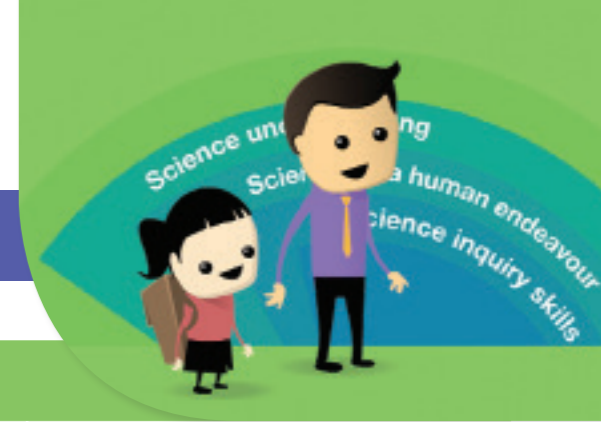# The BitL tool – science years 5–6

Science: Years 5–6

What do you notice?

What are the observable similarities?

What do you notice changes over time and/or geographically?

Use equipment to aid observations in order to group and classify similar things. Link form to function and notice observations that change over time and geographically.

What patterns and relationships can you see?

Consider the different time and geographical scales of dynamic and stable systems. How do the components within a system relate to each other and change over time?

Compare ideas from different cultures.

Describe exceptions.

Pose questions.

What do you predict?

Predict the findings of an investigation or devise and justify predictions based on learning.

How can you test it?

Use a fair test to investigate cause and effect between variables. This may be through modelling, simulations and/or investigations. Consider safety.

How can you review and communicate?

Use evidence to explain observations.

Compare data with predictions.

Suggest improvements in the methodology to answer your question or solve a problem.

Understand the importance of measuring accurately.

Use multimodal texts to communicate.

So what? What next?

Identify how scientific understandings, discoveries and inventions are used to solve problems that directly affect people's lives. Explain how science knowledge and understanding can inform personal and community decisions.

Pedagogical questions:
- What do you see/hear/smell/taste/feel?
- What features and/or properties are the same?
- What features and/or properties are different?
- How do these features and/or properties change over time?
- How do these features and/or properties change in different places?
- What equipment might help to make observations? (camera)
- What equipment can extend your senses? (hand lens, microscope, thermometer, scales, ruler, stopwatch)
- What is interesting and/or unexpected?

Pedagogical questions:
- How could you group or classify them?
- How are they the same as each other?
- What do these things have in common either in the way they look or the way they behave?
- How are these different to each other?
- What is happening?
- How do the patterns and/or relationships change?
- What questions could you ask?
- What is the time scale over which these changes occur?
- Are there any exceptions?
- How do the patterns and/or relationships change with time?
- How might another culture have different ideas?
- What else is like this? How?
- What are the problems or challenges?

Pedagogical questions:
- Explain what might happen if…
- Explain how changing… might affect…
- What do you think will happen next?
- What do you think would happen if?
- Scientists currently think…; how does this relate to your idea?

Pedagogical questions:
- How might you test your predictions?
- What (variable) will you change?
- What (variable) will you measure and/or count and/or draw?
- What (variable) will you keep the same to make a fair test?
- What might a scientist do to find out about that?
- What safety things do you have to think about?

Pedagogical questions:
- How can you represent your data and thinking in a way that you can share it with others?
- What tools (list, table, graph, drawing) might you use to identify trends and share this information?
- How can you use the evidence gathered to support the science ideas?
  How can you compare the data you obtained with your predictions?
- How can you use science ideas to explain your data?
- How fair was your test/investigation? How could you improve it? What would you do differently?
- How accurate was your measurement?
- Do you need to improve it? Why (not)?

Pedagogical questions:
- Who might be interested in this? Why?
- Which of your decisions might this understanding influence? How?
- What science might help us understand this?
- What else could you investigate?

Example: Year 5 – *Chemical Sciences*

Solids, liquids and gases have different observable properties and behave in different ways.

What are the properties of these materials? (include solids, liquids and gases)

How do you see the different states of water behave?

What equipment might help you to make observations of the properties of these materials?

How are these properties changing?

What are the similarities and differences in the properties of ice, water and water vapour?

How can you change water from one state to another?

Does water always behave like this?

Is there anything unusual?

What questions do you have about solids, liquids and gases?

What might happen if water is heated on a stove? What causes this?

Explain how an ice cube put in water would behave differently to one left in a dish? Why do you think this?

Scientists currently think that temperature causes a change of state. How does this relate to what you know about water?

What happens to the state when we dissolve other materials in water?

How might you investigate this?

What will you change/measure/keep the same?

What are the safety risks?

Are there digital or other technologies which may aid your investigation?

How could you use lists, tables or graphs to record and communicate your data and thinking about ice, water and water vapour?

What are the advantages and disadvantages of each method?

How could science ideas about change of state help you explain the data?

How does the data support (or not) science ideas?

How fair was your investigation?

How could you improve it?

Who might be interested in water changing state? Why?

How might this inform decisions about climate change/ keeping your drink bottle cold/ keeping food safe?

What else about the different states of matter could you investigate?