



Glencoe

UTAH
Science Core Curriculum – Eighth Grade
***Physical Science with Earth Science* © 2006**

OBJECTIVES	PAGE REFERENCES
Standard I: Students will understand the nature of changes in matter.	
Objective 1: Describe the chemical and physical properties of various substances.	
a. Differentiate between chemical and physical properties.	SE: 261-262, 560-561, 563, 610-611, 759-760, 764-767 <i>Lab</i> 616 TWE: D 563 DIN 561 LD 261
b. Classify substances based on their chemical and physical properties (e.g., reacts with water, does not react with water, flammable or nonflammable, hard or soft, flexible or nonflexible, evaporates or melts at room temperature).	SE: 560-566, 609-615, 630-635, 759-763, 771-773 <i>Lab</i> 616, 636-637, 653, 775 TWE: D 563
c. Investigate and report on the chemical and physical properties of a particular substance.	SE: 552-554, 589 <i>Accidents in Science</i> 60, 712, 744 <i>Mini LAB</i> 612 <i>Science and Society</i> 638 TWE: FF 591 VL 590, 611
Objective 2: Observe and evaluate evidence of chemical and physical change.	
a. Identify observable evidence of a physical change (e.g., change in shape, size, phase).	SE: 260-265, 562-563, 565, 647 <i>Lab</i> 310-311, 523, 676-677, 776-777 TWE: LD 562 TPK 260
b. Identify observable evidence of a chemical change (e.g., color change, heat or light given off, change in odor, gas given off).	SE: 563-566, 722, 730-733 <i>Lab</i> 741 <i>Mini LAB</i> 738 TWE: D 563, 723, 732 LD 562 QD 731
c. Observe and describe chemical reactions involving atmospheric oxygen (e.g., rust, fire, respiration, photosynthesis).	SE: 648, 733 <i>Integrate Life Science</i> 827 <i>Launch Lab</i> 719 TWE: D 563 IL 564, 739 LD 537

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d. Investigate the effects of chemical change on physical properties of substances (e.g., cooking a raw egg, iron rusting, polymerization of a resin).	SE: 554, 564, 722, 730-733 <i>Mini LAB 738</i> TWE: CUL 565 D 723 DIN 727 IM 728 QD 769
Objective 3: Investigate and measure the effects of increasing or decreasing the amount of energy in a physical or chemical change, and relate the kind of energy added to the motion of the particles.	
a. Identify the kinds of energy (e.g., heat, light, sound) given off or taken in when a substance undergoes a chemical or physical change.	SE: 135-136, 142-143, 262-263, 320-321, 490-491, 734-738, 762 <i>Integrate Chemistry 402</i> TWE: A 735 LD 736
b. Relate the amount of energy added or taken away from a substance to the motion of molecules in the substance.	SE: 254-256, 260-265, 266-267, 758 <i>Lab 271</i> TWE: AS 265 QD 268 TC 252
c. Measure and graph the relationship between the states of water and changes in its temperature.	SE: 263, 520, 563 <i>Mini LAB 262</i> TWE: FYI 263 VL 563
d. Cite evidence showing that heat may be given off or taken in during a chemical change (e.g., striking a match, mixing vinegar and antacid, mixing ammonium chloride and water).	SE: 564, 567, 730-731, 734-738 TWE: A 735 DI 567, 729 LD 736 QD 731 TPK 720, 734
e. Plan and conduct an experiment, and report the effect of adding or removing energy on the chemical and physical changes.	SE: 734-738, 761 <i>Lab 271, 278-279, 742-743, 776-777</i> <i>Mini LAB 25</i> TWE: A 735 LD 736 QD 731
Objective 4: Identify the observable features of chemical reactions.	
a. Identify the reactants and products in a given chemical change and describe the presence of the same atoms in both the reactants and products.	SE: 722-723, 726-729, 731-732, 769, 772 TWE: AS 725, 770 DIN 773 QD 731, 769
b. Cite examples of common significant chemical reactions (e.g., photosynthesis, respiration, combustion, rusting) in daily life.	SE: 518-519, 536-537, 567, 733 <i>Integrate Life Science 774, 827</i> <i>Mini LAB 766</i> <i>National Geographic 737</i> <i>Science and Society 778</i> TWE: LD 537

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c. Demonstrate that mass is conserved in a chemical reaction (e.g., mix two solutions that result in a color change or formation of a precipitate and weigh the solutions before and after mixing).	SE: 567, 721-722, 726-729 <i>Applying Math</i> 566 <i>Design Your Own Lab</i> 568-569 TWE: DI 567 IM 728 QD 722
d. Experiment with variables affecting the relative rates of chemical changes (e.g., heating, cooling, stirring, crushing, concentration).	SE: 738-740 <i>Lab</i> 741, 742-743 TWE: D 739
e. Research and report on how engineers have applied principles of chemistry to an application encountered in daily life (e.g., heat-resistant plastic handles on pans, rust-resistant paints on highway bridges).	SE: 555 <i>Accidents in Science</i> 60, 712 <i>National Geographic</i> 553, 754 <i>Science and Society</i> 638 <i>Science Stats</i> 570 TWE: FF 613, 707 SJ 667
Standard II: Students will understand that energy from sunlight is changed to chemical energy in plants, transfers between living organisms, and that changing the environment may alter the amount of energy provided to living organisms.	
Objective 1: Compare ways that plants and animals obtain and use energy.	
a. Recognize the importance of photosynthesis in using light energy as part of the chemical process that builds plant materials.	SE: 518-519, 536-537 <i>Integrate Environment</i> 139 <i>Integrate Life Science</i> 342, 827 TWE: DI 522 SJ 139 VL 536
b. Explain how respiration in animals is a process that converts food energy into mechanical and heat energy.	SE: 142, 518 <i>Integrate Environment</i> 139 <i>Integrate Health</i> 143 TWE: IM 142
c. Trace the path of energy from the sun to mechanical energy in an organism (e.g., sunlight – light energy to plants by photosynthesis to sugars - stored chemical energy to respiration in muscle cell - usable chemical energy to muscle contraction-mechanical energy).	SE: 129, 136, 142-143, 518 <i>Integrate Environment</i> 139 <i>Integrate Life Science</i> 827 TWE: FF 129 SJ 139
Objective 2: Generalize the dependent relationships between organisms.	
a. Categorize the relationships between organisms (i.e., producer/consumer, predator/prey, mutualism, parasitism) and provide examples of each.	See Glencoe's <i>Biology: The Dynamics of Life</i> © 2004 SE: 44-45, 46-47, 97-98 <i>Section Assessment</i> 45 (#4, #5), 57 (#1) <i>BioDigest</i> 132-133 TWE: SL 47
b. Use models to trace the flow of energy in food chains and food webs.	SE: 142 <i>Integrate Environment</i> 139 <i>Integrate Health</i> 143 TWE: IM 142 SJ 139

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c. Formulate and test a hypothesis on the effects of air, temperature, water, or light on plants (e.g., seed germination, growth rates, seasonal adaptations).	SE: 9, 534 <i>Integrate Life Science</i> 522 <i>National Geographic</i> 531 TWE: FYI 530
d. Research multiple ways that different scientists have investigated the same ecosystem.	SE: 238-241 <i>Design Your Own Lab</i> 242-243 <i>Science and History</i> 600 TWE: VL 239
Objective 3: Analyze human influence on the capacity of an environment to sustain living things.	
a. Describe specific examples of how humans have changed the capacity of an environment to support specific life forms (e.g., people create wetlands and nesting boxes that increase the number and range of wood ducks, acid rain damages amphibian eggs and reduces population of frogs, clear cutting forests affects squirrel populations, suburban sprawl reduces mule deer winter range thus decreasing numbers of deer).	SE: 48, 538, 668 <i>Integrate History</i> 49 <i>Science and Society</i> 778 TWE: FYI 48
b. Distinguish between inference and evidence in a newspaper or magazine article relating to the effect of humans on the environment.	TWE: A 41 AS 50 IL 12
c. Infer the potential effects of humans on a specific food web.	SE: 536-538 <i>Integrate Environment</i> 139 <i>Integrate History</i> 49 TWE: FYI 48
d. Evaluate and present arguments for and against allowing a specific species of plant or animal to become extinct, and relate the argument to the flow of energy in an ecosystem.	See Glencoe's <i>Biology: The Dynamics of Life</i> © 2004 SE: 115 (defined), 135
Standard III: Students will understand the processes of rock and fossil formation.	
Objective 1: Compare rocks and minerals and describe how they are related.	
a. Recognize that most rocks are composed of minerals.	SE: 609, 613-614, 617-619, 624-625, 630-631, 634 TWE: FYI 632 TPK 617
b. Observe and describe the minerals found in rocks (e.g., shape, color, luster, texture, hardness).	SE: 610-614 <i>Lab</i> 616 TWE: FYI 610, 612 USW 614 VL 611
c. Categorize rock samples as sedimentary, metamorphic, or igneous.	SE: 617-623, 624-629, 630-635 <i>National Geographic</i> 633 TWE: DI 629, 635 DIN 626 QD 619, 621, 631

OBJECTIVES	PAGE REFERENCES
Objective 2: Describe the nature of the changes that rocks undergo over long periods of time.	
a. Diagram and explain the rock cycle.	SE: 630, 634-635 <i>Integrate Chemistry</i> 631 TWE: D 631 FYI 632 LD 634
b. Describe the role of energy in the processes that change rock materials over time.	SE: 617-619, 620-623, 630, 634-635, 647-649, 660-661 <i>Integrate Chemistry</i> 631 <i>National Geographic</i> 633 TWE: FYI 632 UA 619
c. Use a model to demonstrate how erosion changes the surface of Earth.	SE: 652, 654-657, 658-659, 660-662 TWE: D 658 DI 662 FYI 657 LD 659 SJ 660 TPK 654
d. Relate gravity to changes in Earth's surface.	SE: 654-656, 661-662, 667 <i>National Geographic</i> 666
e. Identify the role of weathering of rocks in soil formation.	SE: 646-651 <i>Lab</i> 653 TWE: FYI 649 PR 651 TPK 646
f. Describe and model the processes of fossil formation.	SE: 671-672 TWE: FF 672 FYI 671 QD 670
Objective 3: Describe how rock and fossil evidence is used to infer Earth's history.	
a. Describe how the deposition of rock materials produces layering of sedimentary rocks over time.	SE: 624-629 TWE: DI 629 LD 627 QD 626 VL 631
b. Identify the assumptions scientists make to determine relative ages of rock layers.	SE: 669-671 <i>Lab</i> 676-677 TWE: VL 671
c. Explain why some sedimentary rock layers may not always appear with youngest rock on top and older rocks below (i.e., folding, faulting).	SE: 670-671, 674-675 <i>Lab</i> 676-677 TWE: VL 674
d. Research how fossils show evidence of the changing surface of the Earth.	SE: 355, 671-672 TWE: FYI 671 TPK 669
e. Propose why more recently deposited rock layers are more likely to contain fossils resembling existing species than older rock layers.	SE: 671-672 TWE: FYI 672

OBJECTIVES	PAGE REFERENCES
Objective 4: Compare rapid and gradual changes to Earth's surface.	
a. Describe how energy from the Earth's interior causes changes to Earth's surface (i.e., earthquakes, volcanoes).	SE: 360-361, 362-367, 370-371, 373-378 <i>Lab 379</i> TWE: DI 361 FYI 360
b. Describe how earthquakes and volcanoes transfer energy from Earth's interior to the surface (e.g., seismic waves transfer mechanical energy, flowing magma transfers heat and mechanical energy).	SE: 363-367, 373-375, 377-378 TWE: FYI 360 QD 365
c. Model the process of energy buildup and release in earthquakes.	SE: 363-366 TWE: A 365 DI 361
d. Investigate and report possible reasons why the best engineering or ecological practices are not always followed in making decisions about building roads, dams, and other structures.	SE: 48, 55, 369 TWE: A 48 DI 50
e. Model how small changes over time add up to major changes to Earth's surface.	SE: 354-356 <i>Applying Math 357</i> <i>Lab 379</i>
Standard IV: Students will understand the relationships among energy, force, and motion.	
Objective 1: Investigate the transfer of energy through various materials.	
a. Relate the energy of a wave to wavelength.	SE: 298-299, 321-322, 462-467 <i>Lab 310-311</i> TWE: CUR 297 D 466 TC 454
b. Compare the transfer of energy (i.e., sound, light, earthquake waves, heat) through various mediums.	SE: 266-270, 296-297, 321, 329-330 <i>Lab 278-279</i> <i>Mini LAB 458</i> TWE: D 296 FYI 321, 328 TPK 266
c. Describe the spread of energy away from an energy-producing source.	SE: 266-269, 322, 364-366, 403-405, 442-444, 491, 497 <i>Science and History 312</i> TWE: FYI 322 SJ 139
d. Compare the transfer of heat by conduction, convection, and radiation and provide examples of each.	SE: 266-269, 459, 520, 527 <i>Lab 271, 278-279</i> TWE: AS 270 QD 268 SJ 459 TPK 266 USW 269
e. Demonstrate how white light can be separated into the visible color spectrum.	SE: 329, 822 <i>Accidents in Science 210</i> TWE: FF 329 QD 465

OBJECTIVES	PAGE REFERENCES
Objective 2: Examine the force exerted on objects by gravity.	
a. Distinguish between mass and weight.	SE: 106-107 TWE: D 107 IM 106
b. Cite examples of how Earth's gravitational force on an object depends upon the mass of the object.	SE: 104-107, 187 TWE: A 107 FF 105
c. Describe how Earth's gravitational force on an object depends upon the distance of the object from Earth.	SE: 104-105, 187 TWE: FF 105 FYI 107
d. Design and build structures to support a load.	SE: 54-56 <i>Model and Invent Lab 58-59</i> <i>National Geographic 368</i> TWE: MM 56
e. Engineer (design and build) a machine that uses gravity to accomplish a task.	SE: 503 <i>Lab 175</i> TWE: IL 85
Objective 3: Investigate the application of forces that act on objects, and the resulting motion.	
a. Calculate the mechanical advantage created by a lever.	SE: 169 <i>Lab 175</i> TWE: A 164, 169
b. Engineer a device that uses levers or inclined planes to create a mechanical advantage.	SE: <i>Lab 175</i> TWE: A 172, 173 DIN 169
c. Engineer a device that uses friction to control the motion of an object.	SE: 110 <i>National Geographic 66-67</i>
d. Design and build a complex machine capable of doing a specified task.	SE: 174 TWE: MM 169
e. Investigate the principles used to engineer changes in forces and motion.	SE: 81-86, 98-103 <i>Design Your Own Lab 88-89</i> <i>Lab 87</i> TWE: D 101 DIN 100 IL 85 LD 102 TPK 81
Objective 4: Analyze various forms of energy and how living organisms sense and respond to energy.	
a. Analyze the cyclic nature of potential and kinetic energy (e.g., a bouncing ball, a pendulum).	SE: 136-137 <i>Lab 134</i> <i>National Geographic 138</i> TWE: IM 137
b. Trace the conversion of energy from one form of energy to another (e.g., light to chemical to mechanical).	SE: 131-132, 135-137, 438-440 <i>Integrate Environment 139</i> <i>Launch Lab 127</i> TWE: CUR 440 FF 129 LD 138 QD 136 SJ 139

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c. Cite examples of how organisms sense various types of energy.	SE: 322, 335-336, 340-341 <i>Integrate Life Science</i> 342, 735, 827 TWE: FYI 335 TPK 796
d. Investigate and report the response of various organisms to changes in energy (e.g., plant response to light, human response to motion, sound, light, insects' response to changes in light intensity).	SE: 322-324 <i>Integrate Health</i> 405 <i>Integrate Life Science</i> 341 TWE: AS 740 FF 276, 307
e. Investigate and describe how engineers have developed devices to help us sense various types of energy (e.g., seismographs, eyeglasses, telescopes, hearing aids).	SE: 21, 367, 472-475, 796-799, 819-822 <i>National Geographic</i> 471 <i>Science and History</i> 312 TWE: FYI 797, 799 SJ 473

Codes Used for TWE Pages

A	Activity
AS	Assessment
CUL	Cultural Diversity
CUR	Curriculum Connection
D	Discussion
DI	Daily Intervention
DIN	Differentiated Instruction
FF	Fun Fact
FYI	Teacher FYI
IL	Inquiry Lab
IM	Identifying Misconceptions
LD	Lab Demonstration
MM	Make a Model
PR	Post Reading
QD	Quick Demo
SJ	Science Journal
TC	Theme Connection
TPK	Tie to Prior Knowledge
UA	Use an Analogy
USW	Using Science Words
VL	Visual Learning