

Butterflies and the End of Science Teaching



The new National Curriculum is designed to change science courses from learning about things to learning what science does. According to the Ministry of Education, this is “a marked change.” The end product of lessons in butterflies will not be knowledge of butterflies but knowledge that science studies butterflies.

An article in the *Education Gazette*¹ of 28 June 2010, asserts, “The thinking goes that by knowing more about how science works, students become more aware of what science can and cannot do, and this in turn helps them to become more critical users of science.”

It is, of course, a very good idea that children learn what science can and cannot do, and to be “critical users of science”.

But in this curriculum that specifies no content, any content studied becomes accidental and thereby incidental to the greater aim of knowing about science. The content of any lesson or series of lessons is irrelevant to the curriculum except that, according to the Ministry, “Learning about [the science content areas] becomes the vehicle for learning about what science is and its strengths and limitations.”

It may be thought that at least some content will be learnt while the greater lesson that “science is” is mastered. But what this constructivist curriculum calls “knowing” is not knowledge of facts or processes that can be repeated and used. Constructivist knowing is having had experience of things with no shared ongoing factual recall or practical skill.

Even if something more than experience were to be intended when the curriculum speaks of “knowing”, for each child the content covered is to be haphazard. Even if some knowledge of the created universe and its functioning is learnt, the accidental manner of selecting topics means no child necessarily gains a balanced or comprehensive scientific knowledge.

As for children as a whole, across the nation the present school generation will share no common knowledge except that science studies things.

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He was selected by the Ministry of Education and by the NZEI to help write the earlier Pre-Form 1 and Form 1 to 4 Science Syllabuses, and to work in the development of curriculum support materials for science teaching for both the Ministry of Education and the (now superseded) Auckland Education Board.

He has been both Chairman and Chief Judge of the Auckland Science Fair and was invited by the Royal Society to lead the New Zealand delegation to the 1997 International Science Fair in the United States.

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¹ *Education Gazette* Volume 89 Number 11 28 June 2010, Ministry of Education, Wellington. The article is entitled *Investigating Science Itself* by a team from NZCER and is part of an insert *Gazette Focus* which the Ministry has withheld from on-line versions of the *Gazette*.

Creating Dependence on a Gnostic Priesthood

A good science curriculum identifies and specifies the knowledge and skills that best equips children to see God's glory in creation, and to enjoy, wonder at, and work that creation in the service of God and the community. Such a curriculum would provide scope for adaptation to and utilisation of local resources, but those would be expected to inform and exemplify concepts and knowledge that are learnt by all in the wider community. With such knowledge and skill children grow into responsible independence, genuinely able to evaluate and critique what is presented to them by knowledgeable scientists and posturing propagandists.

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This requires more than facts studied in a haphazard and incidental way. It requires the orderly impartation of data about creation and the way it works. It requires teaching knowledge that is integrated, cohesive and balanced. It requires teaching children the relationships between the various fields of science, and the data within those fields. It requires that children recognise the "laws of nature" (or as they really are, the patterns of God's providence), discerning when something fits or doesn't fit. It requires an orderly mastery of key scientific data so they can think scientifically and constructively, not merely critically and purposelessly.

Knowing science's strengths and limitations is useless without knowing the content of what science has learnt and how it learns. Such education in ignorance will morph a generation that has to take on trust everything it is told because, for all it knows about what science can do, it has no basis of known facts by which to evaluating what is pronounced.

With nothing better than a fragmented knowledge of the content of science, but with critical discernment as to what science does, what scientific knowledge will the new uneducated be able to apply? They will have to depend on those who, unlike them, have a comprehensive knowledge of scientific data.

Such Scientific Gnosticism will create a generation that knows nothing useful and is dependent on a messianic priesthood of scientists who have used (or claim to have used) the scientific method to formulate the "truths" hidden mystically from mere mortals.

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The mantras of this new Gnosticism are already familiar: "Science has proved ...", "Scientists tell us ..." and worst of all because it is compellingly *unscientific*, "All scientists believe ..." With no knowledge or skill base to evaluate what is put to them, children will be left to take on faith what the propagandists pronounce with the magic mantra, "It's scientifically proven."

If the Curriculum fulfils its aims and children learn only what science is and what it does but nothing of what science has learnt or discovered, ours will be a nation of the schooled unlearned.

Four Strands of Ignorance

The Curriculum identifies four strands of science teaching through which random content is used to teach what science can do.

The first strand is *Understanding Science* which, as you might have guessed, is not understanding the content of science but, as the article proudly proclaims, “understanding the discipline of science.” The second is *Investigating Science*: not using science to investigate content but investigating the “scientific method.” The third is *Communicating Science* but here again the content is not what is communicated, as this strand “foregrounds the conventions of how science data and ideas are represented.” The fourth strand is *Participating and Contributing* in which children “make decisions”. Not one of these strands is about imparting knowledge of the stuff of science to children.

Still not convinced a National Science Curriculum could really ignore factual knowledge? Here is their three-point summary of what “knowledge” children should be taught in this Curriculum:

Science knowledge is developed by people and changes over time;
Scientists provide evidence to support their explanations;
Open-mindedness is important to science.

By way of example as to how this can be taught, they suggest giving students a food-web. So far so good – this looks like a conventional science lesson. You would expect a teacher to show children the food-web, explain how it works, get them to relate it to their field studies, and help them remember it in a way that enables them to replicate it and apply it, right? No. Children in this Curriculum have to be able to make decisions, so the instruction is to have children make changes to the food-web: don’t learn it, fabricate a different set of facts!

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In this Curriculum children have to communicate, not know, so ask children to discuss what the consequences of those changes are, and to do so without reference to any reliable facts. In other words, replace facts with fiction, and on the basis of ignorance make decisions about ... well, about the group’s discussion.

Above all, the article insists, ensure everyone understands there is no “right” answer” in this science.

Assessing Ignorance

How are teachers to assess this science that knows nothing, and in which nothing is right? The Ministry’s direction: “Measure how students work in groups ... rather than measuring how much the individual ‘knows’.”

What children learn by studying butterflies will be assessed on how well they work in groups to change whatever data they can observe or are given, and how well they discuss how science is developed by open-minded people who have evidence that changes over time. But

shame on any teacher who checks on what any individual student knows about butterflies, or expects a “right” answer to a question about butterflies!

There is a subtle deception at play here. Any good teacher, having ascertained that a child knows the facts of a food-web would test understanding of those facts by doing something such as making a change and asking the child to explain the implications. But constructivism, the philosophy shaping this National Curriculum, denies two things such a teacher is depending on. Constructivism asserts there is no individuality apart from the group, and that there is nothing that can be known in common apart from group experience.

Constructivism denies that any individual can know anything factual in the same way other individuals know those facts. This means that not only is any commitment to teaching a particular body of factual knowledge meaningless, so too is testing an individual child’s “knowledge”. The haphazard way in which bits of scientific knowledge will be used in this Curriculum merely as incidental vehicles for learning that science studies stuff is deliberate. The Curriculum is true to its constructivist faith in denying children comprehensive factual knowledge.

Constructivism also denies individuality, insisting that what it calls “knowledge” is a group’s repository of shared experience. Hence the insistence on group activities and group discussion to make assessments that will then be fraudulently imputed to each child’s personal school record.

To “test” understanding *instead of* factual knowledge, and to insist that “test” has to be of a group interaction and never of an individual’s knowledge, is morally and pedagogically corrupt

Were the Curriculum to advise testing children’s understanding *as well as* their factual knowledge, every sensible teacher would agree. But to “test” understanding *instead of* factual knowledge, and to insist that “test” has to be of a group interaction and never of an individual’s knowledge, is morally and pedagogically corrupt. There are no facts and no individuals in the National Curriculum, only group experience, and children who have personal integrity and knowledge apart from the group are being expunged from classrooms and ultimately from the community.

This is not simply silly – it is wicked.