

Scientific Investigation



1st Marking Period / Throughout Year

COURSE: Science Grade 5
UNIT: Scientific Investigation
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 1st Marking Period / Year

CODE:
MAP LEVEL: 4
GRADE: 5

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- B.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- B.INQ.2 Students will seek relevant information in books, magazines and electronic sources of information.
- B.INQ.3 Students will design and conduct simple investigations.
- B.INQ.4 Students will employ simple equipment and measuring tools to gather data and extend the senses.
- B.INQ.5 Students will use data to construct reasonable explanations.
- B.INQ.6 Students will analyze, critique and communicate investigations using words, graphs and drawings.

SCIENCE - SCIENTIFIC INQUIRY (I)

- B.INQ.7 Students will read and write a variety of fiction and non-fiction science-related texts.
 - B.INQ.8 Students will search the web and locate relevant science information.
 - B.INQ.9 Students will use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials.
 - B.INQ.10 Students will use mathematics to analyze, interpret and present data.
-

ESS/FOCUS QUESTIONS

What is the Scientific Method?

How do scientists develop their questions and hypotheses?

Why is it important for scientists to outline a procedure for investigations?

How do scientists collect, record, and communicate data?

CONTENT

Scientific Inquiry

-Search out, describe, explain and predict natural phenomena.

Scientific Process Skills

-Questions, hypothesis, predictions, planning, observations, interpretations, communicate

Scientific Literacy

-Speaking, listening, presenting, interpreting, reading and writing about science.

SKILLS

Raise questions which can be investigated.

Hypothesize to provide an explanation based upon the evidence.

Predict using evidence from previous experiences.

Plan and conduct a scientific investigation.

Observe differences/similarities by making use of the senses.

Interpret and develop conclusions which summarizes the evidence.

Communicate findings and present results in tables, graphs, or charts.

ASSURED EXPERIENCES

Activity #1:

Along with science journals, all fifth grade students should be familiar with the process of scientific inquiry and have a thorough understanding of all process skills.

Activity #2:

All fifth grade students should know how to use measurement tools, i.e., a balance, graduated cylinder, beaker, and ruler (metric and standard)

Activity #3:

Participation in the school science fair is required; group or individual projects are acceptable.

ASSESSMENTS

Teacher observations

Science Fair Project

Science journal/notebook

Tests

Quizzes

Classroom lab activities

Performance based activities

OPTIONAL ACTIVITIES

RESOURCES

Harcourt Text

United streaming:

'Literacy and Learning: Science Grade 5'

'Be an Inventor'

'Everyday Science: Discovering the Scientific Method'

'Matter and its Properties: Measuring Matter'

Web sites:

www.harcourtschool.com

www.discoveryschool.com

www.nsta.org/ostbc

Science Literature:

Fun with Your Microscope, by Shar Levine and Leslie Johnstone

ADDITIONAL NOTES

All students should maintain a science journal/notebook to record their data which may include observations, questions, summaries, charts, drawings.

Create a science word wall to house science vocabulary as the terms are introduced throughout the unit of study.

VOCABULARY

Analyze	Experiment	Kilometer	Prove
Balance	Fahrenheit	Mass	Record
Celsius	Gram	Meter	Research
Classify	Hypothesis	Metric units	Standard units
Conclusion	Inference	Milliliter	Summarize
Data	Interpret	Millimeter	Thermometer
Degree	Inquiry	Observation	Variable
Demonstrate	Investigation	Prediction	Volume
Disprove	Kilogram	Procedure	

Sound and Light Energy



2nd Marking Period

COURSE: Science Grade 5
UNIT: Sound and Light Energy
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 2nd Marking Period

CODE:
MAP LEVEL: 4
GRADE: 5

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- B.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- B.INQ.2 Students will seek relevant information in books, magazines and electronic sources of information.
- B.INQ.3 Students will design and conduct simple investigations.
- B.INQ.4 Students will employ simple equipment and measuring tools to gather data and extend the senses.
- B.INQ.5 Students will use data to construct reasonable explanations.
- B.INQ.6 Students will analyze, critique and communicate investigations using words, graphs and drawings.
- B.INQ.7 Students will read and write a variety of fiction and non-fiction science-related texts.
- B.INQ.8 Students will search the web and locate relevant science information.
- B.INQ.9 Students will use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials.
- B.INQ.10 Students will use mathematics to analyze, interpret and present data.

SCIENCE - PHYSICAL SCIENCE (II, III, IV)

- B.17 Students will describe the factors that affect the pitch and loudness of sound produced by vibrating objects.
 - B.18 Students will describe how sound is transmitted, reflected and/or absorbed by different materials.
 - B.19 Students will describe how light is absorbed and/or reflected by different surfaces.
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ESS/FOCUS QUESTIONS

What are the properties of light and sound?

How are light and sound transmitted?

How is light absorbed, reflected, and/or refracted by different surfaces?

What are the factors that effect pitch and volume?

CONTENT

Content Standard: 5.1

Sound and light are forms of energy. Sound is a form of energy that is produced by the vibration of objects and is transmitted by the vibration of air and objects. 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.

SKILLS

Explain how light and sound are produced.

Determine how tension will effect the sound.

Investigate the factors that effect the pitch and volume.

Illustrate how sound and light waves travel.

Compare and contrast light and sound waves

Compare and Contrast reflection and refraction

Differentiate between pitch and volume

Investigate the relationship between wavelength and pitch

ASSURED EXPERIENCES

Activity #1:

"What's That Noise"

ASSESSMENTS

Teacher observation

Science notebook/journal

Tests

Quizzes

Classroom Lab Activities

Performance Based Assessments

OPTIONAL ACTIVITIES

Bose Interactive Field Trip - University of Bridgeport

RESOURCES

Harcourt Science Text

United Streaming:

'Basics of Physics: Exploring Light and Color'

'Science investigations Physical Science: Investigation Sound and Light'

'Physical Science: Light'

'Basics of Physics: Exploring Sound'

'Sound: A First Look'

'The Wonder of Sound'

Websites:

www.harcourtschool.com

www.discoveryschool.com

www.cln.org/themes/sound.html

faculty.washington.edu/chudler/hearing.html

www.sci.mus.mn.us/sound/topcss.html

www.teach-nology.com/teachers/lesson_plans/science/physics/lightcolor/

www.energyquest.ca.gov/teachers_resources/lesson_plans.html

ADDITIONAL NOTES

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VOCABULARY

Amplifier: A device that makes an electrical signal stronger

Artificial light: Light which humans create (for example, flashlight, lighthouse, lamps, etc.)

Binoculars: An optical device with two eyepieces that makes distant objects appear larger

Compression: Squeezing together to make smaller

Concave: Curved like the inner surface of a sphere

Contract: To shrink and become smaller

Convex: Curved like the outer surface of a sphere

Density: The mass of an object per unit of volume

Dispersion: Spreading out

Doppler effect: The effect on the pitch of a sound caused by the source and listener moving in relation to one another

Eardrum: A thin membrane that separates the external ear from the middle ear

Echo: Repetition of a sound by reflection of sound waves from a surface

Expansion: Make larger

Fluorescent lamp: A lamp consisting of a glass tube whose inner wall is coated with a material that fluoresces when an electrical current causes a vapor within the tube to discharge electrons.

Frequency: The number of times an action occurs in a given time

Hue: The shade or tint of a color

Incandescent: An electric lamp in which a wire is heated to glow and produce light

Infrared: Invisible radiation wavelengths longer than red in the visible spectrum

Kaleidoscope: A tube-shaped optical instrument that is rotated to produce a succession of symmetrical designs

Laser: A device that converts electromagnetic radiation to highly amplified radiation

Light year: The distance that light travels during one Earth year

Loudspeaker: A device that converts electric signals to sound and projects it

Mach 1: The speed of sound

Microscope: An instrument that uses a combination of lenses to produce magnified images of small objects

Microwaves: Electromagnetic waves whose wavelengths are longer than infrared, but shorter than short-wave radio waves

Music: A pleasing or harmonious sound or combination of sounds

Natural light: Light which humans do not create (for example, light from the sun, fire, stars, lightning, etc.)

Noise: An unpleasant sound or combination of sounds

Opaque: Does not permit the passage of light

Periscope: A device that uses mirrors and lenses to allow observation of an object that is not in the direct line of sight

Photosynthesis: The process by which plants use light, water and carbon dioxide to make food

Pitch: The lowness or highness of a sound

Plane mirror: A flat surfaced mirror

Prism: A triangular glass solid used to separate white light into a spectrum

Reflection: Throw or bend back light from a surface

Refraction: The turning or bending of a wave as it passes from one medium to another of different density

Saturation: The amount of color in a sample

Sonar: An apparatus that uses reflected sound waves to detect underwater objects

Telescope: A device that uses mirrors and lenses to observe distant objects

Timbre: The quality of a sound

Translucent: Allows light to pass but not clearly

Transparent: Allows light to pass so that objects may be seen clearly

Ultrasound: A pitch that is higher than that of sounds within the normal range of hearing

Ultraviolet: Light whose wavelengths are shorter than those of light within the visible spectrum

Vacuum: The absence of matter

Vibration: A to and fro movement

Volume: The loudness of a sound

Wave: A disturbance traveling through a substance

The Function and Structure of Sensory Organs



3rd Marking Period

COURSE: Science Grade 5
UNIT: The Structure and Function of Sensory Organs
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 3rd Marking Period

CODE:
MAP LEVEL: 4
GRADE: 5

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- B.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
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SCIENCE - LIFE SCIENCE (V, VI, VII)

- B.20 Students will describe how light absorption and reflection allow us to see the shapes and colors of objects.
- B.21 Students will describe the structure and function of the human senses and the signals they perceive.

SCIENCE - SCI & TECH IN SOCIETY (XI)

- B.25 Students will compare and contrast the structures of the human eye and the camera.
- B.26 Students will describe the use of different instruments, such as eye glasses, magnifiers, periscopes and telescopes, to enhance our vision.

ESS/FOCUS QUESTIONS

What are the properties of sound and light?

What structures make up the eye?

What structure makes up the ear?

How do the individual structures of the eye and ear work together to gather and transmit information from our environment?

CONTENT

Content Standard 5.2:

Perceiving and responding to information about the environment is critical to the survival of organisms. The sense organs perceive stimuli from the environment and send signals to the brain through the nervous system.

Content Standard 5.4:

Humans have the capacity to build and use tools to advance the quality of their lives. Advances in technology allow individuals to acquire new information about the world.

SKILLS

Identify and label the individual structures of the eye and ear.

Describe the role of the ear and the brain in connection with sound.

Describe sound as a form of energy produced by vibrations.

Determine the types of materials that causes sound to decrease.

Explain the path light takes as it enters the eye.

Compare and contrast the function of cones and rods.

Diagram how concave and convex lenses bend light.

Determine how concave and convex lenses are used for correcting nearsightedness and farsightedness.

Illustrate how sound waves enter the ear and travel to the brain.

Investigate how the inner ear controls balance.

Determine how our brain reacts to various sensory stimuli (light and sound).

Describe how light absorption and reflection allow us to see shapes and colors.

Observe how refracted sunlight forms a rainbow.

Observe light through a diffraction grating.

Observe how water refracts light.

ASSURED EXPERIENCES

Camera Lab - Comparing the function of a human eye to the function of a camera

ASSESSMENTS

Teacher observation

Science notebook/journal

Tests

Quizzes

Classroom Lab activities

Performance Based Assessments

OPTIONAL ACTIVITIES

Cow eye dissection - hands on or online simulation

RESOURCES

Harcourt Textbook

United Streaming Video:

'Basics of Physics: Exploring Sound'

'Biologix: The Ear'

'The Eye: Structure and Function'

'Biologix: The Eye: Vision and Perception'

'The Inside Story with Slim Goodbody: The Sensational Five: The Inside Story of Your Senses'

Websites:

hyperphysics.phy-astr.gsu.edu/hbase/vision/eye.html

www.pasadenaeye.com/faq/faq15/faq15_text.html

www.glenbrook.k12.il.us/gbssci/phys/Class/sound/u11I2d.html

www.enchantedlearning.com/subjects/anatomy/ear/

www.exploratorium.edu/learning_studio/cow_eye/index.html

ADDITIONAL NOTES

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VOCABULARY

Absorption	Functions	Reflection
Auditory nerve	Inner Ear	Response
Concave	Iris	Retina
Cones	Lens	Rods
Convex	Middle ear	Sensory organ
Cornea	Nearsightedness	Stimuli
Eardrum	Optic nerve	Structure
Eye	Outer ear	Transmit
Farsightedness	Pupil	Vacuum

Planet



**A large body orbiting
the Sun or other star.**

4TH Marking Period

COURSE: Science Grade 5
UNIT: The Solar System
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 4th Marking Period

CODE:
MAP LEVEL: 4
GRADE: 5

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- B.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
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SCIENCE - SCIENTIFIC INQUIRY (I)

- B.7 Students will read and write a variety of fiction and non-fiction science-related texts.
- B.8 Students will search the web and locate relevant science information.
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SCIENCE - EARTH SCIENCE (VIII, IX, X)

- B.22 Students will explain the cause of day and night based on the rotation of Earth on its axis.
- B.23 Students will describe the monthly changes in the appearance of the moon based on the moons orbit around the Earth.

ESS/FOCUS QUESTIONS

How does the earth's location in the solar system relate to the cycles of day and night?

What causes the appearance of the moon to constantly change?

CONTENT

Content Standard: 5.3

Most objects in the solar system are in a regular and predicable motion. The positions of the Earth and moon relative to the sun explain the cycles of day and night, and the monthly moon phases.

SKILLS

Explain the cause of night and day based on the rotation of the earth on its axis.

Investigate the earth's relationship to the sun and moon.

Explain how the earth's gravitational pull and rotation produce high and low tides.

Illustrate how the earth's movement around the sun produces various seasons throughout the world.

Determine the earth's role in producing the monthly changes in the appearance of the moon.

Illustrate the phases of the moon.

Explain why various geographic regions of the earth have different climates.

Use manipulatives to demonstrate the rotation and revolution of the earth.

Use manipulatives to demonstrate a solar eclipse and a lunar eclipse.

Describe the effect of gravity on the orbital movement of planets in the solar system.

ASSURED EXPERIENCES

ASSESSMENTS

Teacher Observation

Science Notebook/Journal

Tests

Quizzes

Classroom Lab Activities

Performance Based Assessments

OPTIONAL ACTIVITIES

Activity #1:

Discovery Museum Planetarium Exhibit Field Trip

Activity #2:

Have students determine their weight on earth and compare it to their weight on the moon and other planets.

Activity #3:

Have students illustrate their understanding of the Solar System by creating a brochure which includes photos, facts about the planet, and what life would possibly be like on their planet of interest.

RESOURCES

Harcourt Text

United Streaming:

'Greatest Discoveries with Bill Nye: Astronomy'

'What is an Orbit'

'Seasons of the Year'

'Spin Around the Solar System, The Sun: Our Star Attraction'

'Spin Around the Solar System: Moon Dance'

Websites:

www.harcourtschool.com

www.discoveryschool.com

www.lessonplanspage.com/more/205t01.html

www.efn.org/~jack_v/teaching.html

www.csun.edu/science/geoscience/astronomy/solar_system.html

www.thinkquest.org/library/cat_show.html?cat_id=41

www.solarsystem.org.uk/planet10/

www.nsta.org/ostbc

ADDITIONAL NOTES

All students should maintain a science journal/notebook to record their data which may include observations, questions, summaries, charts, drawings.

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VOCABULARY

Axis	Mars	Revolution
Climate	Mercury	Saturn
Earth	Moon	Solar
Eclipse	Neptune	Solar system
Equator	Orbit	Star
Gravity	Phases	Tides
Hemisphere	Planet	Tilt
Jupiter	Pluto	Uranus
Lunar	Rotation	Venus