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PRIME MINISTER

NATIONAL CURRICULUM: MATHEMATICS AND SCIENCE

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DECISIONS

Mr Baker seeks agreement that he should publish the reports of the Working Groups on the mathematics and science sections of the National Curriculum, and the Government's proposals on them. This will be the start of a formal statutory consultation process. The next step will be for the National Curriculum Council to advise on the detailed attainment levels and programmes of study in these subjects. Thereafter there will need to be an Order under the Education Reform Bill next February, which will introduce the national curriculum for mathematics and science into schools in autumn 1989.

2. It will not be possible for the Sub-Committee to work through the proposals in detail: there are too many of them. But you may wish to take the opportunity to stand back and consider whether what is emerging is on the right lines. If you think that it is too elaborate and hard to follow, you may wish to explore with Mr Baker whether the Government should ask the National Curriculum Council to make the edifice of attainment targets proposed by the two working parties:

i. simpler;
ii. free from unnecessary jargon;
iii. more comprehensible to parents and teachers;
iv. more precise and directed to the key things which children really need to learn.

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BACKGROUND

3. The mathematics and science working groups were commissioned last July to produce reports on the national curriculum in their subjects for ages 5-16. The mathematics group got some publicity at the beginning of this year when one of its members, Professor Prais, resigned, on the ground that it was adopting an insufficiently rigorous approach. Mr Baker considers that the group's final report largely meets the criticism. The first Chairman of the mathematics group also resigned, for personal reasons; his successor, Duncan Graham, has now been appointed Chairman of the National Curriculum Council.

4. Mr Baker proposes to publish the two reports, and the Government's comments on them in August (at the meeting he may suggest this happens on 22 August, rather than 15 August as in his paper). The National Curriculum Council will then consult publicly on both the reports and the Government's response. The Council has to put its final recommendations on the national curriculum in mathematics and science to Mr Baker by 30 November. The Government then has to prepare draft Parliamentary Orders, allowing for one month's statutory consultation on these, and table them by February-March next year. This will allow six months for teacher training and the preparation of teaching materials and tests before introduction into schools in September 1989.

ISSUES

Complexity

5. The aim of the national curriculum is to ensure that all pupils between the ages of 5 and 16 study a basic range of subjects, including mathematics and science; to enable the progress of pupils to be assessed in the light of syllabuses and attainment levels at around 7, 11, 14 and 16; and to let parents, teachers and children know how well each child is doing. The main question for the Sub-Committee is whether the working party reports provide a satisfactory basis for doing this.

6. Mr Baker proposes to question some features of the reports in the comments which he will be publishing on them: for instance, the exclusion of long division and long multiplication from the attainment targets in the mathematics report (see paragraph 13 of his paper) and the insufficient weight given to knowledge and understanding (as opposed to exploration and investigation) in the science report.

7. Even so, the whole system seems extremely elaborate and hard to follow. The Sub-Committee cannot be expected to go through all the attainment targets in details. But you may wish to ask whether the National Curriculum Council could be given a general remit:

i. to simplify. In mathematics for example, the working group recommends 15 attainment targets each with up to 10 levels: up to 150 defined levels of attainment for one subject. A similar number is proposed for science. You might ask whether all this could be streamlined. To take just one example, is it necessary in science to have a separate attainment target with 10 levels devoted to "Human influences on the Earth" which begins with an exploration by children of everyday waste products (Attainment Target 4)?

ii. to cut out jargon. Some of the language in the reports is hard to follow, despite the glossary in Annex E to Mr Baker's paper. Is it, for instance, necessary to use terms like 'profile component' or phrases like 'attainment target', 'level of attainment', 'statement of attainment' which sound the same but mean different things?

iii. to make it comprehensible to parents. The Sub-Committee when it discussed the Black report agreed that the curriculum should make it clear in detailed and specific terms what level of attainment in each subject an average pupil was expected to achieve by the age of 7, 11, 14 and 16. The Science report attempts to give some indication of what children should be doing in particular age ranges for each attainment target, but it is not clear how these tie in with the 10 levels of study for that target. The Mathematics report does not seem to go this far.

Both reports have had difficulty fitting some of their attainment targets into the 10-point scale (see paragraph 9 of Annex A to Mr Baker's paper and paragraph 15 of Annex B);

iv. to make the attainment targets precise and relevant. Mr Baker himself expresses concern about the lack of precision in some of the attainment targets: see for instance paragraph 14 of Annex B of his paper. Would it not be possible to return to labels which people recognise, like physics, chemistry and biology, at least for secondary school children?

Testing

8. The working group has no formal part in settling arrangements for testing and assessment, and Mr Baker's draft response does not comment on their proposals in this area. Nevertheless, if there was anything in them to which the Government objected, it might be as well to say so now. There are two points of doubt:

i. the mathematics Working Group apparently recommends (paragraph 9.15) that tests at age 7 should take the form only of 'extended tasks'. Should there be uniform written tests at age 7?

ii. The science group recommends (paragraph 6.37) that except at the top of the age range teachers' assessment should have a 70.30 weighting compared with external assessment. Should much more weighting be given to external assessment?

9. More generally, you may wish to ask Mr Baker when he will bring forward his proposals for assessment methods in these two subjects.

Effect on resources and staffing

10. Mr Baker's draft proposals note (paragraph 3 in Annex A and B) that the working groups make recommendations on resources, staffing and teacher training. He gives no views on these, but says that he is ready to receive comments. You may wish to ask what these resource implications might be, and consider whether it would be wise to take a more discouraging line on them.

Mathematics

11. The working group recommends that 'practical applications' of mathematics should have a 40% weighting in measuring attainment. These cover such matters as 'personal qualities' and seem vague (see the attainment levels at the end of Chapter 7). Mr Baker proposes that the targets for this component should be subsumed where possible into those for the knowledge and understanding components (paragraph 8 of Annex A). You may wish to go further and suggest that Mr Baker tells the N.C.C. that the Government does not wish to have separate targets for practical skills in mathematics.

12. You may also be concerned about the level of skills in arithmetic. Paragraph 3.11 of the group's main report says that in 1981 only 36% of 13 year olds could correctly calculate the average of 3 numbers (15% less than could do so in 1964). This is not encouraging. There are two disturbing points in the report. It says (paragraph 3.32) that, with calculators available, it is no longer important to 'drill' pupils in pencil and paper methods. It also appears that learning tables up to 10 x 10 should be included at Level 4, for an average 11 year old (number target 2 at the end of chapter 5), whereas it might have been thought appropriate for Level 3, that is for an average 9 year old and a bright 7 year old. Taking these points together, you may wish to consider whether basic numeracy gets enough emphasis in Mr Baker's proposals.

Science

13. Mr Baker proposes to reduce the minimum time to be spent on science by older pupils from the one-sixth suggested by the science working group to one-eighth (paragraph 17 of Annex B). You were earlier concerned that basic science should not suffer to make room for technology. Are you content with Mr Baker's proposals to reduce the minimum time spend on basic science?

Further consideration of the National Curriculum

14. The English working group are due to report on 30 September. Mr Baker says it will be necessary to start consultations on attainment targets for English in primary schools during October to allow for the possibility of introducing some aspects of the English curriculum

in autumn 1989 (paragraph 27). You may wish to ask that he circulates this report, and his draft comments, in October - before any consultation begins.

15. Depending on the discussion, you may also wish to ask Mr Baker to circulate the draft Orders on the mathematics and science curricula, at around the turn of the year, before he publishes them in a final round of consultation.

HANDLING

16. You may wish to ask the Secretary of State for Education and Science to introduce his paper. The Secretary of State for Wales, as a co-author, may wish to speak next. The Secretary of State for Trade and Industry, the Chief Secretary, Treasury and the other regional Secretaries of State may wish to comment. Other Ministers may wish to contribute to the discussion.

RJW.

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Cabinet Office
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