# thinking about the nature of science?

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By now most schools would have read through the essence pages for Science as a learning area (NZC, 2007 p 28-29) and will be considering the importance of the statement "The core strand, Nature of Science, is required learning for all students up to year 10. The other strands provide contexts for learning". But what does this mean for the classroom teacher? How often are the four aspects of the Nature of Science (NOS) taught explicitly in schools? Often the classroom teacher, knowingly or otherwise, may well be teaching elements of the NOS during their science lesson but is it being made explicit to the children? How aware is the teacher of what NOS is? There is now a need to teach children how scientists work, how they investigate, how they share their ideas and make connections with their wider world. Does the implementation of the NOS mean teachers should now focus their attention more on teaching children the processes involved with doing science, as scientists might actually do, rather than focusing mainly on knowledge?

It is the need for explicitness that we feel is so important in developing both teacher and learner understanding of what the NOS is all about. The Science exemplar matrices featured in the New Zealand Curriculum Exemplars (2004) fit very closely to the four aspects within the NOS . Aspects of NOS can be seen in the Science exemplar matrices under the 'Key Aspects of Learning' and indicate what some of these learning experiences could be and how they could progress across levels. Below, we have given a number of examples of what the Nature of Science could look like (This could be) in each of the four aspects. This material allows teachers to identify those areas of NOS that they could focus on when planning and developing lesson or units of work.

The Postcards in Science Project provides good examples of those types of activities that could be used to make the Nature of Science (NOS) more explicit to both teachers and learners. Detailed teacher planning that includes specific examples of NOS, pupil notes, links to curriculum material and children's literature can be downloaded from www.sciencepostcards.com. One example, the science postcard 'No to Noise' uses the book 'Ruby Sings the Blues' by Niki Daly to explore the Nature of Science aspect 'Participation and Contribution'. Here students explore the problem of exposing their hearing to loud noises in their everyday lives. Sound (physical world) is the context used for teaching this aspect of NOS.

Maybe it is time to get thinking about how you will include the Nature of Science in your teaching...

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## Understanding about Science

***Exemplar Matrices Links:*** Thinking in Scientific Ways (Matrix C)

***Achievement Aims:*** Learn about science as a knowledge system: the features of scientific knowledge and the processes by which it is developed; and learn about the ways in which the work of scientists interacts with society.

***This could be:*** Being open-minded, Asking questions, Making observations, Discussing their ideas with others, Knowing science ideas / knowledge may change over time, Using creative insight to aid explanation, Being aware of other cultures, Understanding science knowledge is one way of explaining their world, Working together and needing to provide evidence to support their ideas, and Being prepared to re-evaluate their own ideas.

## Investigating in Science

***Exemplar Matrices Links:*** Investigating in Science (Matrix B)

***Achievement Aims:*** Carry out science investigations using a variety of approaches: classifying and identifying, pattern seeking, exploring, investigating models, fair testing, making things, or developing systems.

***This could be:*** Use a variety of investigative approaches (exploring, classifying, identifying and pattern seeking, fair testing and investigating models), Developing explanations based on evidence, Being curious, Asking questions, Discussing their ideas with others, Being open-minded, Thinking critically about their own and others ideas, Use evidence to support their ideas, Looking for trends and patterns in data, and Being creative.

## Communicating in Science

***Exemplar Matrices Links:*** Developing and Communicating Scientific Understanding (Matrix D)

***Achievement Aims:*** Develop knowledge of the vocabulary, numeric and symbol systems, and conventions of science and use this knowledge to communicate about their own and others' ideas

***This could be:*** Using scientific language, Building their scientific vocabulary, Making predictions based upon their existing science knowledge, Realising science explanations must withstand peer review before being accepted, Sharing explanations of experiences and observations, Using scientific language, including symbols, graphs and diagrams when explaining an idea, Being able to question the accuracy of texts they are using, Having experience of a range of text types, including web resources, and Being able to argue a point of view.

## Participating and contributing

***Exemplar Matrices Links:*** Developing Interest and relating Scientific Learning to the Wider World (Matrix A)

***Achievement Aims:*** Bring a scientific perspective to decisions and actions as appropriate

***This could be:*** Discussing issues of concern to them, Understanding that science investigations could be influenced by their communities, Exploring ways of taking informed action, Knowing science interacts with other cultures, globally, Being aware of the needs of others, Using their science knowledge when considering issues of concern to them, Being open-minded when exploring aspects of an issue, Making decisions based upon evidence, and Being aware of science in their world.