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INTRODUCTION

In the current exhibition in the National Museum in Canberra celebrating the 200 years of Charles Darwin's birth and 150 years of the publication of the Origin of the Species there is a comment about Darwin's attitude to school. ... he was an indifferent student...school bored him... he despaired at Latin and memorization, "every verse was forgot in 48 hours" and he never tired of studying the wonders of the natural world....

If Australia has to have a National Science curriculum let us make sure that it does not bore and that it does engender ongoing lifelong delight in scientific inquiry and study.

The timely publication of the Cambridge Primary Review as The Australasian Association for Progressive and Alternative Education (AAPAE) is finalizing the submissions to the National Curriculum Framing Papers addresses many of the issues which are important to the learners, parents and teachers in alternative, progressive and democratic schools. We urge the Board and the writers of the Curriculum to consider the findings carefully.,

(Alexander, R.J. and Flutter, J. (2009) Towards a New Primary

Curriculum: a report from the Cambridge Primary Review. Part 1: Past and Present.

Cambridge: University of Cambridge Faculty of Education.

<http://www.primaryreview.org.uk/Publications/CambridgePrimaryReviewrep.html>)

AAPAE is pleased to read that the Science framing paper goes a long way to addressing and changing this problem expressed as

".....concern about the handling of science in the national curriculum, arguing that it valued content over scientific understanding and investigation. The submission from the National Inspectors and Advisers Group for Science (NAIGS) felt that science teaching had been skewed by the demands of formal assessment."

(S12-16) AAPAE particularly welcomes the recognition of the value and need to enjoy, explore and build on the natural curiosity and investigative processes of childhood and acknowledge that this flourishes given space and time to PLAY
(S16) AAPAE also welcome the inclusion of “recent evaluation of science learning in United Kingdom schools, the report by science Inspectors concluded that the main factor in the schools with the highest or most rapidly improved science learning was their commitment to science inquiry. In those schools students were given the opportunity to pose questions, and design and carry out investigations for themselves (Ofsted 2008). The ability to pose and investigate questions in science inquiry is an important dimension of developing scientific capabilities.”

Recommendation 1: Consider carefully the elements in the above which highlight learner choice, negotiation and decision making and self directed learning, all key elements in engaged and effective learning which have been at the heart of alternative, progressive and democratic education.

AAPAE has a general concern, expressed in all our responses to the National Curriculum Papers, that by embarking on a national curriculum to which all schools and individuals must adhere, the very pluralistic, changing, dynamic, diverse educational experience and society which we say we value may be countermanded and parental and learner choice further diminished.

AIMS and TERMS

(S17-26) AAPAE broadly supports the aims expressed particularly the role of science capabilities in understanding the world and enabling active citizenship and participation in the decision making processes of the communities in which they live their lives

RECOMMENDATION 2: That experiencing and learning science be valued for learners at every stage of their lives not just for future individual and communal prospects.

CONSIDERATIONS

(S27-39) AAPAE welcomes the recognition that a knowledge heavy, overloaded curriculum leads to learner and teacher stress and ineffective learning and often total disengagement in Science.

We support a return to developing understanding and skill rather than memorization of lots of facts.

The Cambridge Primary Review has something to add to this RELEVANCE OF SCIENCE

Children and teachers are increasingly turned off science as it becomes a content-led, vocabulary-heavy subject where personal curiosity is thwarted and

opportunities for children to develop investigative, questioning and thinking skills are limited ... Primary science should offer children the opportunity to engage with big ideas about how the world works through first hand practical activity. It is the fundamental right of every individual child to explore, to investigate, and to gain scientific skills and knowledge. (p28)

Recommendation 3: That the role of highstakes assessment processes be also considered as factors in narrowing curriculum, disengaging learners and ineffective learning.

(S33) AAPAE supports the inclusion of the notions in this section that learning be relevant to individuals; contemporary and controversial subjects be included; cultural and social aspects be valued and included; the risk and debate inherent in real world science and decision-making be highlighted; inclusion of complex ideas which lead to in depth and sophisticated understanding.

FLEXIBILITY and EQUITY

(S36) AAPAE strongly supports any move to enable the national science curriculum to provide flexibility and choice for teachers and students as this is a key concept in our preferred negotiated curricula.

(S37) AAPAE support equity of opportunity in Science throughout the learner's life.

GENERAL CAPABILITIES

(S38)As with English and Mathematics AAPAE supports the promotion of general capabilities to a more central role as enabling development of skills and understanding and wisdom for effective life in 21st Century

STRUCTURE

ELEMENTS

(S40-44) AAPAE supports the integration of the elements in each stage of a learner's development and particularly welcomes the integration of human endeavour dimensions as this makes a real life context for science.

STAGES OF SCHOOLING □(S45-48) As with the other framing papers AAPAE has a problem with a year by year lock step approach to the curriculum.

Recommendation 4: That the curriculum remain as broad and flexible as possible to allow for individual and local community initiatives and input, for in depth long term and diverse study and promote stages as guides rather than prescriptions to be followed and which drive testing regimes.

(S46 &47) AAPAE supports an 'integrated approach' , including the integration of science as human endeavour

STAGE 1

(S49) Recommendation 5: That enjoyable, exploratory, FREE, as well as purposeful PLAY, be promoted as the central feature of the initiation of scientific inquiry of themselves and the natural world in which they live.

AAPAE supports strongly that “observation is an important skill to be developed at this time, using all the senses in a dynamic way.” and making the beginnings of ordering that observation.

STAGE 2

(S50) Recommendation 6: That free and purposeful play continue and combine with experiences of enjoyable and challenging and gradually more systematic aspects of science, related and relevant to life.

STAGE 3

(S52) Recommendation 7: that the value of “providing a unit in which students conduct a science investigation in an area of their choosing” be recognized at ALL stages of learning.

(S54, 55) AAPAE supports the notion of “restraint and avoiding overcrowding the curriculum, and providing time to build the knowledge base that underlies science understanding.”

Recommendation 8: That students regain control over their learning and negotiate and plan together with teachers their areas of study so that individualised and specialized programs can be valued and engaging.

STAGE 4

(S56 &57) □ Recommendation 9: Resources and human expertise to support the learners in their study and courses need to be provided and the resources of the broader community made available.

PEDAGOGY

The Cambridge Review says and AAPAE agrees that

“Primary science requires a constructivist pedagogy in which pupils’ existing ideas and understandings are respected, elicited, explored and built upon. Science teaching should be relevant to pupils’ lives in order to provide the basis for that public understanding of science which in a scientific and technological age is essential to a functioning democracy. This also means engaging with major global issues such as sustainability. (p29)

(S58-61) AAPAE supports the development of a flexible curriculum catering to

the diverse needs of learners.

Recommendation 10: Give Science adequate time in the total timetable and value the ways that English and Maths goals can be integrated into and with Science.

AAPAE supports the realization that there needs to be less emphasis on a transmission model of pedagogy and more emphasis on a model of student engagement and inquiry.

Recommendation 11: That the learning engine for inquiry is not just or even teacher questions but learner questions and a broad repertoire of skills are employed by both in the learning relationship.

Recommendation 12: That teachers and learners are mentored and supported by working scientists.

ASSESSMENT

Cambridge Primary Review comments that

“The science education community faces a dilemma. The status of science as a core subject is key for the country in terms of future economic development and it needs to be maintained ... There is a wide perception that [this status] is reinforced ... by having an external national SAT at the end of KS2 ... [Yet] the KS2 science SAT has changed the way that science is taught in KS2 classrooms (and viewed by Senior Managers), to the detriment of the children’s learning experience and love of science.”

(S62-64) AAPAE believes that assessment is the servant of the learner and direct feedback between those intimately involved in the learning process is the key. Standardised highstakes, testing regimes and public reporting have been shown over and over to narrow curriculum, stress teachers and learners into test focus, labeling and categorization as less than or outright failure, threats of punishment, criticism, strip self esteem and instill a lifelong distaste for anything academic.

“Tests exist for their own sake they measure the ability of the entire school community, learners, parents, teachers administrators to focus all their efforts on producing good results on tests! Nothing more, nothing less!”

Ackoff.R.L & Greenberg.D 2008 Turning gninraeL Right Side Up

Wharton School Publishing, New Jersey p27

Recommendation 13: Self-assessment of goals and achievement and diagnosis of new directions within the context of the learning/ teaching relationship works to engage and encourage the learner to further inquiry.

CONCLUSION

(S65 66) The National Science Curriculum Framing Paper goes a long way towards recognizing and valuing many of the key ideas in the educational philosophies and practices of alternative, progressive and democratic schools and we look forward to the integration of these into the other curriculum areas. AAPAE hopes that it will be one tool to revitalize Science inquiry in education and that science will be appreciated as an important human endeavour enabling us to live reasonable and satisfactory lives.