



CMT Prep Grade 5 Science

by Dr. Jean Brainard
Edited by Ralph R. Kantrowitz
Designed by Philip W. Sedelnik

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About the Author:

Dr. Jean M. Brainard received a master's degree from the Harvard School of Public Health and a doctorate in biomedical anthropology from the State University of New York at Binghamton. A former university professor, Dr. Brainard has written hundreds of text-book chapters and encyclopedia articles on a diversity of subjects, as well as numerous professional publications based on her own research.

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Connecticut Content Standards for Grades 3–5 Science

Grade 3		Pages 1–29
3.1: Materials have properties that can be identified and described through the use of simple tests.	Problem #'s	
Heating and cooling cause changes in some of the properties of materials.		1–12 (also 146)
3.2: Organisms can survive and reproduce only in environments that meet their basic needs.	Problem #'s	
Plants and animals have structures and behaviors that help them survive in different environments.		13–31 (also 382)
3.3: Earth materials have different physical and chemical properties.	Problem #'s	
Rocks and minerals have properties that may be identified through observation and testing; these properties determine how earth materials are used.		32–56
3.4: Earth materials provide resources for all living things, but these resources are limited and should be conserved.	Problem #'s	
Decisions made by individuals can impact the global supply of many resources.		57–74 (also 88)
Grade 4		Pages 30–65
4.1: The position and motion of objects can be changed by pushing or pulling.	Problem #'s	
The size of the change in an object's motion is related to the strength of the push or pull.		75–84 (also 152)
The more massive an object is, the less effect a given force will have on its motion.		
4.2: All organisms depend on the living and non-living features of the environment for survival.	Problem #'s	
When the environment changes, some organisms survive and reproduce, and other die or move to new locations.		85–110 (also 57, 66)

4.3: Water has a major role in shaping the Earth's surface.	Problem #'s
Water circulates through the Earth's crust, oceans and atmosphere.	111–137
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Electricity in circuits can be transformed into light, heat, sound and magnetic effects.	138–154
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Grade 5	Pages 66–162
5.1: Sound and light are forms of energy.	Problem #'s
Sound is a form of energy that is produced by the vibration of objects and is transmitted by the vibration of air and objects.	155–225 (also 261)
Light is a form of energy that travels in a straight line and can be reflected by a mirror, refracted by a lens, or absorbed by objects.	
5.2: Perceiving and responding to information about the environment is critical to the survival of organisms.	Problem #'s
The sense organs perceive stimuli from the environment and send signals to the brain through the nervous system.	226–286
5.3: Most objects in the solar system are in a regular and predictable motion.	Problem #'s
The positions of the Earth and moon relative to the sun explain the cycles of day and night, and the monthly moon phases.	287–355
5.4: Humans have the capacity to build and use tools to advance the quality of their lives.	Problem #'s
Advances in technology allow individuals to acquire new information about the world.	356–397 (also 34, 222, 326)

Expected Performances Assessed on CMT Science Tests

Grade 3	Problem #'s
B 1: Sort and classify materials based on properties such as dissolving in water, sinking and floating, conducting heat, and attracting to magnets.	1, 2, 7, 10, 11, 146
B 2: Describe the effect of heating on the melting, evaporation, condensation and freezing of water.	3–6, 8, 9, 12
B 3: Describe how different plants and animals are adapted to obtain air, water, food and protection in specific land habitats.	13, 14, 16, 17, 19–21, 26–28, 31, 382
B 4: Describe how different plants and animals are adapted to obtain air, water, food and protection in water habitats.	15, 18, 22–25, 29, 30
B 5: Describe the physical properties of rocks and relate them to their potential uses.	32, 33, 37–43, 45–47, 49, 52, 55
B 6: Relate the properties of rocks to the possible environmental conditions during their formation.	34–36, 41, 42, 44, 46–51, 53–56
B 7: Describe how earth materials can be conserved by reducing the quantities used, and by reusing and recycling materials rather than discarding them.	57–65, 66–71, 72–74, 88
Grade 4	Problem #'s
B 8: Describe the effects of the strengths of pushes and pulls on the motion of objects.	75, 77–81, 83, 152
B 9: Describe the effect of the mass of an object on its motion.	76, 77, 79–84
B 10: Describe how animals, directly or indirectly, depend on plants to provide the food and energy they need in order to grow and survive.	85–87, 90, 96–98, 101–103, 107, 109, 110
B 11: Describe how natural phenomena and some human activities may cause changes to habitats and their inhabitants.	57, 66, 88, 89, 91–95, 99, 100, 104–106, 108

B 12: Describe how the sun's energy impacts the water cycle.	111, 112, 116, 117, 119, 120, 123–125, 128, 129, 135, 137
B 13: Describe the role of water in erosion and river formation.	113–115, 118, 121, 122, 125–127, 130–134, 136
B 14: Describe how batteries and wires can transfer energy to light a light bulb.	138, 141, 147, 148, 153
B 15: Explain how simple electrical circuits can be used to determine which materials conduct electricity.	139, 142, 144, 147–149, 154
B 16: Describe the properties of magnets, and how they can be used to identify and separate mixtures of solid materials.	140, 143, 145, 146, 150–152
Grade 5	Problem #'s
B 17: Describe the factors that affect the pitch and loudness of sound produced by vibrating objects.	155, 156, 160–164, 169, 171–173, 184–188, 199–202, 204, 214, 217, 220, 223, 261
B 18: Describe how sound is transmitted, reflected and/or absorbed by different materials.	157, 158, 165, 170, 174–177, 189, 192–195, 199, 205–208, 214, 218, 221, 224
B 19: Describe how light is absorbed and/or reflected by different surfaces.	159, 166–168, 178–183, 190, 191, 196–198, 203, 208–213, 216, 219, 222, 225
B 20: Describe how light absorption and reflection allow one to see the shapes and colors of objects.	226–229, 231–233, 244–249, 255–259, 266–270, 277, 279, 282–285

<p>B 21. Describe the structure and function of the human senses and the signals they perceive.</p>	<p>230, 233–243, 248–251, 253, 254, 260–265, 268–276, 278, 280, 281, 283–286</p>
<p>B 22. Explain the cause of day and night based on the rotation of Earth on its axis.</p>	<p>252, 287–290, 293, 294, 302–305, 308–311, 319–324, 334–338, 347, 349, 352, 354</p>
<p>B 23. Describe the monthly changes in the appearance of the moon, based on the moon's orbit around the Earth.</p>	<p>291, 292, 295–301, 306, 307, 312–318, 325–333, 339–346, 348, 350, 351, 353, 355</p>
<p>B 24. Compare and contrast the structures of the human eye with those of the camera.</p>	<p>364–366, 371–373, 375, 379–382, 385–387, 393–397</p>
<p>B 25. Describe the uses of different instruments, such as eye glasses, magnifiers, periscopes and telescopes, to enhance our vision.</p>	<p>34, 222, 326, 356–363, 367–370, 374, 376–378, 383, 384, 388–392</p>

Grades 3–5 Core Standards for Scientific Inquiry, Literacy and Numeracy

Content Standards:

Scientific Inquiry:

Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena.

Scientific Literacy:

Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science.

Scientific Numeracy:

Mathematics provides useful tools for the description, analysis and presentation of scientific data and ideas.

Expected Performances:

B INQ.1: Make observations and ask questions about objects, organisms and the environment.

B INQ.2: Seek relevant information in books, magazines and electronic media.

B INQ.3: Design and conduct simple investigations.

B INQ.4: Employ simple equipment and measuring tools to gather data and extend the senses.

B INQ.5: Use data to construct reasonable explanations.

B INQ.6: Analyze, critique and communicate investigations using words, graphs and drawings.

B INQ.7: Read and write a variety of science-related fiction and nonfiction texts.

B INQ.8: Search the Web and locate relevant science information.

B INQ.9: Use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials.

B INQ.10: Use mathematics to analyze, interpret and present data.

3.2: Heredity and Evolution

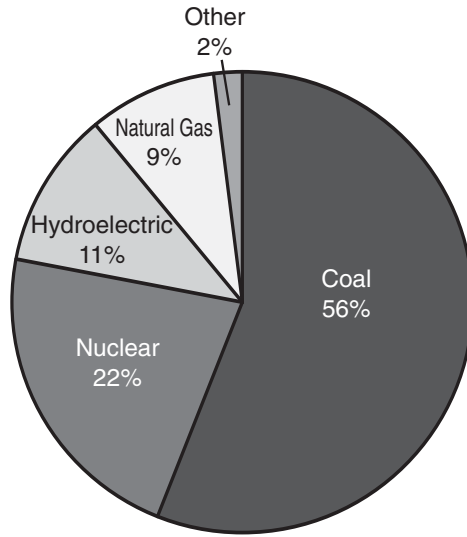
Questions 13 and 14 refer to the information and data below.

A scientist is researching a certain species of plant that grows in boggy areas. She thinks that seeds with a greater mass are more likely to germinate in very wet conditions, while seeds with less mass are likely to rot in the water. The scientist measured the mass of eight seeds and recorded the following values:

0.24 mg	0.25 mg	0.23 mg	0.28 mg
.021 mg	0.22 mg	0.29 mg	0.21 mg

- 13.** Which instrument did the scientist most likely use to measure the mass of the seeds?
- A. balance
 - B. meter stick
 - C. thermometer
 - D. graduated cylinder
- 14.** What is the average mass of the eight seeds she measured?
- A. 0.22 mg
 - B. 0.23 mg
 - C. 0.24 mg
 - D. 0.25 mg
- 15.** Which parts of a fish allow it to obtain oxygen from water?
- A. scales
 - B. fins
 - C. gills
 - D. jaws
- 16.** Jake noticed that his cat's fur is longer and thicker in the winter than it is in the summer. The longer, thicker fur is most likely an adaptation that helps the cat
- A. find food.
 - B. look big.
 - C. stay warm.
 - D. run fast.
- 17.** The leaves of a plant do all of the following except
- A. use energy in sunlight.
 - B. give off oxygen.
 - C. make food.
 - D. provide support.
- 18.** Which book would be most likely to help you understand why a fish adapted to live in salt water cannot survive in freshwater.
- A. *Creatures that Live in Lakes and Ponds*
 - B. *Saltwater Fish and Their Adaptations*
 - C. *Field Guide to North American Lakes*
 - D. *How to Catch Deep Sea Fish*

This circle graph shows the percentage of electricity generated in the U.S. using different energy sources. Use the graph to answer questions 64–66.



- 64.** Not counting the “Other” category, what percentage of electricity generated in the U.S. uses fossil fuels?
- A. 76%
 - B. 65%
 - C. 33%
 - D. 11%
- 65.** Except for “Other,” what percentage of electricity generated in the U.S. uses nonrenewable energy sources?
- A. 87%
 - B. 75%
 - C. 67%
 - D. 56%
- 66.** What percentage of electricity generated in the U.S. and identified in the graph produces wastes that can harm the environment?
- A. 11%
 - B. 22%
 - C. 56%
 - D. 87%

116. The energy that drives the water cycle comes from

- A. Earth's core.
- B. the moon.
- C. clouds.
- D. the sun.

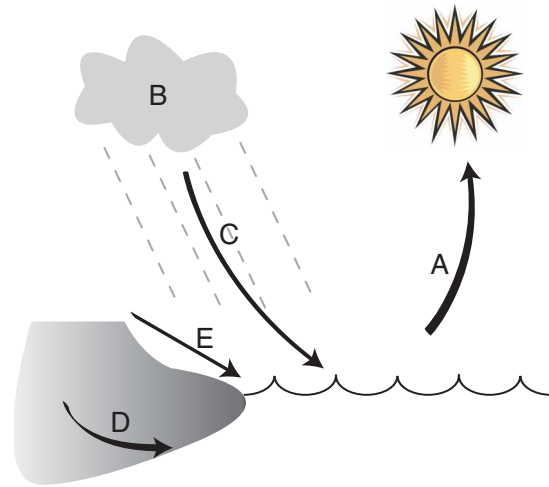
117. Condensation of water occurs when

- A. water turns to water vapor.
- B. rain soaks into the ground.
- C. dew forms.
- D. ice melts.

118. Which of the following may be a reliable source of relevant information on river erosion in Connecticut?

- A. science journals
- B. the Internet
- C. scientific conferences
- D. all of the above

119. In this diagram of the water cycle, which arrow represents ground water?



- A. arrow A
- B. arrow B
- C. arrow C
- D. arrow D

120. Which process adds water vapor to the water cycle?

- A. condensation
- B. precipitation
- C. transpiration
- D. absorption

175. Which substance does sound travel through best?

- A. wood
- B. water
- C. glass
- D. air

176. Which of the following materials absorbs sound best?

- A. glass
- B. concrete
- C. steel
- D. Styrofoam

177. Sound waves called “sonar” can be used to form images of objects on the ocean floor. What property of sound makes it useful for this purpose?

- A. It reflects off objects.
- B. It bends around corners.
- C. It travels faster than light.
- D. It travels only in straight lines.

178. What causes metals such as aluminum and silver to look shiny?

- A. They absorb heat.
- B. They conduct electricity.
- C. They reflect light.
- D. They dissolve in water.

179. A fifth grade teacher took his class outside on a sunny day. The teacher held a hand lens a few inches above some small scraps of tissue paper. After several seconds, the paper started to burn. Which sentence explains why?

- A. The hand lens gave off heat.
- B. The hand lens focused sunlight.
- C. The paper was self-lighting.
- D. The sun was unusually hot that day.

180. Which object reflects the most light?

- A. white sweater
- B. brown shirt
- C. black jacket
- D. purple coat

Use the information and sketch below to answer questions 199 and 200.

This sketch shows a police car speeding down a street. The police car has just passed one pedestrian and is approaching another pedestrian. The police car's siren is blaring. The gray shading represents sound waves from the siren.



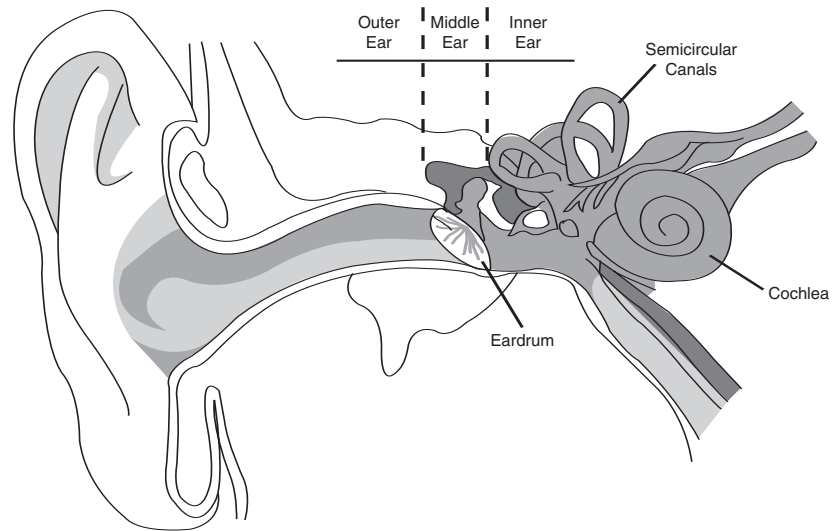
199. What does this picture illustrate?

- A. an echo
- B. sonar
- C. radar
- D. the Doppler effect

200. Both pedestrians hear the police car's siren. How does the siren sound to pedestrian A, compared with how it sounds to pedestrian B?

- A. louder
- B. lower
- C. softer
- D. higher

Use this drawing of the ear to answer questions 274–276.



274. Which part of the ear vibrates first when a sound wave enters the ear?

- A. inner ear
- B. cochlea
- C. eardrum
- D. semicircular canals

275. The part of the ear where sound vibrations are changed to nerve signals is the

- A. outer ear.
- B. middle ear.
- C. inner ear.
- D. eardrum.

276. Which magazine article about the ear would likely provide the most relevant information about how the ears help maintain balance?

- A. Scientific American: “New Devices to Treat Hearing Loss”
- B. National Geographic: “Ear Decorations in Bali”
- C. Popular Science: “The Ear as a Sound Receiver”
- D. Physics Today: “Body Movement and the Semicircular Canals”