

<u>Science Capabilities</u>	<b>Investigating in Science*</b>	<b>Level 1i</b>	<b>Level 1ii</b>	<b>Level 1iii</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>
<u>Gather and Interpret Data</u> <u>Use Evidence</u> <u>Critique Evidence</u> <u>Engage with Science</u>	<b><u>Understanding about science</u></b>  Wonder Question Predict Hypothesise Explore	With support talk about/share observations, inferences and predictions With support pose a question about what they have observed	Talk about/share observations, inferences and predictions Ask a simple question linked to observations	Ask a question linked to observations, inferences, predictions	Make observations & inferences and begin to recognise differences Ask questions informed by observations and inferences for investigation	Make observations and inferences and recognize the difference between them Develop an hypothesis /inference/prediction linked to an investigative question	Make detailed observations and/or inferences related to science ideas. Develop an informed hypothesis /inference/prediction linked to an investigative question
<u>Gather and Interpret Data</u> <u>Use Evidence</u> <u>Critique Evidence</u> <u>Engage with Science</u>	<b><u>Investigating in science</u></b>  Experiment Test Classify Record	With support follow instructions to conduct a simple investigation With support collect & record observations	Begin to follow instructions & use equipment to investigate Begin to collect & record some evidence from observations	Follow instructions & use equipment to investigate Record evidence from observations	With support plan an investigation Identify relevant variables- (what to keep the same, what to change) Carry out observations & collect evidence	Plan & carry out an investigation to gather evidence to test their theory/hypothesis/prediction, controlling variables if appropriate Use precise observations and measurements and/or tests and record findings	Select, justify, plan & carry out systematic investigations to gather evidence to test their inference/hypothesis/prediction on controlling variables if appropriate Choose an appropriate scientific method to observe and measure and/or test and record findings in a systematic way.
<u>Interpret Representations</u> <u>Engage with Science</u>	<b><u>Communicating in Science</u></b>  Review Analyse Evaluate Communicate	With prompting talk about or draw a picture about their observations and/or evidence	Begin to present observations and evidence in a supported way with some new science vocabulary	Present their observations and evidence and begin to talk about the process of their investigation using science vocabulary	Present & explain the process & evidence of investigation using some science ideas and vocabulary  Begin to identify strengths and weaknesses in data and/or investigations and suggest possible improvements.	Present & explain the process of and evidence from investigation using some science ideas and vocabulary, identifying the obvious trends, patterns &/or relationships. Ask questions to check whether data is reliable.  (Through their own investigations and those of others)	Present & explain the process of & evidence from investigation using sound science ideas and vocabulary. Identify trends, patterns &/or relationships suggesting reasons for these. Critique hypothesis and investigation identifying ways to improve the trustworthiness of data. Use their findings to identify further steps for investigation  (Through their own investigations and those of others)
<u>Engage with Science</u>	<b><u>Participating and Contributing</u></b>	Participate in discussions about science in their lives.	Participate in discussions and share ideas about science in their daily lives	Participate in discussions and share ideas about science in their daily lives	Discuss simple matters related to science, supporting their views.	Use their own understanding to discuss and justify their views on matters related to science. and the environment	Seek and use scientific information to debate matters related to science and the environment, making a case for possible action.

Science investigations encompass a variety of approaches: classifying and identifying, pattern seeking, exploring, investigating models, fair testing, making things or developing systems

- **Classifying and identifying:** identifying features or tests that allow them to distinguish between different things. For example working out what an unknown substance is by whether it dissolves, smells, melts etc.
- **Pattern seeking:** common in ecological studies. For instance where in the garden are you most likely to find snails? Surveys are also examples of pattern seeking.
- **Exploring:** involves making careful observations. Determining what birds eat by carefully observing them in the garden is an example of exploration.
- **Investigating models:** developing their own model to explain everyday phenomena and decide what evidence they need to gather to test the model. This testing stage could involve any of the previous sorts of investigations.
- **Fair Testing:** relationships between variables are investigated. One variable is chosen for manipulation and the rest are "controlled" to make it a fair test. For example when investigating how temperature affects the rate of dissolving, temperature is varied but everything else must stay the same
- **Making things or developing systems:** closely linked with technology where students design something to meet a need. What makes it a scientific investigation is the science knowledge required to complete the task. For example to design a switch a student needs knowledge about electrical circuits

From Watson, R., Goldsworthy, A., & Wood-Robinson, V. (1999). What is not fair with investigations? School Science Review, 80 (292)