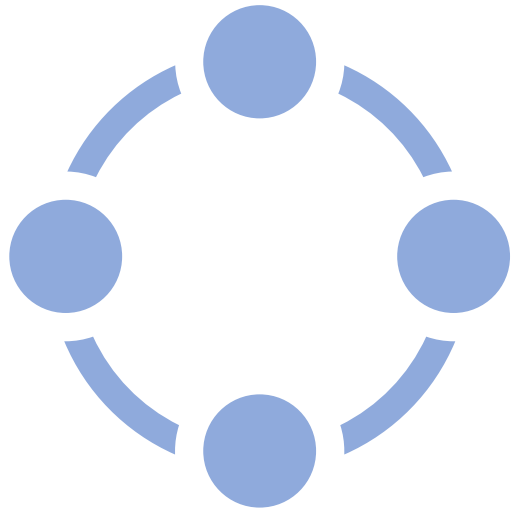
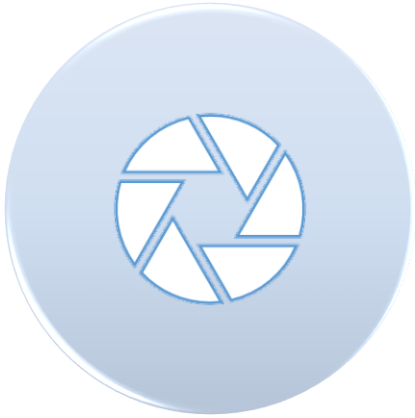
Science Investigation Procedure Cycle



Connections to Grade Level Scientific Methods Skills and Procedures

Teacher Notes:

The purpose of this this teaching resource is to provide background knowledge to support teachers. This resource is not meant to support students.



The investigation procedure is introduced in grade 2 and continues until grade 6 where it is added to. Grade level skills and procedures are deeper dives at different aspects in the process cycle. You may also see some skills & procedures on more than 1 step. This is because some skills may occur in more than one step during an investigation.

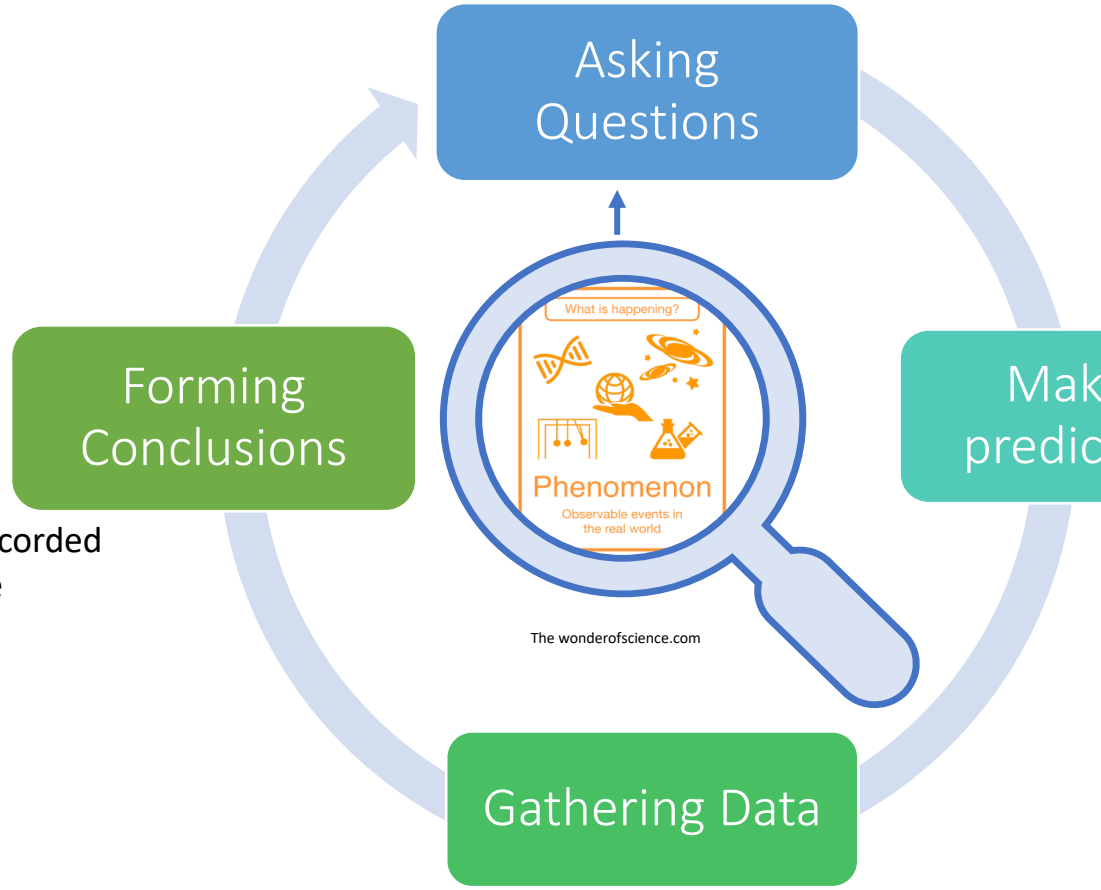
The investigation procedure cycle is a flexible process. For example, during the analysis of data, scientists may ask questions that lead in different directions, or data may not confirm a hypothesis, leading to the generation of new hypotheses. It is important to help students understand that this is not a strictly step-by-step approach.

Investigation Procedure Cycle: Grade 1 Scientific Methods Skills & Procedures

Describe the steps in an investigation

Demonstrate safety and respect during an investigation.

Ask questions to spark curiosity.



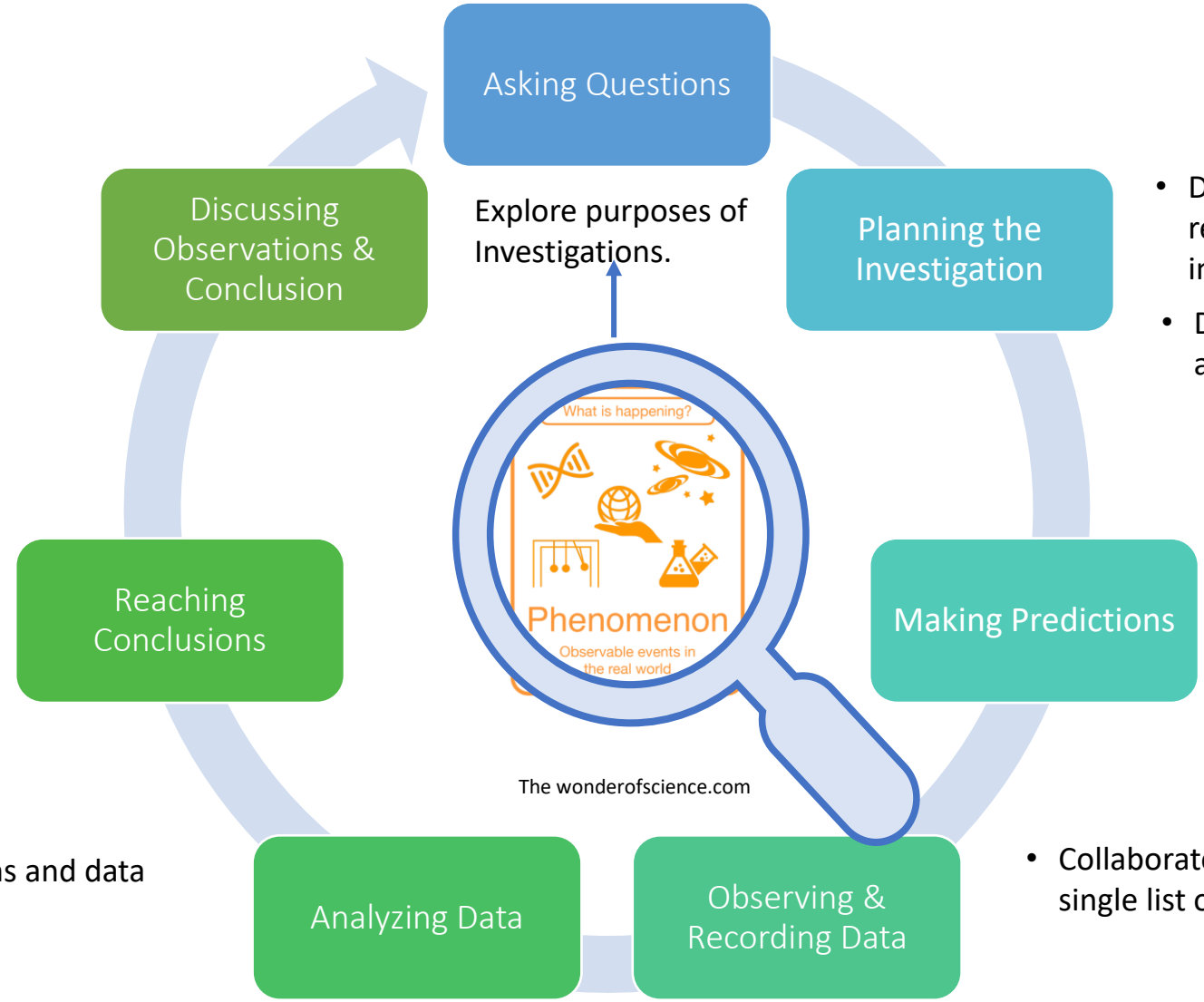
Predict answers to a question that is based on current understanding.

Reflect on recorded data to make conclusions.

Make observations using various senses.
Record observations as data.

Investigation Procedures Cycle: Grade 2 Scientific Methods Skills & Procedures

Develop questions for purpose of investigation.



Explore purposes of Investigations.

- Determine if observations relate to the purpose of an investigation.
- Describe procedures of an investigation.

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. Compare observations and data with others.

- Collaborate to combine recorded data on a single list or chart.

Investigation Procedures Cycle: Grade 4 Scientific Methods Skills & Procedures

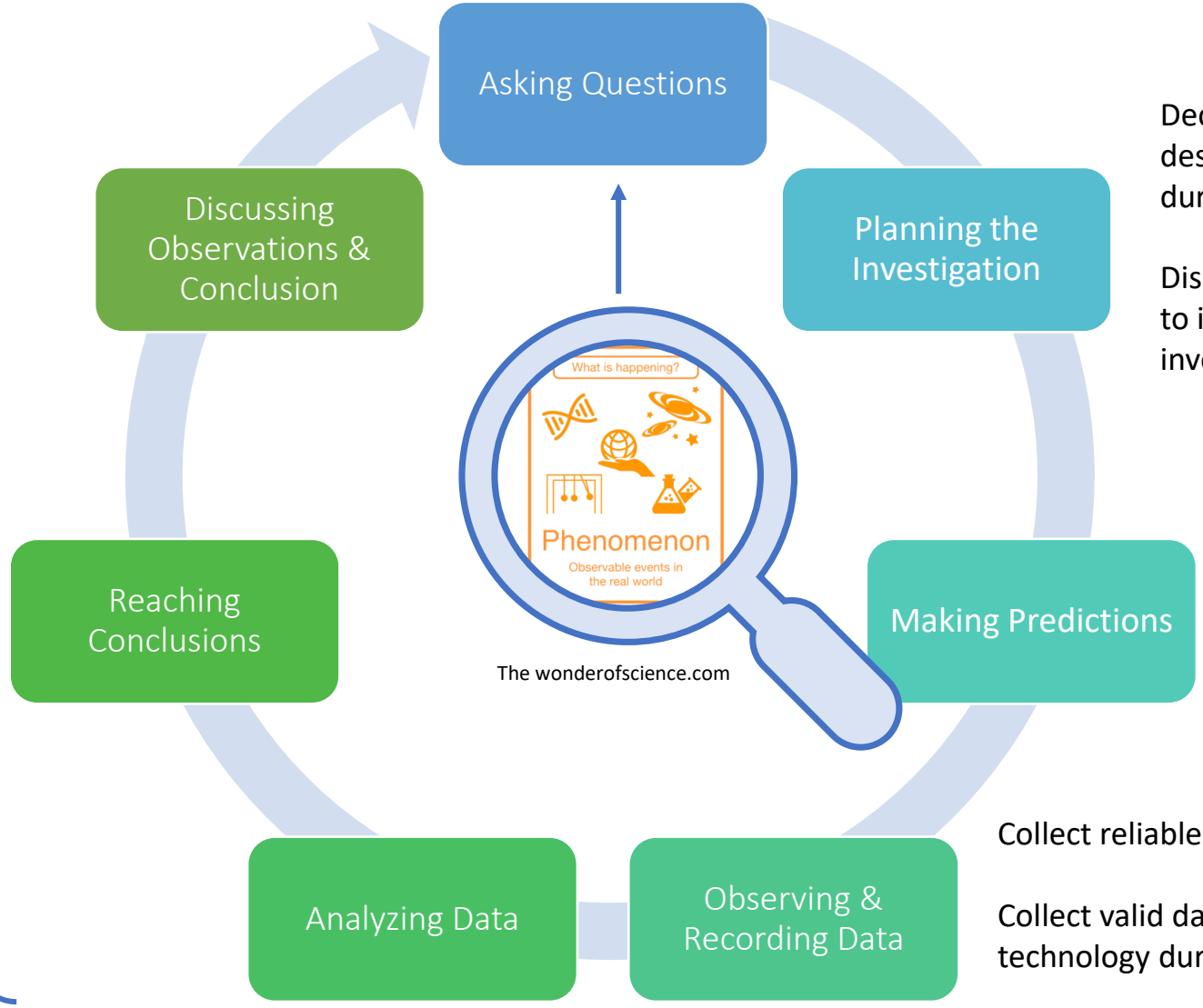
Draw conclusions using reliable and valid evidence from Investigations.

Represent evidence from investigations in a variety of ways.

Interpret data collected from investigations.

Interpret data and evidence expressed in SI units.

Collaborate to evaluate the reliability and validity of a collection of data.



Decide whether to collect descriptive or measured data during investigation.

Discuss tools or technology used to improve accuracy during investigations.

Collect reliable data during investigations.

Collect valid data by accurately using tools or technology during investigations.

Investigation Procedures Cycle: Grade 3 Scientific Methods Skills & Procedures

Develop new questions to further investigation.

Reflect on how data contributes to building knowledge.

Analyze data collected during investigations:

- Make connections to previous knowledge
- Compare-for accuracy
- Notice-changes
- Discuss & collaborate

Collect data using techniques to improve accuracy of data.

Compare the trustworthiness of sources of information

Investigation Procedure Cycle: Grade 5 Scientific Methods Skills & Procedures

- Compare clarity and accuracy of evidence communicated by diverse representations of data.
- Discuss potential impacts of data that is not communicated clearly and accurately.
- Defend a conclusion about cause and effect based on evidence produced in a controlled experiment.
- Discuss use of diverse representations of data in communicating evidence.
- Evaluate the effect of manipulated variable on responding variable in a controlled experiment.

- Plan & conduct controlled experiments
- Identify the variables in a controlled experiment.
- Identify biases that could influence investigation.
- Apply vocabulary for variables correctly in science contexts.

Examine the importance of scientific ethics in investigations.
Determine scientific ethics during an investigation.

Investigation Procedure Cycle: Grade 6 Scientific Methods Skills & Procedures

- Create scientific explanations of how natural phenomena occur
- Discuss observations & measurements used to create scientific explanations
- Determine the appropriateness of methods of communicating explanations based on audience
- Communicate explanations using appropriate digital or non-digital technologies
- Identify explanations of natural phenomena that have been refined as new evidence has been revealed
- Discuss processes that can be used to validate evidence and explanations
- Interpret multiple forms of text that offer explanations of natural phenomena
- Evaluate the trustworthiness of evidence and explanations from a variety of sources

Discuss role of explanations

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- Develop & Test a Hypothesis based on a scientific explanation.

Construct digital or non-digital graphs and tables using proper labels, legends, scales and titles