Developments & Challenges in Australian Environmental Education

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This year of 1990 is an appropriate time to review the place of environmental education in the Australian school curriculum. After a period in the mid 1980s when environmental issues and political attention to the environment were on the back burner in comparison with economic issues, the environment is again a top international political priority. With Green victories in a number of European elections, even the hitherto unmindful Thatcher government in Britain is claiming an environmental concern and announcing several conservation measures, albeit with rather distant targets compared with a number of their prospective partners in Europe.

The Hawke government in its third term sensed a growing environmental disenchantment among its supporters, and appointed one of its heavy-weights to the Environment portfolio. This move, and the strong action he took over several sensitive issues, were enough to keep the Green preferences in line and ensure in 1990 a fourth, unprecedented Labor term of office.

The first Australian government involving official Green support appeared in Tasmania and in most of the other states the governments have upgraded Conservation and the Environment among their ministries.

Most Australians, according to a poll conducted late in May (The Age, 15 June, 1990), feel that the threat to the environment is real, and that its protection should be put ahead of economic growth. Such strong public support for the environment would have been unthinkable a decade ago, even though the evidence for much of the now widely recognised damage to the Australian and global environment was available.

There have also been some remarkable changes in what were very polarised relations between conservation groups and those more aligned to development. For example, the National Farmers Federation and the Australian Conservation Foundation are working together to promote the concept of Land Care. A very broadly based coalition of community interests are working together as Australian Greenhouse Action. Reforestation as a local, regional and national goal enjoys enormous bipartisan support whereas even seven years ago its advocates were seen by the majority as radical.

Sustainable development has been coined as a convenient slogan for this new-found unity. Although there are a number of major remaining differences

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over the meaning of this ambiguous slogan, there are encouraging signs of community, business and union action *for* the environment. *Proof of damage before action* is beginning to change to *proof of safety before permit.*

Where in these general movements *for* the environment is the curriculum of schooling? In a number of ways the environment was recognised by Australian schooling in advance of its wider societal recognition. The priority given to environmental education (EE) by the Curriculum Development Council in its first incarnation during the mid 1970s was exceptional on international standards. It helped to give EE a substantial toe-hold and a corps of supporters around the states and in Canberra.

The demise of the CDC and the absence of an EE priority in its second incarnation in the 1980s was a loss to EE. A national contribution, however, has continued through the biennial meetings and publications of the Australian Association for Environmental Education and in a variety of ways from the education officers in the Environment Ministry.

The state systems through the 1980s tended to constrain the development of EE along with many other curriculum fields by removing consultancies and reducing field staff. Some curriculum development work and professional development continued but often this was disrupted by the series of major reorganisations that were occurring in a number of the systems.

In 1985 Victoria embarked on the most radical reformation of upper secondary education yet undertaken in Australia. The detailed curriculum developments that have followed have taken place during the same time period and in the same national context as the moves *for the environment* that were referred to at the beginning of this paper. These new curricula thus provide an obvious opportunity for monitoring the extent to which education at its most publicly scrutinised level is keeping pace environmentally. This paper is a report on some aspects of this monition.

There are, of course, ten or eleven other years of schooling in Australia and it may be that the new Victorian curriculum for Years 11 and 12 is no guide to the health of EE at these levels. There is, however, enough evidence, from other areas of the curriculum, for the claim to be made that the presence of EE in Years 11 and 12 is the key to establishing it firmly in the curriculum of the earlier levels. In the absence of the legitimation the curriculum of the senior years provides, a subject (and particularly interdisciplinary ones) tends to remain optional, existing as a result of enthusiastic teachers and permissive or encouraging principals. When these supports go, the associated learnings are likely to disappear. This is quite different from what happens in lower secondary if a science or history teacher leaves, or with number and language which maintain their presence, come what may; in the primary years.

Hunt (1990) has reported on the confusion in the Victorian Ministry as to how the environment is to be related to the knowledge areas of the school curriculum in years 9 - 10. He also reports that an evaluation of EE in a number of

member countries of OECD found that EE was marginal to the school program, an 'add-on' to the curriculum dependent on a committed teachers (CERI, 1988).

Environmental Science and the Post Compulsory Curriculum Reform in Victoria

The reform that the Victorian Curriculum and Assessment Board (VCAB) has undertaken involves a rationalisation of more than 2000 courses of study. These had evolved or been created in the fragmented Victorian system of schooling to cope with the rising tide of young people staying on for full secondary education as structured unemployment bit, from 1975 onwards, into their traditional prospects for life beyond school.

In the climate of mid 1970s it had not been too difficult to use a moribund but traditionally respectable subject, Agricultural Science, as the base from which a new course of study, Environmental Science, emerged. Because of its base and the expansive climate at the time, this subject in Year 12 had Group I status. This meant that students could have their scores in it counted as part of the "best four" total, that determined whether or not they could enter the very selective and highly competitive faculties and courses in Victoria's universities and colleges of advanced education. Over the decade since its early development, the subject had gained significant attention of students and schools. It was not in the big league of the more populous HSC subjects, but it certainly was not in the bottom group.

When VCAB was created, it set up seventeen umbrella Fields of Study as the main structural feature for its rationalisation task. Environmental Science was with the five other previous science subjects under the Science Field of Study Committee (FOSC). Under new guidelines developed by this committee, each of these subjects was to be reformed and a study guide produced for four units for study to be associated with the semesters of Years 11 and 12. In 1988 this arrangement was challenged by forces within the Board but outside the Science FOSC. The continued existence of the subject was very seriously threatened and only a most concerted campaign of resistance by the supporters of the subject and the Victorian Association for Environmental Education enabled it to survive. Indeed, without the overt support provided by the then Minister for Conservation it is probable that this specific example of environmental education would not be part of the new Victorian Certificate of Education (VCE). The support within Education alone would not have saved it. It has survived but not without loss. It has not been allowed to remain in the Science Field (despite the support that it had from the FOSC) and it has been forced to drop "Science" from its name to become "Environmental Studies" in the Field of Study previously known as Geography but now entitled "Earth Studies". Ironically Geology has not been required to join this field. About the same time Psychology was placed in the Science Field against the recommendation of that FOSC.

That this could occur at a time when it might have been expected that Environmental Science could have expected stronger support from the

establishment makes an analysis of the educational arguments important. The existence of EE at this level of schooling is, for the reasons stated above, very important and Victoria, it had appeared, had achieved more for *the environment* through this subject than any other state as yet.

Several arguments were put forward in support of abolishing the subject. The first was an attempt to hoist environmental education on its own petard. Environmental educators have, since its origins in the 1970s, acknowledged that there is a weakness in a sectional and optional subject approach. Ideally, they have argued that there should be a clear and explicit dimension of education for the environment in each component of the curriculum, and that an environmental ethic or intention should over-arch the whole curriculum and indeed the life and practice of the school and educational system. Until this ideal is well on the way to being achieved, and its correlates are manifest in the curricula of other subjects, it has equally strongly been argued that environmental subjects need to exist to exemplify what environmental education is. The argument was put that it was policy for all the FOSCs of VCAB to include the environment as a factor in the development of their studies and that therefore the separate subject was no longer necessary. The substance of this argument can be assessed from the data reported later in this paper. This argument had the bureaucratic authority of a hierarchy of policy statements, and could have been a strong one since such authority is commonly used to control and influence the curriculum. Bureaucracies tend, however, to be selective about the exercise of these authorisations. No explicit encouragement had been given to FOSCs to implement this policy about the environment and no corrective comments or sanctions (and many others have been forthcoming) about it have been generally delivered to writers or FOSCs.

The second argument is epistemological in character. Essentially it said that the knowledge to be learned in Environmental Science was extensively included in Geography and that some of it overlapped with knowledge in the other sciences. Accordingly, since VCAB had a policy of avoiding overlap, Environmental Science should not exist. It is interesting, of course, and not without relevance to both the dominant epistemological perspective among the VCAB hierarchy and to the disciplinary backgrounds of some of those in that hierarchy, that, on the first point of substantial overlap, it was Environmental Science, not Geography, that should be dispensed with.

It is true that the environment has and does feature substantially in curricula for studies in Geography. However, in the taxonomy that has been so commonly used in Australia to clarify the nature of environmental education (Lucas, 1977), these geographical studies are studies *of* or *about* or *in* the environment and not studies *for* the environment.

It is also true that there is some overlap of concept words between the curricula and for the sciences and Environmental Science. The Science FOSC, like all other recent curriculum reforms of science internationally, had espoused a Science - Technology - Society (STS) framework for the development of its

various units of study, and in this sense was more likely than in the past to include some environmental aspects among the many sorts of interactions that an STS stance suggests. There has been and still is (see below) quite a major difference between the propositional meanings that the scientists and the environmentalists associate with these concepts for their students to learn.

As the discussions between the two camps over this second argument proceeded, it emerged that there were profound differences in their epistemological views. The situation was typical of what Robottom (1987) described as "contestation" in his extensive studies of the brief history of EE, but the threatening outcome was not "consensus" but extinction. The environmental camp saw values (such as commitment to improving environmental quality and concern for the genetic pool for endangered species, and for non-renewable resources), cognitive tasks (establishing alternative environmental possibilities), and social skills (such as decision making, exposing the value positions of different groups, communicating issues and appropriate action in environmental issues) as things to be learnt. They are "objects" for learning just as much as are the facts about environments and the concepts that disciplines have invented to summarise and explain these facts.

The VCAB hierarchy seemed to see all but the facts and concepts and their associated technical skills, like mapping and measuring, as ways of teaching or motivational aspects of the study - means to (not ends of) learning. Furthermore, despite the existence of the State Conservation Strategy as one of the three planks of current Victorian government policy and the growing consensus of environmental concern referred to at the beginning of this paper, this epistemological view ruled as unacceptable goals for learning some very widely held environmental value positions.

It is not surprising that these two epistemological camps differed on whether Environmental Science warranted the term "Science". This argument has been played out in other forums in Victorian education such as Monash University where a number of staff in the Science Faculty from time to time, have not been comfortable with various studies that have been included in that institution's Master of Environmental Science. In the VCAB case, the inability to see Environmental Science as "Science", however, lay with the non-science hierarchy and not with the Science FOSC itself.

This epistemological view of science as factual and conceptual among the non-science hierarchy of VCAB, has led to clashes between the Science FOSC and the hierarchy that have resulted in limits being placed on approaches to science the FOSC had wished to include. In part, such a view can be attributed to limitations in those who have not themselves experienced the dynamic and social nature of scientific knowledge, discovery and application. In part, however, it seems to be an inevitable outcome of a large scale and co-ordinated reformation of the curriculum. A bureaucratic epistemology arises that is apparently necessary to get 44 Study Guides in 17 Fields of Study to the printer by a certain deadline.

Each Study Guide has to present its curriculum under similar sorts of headings and with formats that conform to a style, whether or not these best reflect the epistemological priorities of what, after, all are very disparate fields of learning.

A similar bureaucratic epistemology emerged when the previous reorganisation of curriculum in Victoria occurred in the 1970s. Student designed options in physics - the first subject to encourage optional studies in Year 12 - were lost when the Victorian Institute for Secondary Education decided that all subjects must have optional studies and that they must all be prescribed in the course details.

Environmental Education and Other VCE Studies

Under the structures the Victorian Curriculum and Assessment Board (VCAB) has established for its definition and legitimation of curriculum content, the study design is the authoritative feature. It is a set of specifications for the development of a course of study. In this sense they are intended to serve much as do "uniform building regulations" in Australian housing. These regulations in states of Australia provide specifications of many details about building that must be complied with. It is possible, however, to build houses that all comply, but which look very different and are different to live in. On the other hand, many compliant houses could also be essentially the same.

Some Victorian teachers may (indeed they are encouraged by the rhetoric to do so) develop courses that include other unprescribed content emphases. The study design provides, however, the only statements of the "guaranteed" content.

VCAB has also incorporated some unusual ways to specify a curriculum in these study guides. They have outlined in some detail Work Requirements. These are activities that students are required to undertake in each unit. They are to be assessed as satisfactorily or unsatisfactorily completed, and to contribute to the award of the VCE. In units 3 and 4 in each study design (essentially for study in Year 12), there are also Common Assessment Tasks (CATS) which will be graded and are important for selection purposes beyond school.

The control by VCAB of these work requirements and assessment tasks means that there is some guarantee that certain sorts of learning experiences will occur and they are certainly much wider in type than was assured in the previous year 12 award, the Higher School Certificate (HSC). On the other hand, their detailed specification is likely to discourage all but the most confident of teachers to add other sorts of learning experiences. VCAB has thus set out to extend the "knowledge of worth", but in doing so has set new boundaries for it in the eyes of most teachers and students.

In the sections that follow, the findings of a content analysis for EE in the accredited or most recent study guides for twelve of the forty-four studies, are reported . The bases for choosing these eight were (a) some established subjects that have been related to the environment in the past (Biology, and Science previously as Physical Science) (b) some that are now strongly linked in the

community to the environment (Chemistry, Geology, Physics and Economics) and (c) some that have obvious potential for links (Australian Studies, Mathematics and the three studies that make up Technology Studies).

The two content emphases that were explored were (a) content and learning activities that would contribute to *education about the environment* and (b) content and activities that would contribute to *education for the environment.*

Economics

Economics is one of five studies under the Business Studies FOSC that have as their central purpose "the development of understanding of the world of business and its operation within society". The study guide emphasises "the key role which business related activity plays within the total fabric of society". It also proclaims that Economics is about "the forces which determine how production occurs and the proceeds are distributed". It suggests that "conflict resolution arises from the need to make choices within constraints and such resolution involves an understanding of the interdependence of economic factors and the outcomes of economic decisions".

For each of the four units of study there is a list of concepts and among more than fifty, "material resources", "scarcity of resources", "standard of living", "conflict", "conflict resolution" and "competing economic objectives" could in the right contexts contribute to EE. None of the many contexts or areas of study listed, however, hints at environmental issues in Australia or raises environmental aspects of comparative economic advantage. This is also the case in the detailed suggestions for the Work Requirements.

Technology Studies

The FOSC for Technology Studies characterises them as people using tools, mechanisms, machines, processes and various resources to produce a desired product. It states that each of its three studies are to place an emphasis on the relationship between human needs, human values and technology.

For *Technological Design and Development*, the FOSC states as one of its five essential features, "the development of informed opinions about environmental, social and economic issues related to the use of technology in society". A similar statement appears in the long list of aims as does "to recognise and create safe and healthy working environments".

The schematic plan indicates that *environmental issues and the designer* are introduced in Units 1 and 2 as a major area of study in Units 3 and 4. The details of Unit 1, however, make no reference to environmental issues and the only references in Unit 2 are confined to health and safety in the workplace and ergonomic aspects of production and the use of products. In Units 3 and 4, as per the plan, *Social and Environmental Implications of Technology* is one of three areas of study and a major work requirement is involved. The independent investigation for Unit 4 suggests alternative energy sources, fuel-efficient vehicle

development, reclamation of eroded or saline land, development of synthetic fibres, and alternative food sources as appropriate topics.

Systems and Technology, likewise, has as an essential feature, "appreciation of environmental, social and economic issues related to increasing use of technological systems in society". This feature is evident in the aims, "develop a knowledge and appreciation of issues related to the increasing use of technological systems in society", and "make considered value judgements about the effects of the use, control and development of technological systems on individuals, society and the environment".

These aims, however, then seem to disappear since neither of them obviously relates to the table that sets out how sixteen areas of study (learning) are to be developed through the four units. The details of Unit 1 and Unit 2 make reference to health and safety in production, but no reference to the impact of systems or their maintenance on the environment. The aims resurface in Unit 3 in the major study, *Comparison of Alternative Technological Systems* (such as nuclear versus solar energy or internal combustion engine versus electrically powered vehicle). This study should include the "use of non-renewable resources" and "health and safety" as two of the four comparative criteria.

Materials and Technology states that the third of the studies is designed to enable students to "develop an awareness of the social and environmental implications of the production, use and disposal of materials" along with ten other aims.

Unit 1 states that "the environmental effects of the use of the material or materials" for a specific purpose is to be included in the study of the Characteristics and Uses of Materials but it is not an explicit part of any of the work requirements. In Unit 2, "awareness of the implications of the disposal of materials" is an objective and a sub-area of Selection of Compatible Materials. The students do not appear to have to deal with the issues of the disposal of their own materials in the work requirements. Units 3 and 4 have Conservation of Natural Resources as a major area of study and the work requirement of a folio is to include a "social and environmental issues" section.

Australian Studies

The FOSC states that the aim of Australian Studies is "to assist students to be informed and thinking members of Australian society, to learn more about Australia and its place in the world, and to value what they consider to be good in Australian society and identify what they consider needs to be changed".

None of the four areas of study refers to the environment. Unit 2, Australia's People and Patterns of Work, has "the physiography of Australia influences where people live and the ways they experience work" as a major proposition for study, and Unit 4, Australia : A Technological Society, proposes that "options exist for the ways individuals, industry, and government consider and implement technological innovation". These propositions have obvious

implicit environmental potential. The first becomes explicit in the requirement that "the development of particular industries in specific regions and the effects of this on the environment" be part of its exploration. The second becomes explicit in the direction that "conservation and the environment" be part of the exploration. On the crude assumption that each proposition will have equal attention in the study and that the exploration directives also command equal time the environmental dimension would appear to be about 5 percent of these studies.

Mathematics

In the introduction the FOSC states that "solving problems of an unfamiliar and non-standard kind, and using mathematical modelling as a tool in applying mathematical knowledge to real world problems" is one of the three kinds of learning activity that underlie the study.

Throughout the details for each of sixteen units that are described, a number of real world applications are listed. No environmental issues are included explicitly, although "growth and decay", "risk analysis", "radioactive decay" and "population" have obvious environmental potential.

Given the emphases in the work requirements to problem solving in the real world, and to independent investigations of issues it is disappointing that the many environmental situations that involve the concepts of *space and number*, *change and approximation*, and *reasoning and data* are not offered as very suitable sources.

The Sciences

The Science FOSC has developed six study designs, and their content analysis will be reported as a group of studies.

The FOSC has espoused an over-arching Science-Technology-Society approach in keeping with almost all other contemporary international developments in science curricula (see Holman, 1988). This has led to repeated references in the introductions to the study guides to "social impact", "social usefulness", "social problems", and to science/society, except for Psychology which at this point is very individually oriented.

Physics, Chemistry, Biology and Science quite explicitly refer both to the importance of the sciences for solving social and environmental problems and to the problems that the applications of science in the form of various technologies have caused. Geology and Psychology are more oblique, although the former does have as an aim "the responsible use of the earth's resources" and the latter aims at "becoming familiar with complexities and variations in thoughts, feelings and behaviours and enhance understanding of themselves and others".

A notable aim in most of the science studies concerns the skills of communication. This reflects the S-T-S approach in which communication in science, and of science to others is very important. Communication skills are likewise essential outcomes of EE. Biology and Science refer to the place and use

of science knowledge in social decision making. Only Chemistry refers to "ethical questions" but Geology aims at "responsible" use, and Science aims at "awareness of... the limitations of scientific knowledge and development".

To see to what extent this societal and environmental rhetoric is carried into the details for the units and their Work Requirements, their content was qualitatively and quantitatively assessed. The qualitative criteria, as indicated above, were (a) learning *about* environmental situations that should lead to an understanding of the science that is involved, and (b) learning knowledge and skills *for* environmental situations that relate science to alternatives possibilities, to decision making, to problem resolution, and to communicating the nature of issues. Four quantitative categories were developed. The highest, ***, was associated with a unit if the description of the Unit and its Work Requirements implied that these environmental emphases were repeated a number of times throughout its study. The second category, **, applied to units where there is more than one environmental reference but their learning does not appear to be a major outcome. The third category, *, is used for isolated environmental references, and category four, zero, is self-explanatory.

The word "environment" occurs many times in these units but in both Psychology and Biology some of these uses are to the immediate surroundings of an organism or individual and not to the meaning of interest in this paper.

The results of this content analysis are shown in Table 1.

Summary of Results

EE survives in the new VCE as a subject but with reduced status (at the time of writing it is threatened again with non-approval by the University of Melbourne as a selection subject for most faculties).

There has been very little penetration by the environment in the reformed studies for Economics and Mathematics, two subject fields that now have many obvious associations with it in the wider societal scene. In Australian Studies and Technology Studies, two new fields without the weight of traditional content, there has been, respectively, a slight and a quite substantial inclusion of an EE dimension.

Apart from Psychology in which the environment as a personal or social issue is ignored, there has been significant progress in the recognition of the environment by the science subjects. It is disappointing that Biology, Geology and Physics did not extend this recognition to their later units but Chemistry and Science certainly have.

Challenges for EE

If these curricula are practised pedagogically, from 1991 onwards, in ways that approach the intentions in their study guides, more students will experience EE in their VCE than was the case in the Higher School Certificate; but just how extensive and with what qualities this gain will be remains to be seen in 1991 and

beyond. Environmental educators will need to be clear about what has been achieved so far and what developments they want to pursue in the next few years, after the advent of the VCE.

Environmental Studies will need to be guarded carefully as a model and testing ground for EE, but it is unlikely that it will be an influence on the majority of students. There is clearly a lot of scope for further inclusion of EE in most of the 43 other studies. Four possibilities emerge from the analyses in this paper. The first relates to the conceptual clarity VCAB has required in its study guides. In each of the studies that have been analysed concepts or conceptual propositions have been listed that do have environmental significance that is not identified by the curriculum planners and writers. Although areas of study and societal applications are suggested in the guides to assist teachers to extend the limited intentional, or abstract definitional meanings of these concepts, extensions to the environment are missing. Environmentalists and environmental educators should engage in dialogue and workshops with members of these fields of study so that they conceptualise these environmental extensions themselves, become confident of their pedagogical possibilities and thus include them in the first revisions of the guides.

The second challenge also refers to the conceptual content of the studies, but involves concepts that are not, in general, yet present. In the real world interface between disciplinary thinking and the environment there are phenomena that become described in concepts that formal education has largely neglected. For example, in the physics of sound, frequency and amplitude are familiar concepts. Pitch and loudness and their measurement and applications are social correlates of these that are now being accepted by physics teachers. Noise pollution, noise damage and the monitoring of noise levels are the corresponding concepts that are needed to describe the environmental interface with sound. Physics teachers are the natural ones to deal with these socio-physical concepts in schooling if they are to be included in the curriculum of schooling.

For every field of study there are these socio-disciplinary concepts. Shelf life, toxic level, acceptable dose of radiation, social risk, available resource and net economic welfare are but a few examples of these that are yet to be addressed by the curriculum of schooling. Educators, environmental and disciplinary, will need to be helped by those scientists and lawyers who are dealing with actual environmental issues if we are to incorporate these cognitive cutting edges for identifying and resolving environmental issues. Chemistry in the VCE is to be congratulated for tackling "waste" so substantially. Mathematics has also made a beginning with its reference to "risk analysis".

The third possibility relates to the defence that VCAB's bold experiments at assessment will need if they are to be sustained. The wide range of activities in the work requirements and the CATS are responsible for most of the EE *for* the environment reported above. It is through involvement in, and practice of valued activities that the cognitive and social skills needed for environmental action will

be learnt. The emphasis the study guides give to them is already under open attack from some university quarters and more passively from unenthusiastic and traditional teachers. Environmental educators will need all the skills and enthusiasms to support the VCAB intentions in the face of conservative teachers and traditional university views of knowledge and selection procedures.

The final possibility is more subtle. It is known that active involvement in issues is a more effective way to develop relevant values and attitudes than is the provision of cognitive information. VCAB's work requirements encourage investigations and projects. These, however, are also part of its assessment processes and they can, accordingly, easily become to be seen as teachers' requirements rather than as the students own property to acquire. They offer newly legitimated opportunities for teachers to educate the students rather than teach them - a challenge indeed for most of us.

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Table 1: The emphasis on environmental education (EE) in the study guides for VCE science units.
(a) EE *about* the environment; (b) EE *for* the environment.

STUDY DESIGN	UNIT 1	UNIT 2	UNIT 3	UNIT 4
BIOLOGY	Organisms in their Environment (a) (b) *** ***	Functioning Organisms (a) (b) * *	Survival Mechanisms (a) (b) ** zero	Biological Continuity and Change (a) (b) * *
CHEMISTRY	Materials (a) (b) *** ***	Chemistry in Everyday Life (a) (b) ** **	Chemistry and the Market Place (a) (b) * *	Energy and Matter (a) (b) ** **
GEOLOGY	Geology of Victoria (a) (b) * zero	Earth Resources and their Use (a) (b) *** **	Origin and Structure of the Earth (a) (b) zero zero	Unraveling the Earth's Past (a) (b) zero zero
PHYSICS	Heat, Light, Radioactivity and Nuclear Energy (a) (b) *** ***	Movement and Electricity (a) (b) zero *	Investigation, Sound Electronics and Electric Power (a) (b) * *	Motion, Gravity Structure and Materials, Light and Matter (a) (b) zero zero
PSYCHOLOGY	Develop-ment of Behaviour (a) (b) zero *	Self and Others (a) (b) zero zero	Experiencing the World (a) (b) zero *	Learning, Memory and Thinking (a) (b) zero zero
SCIENCE	Using Resources to meet Human Needs (a) (b) *** ***	Creating Products for Society (a) (b) ** **	New Technologies and Society (a) (b) ** **	Changing Views of the Universe (a) (b) zero *

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