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### INVESTIGATING IN SCIENCE: ABOUT THIS MATRIX

This matrix should be selected if the teacher’s intention for learning is to develop students’ abilities to carry out scientific investigations to answer their own and others’ questions. The matrix links to the integrating strand Developing Scientific Skills and Attitudes (*Science in the New Zealand Curriculum*, pages 42–51) and reflects some of the processes and conventions of the scientific community.

#### About Investigating

These indicators are intended to apply to a broad range of types of investigation. While carrying out scientific investigations, students need to be able to select and use the key aspects of learning most appropriate to the context of their scientific work. The order of the key aspects of learning in this matrix may appear to form a logical sequence, but it is unlikely to reflect the actual creative experience of an investigation. Evaluation, processing, interpreting, and communication are ongoing aspects of any investigation and can lead to changes as the investigation proceeds. (See *Science in the New Zealand Curriculum*, page 47, note 3.)

The types of investigations include fair testing, pattern seeking, classifying and identifying, making things or developing systems, researching, and exploring.

#### Scientific Conventions (referred to in the progress indicators)

- Work safely (e.g., ensure that hazards are identified and appropriate measures taken).
- Behave ethically (e.g., cause no unnecessary suffering to living things).
- Report results and procedures clearly and honestly (e.g., use diagrams, tables, graphs; separate questions, procedures, and outcomes).
- Try to ensure that the evidence presented is credible (e.g., make precise observations, use instruments to measure as accurately as necessary, repeat measurements to check uncertainty).
- Try to eliminate competing explanations (e.g., control the variables).
- Work collaboratively.
- Take into account previous research.

	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
<b>OVERALL PROGRESSION</b>	Participates in investigative activities.	Contributes meaningful ideas and actively participates in an investigation.	Initiates aspects of systematic investigations within a supportive framework.	With support, initiates and sustains investigations using some scientific conventions.	Initiates and persists with systematic and meaningful investigations using scientific conventions.

### SCIENCE MATRIX B: INVESTIGATING IN SCIENCE

KEY ASPECTS OF LEARNING	PROGRESS INDICATORS				
	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
<b>Exploring a Situation</b>	Contributes observations to a class exploration. With support, identifies observed similarities and differences.	Makes observations and looks for patterns or relationships, with prompting as needed. Describes some observations.	Makes a series of observations to look for patterns or relationships. Describes or represents the observations made with some accuracy and detail.	Makes more detailed observations and suggests patterns and/or relationships related to a scientific idea. Communicates about observations with accuracy and detail.	Makes increasingly focused and detailed observations relevant to identified scientific patterns and relationships. Communicates detailed observations accurately and systematically.
<b>Asking Questions</b>	With support, asks questions about a given situation.	Contributes questions in discussions.	Generates questions and participates in choosing questions to investigate.	Generates, discusses, and chooses interesting questions to investigate.	Refines worthwhile questions for systematic investigation.
<b>Making Predictions</b>	Says what they think will happen in simple investigative situations.	Predicts possible outcomes for simple trials and gives reasons.	Uses their own ideas to make testable predictions.	Uses their developing scientific ideas to make testable predictions.	Uses scientific ideas to make testable predictions.
<b>Using Systematic Approaches and Scientific Conventions</b>	Collects and records simple data from observations.	Carries out observations and simple trials based on their own ideas and collects relevant data.	Plans and carries out more systematic trials, using measurement to identify patterns and test ideas. Suggests more than one way to investigate a question. Begins to use some scientific conventions.	Plans and carries out systematic investigations to gather evidence to test their ideas. Uses an increasing range of measurements and conventions.	Plans and carries out systematic investigations to produce evidence supporting a scientific idea or answering a science-related question. Uses appropriate data-gathering instruments and conventions.
<b>Processing and Interpreting</b>	With prompting, identifies observed similarities and differences to reach conclusions in simple investigations.	Reaches conclusions to simple investigations that are linked to their own understanding.	Organises data to display obvious trends and patterns and to reach conclusions. Reaches simple conclusions and links them to their own understandings.	Organises data to display trends, patterns, and relationships. Uses findings to draw conclusions related to simple scientific ideas.	Selects ways to organise data to identify trends and relationships. Reaches relevant conclusions, recognising how these relate to scientific ideas.
<b>Evaluating the Investigative Process as a Continuous Activity</b>	Participates in teacher-assisted evaluations.	Talks about features of investigations and suggests simple improvements.	With support, looks for strengths and weaknesses in their own investigations and suggests improvements.	Identifies the strengths and weaknesses of their own and others’ investigations and makes appropriate improvements. Reviews data-gathering procedures honestly.	Identifies and reflects on the strengths and weaknesses of their own and others’ investigations to inform the next step. With support, critiques data-gathering procedures in order to recognise limitations to the claims that can be made from the data.
<b>Reporting</b>	Talks freely about ideas and aspects of their investigation.	Reports on some or all of their investigation in an organised way. Refers to their observations.	Presents an organised report linking findings to their observations.	Presents a well-organised report using data to support their conclusions.	Presents a selective and well-reasoned report supported by relevant data.