

Science Benchmark Clarification, Instruction, and Assessment

Strand I: Construct New Scientific and Personal Knowledge

Content Standard 1: All students will ask questions that help them learn about the world; design and conduct investigations using appropriate methodology and technology; learn from books and other sources of information; communicate findings of investigations using appropriate technology. (Constructing)

Benchmark

Generate reasonable questions about the world based on observation. (SCI.I.1.E.1)

Benchmark Clarification

Students make observations that lead to questions that can be answered through the process of scientific investigation (e.g. “Why does the moon appear to change shape?”)

Key Concepts (voc.)/Tools

Questions lead to action, including careful observation and testing: questions often begin with “What happens if....?” or “How do these two things differ?”

Real-World Context

Any in the sections on Using Science Knowledge

Resources:

<http://mtn.merit.edu/mcf/SCI.I.1.E.1.html>

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Benchmark

Develop solutions to problems through reasoning, observation, and investigation.
(SCI.I.1.E.2)

Benchmark Clarification

An organized approach to a problem promotes a reasonable solution. Students will develop an approach to a problem using reasoning, observations, data collection, and investigations to arrive at a solution.

Key Concepts (voc.)/Tools

- Ask questions, gather information, think; observe (K-2)
- Predict, collect data, draw conclusions, conduct fair tests; prior knowledge. (3-5)

Real-World Context

Any in the sections on Using Scientific Knowledge

Resources:

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Benchmark

Manipulate simple devices that aid observation and data collection. (SCI.I.1.E.3)

Benchmark Clarification

Students will observe and collect data by using tools such as magnifying glasses, thermometers, calculators, telescopes, and weather instruments.

Key Concepts (voc.)/Tools

Various data collection tools suitable for this level, such as

- Hand lenses
- Wind direction indicators
- Grids for sampling areas of the sky or landscape

Real-World Context

Any suggested in Using Scientific Knowledge benchmarks for which students would design and/or conduct investigations

Resources:

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Benchmark

Use simple measurement devices to make measurements in scientific investigations.(SCI.I.1.E.4)

Benchmark Clarification

Students will select and use the appropriate measurement tools (e.g. scales, rulers, thermometers, measuring spoons and cups, and measuring tapes) to investigate volume, area, weight, and linear measures.

Key Concepts (voc.)/Tools

Measurement units:

- Milliliters
- Liters
- Teaspoon
- Tablespoon
- Ounce
- Cup
- Millimeter
- Centimeter
- Meter
- Gram.

Measurement tools:

- Measuring cups and spoons
- Measuring tape
- Scale
- Thermometers
- Rulers
- Graduated cylinders.

Real-World Context

- Making simple mixtures, such as:
 - food
 - play dough
 - papier mache
- Measuring the height of a person
- Weighing of a ball

Resources: <http://mtn.merit.edu/mcf/SCI.I.1.E.4.html>

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Benchmark

Develop strategies and skills for information gathering and problem solving. (SCI.I.1.E.5)

Benchmark Clarification

Scientists use many methods of gathering information and problem solving. To gather information, students will:

- Ask questions
- Use different sources such as reference books, trade books, magazines, web sites, and other peoples' knowledge

Key Concepts (voc.)/Tools

Sources of information, such as reference books, trade books, magazines, web sites, other peoples' knowledge.

Real-World Context

Seeking help from or interviewing peers, adults, experts; using libraries, World Wide Web, CD-ROMs, other computer software, and other resources

Resources:

<http://mtn.merit.edu/mcf/SCI.I.1.E.5.html>

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Benchmark

Construct charts and graphs and prepare summaries of observations. (SC.I.1.E.6)

Benchmark Clarification

Scientists use charts and graphs to visually represent their findings. Students will construct various graphs and charts to present their data. Students will prepare summaries of their observations.

Key Concepts (voc.)/Tools

- Increase
- Decrease
- No change
- Bar graph
- Data table

Tools:

- Graph paper
- Rulers
- Crayons

Real-World Context

Examples of bar charts like those found in a newspaper.

Resources:

<http://mtn.merit.edu/mcf/SC.I.1.E.6.html>