

GLENCOE CORRELATION
FROM BACTERIA TO PLANTS (B)
ASTRONOMY (J)
MOTION, FORCES, AND ENERGY (M)
WAVES, SOUND, AND LIGHT (O)
UTAH
Science – 6th Grade

OBJECTIVES	PAGE REFERENCES			
	FROM BACTERIA TO PLANTS (B)	ASTRONOMY (J)	MOTION, FORCES, AND ENERGY (M)	WAVES, SOUND, AND LIGHT (O)
Standard 1				
Science Benchmark				
The appearance of the lighted portion of the moon changes in a predictable cycle as a result of the relative positions of Earth, the moon, and the sun. Earth turns on an axis that is tilted relative to the plane of Earth's yearly orbit. The tilt causes sunlight to fall more intensely on different parts of the Earth during various parts of the year. The differences in heating of Earth's surface and length of daylight hours produce the seasons.				
Students will understand that the appearance of the moon changes in a predictable cycle as it orbits Earth and as Earth rotates on its axis.				
Objective 1: Explain patterns of changes in the appearance of the moon as it orbits Earth.				
a. Describe changes in the appearance of the moon during a month.		SE: 46-50 Activity 55 TWE: IM 38F TPK 46 SJ 47		
b. Identify the pattern of change in the moon's appearance.		SE: 46-50, 66 #19 Activity 55 TWE: IM 38F VL 48		
c. Use observable evidence to explain the movement of the moon around Earth in relationship to Earth turning on its axis and the position of the moon changing in the sky.		SE: 46-50, 66 #17 Activity 55 TWE: IM 38F D 50 LD 50 R 54		

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d. Design an investigation, construct a chart, and collect data depicting the phases of the moon.		SE: <i>Activity 55</i> <i>Skill Builder Activities 54</i> TWE: IM 38F A 55		
Objective 2: Demonstrate how the relative positions of Earth, the moon, and the sun create the appearance of the moon's phases.				
a. Identify the difference between the motion of an object rotating on its axis and an object revolving in orbit.		SE: 41-43, 46 <i>Explore Activity 39</i> TWE: A 39		
b. Compare how objects in the sky (the moon, planets, stars) change in relative position over the course of the day or night.		SE: 40-45, 47-50, 70-71, 104-105		
c. Model the movement and relative positions of Earth, the moon, and the sun.		SE: <i>Activity 55</i> TWE: QD 44 R 45, 54 ACT 50 LD 50		
Standard 2 Science Benchmark The appearance of the lighted portion of the moon changes in a predictable cycle as a result of the relative positions of Earth, the moon, and the sun. Earth turns on an axis that is tilted relative to the plane of Earth's yearly orbit. The tilt causes sunlight to fall more intensely on different parts of the Earth during various parts of the year. The differences in heating of Earth's surface and length of daylight hours produce the seasons.				
Students will understand how Earth's tilt on its axis changes the length of daylight and creates the seasons.				
Objective 1: Describe the relationship between the tilt of Earth's axis and its yearly orbit around the sun.				
a. Describe the yearly revolution (orbit) of Earth around the sun.		SE: 43-45, 74 <i>Science Online 43</i> <i>Activity 75</i>		
b. Explain that Earth's axis is tilted relative to its yearly orbit around the sun.		SE: 43-45 TWE: FF 43		

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c. Investigate the relationship between the amount of heat absorbed and the angle to the light source.		SE: 43-45 Activity 60-61 TWE: QD 44 A 61		
Objective 2: Explain how the relationship between the tilt of Earth's axis and its yearly orbit around the sun produces the seasons.				
a. Compare Earth's position in relationship to the sun during each season.		SE: 44-45		
b. Compare the hours of daylight and illustrate the angle that the sun's rays strikes the surface of Earth during summer, fall, winter, and spring in the Northern Hemisphere.		SE: 44-45 TWE: VL 43		
c. Use collected data to compare patterns relating to seasonal daylight changes.		SE: Science Online 45		
d. Use a drawing and/or model to explain that changes in the angle at which light from the sun strikes Earth, and the length of daylight, determine seasonal differences in the amount of energy received.		SE: 44-45 TWE: R 45		
e. Use a model to explain why the seasons are reversed in the Northern and Southern Hemispheres.		TWE: R 45		

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	FROM BACTERIA TO PLANTS (B)	ASTRONOMY (J)	MOTION, FORCES, AND ENERGY (M)	WAVES, SOUND, AND LIGHT (O)
Standard 3 Science Benchmark The solar system consists of planets, moons, and other smaller objects including asteroids and comets that orbit the sun. Planets in the solar system differ in terms of their distance from the sun, number of moons, size, composition, and ability to sustain life. Every object exerts gravitational force on every other object depending on the mass of the objects and the distance between them. The sun's gravitational pull holds Earth and other planets in orbit. Earth's gravitational force holds the moon in orbit. The sun is one of billions of stars in the Milky Way galaxy, that is one of billions of galaxies in the universe. Scientists use a variety of tools to investigate the nature of stars, galaxies, and the universe. Historically, cultures have observed objects in the sky and understood and used them in various ways.				
Students will understand the relationship and attributes of objects in the solar system.				
Objective 1: Describe and compare the components of the solar system.				
a. Identify the planets in the solar system by name and relative location from the sun.		SE: 70-71, 76-81, 82-89 Activity 94-95 TWE: CB 68E		
b. Using references, compare the physical properties of the planets (e.g., size, solid or gaseous).		SE: 76-81, 82-89 Math Skills Activity 80 TWE: IS 72 A 74 ACT 88		
c. Use models and graphs that accurately depict scale to compare the size and distance between objects in the solar system.		SE: 70-71, 100 #16 MiniLab 84 Skill Builder Activities 87 Activity 94-95 TWE: ACT 77		
d. Describe the characteristics of comets, asteroids, and meteors.		SE: 90-93 Accidents in Science 96-97 TWE: D 91 ACT 91, 97 A 93 CB 96		
e. Research and report on the use of manmade satellites orbiting Earth and various planets.		SE: Science Online 20 Skill Builder Activities 81 TWE: E 26, 77, 89 ACT 52 SJ 86, 91	SE: 47	SE: 79, 84-85 Science Online 84

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Objective 2: Describe the use of technology to observe objects in the solar system and relate this to science's understanding of the solar system.				
a. Describe the use of instruments to observe and explore the moon and planets.		SE: 10-13, 15-22, 23-29 <i>Science Online</i> 80 TWE: CB 6E E 26, 27, 77 SJ 86, 91	SE: <i>Chapter Assessment</i> 154 TWE: CON 119	SE: 114-115 <i>National Geographic</i> 78 TWE: MM 115
b. Describe the role of computers in understanding the solar system (e.g., collecting and interpreting data from observations, predicting motion of objects, operating space probes).		SE: <i>Science Online</i> 27		
c. Relate science's understanding of the solar system to the technology used to investigate it.		SE: 8-13, 15-22, 23-29, 52-53, 76-81, 82-87 TWE: C 54		SE: 79 <i>National Geographic</i> 78 TWE: ACT 78
d. Find and report on ways technology has been and is being used to investigate the solar system.		SE: 8-13, 15-22, 23-29 TWE: E 26, 27, 77, 89 SJ 86	SE: <i>Field Guide</i> 190-193 TWE: CON 119 E 193	SE: <i>Astronomy Integration</i> 42 TWE: E 78
Objective 3: Describe the forces that keep objects in orbit in the solar system.				
a. Describe the forces holding Earth in orbit around the sun, and the moon in orbit around Earth.		SE: 71-74 TWE: UA 72	SE: 43 TWE: D 46	SE: 67
b. Relate a celestial object's mass to its gravitational force on other objects.		SE: 71, 92	SE: 43	
c. Identify the role gravity plays in the structure of the solar system.		SE: 71-74, 92 <i>Physics Integration</i> 72 <i>MiniLab</i> 79 TWE: V 73 A 79		

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Standard 4 Science Benchmark The solar system consists of planets, moons, and other smaller objects including asteroids and comets that orbit the sun. Planets in the solar system differ in terms of their distance from the sun, number of moons, size, composition, and ability to sustain life. Every object exerts gravitational force on every other object depending on the mass of the objects and the distance between them. The sun's gravitational pull holds Earth and other planets in orbit. Earth's gravitational force holds the moon in orbit. The sun is one of billions of stars in the Milky Way galaxy, that is one of billions of galaxies in the universe. Scientists use a variety of tools to investigate the nature of stars, galaxies, and the universe. Historically, cultures have observed objects in the sky and understood and used them in various ways.				
Students will understand the scale of size, distance between objects, movement, and apparent motion (due to Earth's rotation) of objects in the universe and how cultures have understood, related to and used these objects in the night sky.				
Objective 1: Compare the size and distance of objects within systems in the universe.				
a. Use the speed of light as a measuring standard to describe the relative distances to objects in the universe (e.g., 4.4 light years to star Alpha Centauri; 0.00002 light years to the sun).		SE: 107, 121 <i>Skill Builder Activities</i> 108 <i>MiniLab</i> 122 TWE: CC 107 A 122		SE: 70 TWE: C 70 IM 123
b. Compare distances between objects in the solar system.		SE: 70-71 <i>Activity</i> 94-95 TWE: ACT 88		SE: <i>Skill Builder Activities</i> 70
c. Compare the size of the Solar System to the size of the Milky Way galaxy.		SE: 120-121 <i>MiniLab</i> 122		
d. Compare the size of the Milky Way galaxy to the size of the known universe.		SE: 120-121 <i>MiniLab</i> 122		
Objective 2: Describe the appearance and apparent motion of groups of stars in the night sky relative to Earth and how various cultures have understood and used them.				
a. Locate and identify stars that are grouped in patterns in the night sky.		SE: 104-105 <i>MiniLab</i> 105 <i>Field Guide</i> 138-141 TWE: CB 139 ACT 141		

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b. Identify ways people have historically grouped stars in the night sky.		SE: <i>Field Guide</i> 138-141 TWE: SJ 105 CD 121 CC 139 FF 141		
c. Recognize that stars in a constellation are not all the same distance from Earth.		SE: 104-108		
d. Relate the seasonal change in the appearance of the night sky to Earth's position.		SE: 104-105 TWE: VL 140		
e. Describe ways that familiar groups of stars may be used for navigation and calendars.		SE: <i>MiniLab</i> 105 TWE: QD 139		
Standard 5				
Science Benchmark				
Microorganisms are those living things that are visible as individual organisms only with the aid of magnification. Microorganisms are components of every ecosystem on Earth. Microorganisms range in complexity from single to multicellular organisms. Most microorganisms do not cause disease and many are beneficial. Microorganisms require food, water, air, ways to dispose of waste, and an environment in which they can live. Investigation of microorganisms is accomplished by observing organisms using direct observation with the aid of magnification, observation of colonies of these organisms and their waste, and observation of microorganisms' effects on an environment and other organisms.				
Students will understand that microorganisms range from simple to complex, are found almost everywhere, and are both helpful and harmful.				
Objective 1: Observe and summarize information about microorganisms.				
a. Examine and illustrate size, shape, and structure of organisms found in an environment such as pond water.	SE: <i>Activity</i> 14, 43 TWE: AC 12, 33 MAM 33			

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b. Compare characteristics common in observed organisms (e.g., color, movement, appendages, shape) and infer their function (e.g., green color found in organisms that are producers, appendages help movement).	SE: 9, 11, 32, 33-35, 37-39 <i>Activity 14, 43</i> <i>MiniLab 40</i> TWE: VL 35 LD 38			
c. Research and report on a microorganism's requirements (i.e., food, water, air, waste disposal, temperature of environment, reproduction).	SE: 8-13, 32, 33-39 <i>Activity 43</i> <i>Go Further 25</i> TWE: USW 11 RT 42 AS 42			
Objective 2: Demonstrate the skills needed to plan and conduct an experiment to determine a microorganism's requirements in a specific environment.				
a. Formulate a question about microorganisms that can be answered with a student experiment.	SE: <i>Problem-Solving Activity 20</i> <i>Activity 22-23</i> TWE: AS 16			
b. Develop a hypothesis for a question about microorganisms based on observations and prior knowledge.	SE: <i>Problem-Solving Activity 20</i> <i>Activity 22-23</i> TWE: AS 16	SE: <i>The Nature of Science 2-5</i>		
c. Plan and carry out an investigation on microorganisms. {Note: Teacher must examine plans and procedures to assure the safety of students; for additional information, you may wish to read microbe safety information on Utah Science Home Page.}	SE: <i>Problem-Solving Activity 20*</i> <i>Activity 22-23</i> TWE: AS 16* *Students can carry out investigations based on their hypotheses.			

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d. Display results in an appropriate format (e.g., graphs, tables, diagrams).	SE: <i>Problem-Solving Activity 20*</i> <i>Activity 22-23</i> TWE: AS 16* *Students can carry out investigations based on their hypotheses and record relevant data.			
e. Prepare a written summary or conclusion to describe the results in terms of the hypothesis for the investigation on microorganisms.	SE: <i>Problem-Solving Activity 20*</i> <i>Activity 22-23</i> TWE: AS 16* *Students can carry out investigations based on their hypotheses and report their conclusions.			
Objective 3: Identify positive and negative effects of microorganisms and how science has developed positive uses for some microorganisms and overcome the negative effects of others.				
a. Describe in writing how microorganisms serve as decomposers in the environment.	SE: 16, 40, 41, 42, 51 <i>Activity 22-23</i> *Text discussion of decomposers can be used to spur writing assignments about microorganisms and decomposition.			
b. Identify how microorganisms are used as food or in the production of food (e.g., yeast helps bread rise, fungi flavor cheese, algae are used in ice cream, bacteria are used to make cheese and yogurt).	SE: 18, 36, 50 TWE: CDIV 16, 35 VL 18 CH 21			

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c. Identify helpful uses of microorganisms (e.g., clean up oil spills, purify water, digest food in digestive tract, antibiotics) and the role of science in the development of understanding that led to positive uses (i.e., Pasteur established the existence, growth, and control of bacteria; Fleming isolated and developed penicillin).	SE: 15, 16, 18, 21, 36, 39, 51 <i>Science and Society</i> 54-55 TWE: TFYI 16 AC 50			
d. Relate several diseases caused by microorganisms to the organism causing the disease (e.g., athlete's foot -fungi, streptococcus throat -bacteria, giardia -protozoa).	SE: 19, 39, 40, 51 TWE: EX 19 DI 19, 38 TFYI 19 SJ 20 HI 39			
e. Observe and report on microorganisms' harmful effects on food (e.g., causes fruits and vegetables to rot, destroys food bearing plants, makes milk sour).	SE: 42, 50 <i>Science and Society</i> 54-55 TWE: CH 21 QD 45		SE: <i>Field Guide</i> 191	

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	FROM BACTERIA TO PLANTS (B)	ASTRONOMY (J)	MOTION, FORCES, AND ENERGY (M)	WAVES, SOUND, AND LIGHT (O)
Standard 6 Science Benchmark Heat, light, and sound are all forms of energy. Heat can be transferred by radiation, conduction and convection. Visible light can be produced, reflected, refracted, and separated into light of various colors. Sound is created by vibration and cannot travel through a vacuum. Pitch is determined by the vibration rate of the sound source.				
Students will understand properties and behavior of heat, light, and sound.				
Objective 1: Investigate the movement of heat between objects by conduction, convection, and radiation.				
a. Compare materials that conduct heat to materials that insulate the transfer of heat energy.			SE: 165-166 Activity 174-175 Section Assessment 167 MiniLab 164 Explore Activity 157 TWE: MM 166 A 157	
b. Describe the movement of heat from warmer objects to cooler objects by conduction and convection.			SE: 162-165 Skill Builder Activities 167 TWE: A 167 LD 166	
c. Describe the movement of heat across space from the sun to Earth by radiation.		SE: 8-9	SE: 139, 163 Explore Activity 65 MiniLab 143	SE: 12, 66-70
d. Observe and describe, with the use of models, heat energy being transferred through a fluid medium (liquid and/or gas) by convection currents.			SE: 164-165 MiniLab 165 TWE: LD 166	
e. Design and conduct an investigation on the movement of heat energy.		SE: Activity 60-61	SE: Activity 168, 174-175 TWE: ACT 128, 166 MM 166	SE: Explore Activity 65
Objective 2: Describe how light can be produced, reflected, refracted, and separated into visible light of various colors.				
a. Compare light from various sources (e.g., intensity, direction, color).		SE: 106 Health Integration 9 TWE: CB 102F QD 106		SE: 116-117 Section Assessment 117 TWE: E 98 QD 117

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	FROM BACTERIA TO PLANTS (B)	ASTRONOMY (J)	MOTION, FORCES, AND ENERGY (M)	WAVES, SOUND, AND LIGHT (O)
b. Compare the reflection of light from various surfaces (e.g., loss of light, angle of reflection, reflected color).	SE: 126 TWE: LD 126 EX 126	SE: 10-13 <i>Explore Activity 7</i> <i>Activity 14</i> TWE: QD 44 C 81		SE: 19, 97-98, 101-106 <i>Activity 107</i> <i>Skill Builder Activities 100</i> TWE: ACT 103 QD 104 VL 102 E 99
c. Investigate and describe the refraction of light passing through various materials (e.g., prisms, water).	SE: 126 TWE: LD 126	SE: 10-13 TWE: IS 10 QD 10		SE: 20-21, 98, 108-111 <i>Activity 80, 118-119</i> <i>Skill Builder Activities 25</i> TWE: LD 110 QD 20 VL 21 A 20
d. Predict and test the behavior of light interacting with various fluids (e.g., light transmission through fluids, refraction of light).				SE: 17, 20-21 <i>Explore Activity 95</i> <i>MiniLab 20</i> TWE: CC 118
e. Predict and test the appearance of various materials when light of different colors is shone on the material.	TWE: LD 126			SE: 98-99 <i>Chapter Assessment 124</i>
Objective 3: Describe the production of sound in terms of vibration of objects that create vibrations in other materials.				
a. Describe how sound is made from vibration and moves in all directions from the source in waves.				SE: 11, 36-37 <i>Explore Activity 35</i> <i>MiniLab 50</i> <i>Skill Builder Activities 45</i> TWE: D 37 LD 38 A 45 SJ 16

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b. Explain the relationship of the size and shape of a vibrating object to the pitch of the sound produced.				SE: 16, 40 Activity 56-57 Chapter Assessment 62-63 MiniLab 50 TWE: MM 51 A 17 D 40 CC 131 SJ 16
c. Relate the volume of a sound to the amount of energy used to create the vibration of the object producing the sound.				SE: 38-39 MiniLab 11 Chapter Study Guide 60 TWE: LD 38 ACT 39
d. Make a musical instrument and report on how it produces sound.				SE: 47-53 Activity 56-57 MiniLAB 50 Field Guide 130-133 TWE: A 50, 55 MM 133 ACT 132 R 55 SJ 131

Codes Used for TWE Pages

FROM BACTERIA TO PLANTS (B)

AC	Activity
AS	Assessment
CDIV	Cultural Diversity
CH	Challenge
DI	Discussion
EX	Extension
HI	Health Integration
LD	Lab Demonstration
MAM	Make a Model
QD	Quick Demo
RT	Reteach
SJ	Science Journal
TFYI	Teacher FYI
USW	Using Science Words
VL	Visual Learning

ASTRONOMY (J)

A	Assessment
ACT	Activity
C	Challenge
CB	Content Background
CC	Curriculum Connection
CD	Cultural Diversity
D	Discussion
E	Extension
FF	Fun Fact
IM	Identifying Misconceptions
IS	Inclusion Strategies
LD	Lab Demonstration
QD	Quick Demo
R	Reteach
SJ	Science Journal
TPK	Tie to Prior Knowledge
UA	Use an Analogy
V	Visualizing
VL	Visual Learning

MOTION, FORCES, AND ENERGY (M)

A	Assessment
ACT	Activity
CON	Connections
D	Discussion
E	Extension
LD	Lab Demonstration
MM	Make a Model

WAVES, SOUND, AND LIGHT (O)

A	Assessment
ACT	Activity
C	Challenge
CC	Curriculum Connection
D	Discussion
E	Extension
IM	Identifying Misconceptions
LD	Lab Demonstration
MM	Make a Model
QD	Quick Demo
R	Reteach
SJ	Science Journal
VL	Visual Learning