

MAPPING GRADE 3 SCIENCE INSTRUCTION

Concept: Science Process Skills
PWC Strand: Reasoning and Logic

CMS Unit Test: Science Skills
SOL Reporting Category: Scientific Investigation

PWC Objective: 3.1.1 / Infused

The student will continue to use basic science skills with increasing precision in planning and conducting investigations. Key concepts include:

- observing and predicting **(SOL 3.1a)**
- classifying objects into at least two major groups and subgroups based on similar characteristics **(SOL 3.1b)**
- developing questions **(SOL 3.1c)**
- measuring volume, length, and mass to the nearest milliliter and liter, centimeter, and gram **(SOL 3.1d-f)**
- organizing data in charts and graphs **(SOL 3.1g)**
- measuring temperature and time to the nearest degree Celsius and minute **(SOL 3.1h-l)**
- inferring and concluding **(SOL 3.1j)**
- sequencing natural events in chronological order **(SOL 3.1k)**

What Students Should Know (Critical Attributes)	What Students Should Be Able To Do (Essential Skills)
<p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • What do we do to solve scientific problems through an investigation? • What are hypotheses and why are they necessary? • What units can be used to measure length, mass, temperature and time? • Why is it necessary to be as precise as possible when taking measurements? • What is an inference and why is it important to an investigation? <p><u>Critical Attributes:</u></p> <p>An investigation involves asking a simple question; planning a way to do something to objects to see what will happen; observing and describing the objects or what happens to them; gathering the results, or data, in numbers and pictures that can be organized into bar, line, or picture graphs; and studying the data to interpret what happened. It is best to do an investigation three or more times to be sure that results are consistent.</p>	<p>Teacher note:</p> <p>A critical component of successful inquiry in science includes deriving meaningful questions and issues from content-related concepts. It is necessary to establish an adequate knowledge base to support investigation and develop explanations of science phenomena. Inquiry in Grade 3 Science not only allows students to strengthen their facility with basic science skills, but it also allows them to reflect on the science concepts they are learning. <i>For this reason, it is important that teachers keep the critical attributes of investigation in mind as they plan instruction to meet objectives in the Life Science, Environmental Science, Physical Science, and Earth and Space Science strands at this level.</i></p>

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What Students Should Know (Critical Attributes)	What Students Should Be Able To Do (Essential Skills)
<p>3.1a Complete observations are made using all senses. Simple instruments can help extend the sense.</p> <p>3.1b It is sometimes useful to organize objects according to similarities and differences. By organizing objects into sets and subsets, it may be easier to determine a specific type of characteristic.</p> <p>3.1c Questions frequently arise from observations. Hypotheses can be developed from those questions.</p> <p>3.1d-f Metric measures, including centimeters, grams, milliliters, and liters, are a standard way to record measurements. The metric system is recognized everywhere around the world.</p> <p>3.1g In order for data from an investigation to be most useful, it must be organized so that it can be examined more carefully. Charts and graphs are powerful tools for reporting and organizing data.</p> <p>3.1g A bar graph can be horizontal or vertical and it compares amounts. Both the X-axis and the Y-axis must be identified. Discrete data are found on a bar graph.</p> <p>3.1g A line graph can be used to show the passing of time or other types of continuous data. Individual pieces of data are plotted then connected with lines.</p> <p>3.1g A picture graph is similar to a bar graph except it uses symbols to represent quantities.</p> <p>3.1h-i Degrees Celsius is a standard way of measuring temperature and is a measurement recognized around the world. Time can be measured to the nearest minute.</p>	<ul style="list-style-type: none">• Make and communicate careful observations.• Make and communicate predictions about the outcomes of investigations.• Classify objects into at least two major groups and sub groups based on similar characteristics.• Develop hypotheses from simple questions. These questions should be related to the concepts in the third grade standards. Hypotheses should be stated in terms such as "if an object is cut into smaller pieces, then the physical properties of the object and its smaller pieces will remain the same."• Measure length to the nearest centimeter, mass to the nearest gram, volume to the nearest liter and milliliter, temperature to the nearest degree Celsius, and time to the nearest minute using the appropriate instrument.• Communicate results of investigations by displaying data in the form of tables, charts, and graphs. Students will construct bar and picture graphs and line plots to display data. (Example: 3.7 - Students should compare types of soil and their effect on plant growth.)

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What Students Should Know (Critical Attributes)	What Students Should Be Able To Do (Essential Skills)
<p>3.1j When we test a hypothesis several times, we will have enough data to allow us to make inferences. While an observation is an experience perceived through the senses, an inference is an explanation or interpretation of an observation. To infer means to construct a link between what is observed directly and what is already known from past experience.</p> <p>3.1k Putting natural events in a sequence allows us to notice changes over time.</p>	<ul style="list-style-type: none">• Sequence natural events chronologically. Example: 3.9 - plant and animal life cycles, phases of the moon, the water cycle, and tidal change.