>0.004</td>
</tr>
<tr>
<td>ALL2 work partner(s)/groupings</td>
<td>England</td>
<td>11.245</td>
<td>0.001</td>
</tr>
<tr>
<td>ALL3 topics for individual and group assignments</td>
<td>- *</td>
<td>2.988</td>
<td>0.083</td>
</tr>
<tr>
<td>ALL4 materials used in assignments</td>
<td>-</td>
<td>0.299</td>
<td>0.584</td>
</tr>
<tr>
<td>ALL5 topics for class and group study</td>
<td>Ontario</td>
<td>7.388</td>
<td>0.007</td>
</tr>
<tr>
<td>ALL6 format of assignments and presentations</td>
<td>-</td>
<td>1.131</td>
<td>0.288</td>
</tr>
<tr>
<td>ALL7 design of assignments</td>
<td>-</td>
<td>2.004</td>
<td>0.157</td>
</tr>
<tr>
<td>ALL8 learning strategies</td>
<td>-</td>
<td>0.104</td>
<td>0.748</td>
</tr>
<tr>
<td>ALL9 time lines and attendance patterns for independent study modules</td>
<td>Ontario</td>
<td>7.421</td>
<td>0.006</td>
</tr>
</tbody>
</table>

* not significant at the 1% level

Table 4.2 shows that apart from item ALL2, students are allowed to choose three aspects of classroom activity more frequently ($p<0.001$) in Ontario than in England.
Table 4.3

Results for questionnaire items EX1 to EX10

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>More frequent usage in:</th>
<th>$x^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students are expected to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EX1 ask questions freely</td>
<td>- *</td>
<td>0.518</td>
<td>0.472</td>
</tr>
<tr>
<td>EX2 make decisions: *cooperatively</td>
<td>-</td>
<td>8.299</td>
<td>0.040</td>
</tr>
<tr>
<td>EX3 *individually</td>
<td>Ontario</td>
<td>8.299</td>
<td>0.004</td>
</tr>
<tr>
<td>EX4 design questions to be asked of themselves and classmates</td>
<td>-</td>
<td>3.272</td>
<td>0.070</td>
</tr>
<tr>
<td>EX5 work in small groups on assigned tasks</td>
<td>-</td>
<td>1.495</td>
<td>0.221</td>
</tr>
<tr>
<td>EX6 work in small groups on self-directed tasks</td>
<td>Ontario</td>
<td>9.275</td>
<td>0.002</td>
</tr>
<tr>
<td>engage in a variety of interactive experiences:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EX7 *as a member of the full class group</td>
<td>Ontario</td>
<td>10.523</td>
<td>0.001</td>
</tr>
<tr>
<td>EX8 *one to one with the teacher</td>
<td>Ontario</td>
<td>7.782</td>
<td>0.005</td>
</tr>
<tr>
<td>EX9 *as a member of a small group</td>
<td>-</td>
<td>2.438</td>
<td>0.118</td>
</tr>
<tr>
<td>EX10 *with members of the community/experts</td>
<td>-</td>
<td>0.892</td>
<td>0.345</td>
</tr>
</tbody>
</table>

* not significant at the 1% level

Table 4.3 shows that in 4 instances students are expected to perform various classroom activities more frequently ($p<0.001$) in Ontario than in England.
Table 4.4

Results for questionnaire items EX11 to EX18

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>More frequent usage in:</th>
<th>$\chi^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students are expected to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EX11 work with a variety of media</td>
<td>* print</td>
<td>- *</td>
<td>0.596</td>
</tr>
<tr>
<td>EX12 * film</td>
<td>Ontario</td>
<td>16.370</td>
<td>0.000</td>
</tr>
<tr>
<td>EX13 * video</td>
<td>-</td>
<td>2.138</td>
<td>0.144</td>
</tr>
<tr>
<td>EX14 * audio</td>
<td>-</td>
<td>3.026</td>
<td>0.082</td>
</tr>
<tr>
<td>EX15 * computer</td>
<td>-</td>
<td>0.732</td>
<td>0.392</td>
</tr>
<tr>
<td>EX16 involve themselves in independent study</td>
<td>-</td>
<td>0.182</td>
<td>0.670</td>
</tr>
<tr>
<td>EX17 engage in higher-level thinking &amp; problem solving</td>
<td>-</td>
<td>2.434</td>
<td>0.119</td>
</tr>
<tr>
<td>EX18 cooperate within the learning environment</td>
<td>-</td>
<td>2.083</td>
<td>0.149</td>
</tr>
</tbody>
</table>

* not significant at the 1% level

Table 4.4 shows that students are expected to work more frequently ($p<0.001$) with film in Ontario than in England, but that there was no difference in students being expected to work with other media between the two educational systems.
Table 4.5

Results for questionnaire items EX19 to EX24

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>More frequent usage in:</th>
<th>$\chi^2$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Students are expected to:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EX19 develop a sense of responsibility for own actions</td>
<td>- *</td>
<td>1.207</td>
<td>0.272</td>
</tr>
<tr>
<td>EX20 respect the needs &amp; rights of others</td>
<td>-</td>
<td>0.258</td>
<td>0.611</td>
</tr>
<tr>
<td>EX21 participate in determining appropriate consequences for their actions</td>
<td>-</td>
<td>0.038</td>
<td>0.845</td>
</tr>
<tr>
<td>EX22 develop a respect for materials and equipment</td>
<td>-</td>
<td>0.512</td>
<td>0.474</td>
</tr>
<tr>
<td>EX23 conduct peer evaluation</td>
<td>Ontario</td>
<td>12.870</td>
<td>0.000</td>
</tr>
<tr>
<td>EX24 maintain a personal work file</td>
<td>-</td>
<td>4.879</td>
<td>0.027</td>
</tr>
</tbody>
</table>

* not significant at the 1% level

According to Table 4.5 only one item was significant at the 1% level, which showed that students were expected to conduct peer evaluation more frequently in Ontario than in England.
Table 4.6

Results for questionnaire items T1 to T9

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>More frequent usage in:</th>
<th>$x^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teacher is:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1 presenter/demonstrator/instructor of new concepts</td>
<td>England</td>
<td>14.941</td>
<td>0.000</td>
</tr>
<tr>
<td>T2 director &amp; selector of tasks &amp; task format</td>
<td>- *</td>
<td>0.653</td>
<td>0.419</td>
</tr>
<tr>
<td>T3 director of task only (students choose format)</td>
<td>-</td>
<td>3.346</td>
<td>0.067</td>
</tr>
<tr>
<td>T4 resource person &amp; adviser for students, choosing both task &amp; format</td>
<td>-</td>
<td>4.716</td>
<td>0.030</td>
</tr>
<tr>
<td>T5 mediator in student disputes</td>
<td>-</td>
<td>5.219</td>
<td>0.022</td>
</tr>
<tr>
<td>T6 tutor of individuals and small groups</td>
<td>-</td>
<td>3.226</td>
<td>0.072</td>
</tr>
<tr>
<td>T7 researcher of resources and styles within the learning process</td>
<td>-</td>
<td>4.278</td>
<td>0.039</td>
</tr>
<tr>
<td>T8 a model for good learning</td>
<td>-</td>
<td>5.657</td>
<td>0.017</td>
</tr>
<tr>
<td>T9 mentor/adviser for emotional &amp; social needs of students</td>
<td>-</td>
<td>5.762</td>
<td>0.016</td>
</tr>
</tbody>
</table>

* not significant at the 1% level

Table 4.6 shows that teachers' views of what they actually do as teachers, show a significant difference on only one item between Ontario and England.
Table 4.7

Results for questionnaire items T10 to T17

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>More frequent usage in:</th>
<th>$\chi^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teacher is:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T10 collaborator/coach with:</td>
<td>* students</td>
<td>- *</td>
<td>0.234</td>
</tr>
<tr>
<td>T11 * staff</td>
<td>-</td>
<td>0.106</td>
<td>0.745</td>
</tr>
<tr>
<td>T12 * parents</td>
<td>-</td>
<td>1.507</td>
<td>0.220</td>
</tr>
<tr>
<td>T13 an effective time manager</td>
<td>-</td>
<td>3.401</td>
<td>0.065</td>
</tr>
<tr>
<td>T14 a resource manager (both human &amp; material)</td>
<td>-</td>
<td>0.980</td>
<td>0.322</td>
</tr>
<tr>
<td>T15 an observer of student behaviour &amp; needs</td>
<td>-</td>
<td>0.299</td>
<td>0.585</td>
</tr>
<tr>
<td>T16 an evaluator of student progress</td>
<td>-</td>
<td>0.678</td>
<td>0.410</td>
</tr>
<tr>
<td>T17 an evaluator of program</td>
<td>-</td>
<td>0.601</td>
<td>0.438</td>
</tr>
</tbody>
</table>

* not significant at the 1% level

Table 4.7 also shows that teachers' views of what they actually do as teachers shows no significant difference between Ontario and England on any of the items.
Table 4.8

Results for questionnaire items TX1 to TX10

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>More frequent usage in:</th>
<th>$\chi^2$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>the teacher is expected to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TX1 have an understanding of adolescent development</td>
<td>- *</td>
<td>0.021</td>
<td>0.884</td>
</tr>
<tr>
<td>TX2 decide on the composition of student groupings</td>
<td>Ontario</td>
<td>6.619</td>
<td>0.010</td>
</tr>
<tr>
<td>TX3 organise, modify &amp; evaluate the curriculum</td>
<td>-</td>
<td>2.144</td>
<td>0.143</td>
</tr>
<tr>
<td>TX4 participate &amp; collaborate in learning activities</td>
<td>-</td>
<td>1.625</td>
<td>0.202</td>
</tr>
<tr>
<td>TX5 respect student decisions</td>
<td>Ontario</td>
<td>8.803</td>
<td>0.003</td>
</tr>
<tr>
<td>TX6 encourage risk-taking in self &amp; students</td>
<td>Ontario</td>
<td>20.527</td>
<td>0.000</td>
</tr>
<tr>
<td>TX7 involve students in the setting of long &amp; short term goals within the constraints of subject guidelines</td>
<td>-</td>
<td>2.219</td>
<td>0.136</td>
</tr>
<tr>
<td>TX8 facilitate learning beyond the classroom</td>
<td>-</td>
<td>3.794</td>
<td>0.051</td>
</tr>
<tr>
<td>TX9 give encouragement to motivate students</td>
<td>-</td>
<td>0.803</td>
<td>0.370</td>
</tr>
<tr>
<td>TX10 plan for personal professional development</td>
<td>-</td>
<td>4.235</td>
<td>0.040</td>
</tr>
</tbody>
</table>

* not significant at the 1% level

Table 4.8 shows that the teacher is expected to carry out 3 functions more frequently ($p<0.001$) in Ontario than in England.
Table 4.9

Results for questionnaire items CL1 to CR4

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>More frequent usage in:</th>
<th>$\chi^2$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The classroom:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL1 has an inviting atmosphere</td>
<td>Ontario</td>
<td>21.615</td>
<td>0.000</td>
</tr>
<tr>
<td>CL2 has student work prominently displayed</td>
<td>- *</td>
<td>2.294</td>
<td>0.130</td>
</tr>
<tr>
<td>CL3 is equipped with moveable /groupable furniture</td>
<td>-</td>
<td>1.185</td>
<td>0.276</td>
</tr>
<tr>
<td>CL4 provides easy access to computers</td>
<td>-</td>
<td>3.102</td>
<td>0.078</td>
</tr>
<tr>
<td>CL5 has theme-related print, media &amp; concrete objects</td>
<td>-</td>
<td>3.163</td>
<td>0.075</td>
</tr>
<tr>
<td>CL6 is suitable for the program</td>
<td>Ontario</td>
<td>8.225</td>
<td>0.004</td>
</tr>
<tr>
<td><strong>The course content:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CR1 meets the requirements of Ministry guidelines</td>
<td>-</td>
<td>1.791</td>
<td>0.181</td>
</tr>
<tr>
<td>CR2 provides varied methods to achieve proficiency</td>
<td>-</td>
<td>3.473</td>
<td>0.062</td>
</tr>
<tr>
<td>CR3 is integrated (skills, knowledge &amp; attitudes)</td>
<td>-</td>
<td>4.843</td>
<td>0.028</td>
</tr>
<tr>
<td>CR4 includes development of oracy, numeracy &amp; literacy skills</td>
<td>-</td>
<td>0.344</td>
<td>0.558</td>
</tr>
</tbody>
</table>

* not significant at the 1% level

Table 4.9 shows that teachers perceive the classroom differently between Ontario and England on 2 items, and there are no significant differences on how they perceive the course content.
### Table 4.10

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>More frequent usage in:</th>
<th>$\chi^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Evaluation involves:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EV1 establishing criteria to be used in discussion with students</td>
<td>Ontario</td>
<td>14.584</td>
<td>0.000</td>
</tr>
<tr>
<td>EV2 higher level thinking questions on tests</td>
<td>-</td>
<td>2.066</td>
<td>0.151</td>
</tr>
<tr>
<td>EV3 choices offered on test and assignments</td>
<td>Ontario</td>
<td>9.407</td>
<td>0.002</td>
</tr>
<tr>
<td>EV4 observational checklists filled out by teachers</td>
<td>-</td>
<td>3.648</td>
<td>0.056</td>
</tr>
<tr>
<td>EV5 self evaluation by students</td>
<td>-</td>
<td>1.382</td>
<td>0.240</td>
</tr>
<tr>
<td>EV6 peer evaluation</td>
<td>Ontario</td>
<td>15.198</td>
<td>0.000</td>
</tr>
<tr>
<td>EV7 oral as well as written testing &amp; assignments</td>
<td>-</td>
<td>1.649</td>
<td>0.199</td>
</tr>
<tr>
<td>EV8 formative &amp; summative evaluation</td>
<td>-</td>
<td>1.957</td>
<td>0.162</td>
</tr>
<tr>
<td>EV9 some student selection of which work is to be evaluated</td>
<td>-</td>
<td>1.600</td>
<td>0.206</td>
</tr>
</tbody>
</table>

* not significant at the 1% level

Table 4.10 shows that there are significant differences between England and Ontario in terms of what evaluation involves in 3 instances, all of which occur more frequently in Ontario.
Table 4.11

Results for questionnaire items EV10 to EV18

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>More frequent usage in:</th>
<th>$\chi^2$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>EV10 students being allowed to re-do assignments in order to improve evaluation</td>
<td>- *</td>
<td>1.349</td>
<td>0.245</td>
</tr>
<tr>
<td>EV11 assignments chosen to maximise student interest &amp; success, &amp; minimise plagiarism &amp; outside help</td>
<td>-</td>
<td>4.859</td>
<td>0.028</td>
</tr>
<tr>
<td>EV12 maintaining a personal work file</td>
<td>-</td>
<td>0.460</td>
<td>0.498</td>
</tr>
<tr>
<td>EV13 student-teacher conferences</td>
<td>Ontario</td>
<td>8.151</td>
<td>0.004</td>
</tr>
<tr>
<td>EV14 students being given the opportunity to design some of their own evaluation instruments</td>
<td>Ontario</td>
<td>10.477</td>
<td>0.001</td>
</tr>
<tr>
<td>EV15 frequent communication with parents</td>
<td>-</td>
<td>2.031</td>
<td>0.154</td>
</tr>
<tr>
<td>EV16 on-going evaluation of the program by both students and teachers</td>
<td>Ontario</td>
<td>11.524</td>
<td>0.001</td>
</tr>
<tr>
<td>EV17 taking into account individual differences among students in terms of learning styles</td>
<td>-</td>
<td>2.190</td>
<td>0.139</td>
</tr>
<tr>
<td>EV18 taking into account individual differences among students in terms of differing abilities</td>
<td>-</td>
<td>2.922</td>
<td>0.087</td>
</tr>
</tbody>
</table>

* not significant at the 1% level
Table 4.11 also shows that there are significant differences between England and Ontario in terms of what evaluation involves in 3 instances, all of which again occur more frequently in Ontario.
The Second Instrument (M1 to M20)

Table 4.12

Results for questionnaire items M1 to M5

<table>
<thead>
<tr>
<th>Item</th>
<th>More frequent in</th>
<th>Statement X</th>
<th>Statement Y</th>
<th>More frequent in</th>
<th>$\chi^2$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>- *</td>
<td>Activities carried out by pupils are restricted to ones set by the teacher</td>
<td>Activities carried out by pupils are variable &amp; negotiated with the teacher</td>
<td>- *</td>
<td>4.860</td>
<td>0.027</td>
</tr>
<tr>
<td>M2</td>
<td>-</td>
<td>Pupil activities are mainly listening &amp; writing</td>
<td>Pupil activities are mainly problem solving &amp; experimental</td>
<td>-</td>
<td>5.676</td>
<td>0.017</td>
</tr>
<tr>
<td>M3</td>
<td>-</td>
<td>The main activity of the teacher is to lecture &amp; provide information</td>
<td>The main activity of the teacher is to facilitate &amp; enable pupils to learn</td>
<td>-</td>
<td>2.034</td>
<td>0.154</td>
</tr>
<tr>
<td>M4</td>
<td>England</td>
<td>Pupils take a passive role being provided with information &amp; activities by the teacher</td>
<td>Pupils take an active role seeking information and developing their own course of study</td>
<td>Ontario</td>
<td>6.690</td>
<td>0.010</td>
</tr>
<tr>
<td>M5</td>
<td>-</td>
<td>The teacher's role is fixed, being a provider</td>
<td>The teacher's role varies, being enabler &amp; facilitator</td>
<td>-</td>
<td>3.742</td>
<td>0.053</td>
</tr>
</tbody>
</table>

* not significant at the 1% level

Table 4.12 shows only one item indicating active learning taking place significantly more frequently in Ontario than in England.
Table 4.14

Results for questionnaire items M6 to M10

<table>
<thead>
<tr>
<th>Item</th>
<th>More frequent in</th>
<th>Statement X</th>
<th>Statement Y</th>
<th>More frequent in</th>
<th>$x^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6</td>
<td>England</td>
<td>Resources are limited in number &amp; variety</td>
<td>Resources are numerous &amp; varied</td>
<td>Ontario</td>
<td>11.570</td>
<td>0.001</td>
</tr>
<tr>
<td>M7</td>
<td>England</td>
<td>The time spent on activities is fixed, being determined by the teacher</td>
<td>The time spent on activities is variable &amp; flexible, being negotiated by the pupil with the teacher</td>
<td>Ontario</td>
<td>8.286</td>
<td>0.004</td>
</tr>
<tr>
<td>M8</td>
<td>England</td>
<td>The classroom has a formal layout which rarely changes</td>
<td>The layout of the classroom is flexible, according to the activity</td>
<td>Ontario</td>
<td>7.353</td>
<td>0.007</td>
</tr>
<tr>
<td>M9</td>
<td>England</td>
<td>The preparation for lessons is straightforward &amp; unilateral</td>
<td>Complex preparations are required for a number of different activities</td>
<td>Ontario</td>
<td>7.433</td>
<td>0.006</td>
</tr>
<tr>
<td>M10</td>
<td>England</td>
<td>The objectives of lessons are usually content-based</td>
<td>Process is the main objective of lessons</td>
<td>Ontario</td>
<td>20.903</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 4.14 shows significant differences between England and Ontario on all items.
Table 4.15

Results for questionnaire items M11 to M15

<table>
<thead>
<tr>
<th>Item</th>
<th>More frequent in</th>
<th>Statement X</th>
<th>Statement Y</th>
<th>More frequent in</th>
<th>$\chi^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>M11</td>
<td>England</td>
<td>The outcome of lessons &amp; activities is usually closed &amp; predetermined</td>
<td>Activities &amp; the method of learning lead to outcomes which are open &amp; variable</td>
<td>Ontario</td>
<td>22.126</td>
<td>0.000</td>
</tr>
<tr>
<td>M12</td>
<td>England</td>
<td>Assessment is normally under the control of the teacher</td>
<td>Both pupil &amp; teacher have a say in assessment</td>
<td>Ontario</td>
<td>9.472</td>
<td>0.002</td>
</tr>
<tr>
<td>M13</td>
<td>- *</td>
<td>Evaluation is normally teacher based</td>
<td>Both pupil &amp; teacher have a say in evaluation</td>
<td>- *</td>
<td>2.774</td>
<td>0.096</td>
</tr>
<tr>
<td>M14</td>
<td>-</td>
<td>The teacher decides everything</td>
<td>Negotiation takes place between pupil &amp; teacher on a number of issues</td>
<td>-</td>
<td>2.667</td>
<td>0.102</td>
</tr>
<tr>
<td>M15</td>
<td>-</td>
<td>There is little scope for pupils to show initiative</td>
<td>Pupils are encouraged to show initiative</td>
<td>-</td>
<td>1.763</td>
<td>0.184</td>
</tr>
</tbody>
</table>

* not significant at the 1% level

Table 4.15 shows significant differences between England and Ontario on two items. Open-ended classroom activities, and both student and teacher having a say in assessment, are more frequent in Ontario than in England.
Table 4.16

Results for questionnaire items M16 to M20

<table>
<thead>
<tr>
<th>Item</th>
<th>More frequent in</th>
<th>Statement X</th>
<th>Statement Y</th>
<th>More frequent in</th>
<th>$x^2$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>M16</td>
<td>- *</td>
<td>Learning is a process directed by the teacher</td>
<td>Pupil &amp; teacher work in partnership to enable learning</td>
<td>- *</td>
<td>1.182</td>
<td>0.277</td>
</tr>
<tr>
<td>M17</td>
<td>-</td>
<td>Teacher control is the main form of discipline</td>
<td>Teacher control works alongside self-control by pupil to maintain discipline</td>
<td>-</td>
<td>2.133</td>
<td>0.144</td>
</tr>
<tr>
<td>M18</td>
<td>-</td>
<td>The climate in the classroom is formal</td>
<td>An air of informality prevails in the classroom</td>
<td>-</td>
<td>1.028</td>
<td>0.311</td>
</tr>
<tr>
<td>M19</td>
<td>-</td>
<td>Relations between pupils, &amp; with teachers, is particular</td>
<td>Pupil-pupil &amp; teacher-pupil relationships form an integral part of the learning process</td>
<td>-</td>
<td>4.485</td>
<td>0.034</td>
</tr>
<tr>
<td>M20</td>
<td>England</td>
<td>Most work is school based, there is little interaction with the community</td>
<td>The wider community is seen as a resource - school-community interaction is evident</td>
<td>Ontario</td>
<td>9.090</td>
<td>0.003</td>
</tr>
</tbody>
</table>

* not significant at the 1% level

Table 4.16 shows a significant difference between England and Ontario on only one item. The wider community is seen as a resource more frequently in Ontario than in England.

The second instrument, the bi-polar rating scale, showed
significant differences at the 1% level on 9 out of 20 items, and all the differences were in the same directions: the teachers from England towards Statement X, and the teachers from Ontario towards Statement Y.

Discussion of Questionnaire Results

Hypothesis A: the implementation of the Key Stage 3 science programs in England and Wales has been more assessment driven than the Transition Years science programs in Ontario.

Questionnaire Results
Item M10 indicated that lessons are more frequently content-oriented in England, and that lessons are more frequently process-oriented in Ontario. Other items such as ALL5, ALL9, EX6, EX7, M4, M7, and M11 can be interpreted as adding support to these suppositions. Item M12 indicated that assessment is under the control of the teacher more frequently in England, and that both students and teachers more frequently have a say in assessment in Ontario.

These results can be interpreted by saying that with a content-heavy and time-consuming curriculum in England, in which the teacher is pressured to conform to the legalities of formal assessment, teachers have to be the locus of control. In Ontario, it may be the case that teachers have
More time to be more flexible in their approach, and are given more official encouragement to be more flexible, with less pressure from formal assessment, and so do not need to be the locus of control.

**Conclusion**

The evidence of the interviews supports the hypothesis that the implementation of the Key Stage 3 science programs in England has been more assessment driven than the Transition Years science programs in Ontario. The evidence of the questionnaires only indirectly supports this hypothesis.

**Hypothesis B:** the Transition Years science programs in Ontario are being implemented in ways which promote a wider variety of teaching methods than do the National Curriculum Key Stage 3 science programs in England.

**Questionnaire Results**

A number of items have an indirect bearing on the hypothesis. The response to item ALL9 suggests that independent study modules are used more frequently in Ontario than in England. Item EX7 suggests that students in Ontario more frequently "engage in a variety of interactive experiences", which could be interpreted as referring to a variety of teaching methods.

Item M10 suggests that lessons are more process-
oriented in Ontario, and more content-based in England. A more process-oriented course suggests, but does not necessarily provide evidence for, a greater variety of teaching methods. Likewise item M8 which suggests that the layout of classrooms is flexible, and can be changed according to the activity going on, more frequently in Ontario, could be taken as suggesting, but not providing evidence for, a greater variety of teaching methods. Interestingly, item CL3, which asks the same thing, showed no significant differences at the 1% or 5% level, single-sided. This lack of internal reliability is worrying.

Item M20 suggests that visits and outside speakers are utilised as a teaching/learning resource more frequently in Ontario than in England. Items EX11, EX13, EX14, and EX15 showed that there were no significant differences between England and Ontario in students' use of print, video, audio, and computer media. There was no significant difference between teachers in England and teachers in Ontario on item CR2 which asked how frequently the course content provides varied methods for achieving proficiency, nor on items CR3 and CR4 which asked how frequently the course content is integrated and includes development of oracy, numeracy and literacy. However, items M4, M7, and M11 indicate that there is more of an 'active learning' approach in Ontario, which also suggests that a wider variety of teaching methods may be used.
Conclusion

The questionnaire results only partially support the hypothesis that the Transition Years science program in Ontario is being implemented in a way which promotes a wider variety of teaching methods than does the National Curriculum science program in England.

Hypothesis C: the Transition Years science program in Ontario is being implemented in a way which gives teachers more ownership of the curriculum than does the National Curriculum Key Stage 3 science program in England.

Questionnaire Results

Very few items dealt with this hypothesis either directly or indirectly. Item EV16 indicated that on-going evaluation of the program by both students and teachers occurred more frequently in Ontario than in England. Item M13, which asked the same thing, showed no significant differences between teachers in England and teachers in Ontario. This would once more appear to show a lack of internal reliability. Evaluation of the program undoubtedly takes place in England as well, but it would require further research to determine the extent to which evaluation can result in real changes to the program, and whether this helps teachers to feel greater ownership of the curriculum.
**Conclusion**
The evidence from the questionnaires neither supports nor disproves the hypothesis that the Transition Years science programs in Ontario are being implemented in ways which give teachers more ownership of the curriculum than do the National Curriculum Key Stage 3 science programs in England.

**Hypothesis D:** the Transition Years science programs in Ontario are being implemented in ways which are less centralised than the National Curriculum Key Stage 3 science programs in England.

**Questionnaire Results**
Questionnaire items were not relevant to this hypothesis.

**Conclusion**
The evidence from the questionnaires neither supports nor disproves the hypothesis that the Transition Years science programs in Ontario are being implemented in ways which are less centralised than the National Curriculum Key Stage 3 science programs in England.
Summary of Questionnaire Results

The hypotheses are that the Transition Years science programs in Ontario, when compared with the National Curriculum science programs for Key Stage 3 in England and Wales, are being implemented in ways which:

- are less assessment driven....Hypothesis A
  This hypothesis is only indirectly supported

- promote a wider variety of
  teaching methods.............Hypothesis B
  This hypothesis is only partially supported

- give teachers more ownership of
  the curriculum ...............Hypothesis C
  This hypothesis is neither supported nor disproved

- are less centralised.........Hypothesis D
  This hypothesis is neither supported nor disproved
CHAPTER VI
LIMITATIONS OF THE STUDY

The content and format of the interview outline, and the two questionnaires, were checked carefully by an expert. The interview outline was tried out twice with teachers and some modifications were made. The questionnaires had already been used as research tools and so were presumed to already show content-related evidence of validity. The interview outline and questionnaires were regarded as being very comprehensive, but it was recognised that this could give additional, useful, background information.

There were a number of possible threats to the internal validity of both interviews and questionnaires. One such threat was the attitude of the subjects. Almost half of the sample of teachers in England were acquainted with the researcher, and might have been prepared to be more open than the teachers in Ontario in answering questions. Teachers who were acquainted with the researcher might have been more prepared to let any strong feelings about the National Curriculum affect a range of responses. There may also have been a very similar 'history threat' to internal validity, in that teachers in England would appear to have been through a more traumatic process of change than have teachers in Ontario. Different experiences may have resulted in different prejudices. Teachers in Ontario might
also have been more willing to try and give a positive impression of their school to a researcher from another country, and so might have tended to give responses which were more 'politically correct' than would otherwise be the case.

In asking teachers to recall their experiences with the National Curriculum in England, the researcher was asking them to consider six or seven years of experience of continual change; in Ontario, changes have occurred over less than half this period of time. Memory may be more unreliable over longer periods of time, thereby posing another threat to internal reliability.

There may also have been a location threat to internal validity for some of the interviews in Ontario. In one school, three interviews were carried out in a quiet corner of an almost deserted staffroom, but one or two other teachers walked in and out during the interviews. Interviewees may have been reluctant to be fully open in their responses in such conditions. One interview with a principal was hurried because another visitor was expected, which may have resulted in a lack of depth to the responses which were given. Another possible threat to internal validity amongst some teachers in Ontario, and some teachers in England, was related to the school year. Some schools had started, or were about to start, examinations, and some teachers might have filled in the questionnaires too
hurriedly in order to get back to more important matters.

Data collector bias might also have posed a problem. The researcher endeavoured to minimise this by describing the nature of the study, only briefly, at the start of the interview, and then giving a more detailed account of events and concerns, or answering teachers' questions, when the interview was over, so as not to prejudice, or contaminate teachers' opinions.

The small sample size may also have had an effect. The researcher had anticipated more science teachers in Ontario teaching Transition Years students in elementary and high schools, but found that often only one teacher was responsible, particularly in some of the smaller rural schools. In England the researcher had also anticipated involving more teachers, but in each of two secondary schools only two teachers were available due to unforeseen circumstances.

Table 4.3 appears to indicate that a larger proportion of teachers in Ontario, than in England, gave a favourable response when questioned about the usefulness of training sessions with the science advisers/consultants. However, since such training sessions in Ontario were not mandatory, this may be an effect of self-selected participation. Perhaps most teachers who attended had positive expectations of what they would get out of such sessions. It would also be of interest to investigate Question 7 a little further,
and to determine whether any change in teachers' style of science teaching, as a result of the introduction of the Common Curriculum/National Curriculum, is linked to attendance at training sessions.

In Ontario, no distinction was made between elementary schools and high schools, which the researcher came to acknowledge as a weakness of the study. A number of elementary schools appeared to have a more process-oriented curriculum, whereas some high schools appeared to have a more content-oriented curriculum. It may be the case that elementary schools have moved further towards the Transition Years philosophy than have high schools, but further research would be needed to validate this claim.

All teachers, in both countries, responded with courtesy, and a deep concern for professional values, and for their students.
CHAPTER VII
DISCUSSION AND CONCLUSIONS

Table 6.1
Summary of Study findings

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Background &amp; Issues</th>
<th>Interviews</th>
<th>Questionnaires</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>supported</td>
<td>supported</td>
<td>indirectly supported</td>
</tr>
<tr>
<td>B</td>
<td>partially supported</td>
<td>partially supported</td>
<td>partially supported</td>
</tr>
<tr>
<td>C</td>
<td>indirectly supported</td>
<td>neither supported nor disproved</td>
<td>neither supported nor disproved</td>
</tr>
<tr>
<td>D</td>
<td>supported</td>
<td>supported</td>
<td>neither supported nor disproved</td>
</tr>
</tbody>
</table>

Discussion

Hypothesis A

This hypothesis postulates that the Transition Years science programs in Ontario, when compared with the National Curriculum Key Stage 3 science programs in England and Wales, are being implemented in ways which are less assessment driven. The evidence from the 'Background and Issues' section described the edifice of testing and assessment in England and Wales, and the more varied, flexible, and less dominating methods of assessment in Ontario, which support this hypothesis. The interviews showed that teachers in England, generally speaking, thought that science, and other programs were assessment driven,
which was the opposite to the situation in Ontario. The evidence from the questionnaires only indirectly supports Hypothesis A, consequent upon interpretation. The questionnaires were not designed to directly address this hypothesis.

**Hypothesis B**

This hypothesis postulates that the Transition Years science programs in Ontario, when compared with the National Curriculum Key Stage 3 science programs in England and Wales, are being implemented in ways which promote a wider variety of teaching methods. Hypothesis B is partially supported by the evidence of the interviews and the questionnaires which showed teachers in Ontario positively accepting and putting into practice a wider variety of teaching methods. In England teachers indicated that they were under too much pressure from the demands of assessment and a content-heavy curriculum to implement a wide variety of teaching methods, but this was not an overwhelming response. This pressure was also evident in the evidence from the background and issues section which can therefore be said to indirectly support the hypothesis. The evidence of the questionnaires also indicated that teachers in England used less of a variety of teaching methods than teachers in Ontario, but again this was not an overwhelming response. This can perhaps be explained by teachers in
England striving to do their utmost, professionally, and to adopt as wide a variety of teaching methods as possible because they appreciate that students respond best to such an approach. Further research may be needed to demonstrate the validity of this latter suggestion.

**Hypothesis C**

This hypothesis postulates that the Transition Years science programs in Ontario, when compared with the National Curriculum Key Stage 3 science programs in England and Wales, are being implemented in ways which give the teachers more ownership of the curriculum. Hypothesis C was indirectly supported by the evidence of the 'Background and Issues' section, according to which the curriculum in England and Wales was imposed with little consultation with teachers, and with relatively little involvement of teachers and LEA advisers in curriculum development. Exactly the reverse situation pertained in Ontario. It might therefore be reasonably supposed that teachers in England and Wales would have little ownership of the curriculum. Whilst the questionnaires were not designed to address this hypothesis, the interviews did not directly address it either. However the interviews did reveal evidence of an imposed curriculum, with relatively little consultation with teachers, and with relatively little involvement of teachers and LEA advisers in curriculum development. There was still no mention of
ownership of the curriculum. There are perhaps two reasons for this. Firstly, teachers in England and Wales have had several years to accept and live with this situation. They may take it as axiomatic, without feeling a need to comment, particularly as there are more immediate problems such as a content-heavy curriculum and not enough time. Secondly, teachers may be too busy putting the curriculum into practice in the classroom and laboratory, and may come to regard their particular way of implementing the curriculum as constituting some kind of ownership. It would be interesting to investigate whether there is a relationship between individual and collaborative efforts at producing teaching materials, and ownership of even an imposed curriculum. It would also be interesting to see whether in Ontario there is a relationship between teachers' involvement with program departments and their ownership of the curriculum.

Hypothesis D

This hypothesis postulates that the Transition Years science programs in Ontario, when compared with the National Curriculum science programs of Key Stage 3 in England and Wales, are being implemented in ways which are less centralised. The evidence from the 'Background and Issues' section and from the interviews supports this hypothesis, and describes a centrally imposed curriculum with relatively
little autonomy on the local level in England and Wales, and much less centrally directed curriculum with more local autonomy in Ontario. The questionnaires were not designed to address this hypothesis, and so are not relevant.

Conclusions
Hypotheses A and D are supported by this study.
Hypotheses B and C are only partially supported by this study.

Commentary
In the introduction to *Studying Curriculum* (Goodson, 1994) Hargreaves writes:

> The provincial reform agenda in Ontario now explicitly addresses issues of subject status and curriculum integration; of rigor and relevance for all students, not rigor for some and relevance for the rest; of a common curriculum that does not force status-based choices between different social groups. (p. 7)

Whilst the actual degree of implementation of restructuring in Ontario schools can be debated, the intentions behind it, from one of the major architects, are clearly egalitarian.

In England and Wales, where the education system has been more centralised and more assessment driven, educational change has been more traditionalist and less progressive than in Ontario. There are, however, important
political and sociological dimensions to change in both systems which must be addressed for a fuller understanding to emerge.

The researcher found the mood amongst teachers in Ontario to be positive and optimistic for the future. In England the mood in the state education sector appeared perhaps more positive and optimistic than for five or six years, following the implementation of the Dearing report, but the level of optimism should not be overstated. Problems remain in both systems.

In England and Wales there are still problems for teachers related to curriculum overload, and the consequent shortage of time, which perhaps militates against use of a wider variety of teaching methods. In Ontario, links between elementary schools and high schools need to be improved, and changes related to School Councils, increased standardised testing, and more centralised curriculum development are being implemented.

Previous recent change in Ontario has been implemented gradually, with careful analysis and planning, and with care taken to ensure that teachers were genuine partners in the educational enterprise. There are lessons here for the implementation of educational change in England and Wales. Educational change depends on the goodwill and professionalism of teachers.
REFERENCES


council that works. *FWTAO Newsletter*, 2-7.


Scottish Office Education Department. (1993). *National


### Appendix A

**Age and grade comparisons - Ontario / England and Wales**

| AGE (years) | Key Stage 1 | Key Stage 2 | Key Stage 3 | Key Stage 4 | Key Stage 5 | Key Stage 6 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Year 12 | Year 13 | 6th Form | Grade 1 | Grade 2 | Grade 3 | Grade 4 | Grade 5 | Grade 6 | Grade 7 | Grade 8 | Grade 9 | Grade 10 | Grade 11 | Grade 12 | Grade 13 | ONC |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 5           | reception   | Year 1     | Year 2     | Year 3     | Year 4     | Year 5     | Grade 1 | Grade 2 | Grade 3 | Grade 4 | Grade 5 | Grade 6 | Grade 7 | Grade 8 | Grade 9 | Grade 10 | Grade 11 | Grade 12 | Grade 13 | 6th Form | Grade 1 | Grade 2 | Grade 3 | Grade 4 | Grade 5 | Grade 6 | Grade 7 | Grade 8 | Grade 9 | Grade 10 | Grade 11 | Grade 12 | Grade 13 | ONC |
Appendix B

Selected Questions from the 1993 Key Stage 3 Science SATs

Science Tier 5 - 8 - Paper One

12. The diagram shows a tree growing in a field. The sun is shining, so photosynthesis is taking place rapidly in the leaves.

(a) Complete each of the boxes with the name of a suitable substance to show what happens during photosynthesis.

(b) Complete the following sentence:

Starch is made in the leaves from ______________ which is produced during photosynthesis.

The diagrams show both surfaces of a leaf taken from the tree.

(c) Name the green pigment present in the leaves.

(d) What is the function of this pigment?

(e) Explain why the upper surface of the leaf is a darker green than the lower surface.
16. The diagram shows a way of using solar energy to heat water.

(a) On the diagram draw an arrow to show the direction of the flow of water in the copper pipe.  

(b) Explain, in terms of the flow of water, why the hot water tank outlet is at the top of the water tank.  

(c) Energy can be transferred by the processes of conduction, convection and radiation. For each of the following, name the energy transfer process involved.

(i) Energy from the Sun reaches the solar panel by  

(ii) Energy from the water in the pipe transfers through the wall of the pipe to the water in the tank by  

(d) Explain how the energy is transferred through the pipe wall.
Appendix C

Science Practical Assessments (SC1s)

Investigating frictional forces

Students should investigate what affects the frictional force when a block is dragged over a surface. This investigation may be carried out instead of Worksheet PSB "Investigating friction".

Sample criteria are given below for an assessment between levels 4 and 7.

<table>
<thead>
<tr>
<th>Strand (i) Ask questions, predict and hypothesize, e.g.</th>
<th>Strand (ii) Observe, measure and manipulate variables, e.g.</th>
<th>Strand (iii) Interpret their results and evaluate scientific evidence, e.g.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4(a) Suggest that the friction may depend on the load</td>
<td>4(b) Control nature and area of the surface and measure the frictional force for two different loads</td>
<td>4(c) Conclude that a big load causes a bigger frictional force than a small load</td>
</tr>
<tr>
<td>5(a) Suggest that a larger load would produce a larger frictional force, because there would be a larger force on the surface</td>
<td>5(b) Control nature and area of the surface and measure the frictional force for two different loads producing measurably different frictional forces</td>
<td>5(c) Conclude that a big load causes a bigger frictional force than a small load, but qualifying the conclusion</td>
</tr>
<tr>
<td>6(a) Suggest that the larger the load, the larger the frictional force because there will be a larger force on the surface</td>
<td>6(b) For different areas of contact, measure the frictional force for a range of different loads producing measurably different frictional forces</td>
<td>6(c) Conclude that a large load causes a bigger frictional force because the large load exerts a larger force</td>
</tr>
<tr>
<td>7(a) Suggest, with reasons that the surface material, surface area and load all affect the frictional force, and that one of the most important of these is the load</td>
<td>7(b) For a range of different areas of contact, measure the frictional force for a range of different loads producing measurably different frictional forces</td>
<td>7(c) Conclude that a large load causes a bigger frictional force because the large load exerts a larger force for the surfaces tested and within the range of loads tested</td>
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</tbody>
</table>

(from the Nuffield Coordinated Science Course)
## Appendix D

### The ten National Curriculum subjects

<table>
<thead>
<tr>
<th>Core Subjects</th>
<th>Foundation Subjects</th>
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<tbody>
<tr>
<td>English</td>
<td>Technology</td>
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<tr>
<td>Mathematics</td>
<td>History</td>
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<tr>
<td>Science</td>
<td>Geography</td>
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<td></td>
<td>A modern language</td>
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<td></td>
<td>Art</td>
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<tr>
<td></td>
<td>Music</td>
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<tr>
<td></td>
<td>Physical Education</td>
</tr>
</tbody>
</table>

(Hymas, 1993)
Appendix E

The five National Curriculum Attainment Targets

Attainment Target 1: Scientific Investigation
Attainment Target 2: Life and living processes
Attainment Target 3: Earth and environment
Attainment Target 4: Materials and their behaviour
Attainment Target 5: Energy and its effects

(see Appendix F)

(Department of Education and Science, 1991)
### Appendix F

**National Curriculum Levels for Attainment Target 5**

## Attainment target 5: Energy and its effects

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>STATEMENTS OF ATTAINMENT</th>
</tr>
</thead>
</table>
| 1     | Pupils should:   
|       |   a) understand that things can be moved by pushing or pulling them.   
|       |   b) be able to describe how a toy with a simple mechanism, which moves and stores   
|       |   energy, works.   
|       |   c) understand that magnets can produce pushes and pulls.   
|       |   d) know about the simple properties of sound and light, including loud/soft,   
|       |   bright/dark, high/low notes and colours.   |
| 2     | a) understand that pushes, pulls and squeezes can make things start moving, speed   
|       |   up, swerve, stop or change shape.   
|       | b) know that some materials conduct electricity well while others do not.   
|       | c) know that light passes through some materials and not others and that when it   
|       |   does not shadows are formed.   |
| 3     | a) know about the factors which cause objects to float or sink in water.   
|       | b) understand how energy is used and transferred in models and toys.   
|       | c) know that a complete circuit is needed for electrical devices to work.   
|       | d) know that light, or sound, can be reflected.   |
| 4     | a) understand that the changes in movement of an object depend on the size and   
|       |   direction of the forces acting on it.   
|       | b) be able to construct simple electrical circuits from diagrams.   
|       | c) know that sound travels at a different speed from light.   
|       | d) know that light travels in straight lines.   |
| 5     | a) understand the quantitative relationship between speed, distance and time.   
|       | b) understand the use of switches, relays, potentiometers and logic gates in   
|       |   controlling simple circuits.   
|       | c) understand the rule governing the reflection of light at plane surfaces.   |
Appendix F (continued)

LEVEL

STATEMENTS OF ATTAINMENT

6
a) understand the relationship between an applied force, the area over which it acts and the resulting pressure.
b) understand the qualitative relationships between current, charge, potential difference and resistance.
c) understand the relationship between loudness and amplitude, pitch and frequency of a sound wave.

7
a) understand the quantitative relationships between force, distance, work, power and time.
b) understand the law of moments.
c) understand the magnetic effect of an electric current and its application in a range of common devices.
d) be able to interpret common electrostatic phenomena in terms of unbalanced charges.
e) be able to use the wave model to explain refraction.

8
a) understand the quantitative relationship between force, mass and acceleration.
b) understand the behaviour of a circuit in terms of a model of charge flow and energy transfer.
c) be able to apply a knowledge of the wave model to explain resonance in sound or mechanical systems.

9
a) understand the quantitative relationships between mass, weight, potential energy and kinetic energy.
b) understand the quantitative relationships between charge, current, potential difference, resistance and electrical power.
c) understand that the electromagnetic spectrum forms a continuum of radiation with differing physiological effects.

10
a) understand the concept of momentum and its conservation.
b) understand the principles of electromagnetic induction and their application to the generation and transmission of electricity.
c) understand the processes of dispersion or interference or diffraction or polarisation in terms of the wave model of light.
Appendix G

Education Reforms across Canada

BY JENNIFER LEWINGTON
Education Reporter

EVERY province and territory has taken a stab at education reform in the past 10 years, but none of them has yet pulled off a complete overhaul.

"I don't see across the country enough of a critical mass that would say [the school system] is qualitatively different," says Michael Fullan, dean of education at the University of Toronto.

"The major difficulty is that we haven't mastered top-down change and bottom-up development."

Following is a progress report on cross-Canada reforms:

Newfoundland
A 1992 royal commission recommended:
- One-third fewer school boards, with the authority of denominational churches reduced to providing religious education.
- Church groups and the government are at odds over the issue.
- Legislation to extend the school day, add full-time kindergarten, increase province-wide testing and end permanent certification of teachers. This is on hold pending a resolution of school-board restructuring.
- Prince Edward Island
- A new School Act in 1992 included:
- Education decisions-making centralized with the ministry, consolidated school boards and local school councils.
- Definitions of what students are expected to know at key stages of their schooling, and better defined standards.
- Province-wide tests to assess individual student performance and the system as a whole.

Nova Scotia
A government white paper on education reform is expected soon, in the wake of a 1994 discussion paper and a 1992 legislative committee report. The white paper is expected to recommend:
- More decision-making at the local level, with school councils and fewer school boards.
- Clearer definition of what students should achieve.

New Brunswick
A 1992 royal commission issued 42 recommendations, all endorsed by the government. They included:
- A stronger focus on the early years of school and preschool, with financial support for children in need of special services.
- Additional province-wide testing for students, more instructional time and a move to what is called outcomes-based education in which expectations for student achievement are better defined.
- Teacher training reforms. New teachers now require two degrees to enter the profession and receive coaching from veteran teachers.

The Atlantic provinces are working in collaboration on a common curriculum for some courses and shared testing practices.

Quebec
In response to public hearings on education reform in 1993, the ministry:
- Appointed a committee to define expectations for student achievement by the end of Grade 8.
- Decentralized authority over curriculum and evaluations to local schools, which under a new education act in 1997 were given legislative authority to set up school councils and recognize the rights of parents.

Ontario
The government appointed a five-member royal commission in 1993, in the wake of studies on education reform dating back five years.
In advance of the commission's report,

(release yesterday, Education Minister David Cook announced several key policy changes. These include:
- A commitment to province-wide testing, starting with a Grade 9 reading-and-writing test released last year.
- A new curriculum for Grades 1 to 9, still in draft form, that is supposed to define what students are expected to achieve.
- Manitoba
This week the government released an "action plan" for renewal of the education system. Key elements are:
- More parent involvement through school advisory councils, along with legislation giving parents freedom to choose where to send their children.
- A core curriculum that puts more emphasis on math, language arts (English), science and social studies, including more Canadian history.
- Provincial standards and testing in key subject areas at Grades 3, 6, 9 and 12.

Saskatchewan
Major curriculum-reform efforts date back to 1984, along with more recent ministry-sponsored consultations on school-board amalgamation and collaboration between schools and social-service agencies to help troubled children.

Other reform measures include:
- System-wide assessment of student achievement in core subject areas in Grade 5, 8 and 11. The results do not count for individual programs.
- Provincial standards and testing in key subject areas at Grades 3, 6, 9 and 12.

British Columbia
A 1984 Royal Commission report called for sweeping changes in the content and direction of schooling. Implementation has been slow and difficult, in part because the ministry had trouble explaining how the new philosophical directions would improve education.

Among key changes:
- Over the next two years one-third of the school curriculum will be rewritten, with a stronger focus on student-achievement results, application of learning to the world of work and learning of core subjects. For example, students in Grades 5 to 8 must study a second language; previously this was reserved only for those in Grade 8.
- A new structured elementary-school system, with students from several grades grouped together.

All the western provinces are working together on curriculum and goals for students

88-0166-84-11

Northwest Territories
The government:
- Revised curriculum document to spell out expectations for student learning at key grade levels.
- Introduced similar tests for students in Grades 8 to 12 to help diagnose reasons for weak student performance.

Similar testing in science, social studies and English is under development for Grades 4 to 12.

Other initiatives:

(Toronto Globe and Mail, January 27th 1995)
Appendix H

Principles of Education from the Common Curriculum

Learning

1. Learning involves developing values as well as knowledge and skills.

2. Students learn in different ways and at different rates.

3. Students learn by asking questions and making connections.

4. Learning requires effort and self-discipline.

5. Students must see the relevance of what they are learning.

Teaching

1. Teachers must address the range of knowledge, skills, and values found among students.

2. Teachers must use a variety of methods to meet the different learning needs of students.

3. Teaching methods must encourage students to ask questions and make connections.

4. Teachers must have high expectations for all students.

5. Teaching must occur in contexts that link school work to everyday life.

Curriculum

1. The curriculum must reflect the diversity of Canadian society.

2. Curriculum must be adaptable to accommodate the strengths, needs, and backgrounds of individual students.

3. The curriculum must guide students to make connections through constant inquiry.

4. All of the activities and experiences that contribute to students' achieving the outcomes must be considered part of the curriculum.
Appendix H (continued)

5. Curriculum must demonstrate connections among people, ideas, events, and processes to prepare students for a changing world.

Assessment, Evaluation, and Reporting

1. Assessment must involve the use of a wide variety of methods so that the evaluation of students' achievement is as accurate as possible.

2. Assessment, evaluation, and reporting are the responsibility of the teacher, who must consider the needs of individual students and work closely with them and their families.

3. Assessment, evaluation, and reporting are continuous and essential parts of curriculum and effective classroom practice.

4. Reporting must describe the student's progress towards achieving the outcomes and must include plans for improving the student's performance.

5. The evaluation of programs should lead to their improvement and should focus on their effectiveness in preparing students for life and work.

Appendix I

Questionnaire - Implementation Indicators

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<th>Implementation Indicators</th>
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<td>Students are allowed to choose:</td>
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<td>ALL1 * questions on tests</td>
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<td>ALL2 * work partner(s)/groupings</td>
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<td>ALL3 * topics for individual and group assignments</td>
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<td>ALL4 * materials used in assignments</td>
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<td>ALL5 * topics for class and group study</td>
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<td>ALL6 * format of assignments/presentations</td>
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<td>ALL7 * design of assignments</td>
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<td>ALL8 * learning strategies</td>
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<td>ALL9 * time lines and attendance pattern for independent study modules</td>
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<td>Students are expected to:</td>
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<td>EX1 * ask questions freely</td>
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<td>EX2 * make decisions:</td>
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<td>EX3 * individually</td>
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<td>EX4 * design questions to be asked of themselves and classmates</td>
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<tr>
<td>EX5 * work in small groups on assigned tasks</td>
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<td>EX6 * work in small groups on self-directed tasks</td>
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<td>EX7 * engage in a variety of interactive experiences:</td>
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<td>EX8 * as a member of the full class</td>
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<td>EX9 * one to one with the teacher</td>
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<td>EX10 * as a member of a small group</td>
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<td>EX11 * with members of the community/experts</td>
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<td>EX12 * work with a variety of media</td>
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<td>EX13 * print</td>
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<td>EX15 * video</td>
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<td>EX16 * audio</td>
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<td>EX17 * computer</td>
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<td>Students are expected to:</td>
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<td>EX16 * involve themselves in independent study</td>
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<tr>
<td>EX17 * engage in higher-level thinking &amp; problem solving</td>
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<td>EX18 * cooperate within the learning environment</td>
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<tr>
<td>EX19 * develop a sense of responsibility for own actions</td>
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<tr>
<td>EX20 * respect the needs and rights of others</td>
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<tr>
<td>EX21 * participate in determining appropriate consequences for their actions</td>
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<tr>
<td>EX22 * develop a respect for materials and equipment</td>
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<td>EX23 * conduct peer evaluation</td>
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<td>EX24 * maintain a personal work file</td>
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<tr>
<td>The teacher is:</td>
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<td>T1 * presenter/demonstrator/instructor of new concepts</td>
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<td>T2 * director &amp; selector of tasks, &amp; task format</td>
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<td>T3 * director of task only(students choose format)</td>
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<td>T4 * resource person &amp; advisor for students choosing both task and format</td>
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<td>T5 * mediator in student disputes</td>
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<td>T6 * tutor of individuals and small groups</td>
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<td>T7 * researcher of resources and styles within the learning process</td>
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<td>T8 * a model for good learning</td>
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<td>T9 * advisor for emotional/social needs of students</td>
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<td>T10 * collaborator/coach with: * students</td>
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<td>T11</td>
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<td>T12</td>
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<td>T13 * an effective time manager</td>
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<td>T14 * a resource manager (both human and material)</td>
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<td>T15 * an observer of student behaviour &amp; needs</td>
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<td>Implementation Indicators</td>
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<td>The teacher is:</td>
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<td><strong>T16</strong></td>
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<td>* an evaluator of student progress</td>
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<td><strong>T17</strong></td>
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<td>* an evaluator of program</td>
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<td>The teacher is expected to:</td>
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<td><strong>TX1</strong></td>
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<td>* have an understanding of adolescent development</td>
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<td><strong>TX2</strong></td>
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<td>* decide on composition of student groupings</td>
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<td><strong>TX3</strong></td>
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<td>* organise, modify &amp; evaluate the curriculum</td>
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<td><strong>TX4</strong></td>
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<td>* participate &amp; collaborate in learning activities</td>
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<td><strong>TX5</strong></td>
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<td>* respect student decisions</td>
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<td><strong>TX6</strong></td>
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<tr>
<td>* encourage risk-taking in self &amp; students</td>
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<tr>
<td><strong>TX7</strong></td>
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<tr>
<td>* involve students in the setting of long &amp; short term goals within the constraints of subject guidelines</td>
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<td><strong>TX8</strong></td>
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<td>* facilitate learning beyond the classroom</td>
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<td><strong>TX9</strong></td>
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<td>* give encouragement to motivate students</td>
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<td><strong>TX10</strong></td>
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<td>* plan for personal professional development</td>
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<td>The classroom:</td>
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<td><strong>CL1</strong></td>
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<td>* has an inviting atmosphere</td>
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<td><strong>CL2</strong></td>
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<td>* has student work prominently displayed</td>
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<td><strong>CL3</strong></td>
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<td>* is equipped with moveable/groupable furniture</td>
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<td><strong>CL4</strong></td>
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<td>* provides easy access to computers</td>
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<td><strong>CL5</strong></td>
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<td>* has theme-related print, media &amp; concrete objects</td>
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<td><strong>CL6</strong></td>
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<td>* is suitable for the program</td>
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<td>The course content:</td>
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<td><strong>CR1</strong></td>
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<td>* meets the requirements of Ministry guidelines</td>
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<td><strong>CR2</strong></td>
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<td>* provides varied methods to achieve proficiency</td>
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<td><strong>CR3</strong></td>
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<td>* is integrated (skills, knowledge, &amp; attitudes)</td>
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<td><strong>CR4</strong></td>
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<tr>
<td>* includes development of oracy, numeracy &amp; literacy skills</td>
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<td>Implementation Indicators</td>
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<tr>
<td><strong>Evaluation involves:</strong></td>
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<tr>
<td>EV1</td>
<td>establishing criteria to be used in discussion with students</td>
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<tr>
<td>EV2</td>
<td>higher-level thinking questions on tests</td>
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<tr>
<td>EV3</td>
<td>choice offered on tests and assignments</td>
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<td>EV4</td>
<td>observational checklists filled out by teachers</td>
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<td>EV5</td>
<td>self evaluation by students</td>
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<td>EV6</td>
<td>peer evaluation</td>
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<td>EV7</td>
<td>oral as well as written testing &amp; assignments</td>
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<td>EV8</td>
<td>formative &amp; summative evaluation</td>
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<tr>
<td>EV9</td>
<td>some student selection of which work is to be evaluated</td>
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<tr>
<td>EV10</td>
<td>students being allowed to re-do assignments in order to improve evaluation</td>
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<tr>
<td>EV11</td>
<td>assignments chosen to maximise student interest and success, and minimise plagiarism and outside help</td>
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<td>EV12</td>
<td>maintaining a personal work file</td>
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<td>EV13</td>
<td>student-teacher conferences</td>
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<td>EV14</td>
<td>students being given the opportunity to design some of their own evaluation instruments</td>
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<td>EV15</td>
<td>frequent communication with parents</td>
<td></td>
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<td>EV16</td>
<td>on-going evaluation of the program by both students and teachers</td>
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<tr>
<td>EV17</td>
<td>taking into account individual differences among students in terms of learning styles</td>
<td></td>
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<tr>
<td>EV18</td>
<td>taking into account individual differences among students in terms of differing abilities</td>
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</table>
### Appendix J

#### Questionnaire on Teaching Methods

<table>
<thead>
<tr>
<th>Statement X</th>
<th>X Tend to X</th>
<th>O</th>
<th>Tend to Y</th>
<th>Statement Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activities carried out by pupils are restricted to ones set by the teacher</td>
<td></td>
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<td></td>
<td>Activities carried out by pupils are variable and negotiated with the teacher</td>
</tr>
<tr>
<td>Pupil activities are mainly listening and writing</td>
<td></td>
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<td></td>
<td>Pupil activities are mainly problem-solving and experimental</td>
</tr>
<tr>
<td>The main activity of the teacher is to lecture and provide information</td>
<td></td>
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<td></td>
<td>The main activity of the teacher is to facilitate and enable pupils to learn</td>
</tr>
<tr>
<td>Pupils take a passive role being provided with information and activities by the teacher</td>
<td></td>
<td></td>
<td></td>
<td>Pupils take an active role seeking information and developing their own course of study</td>
</tr>
<tr>
<td>The teacher's role is fixed, being a provider</td>
<td></td>
<td></td>
<td></td>
<td>The teacher's role varies, being enabler and facilitator</td>
</tr>
<tr>
<td>Resources are limited in number and variety</td>
<td></td>
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<td></td>
<td>Resources are numerous and varied</td>
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<tr>
<td>The time spent on activities is fixed, being determined by the teacher</td>
<td></td>
<td></td>
<td></td>
<td>The time spent on activities is variable and flexible, being negotiated by the pupil with the teacher</td>
</tr>
<tr>
<td>The classroom has a formal layout which rarely changes</td>
<td></td>
<td></td>
<td></td>
<td>The layout of the classroom is flexible, changing according to the activities going on</td>
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<tr>
<td>The preparation for lessons is straightforward and unilateral</td>
<td></td>
<td></td>
<td></td>
<td>Complex preparations are required for a number of different activities</td>
</tr>
<tr>
<td>The objectives of lessons are usually content based</td>
<td></td>
<td></td>
<td></td>
<td>Process is the main objective of lessons</td>
</tr>
<tr>
<td>The outcome of lessons and activities is usually closed and predetermined</td>
<td></td>
<td></td>
<td></td>
<td>Activities and the method of learning lead to outcomes which are open and variable</td>
</tr>
<tr>
<td>Assessment is normally under the control of the teacher</td>
<td></td>
<td></td>
<td></td>
<td>Both pupil and teacher have a say in assessment</td>
</tr>
<tr>
<td>Evaluation is normally teacher based</td>
<td></td>
<td></td>
<td></td>
<td>Both pupil and teacher have a say in evaluation</td>
</tr>
<tr>
<td>The teacher decides everything</td>
<td></td>
<td></td>
<td></td>
<td>Negotiation takes place between pupil and teacher on a number of issues</td>
</tr>
<tr>
<td>There is little scope for pupils to show initiative</td>
<td></td>
<td></td>
<td></td>
<td>Pupils are encouraged to show initiative</td>
</tr>
<tr>
<td>Learning is a process directed by the teacher</td>
<td></td>
<td></td>
<td></td>
<td>Pupil and teacher work in partnership to enable learning</td>
</tr>
<tr>
<td>Teacher control is the main form of discipline</td>
<td></td>
<td></td>
<td></td>
<td>Teacher control works alongside self-control of the pupil to maintain discipline</td>
</tr>
<tr>
<td>The climate in the classroom is formal</td>
<td></td>
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<td></td>
<td>An air of informality prevails in the classroom</td>
</tr>
<tr>
<td>Relations between pupil, and with teacher, in particular</td>
<td></td>
<td></td>
<td></td>
<td>Pupil-pupil and pupil-teacher relationships form an integral part of the learning process</td>
</tr>
<tr>
<td>Most work is school based there is little interaction with the community</td>
<td></td>
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<td></td>
<td>The wider community is seen as a resource - school community interaction is evident</td>
</tr>
</tbody>
</table>
Appendix M

Letter to Directors of Education for School Boards

Graduate Lounge,
Faculty of Education,
University of Windsor,
401 Sunset Avenue,
Windsor, Ontario, N9B 3P4.
(Home telephone: 519-969-3289)

Date: __________

Dear __________

I am a graduate student, from England (where I am Head of Physics at a secondary school), working towards my Master's degree in Education at the University of Windsor.

My thesis is a comparison between aspects of the National Curriculum in Britain and the Common Curriculum in Ontario. I am particularly interested in the science program during the Transition Years. Could I please have permission to visit 2 high schools and 4 elementary schools to ask members of the science departments to complete a questionnaire, and also to interview a number of them? I would also like to interview principals. I enclose a copy of the questionnaire and an outline of interview areas.

I've also enclosed a copy of my thesis petition. This is a summary of my research proposal which I can let you look at if you are interested. Also enclosed are copies of two documents from the Faculty of Education which has given me permission to proceed with the study.

Perhaps I could work with the Science Consultant, __________, in deciding which schools to visit?

I look forward to hearing from you soon, and would be happy to let you have any other information you require.

Yours faithfully,
Appendix 0

Letter to School Principals

Graduate Lounge,
Faculty of Education,
University of Windsor,
401 Sunset Avenue,
Windsor, Ontario, N9B 3P4.
(Home telephone: 519-969-3289)
Date: __________

Dear __________,

I am a graduate student, from England (where I am Head of Physics at a secondary school), working towards my Master's degree in Education at the University of Windsor. __________ was kind enough to call you on my behalf, and I've included some further information about my thesis.

My thesis is a comparison between aspects of the National Curriculum in Britain and the Common Curriculum in Ontario. I am particularly interested in the science program during the Transition Years. Could I please have permission to ask members of your science team to complete a questionnaire, and also to interview a number of them, as well as yourself? I enclose a copy of the questionnaire and an outline of interview areas.

I've also enclosed a copy of my thesis petition. This is a summary of my research proposal which I can let you look at if you are interested.

Perhaps I can call you in a couple of days time? Many thanks for your positive response.

Yours faithfully,
Appendix P

Interview Outline - Teachers

1) How long have you been teaching?

2) How long have you been in this particular school?

3) Do you have a position of responsibility?
   - within the science department?

4) What longer training courses (lasting about a week or
   more) have you completed since your initial teacher
   training?

5) Do you teach Transition Years/Key Stage 3 science
   classes? - which grades?

6) Have you attended any Common Curriculum/National
   Curriculum training sessions?
   - Any specifically for science?
   - Were these training sessions useful?
   - Who organised these training sessions?

7) Has your style of science teaching changed as a result
   of the Common Curriculum/National Curriculum?
   - Do you use a wider variety of teaching methods than
     previously?

8) Do you find information about the science program from
   the Program Department/LEA advisers useful?
   - How detailed is this information?
   - Do you feel remote from the science
     consultants/advisers?

9) Do you welcome the introduction of the Common
   Curriculum/National Curriculum? - why?

10) Do you feel valued as a teacher - within your school?
    - in the wider community?
Appendix P (continued)

11) Has the amount of testing you do changed as a result of the Common Curriculum Transition Years/National Curriculum Key Stage 3 program?

12) Do you utilise a wider variety of assessment methods now, or roughly the same as before?

13) To what extent do you think the Common Curriculum/National Curriculum science program is assessment driven, if at all?

14) England - what do you think about the Dearing Report?

15) Ontario - (a) what are links like between elementary schools and high schools that you have experience of?

(b) what do you think about the Minister's announcement about Parent Councils?

(c) what do you think about the Minister's announcement about an increase in standardised testing?

(d) what do you think about the Minister's announcement that curriculum development be more centralised?

15) How confident are you about the future?
Appendix P (continued)

Interview Outline - Principals/Headteachers

1) Do you welcome the introduction of the Common Curriculum/National Curriculum? - Why?

2) How involved are you in the implementation of the Transition Years/Key Stage 3 science program?

3) Have teaching methods changed as a result of the Common Curriculum/National Curriculum?

4) Do you find information from the Program Department/LEA advisers useful?
   - How detailed is this information?
   - Do you feel remote from the consultants/advisers?

5) Has the amount of testing you do changed as a result of the Common Curriculum Transition Years/National Curriculum Key Stage 3 program?

6) Do teachers utilise a wider variety of assessment methods now, or roughly the same as before?

7) To what extent do you think the Common Curriculum/National Curriculum programs are assessment driven, if at all?

8) England - what do you think about the Dearing Report?
    Ontario - (a) what are links like between elementary schools and high schools that you have experience of?
    (b) what do you think about the Minister's announcement about Parent Councils?
    (c) what do you think about the Minister's announcement about an increase in standardised testing?
    (d) what do you think about the Minister's announcement that curriculum development be more centralised?

9) How confident are you about the future?
Appendix O

The 4 National Curriculum Attainment Targets

Attainment Target 1: Experimental and Investigative Science
Attainment Target 2: Life Processes and Living Things
Attainment Target 3: Materials and their properties
Attainment Target 4: Physical Processes

(Department for Education, 1995)
Appendix R

Benchmarks

An example of BENCHMARKS

GRADE SIX MATHEMATICS - Benchmarks are scored on five levels of performance.

Key objectives from the Ontario Ministry and Toronto Board:
• Use mathematical concepts and arithmetic operations with understanding;
• Apply mathematics to the solution of everyday practical problems;
• Solve problems involving one or more operations with whole numbers and decimals.

BABYSITTING - Applying Mathematics to Everyday Problems
The task for this Benchmark required that students solve a problem which involved babysitting. The students were told that a student named Trevor babysits at a rate of $2.50 an hour up to 10:00 p.m.; after 10:00 p.m., he is paid double. The students were asked to work out how much Trevor would make if he started at 6:00 p.m. and worked for one hour, two hours, three hours, etc., up to seven hours and to record their full solutions.

Students who did well on this activity produced solutions which organized clearly several levels of information such as the times, the amounts of money earned at various stages and the overall total. The students developed the solutions accurately and confidently.

HOLISTIC SCORING CRITERIA

LEVEL FIVE
The student understands the problem and solves it correctly. The information is organized so that it facilitates solving the problem. The student may show several levels of data organization (e.g., times, money, sub-totals). The student takes ownership of the problem which is demonstrated through seeking clarification of the problem, re-reading the problem and monitoring the solution against the original information. The student perseveres and is efficient in solving the problem.

LEVEL FOUR
The student understands the problem and probably solves it correctly; however, the organization of the information is limited. The answer may be calculated mentally and given orally. The student may make some minor errors.

LEVEL THREE
The student does not fully understand the problem, calculates $17.50 for the seventh hour and then doubles $17.50 for the solution. The information is organized by simply listing seven $2.50s or in a way that does not facilitate solving the problem.

LEVEL TWO
The student has little understanding of the problem and may attempt to solve it by simply listing four or seven $2.50s. The intervening steps are not recognized or, if recognized and worked on, are not integrated to reach a final answer. The student does not re-read the problem or check calculations against the original information. The student needs coaching and tends to be confused and disorganized.

LEVEL ONE
Very limited response or no response.

OTHER FINDINGS
The correct solution of $25.00 was obtained by 25 percent of the students. The incorrect solution of 7 x $2.50 = $17.50, in which doubling is overlooked was produced by 18 percent of the students.

OTHER REFERENCES
Additional information can be found in Benchmark M6-16, Applying Mathematics to Everyday Problems. (Teachers are referred to additional Benchmarks on a particular skill.)
Appendix S

Vocational Qualifications in England and Wales: GNQVs

The new Qualifications Framework

GNQVs form part of the new Qualifications Framework which include work-based NVQs and the traditional GCSEs and GCE A/AS levels. These three types of qualifications offer students a choice of learning methods, subjects and opportunities for further study and employment.

What are GNQVs?

General National Vocational Qualifications - GNQVs - are new alternatives to GCE A Level study or more GCSEs.

- Advanced GNQVs - the new ‘vocational A levels’ - are equivalent to two GCE A Levels, and normally take two years of full-time study.

- Intermediate GNQVs are equivalent to four or five GCSEs at grades A-C, and normally take one year full-time.

- Foundation GNQVs are equivalent to four GCSEs at grades D-G, and normally take one year of full-time study.

You can take a full GNQ along with other qualifications - such as a GCE A Level, AS courses, a couple of GCSEs or additional GNQ or NVQ units.

What GNQVs are available?

Many schools and colleges are offering GNQVs in all or some of the following subjects:

Foundation, Intermediate and Advanced Levels

- Art & Design
- Business
- Health & Social Care
- Leisure & Tourism
- Manufacturing

Intermediate and Advanced Levels

- Construction & the Built Environment
- Hospitality & Catering
- Science

From September 1995 Foundation GNQVs should be available in Construction & the Built Environment, Engineering, Hospitality & Catering, Information Technology, Science and Media: Communication and Production.

New GNQVs in Distribution, Landbased & Environmental Industries, Management Studies (Advanced Level only) and Performing Arts should be introduced in September 1996.

(Department for Education leaflet)
Appendix T

The NASUWT view of the Dearing Report

(National Association of Schoolmasters and Union of Women Teachers)

NASUWT REPORT

No.9

July 1994

NASUWT WINS ON ASSESSMENT

The Government's proposals, published on 1 July, whilst conceding external marking, also offer very significant concessions to the NASUWT over moderated teacher assessment.

In his letter to the General Secretary of 1 July, John Patten wrote:

"As you will see, I intend to take steps to reduce further the workload associated with the assessment arrangements for next year. My proposals have evolved in part as the result of constructive discussions my Ministers and officials have had with you and your Association. You will note in particular that we have taken up your suggestion that the tests for 11 and 14 year olds should be externally marked."

Key Stage 1

The mandatory external audit of teachers' own assessments of 7 year olds is dropped. Only the marking of the English and mathematics tests will be audited.

Key Stage 2

There will be no external audit of teachers' own assessments.

Key Stage 3

External auditing of teachers' own assessments, currently suspended, will be permanently abolished.

Teachers will be required to produce their own assessments of pupils' progress in the core subjects. How they do this will be for their own professional judgement. If requested to by parents, teachers will need to report on the level of attainment by attainment targets. There will be no requirements governing the collection of supporting evidence or the keeping of records.

The NASUWT has never objected to traditional teacher assessment which is in effect reintroduced. The Association objected strongly to the workload implications of moderated teacher assessment.

League Tables

The Government has confirmed its decision of August 1993 to abolish league tables for 7 and 14 year olds. The controversial tables at Key Stage 2 will only be introduced when the tests are established. The NASUWT will continue to oppose crude league tables. But it is neither wise nor safe to take industrial action against league tables.

The National Executive next meets on 16 September when it will consider these developments and their implications for the current action.

Nigel de Gruchy said: "If 'snagging up to the Government' produces a reduction in core subject teachers' marking workload of up to 30 hours, if it strips away the bureaucracy inherent in moderated teacher assessment and further reduces workload, if it restores professional independence in assessment, then let's snatch up some more!"

(NASUWT leaflet)
Appendix U

Science in the revised National Curriculum (post-Dearing)

Science

- Prescribed content at all key stages has been reduced, and duplication across subjects has been removed. For example, the study of weather is included in geography but not in science.

- Material previously found in the programmes of study at more than one key stage is allocated to the key stage at which it is most appropriately taught. For example, weathering is included at Key Stage 3, and radioactivity at Key Stage 4.

- The balance between earth science and chemistry at Key Stages 3 and 4 has been adjusted to place greater emphasis on chemistry.

- Some areas of study are introduced later than Key Stage 1: for example 'The Earth and beyond' is introduced at Key Stage 2, and 'Energy resources and energy transfer' at Key Stage 3.

- The level descriptions for level 3 apply to work carried out in the context of the Key Stage 3 programme of study, and the description of 'exceptional performance' draws on some aspects of the Key Stage 4 programme of study.

- The programmes of study for Experimental and Investigative Science at all key stages have been substantially revised to reflect a broader range of experimental and investigative work, and to give increased prominence to qualitative work.
  - There is greater emphasis on the ways in which scientific evidence may be obtained and evaluated, on the ways observations and measurements are made, and on the quality of the data obtained.
  - Work through which pupils can show attainment at the higher levels no longer requires an extensive investigation into several aspects of a question.
  - The level descriptions for attainment target 1 apply to work carried out as part of a whole investigation and to work carried out in other contexts.

- The great majority of pupils are expected to take double science courses or separate GCSEs in physics, chemistry and biology. The single science course is not regarded as providing a foundation for separate science courses at A level.

- The material in the programme of study for single science has been reduced to make it appropriate for GCSE courses taught in half the time allocated to double science courses. The content of the single science course balances the need to consolidate and extend themes included at Key Stage 3 with the need to maintain interest by introducing new material.

(SCAA, 1995b)
Appendix V

A section from the Common Curriculum document

Systems, Structures, and Their Functions

Through exploration of the interconnected systems and structures that make up the world, students develop an understanding of the world as a whole.

<table>
<thead>
<tr>
<th>By the end of Grade 3, students will:</th>
<th>By the end of Grade 5, students will:</th>
<th>By the end of Grade 9, students will:</th>
</tr>
</thead>
<tbody>
<tr>
<td>M14 - compare the design features of a number of everyday items, and indicate which of these features allow people to use each item most effectively (e.g., types of clothing, playground equipment, games from diverse cultures, magnifiers, Velcro shoe fasteners); 2a 3a</td>
<td>analyse familiar products, processes, and systems, and explain how the design has been determined by the function (e.g., an automobile, the postal system, packaging for different products); 2a 3a</td>
<td>analyse the designs of various products, processes, and systems, assess how effectively these products, processes, and systems function and how aesthetically appealing they are, and suggest ways to improve them (e.g., the relationship between types of clothing produced and climate; the processing of dairy products; the functioning and efficiency of a local transportation system); 2a 5c 8b 8c</td>
</tr>
<tr>
<td>M15 - safely use tools and materials in building simple products, structures, and devices (e.g., use hand tools and materials such as cardboard, plastics, and straws to build lances, castles, boats, model cars); 3a 3b</td>
<td>safely use tools, equipment, and materials in designing and building structures, mechanisms, and systems that include control devices (e.g., design and build model gliders of different materials and with different using structures; design and build working models of a drawbridge, hoist, weather vane, thermometer, lift lock); 3a 3b</td>
<td>safely use a variety of materials and industrial-type tools and equipment (e.g., power tools, lathes, robotic components, computer-assisted design programs) in designing, building, and testing products, structures, and systems that incorporate control devices for safe and efficient operation (e.g., produce small engines, pumps, smoke sensors; use concepts of force, stress, tension to test the strength of a model bridge); 3a 3b</td>
</tr>
<tr>
<td>M16 - demonstrate a knowledge of how to build structures and mechanisms by joining similar materials (e.g., by gluing, nailing, sewing, stapling, tying); 3a 3b</td>
<td>use different materials to build structures, mechanisms, and systems that require a variety of fabrication techniques (e.g., conveyor systems, lift bridges, computer-controlled models); 3a 3b</td>
<td>from a range of materials and fabrication strategies, select and use appropriate ones to produce a specific product (e.g., consider requirements for strength, lightness, appearance, and insulation in determining shapes); 10 2a 3a 3b</td>
</tr>
<tr>
<td>M17 - design and build a variety of simple structures and machines, using various safe and familiar forms of energy (e.g., rubber bands, springs, batteries); 3a 3b</td>
<td>design and build devices that use different sources of energy, and compare and assess how efficiently they function and use energy (e.g., build water wheels, treadmills; compare and assess the amount and cost of fuel consumed by different devices); 2a 3a 3b</td>
<td>design, build, test, and evaluate devices that use different sources of energy, and suggest alternative sources of energy (e.g., experiment with solar, wind, and water power; evaluate the efficiency of simple machines); 2a 3a 3b</td>
</tr>
</tbody>
</table>

(Ministry of Education and Training, 1995b)
LINKING ESSENTIAL LEARNINGS AND ATTAINMENT TARGETS / STATEMENTS OF ACHIEVEMENT

Transition Years — AN EXAMPLE — Science — Grade 7

Activity
- Use a microscope to examine both plant and animal cell examples. Use cell structure and other characteristics to develop a tree diagram for classifying living organisms as plant or animal.
From London Document Grade 7 Science: Characteristics/Classification of Living Things.
(Strategies/Evidence/Assessment) see over

Essential Learning Statement(s)

Systems
The student:
- manipulates components (focus) to understand their impact on the system (microscope).

Attainment Target(s)

Science and Technology
The student will apply fundamental skills, concepts, laws and principles of science that contribute to participation in a technological world.

Statement(s) of Achievement

The student (can):
- use a variety of technologies and manipulative materials to support research, experimentation and reporting.
What is the School Achievement Indicators Program?

Canadians have long been interested in how well their education systems are meeting the needs of students and society. To provide information on this issue, the provinces and territories, through the Council of Ministers of Education, Canada, have developed the School Achievement Indicators Program (SAIP). A key part of this program will be a Canada-wide assessment of student achievement in science, to be conducted in April 1996. The mathematics assessment was administered in April 1993 while the reading and writing assessments were administered in April 1994.

How can the SAIP develop a Canada-wide assessment when each province and territory has its own curriculum?

School programs differ from one part of the country to another. Making comparisons of results from these various programs is a complex task. However, young Canadians in different provinces and territories learn many similar skills in reading, writing, mathematics, and science. The SAIP assessments help determine whether or not they reach similar levels of performance at the same age in different provinces or territories.

Educators in provinces and territories have reviewed the assessment materials with respect to their curricula.

Who will participate in the assessment?

A random sample of Canadian students who were 13 and 16 years old on August 31, 1995, will participate in the science assessment.

Is the assessment a test?

The SAIP assessment is not a regular test or exam; the results will not affect an individual student’s academic record in any way. Results will be reported for provinces and territories only, not for individual students, schools, or school jurisdictions. Students’ names and the name of their school will not appear on the answer booklets.

What will participating students be asked to do?

Individual students will take part in either the assessment of science content or of science inquiry skills where possible.

The students will spend up to two hours answering questions or completing tasks to demonstrate their levels of performance. They will also fill out a questionnaire that asks for related general background information.

Students will write the assessment in their language of instruction, French or English.

Will the assessment be fair to students across Canada?

The questions and tasks were field-tested across Canada. Teachers from across Canada reviewed the assessment materials as part of the field testing process. Students were also given the opportunity to comment on the questions and tasks.

Educators in the provinces and territories reviewed all assessment materials to ensure that they were as free as possible from cultural and gender bias and stereotyping.

Each assessment is designed to measure a sample of a range of abilities and to give all students an opportunity to show how well they can do. Some questions and tasks will be relatively easy for many students while others may be relatively difficult.

How do students prepare for this assessment?

Schools will receive information bulletins describing the assessment well in advance of the administration date. These information bulletins will include sample questions. Teachers, parents, and students will be able to review the sample questions if they wish. However, students will not be able to study for these assessment activities as they could for a school exam.

Because the assessments are designed for 13- and 16-year-old students, they cover a broad range of knowledge and skills.

Students participating in the science assessments will need an HB pencil, an eraser, and a calculator. They may use a ruler. A formula sheet and all necessary data tables will be provided.

Is the assessment really necessary?

A large number of Canadians believe that we need more information about how well students are doing. The Ministers of Education are responding to parents, teachers, and many other Canadians who want and need answers to questions such as:

- “How well do students in Canada solve scientific problems?”
- “Does the achievement in science by Canadian students change over time?”

We already have some provincial and territorial data, and some international comparisons, but there has been no Canada-wide study of student achievement in science.

The SAIP assessment will help fill part of the picture about the achievements levels demonstrated by 13- and 16-year-old students across Canada, and also about the extent to which skills and knowledge develop between the ages of 13 and 16.

The results will provide valuable information for decision makers.
VITA AUCTORIS

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