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### THINKING IN SCIENTIFIC WAYS: ABOUT THIS MATRIX

This matrix should be selected if the teacher's intention for learning is to develop students' abilities to construct their own understanding in scientific discussions with others. The focus is on exploring science as a human activity, understanding the thinking and working processes in communities of scientists, and modelling some of these processes in school science. The progress indicators link to the integrating strand Making Sense of the Nature of Science and Its Relationship to Technology (*Science in the New Zealand Curriculum*, pages 24–41) and reflect the values and procedures of the scientific community as well as learning strategies known to develop personal understanding. Teachers can apply them to students' own school-based science or use them to help students explore the stories of professional science in the past or present.

Explanations often involve the use of analogies, metaphors, and models.

OVERALL PROGRESSION	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
	Contributes to a discussion that seeks to explain an experience.	Offers relevant contributions to a scientific discussion.	Considers and justifies contributions to a scientific discussion.	Considers alternatives and uses evidence to justify preferred theories and explanations.	Debates alternatives and uses evidence to support or challenge theories and explanations.

### SCIENCE MATRIX C: THINKING IN SCIENTIFIC WAYS

KEY ASPECTS OF LEARNING	PROGRESS INDICATORS				
	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
<b>Suggesting Explanations</b>	Offers simple explanations for observations or events.	Suggests cause-effect links for observations or events.	Suggests explanations supported by some evidence.	Suggests an explanation and considers others linked to the evidence.	With reference to relevant scientific ideas, seeks other possible explanations that fit the evidence.
<b>Comparing and Evaluating Explanations</b>	Begins to use their own experiences to support their ideas. Recognises that other people may have different ideas.	Prefers one explanation. Accepts that their ideas may change if someone suggests a better idea.	Explains why they changed or did not change their ideas, referring to the evidence. With support, clarifies or changes their ideas in the light of the evidence.	Attempts to eliminate or support explanations using evidence. Clarifies or changes their ideas after considering the evidence and argument.	Clarifies or changes their explanation, presenting a case based on evidence and argument. Considers suggested explanations and uses evidence to support or eliminate them.
<b>Evaluating the Quality of Evidence and Accepting Uncertainty</b>	Recognises that 'we' do not have an explanation.	Recognises that 'we' are uncertain about an explanation.	Accepts there is not enough evidence to choose an explanation.	Is aware of the need to assess the quality of evidence.	Assesses the quality of the available evidence.
<b>Understanding How the Science Community Operates</b>	Recognises that scientists find things out and share their ideas.	Recognises that scientists test their ideas to select the best explanations.	Recognises that scientists develop new ideas, building on previous science ideas. Explains that scientists seek out evidence to support or refute ideas.	Recognises that scientists debate their ideas with others in the scientific community. Explains that acceptance of an idea depends on evidence and argument.	Recognises that scientists strive to add to or change the understandings held by the scientific community. Explains that scientists present their ideas for critical scrutiny by other scientists.