

GLENCOE CORRELATION
PHYSICAL SCIENCE
SOUTH DAKOTA
Science Standards
Grades 9-12

STANDARDS	PAGE REFERENCES
GRADES 9-12 NATURE OF SCIENCE STANDARDS	
STUDENTS WILL:	
1. analyze how societal, cultural, and personal beliefs influence scientists' investigations and interpretations.	SE: 10, 296-297, 302-303 <i>Activity</i> 380-381, 756-757 <i>Problem Solving Activity</i> 303 <i>Science and History</i> 118-119 <i>Science and Society</i> 314-315, 412-413, 788-789
2. analyze evidence that supports or refutes past or current scientific theories, hypotheses, and/or explanations about a specific topic.	SE: 266-267, 395, 547-549, 738-739 <i>Activity</i> 756-757 <i>Astronomy Integration</i> 562, 647 <i>Earth Science Integration</i> 45-46 <i>Problem Solving Activity</i> 303 <i>Science and History</i> 118-119
3. analyze how new discoveries may either modify existing theories or result in establishing a new paradigm.	SE: 244-246, 266-267, 305-310, 395, 555 <i>Accidents in Science</i> 282-283, 596-597, 758-759 <i>National Geographic</i> 604-605 <i>Science and Society</i> 694-695
4. compare different scientific explanations for the same observations about natural phenomena.	SE: 395, 547-549 TWE: FYI 394
5. explain how observation and evidence are essential for reaching a conclusion.	SE: 10, 810-811 <i>Activity</i> 148-149, 380-381, 496, 692-693 <i>Accidents in Science</i> 282-283, 664-665 <i>Science and History</i> 566-567 <i>Science and Society</i> 788-789
6. analyze how new knowledge and methods emerge from investigations and from public communication among scientists.	SE: 7-10, 266-267, 554-555, 674-677, 686-690 <i>National Geographic</i> 2-3, 466, 604-605 <i>Science and Society</i> 150-151, 476-477
7. differentiate among facts, predictions, theory, and law/principles in scientific investigations.	SE: 12, 54-55, 68-69, 75, 83, 112, 207, 273, 488, 802
8. apply basic science process skills. (example: observing, classifying, measuring, communicating, predicting, inferring)	SE: 7-10, 17-21, 798-811 <i>Activity</i> 58-59, 180-181, 348-349, 508-509, 525, 563, 727
9. identify questions and concepts to guide the development of hypotheses and of scientific investigations including the analysis of primary sources of information.	SE: 8, 802 <i>Activity</i> 58-59, 116-117, 148-149, 216-217, 312-313, 380-381, 442-443, 692-693
10. select and use appropriate instruments to extend observations and measurements.	SE: 17-21, 378, 401, 408-409, 468-473, 805-806, 812-813 <i>Astronomy Integration</i> 86 <i>Health Integration</i> 379, 494
11. manipulate multiple variables with repeated trials.	SE: 9-10, 803, 812-813 <i>Activity</i> 106, 348-349, 380-381, 442-443

STANDARDS	PAGE REFERENCES
12. apply appropriate mathematical techniques in evaluating experimental data.	SE: 16, 23-26, 816-825 <i>Activity</i> 58-59, 148-149, 692-693 <i>Math Skills Activity</i> 128, 499, 625, 748
13. formulate and revise scientific explanations and models.	SE: 10-11, 807-811 <i>Activity</i> 148-149, 216-217, 312-313, 563, 692-693, 756-757 <i>Problem Solving Activity</i> 230, 552
14. use written, oral, and technological communication skills to explain scientific phenomena and concepts.	SE: 22-26, 811-815 <i>Activity</i> 312-313, 410-411, 564-565, 756-757 <i>National Geographic</i> 110, 199, 503, 683
15. use safe and effective laboratory techniques.	Student <i>MiniLabs</i> and <i>Activities</i> show safety symbols. Photos reinforce student safety, i.e., 28. SE: 826 TWE: 34T-35T
GRADES 9-12 PHYSICAL SCIENCE STANDARDS	
STUDENTS WILL: 1. relate macroscopic and microscopic characteristics of the four states of matter.	SE: 488-492, 500-507 <i>Activity</i> 171, 496, 508-509 <i>Explore Activity</i> 487, 517 TWE: CH 495
2. differentiate between physical and chemical properties used to describe matter.	SE: 526-532, 550-551, 554-557, 574-578, 608-620, 622-627, 642-643, 650-651 <i>Activity</i> 534-535, 621
3. trace the changing model of the atom. (example: the Bohr to the wave-mechanical model)	SE: 258-260, 547-549, 558-560, 576-578, 582-586 <i>Activity</i> 579
4. use the periodic table to determine reactivity, to write formulas, to identify types of compounds formed, and to determine valence and oxidation number.	SE: 554-561, 574-578, 587-593, 610-620, 622-626 <i>Activity</i> 564-565 TWE: A 582, 583
5. analyze how placement of elements on the periodic table is a function of atomic structure.	SE: 558-560, 576-577, 587-588, 610-614, 616-620, 622-627 TWE: A 583
6. explain characteristics of atoms and of relationships that exist among them.	SE: 547-551, 561, 576-578, 580-586, 608-620, 622-629 <i>Activity</i> 630-631 <i>National Geographic</i> 632-633
7. compare characteristics of isotopes of the same element.	SE: 261, 266-267, 276-278, 552-553
8. analyze different types of stoichiometric relationships.	SE: 588, 740-741, 743-745, 780-781 <i>Problem Solving Activity</i> 589
9. differentiate between acids and bases.	SE: 766-769, 772-775, 780-781 <i>Activity</i> 776, 786-787 <i>Science and Society</i> 788-789 TWE: RE 771
10. compare the roles of electrons in covalent, ionic, and metallic bonding.	SE: 576-578, 580-586, 609-611, 617-618 <i>Activity</i> 579 TWE: CH 615 DI 623

STANDARDS	PAGE REFERENCES
11. describe factors that affect reaction rates including temperature, concentration, surface area, and catalysts.	SE: 753-754 <i>Activity 755</i>
12. apply calorimetry to investigate heat of reaction.	SE: 163 TWE: <i>Activity 753</i>
13. analyze the properties and interactions of acids, bases, and salts.	SE: 766-769, 772-775, 777-781 <i>Activity 776, 786-787</i> <i>Explore Activity 765</i> <i>Science and Society 788-789</i> TWE: RE 771
14. describe factors that affect solubility and rate of solution. (example: nature of solute and solvent, temperature, agitation, surface area, pressure of gases)	SE: 709-710, 712-715, 718-726 <i>Activity 728-729</i> TWE: EX 711
15. analyze energy transfer as matter changes from one form to another.	SE: 488-492 <i>Activity 496</i> TWE: CH 495 FYI 753 QD 619
16. analyze physical and chemical processes involving atoms, molecules, and ions that result in endothermic and exothermic changes.	SE: 492, 750, 752-753 <i>Activity 496</i> <i>National Geographic 751</i> TWE: EX 711 QD 619
17. explain how molar quantities are changed based upon the intended chemical reaction.	SE: 738-741, 743-749, 777-781 <i>Activity 786-787</i>
18. analyze how phases of matter are explained by kinetic theory and by forces of attraction between particles.	SE: 488-492 <i>Activity 594-595</i> TWE: CH 495
19. apply the kinetic molecular theory to solve quantitative problems involving pressure, volume, and temperature in ideal gases.	SE: 488-494, 502-507
20. use models to make predictions about chemical bonds, chemical reactivity, and polarity of molecules.	SE: 558-560, 581-584, 641 <i>Activity 579, 630-631</i> <i>National Geographic 585</i> TWE: MM 577
21. demonstrate the relationships between force and motion in Newton's laws.	SE: 52-56, 68-70, 75-77, 83-88 <i>Activity 57, 58-59, 89, 90-91</i> TWE: CH 74
22. solve graphically and analytically vector problems related to force.	SE: 53
23. relate gravitational or centripetal force to projectile or uniform circular motion.	SE: 75-77, 79-82
24. apply quantitative relationships among mass, velocity, force, and momentum.	SE: 68-70, 76-78, 86-88 <i>Activity 57, 58-59, 90-91</i>
25. apply the quantitative relationships among force, distance, work, time, and power to solve problems or to describe situations.	SE: 128-131, 134-135 <i>Activity 148-149</i>

STANDARDS	PAGE REFERENCES
26. explain how extremely large and extremely small quantities and very rapidly moving objects are not necessarily described by the same laws that Newtonian physics describe.	TWE: FYI 69
27. explain the sources of intramolecular and intermolecular forces in matter.	SE: 488-494, 580-586, 707-710, 713-717, 723-726
28. calculate the force on a charged particle at rest and/or in motion.	SE: 196 The text describes the force on a charged particle qualitatively. The force is calculated with the use of Coulomb's Law, described in Glencoe's <i>Physics: Principles and Problems</i> pages 470-472. An application for this force is shown in Glencoe's <i>Chemistry: Matter and Change</i> page 106.
29. determine if an object is in equilibrium and distinguish among stable, neutral and unstable equilibria.	SE: 53-55, 74 TWE: SJ 73
30. describe mathematically the relationships among potential energy, kinetic energy, and work.	SE: 102-105, 108-111, 127-131
31. describe how energy can be transferred and transformed to produce useful work and to calculate the efficiency of selected systems.	SE: 107-109, 134-137, 176-178, 209-215, 237-239, 290-291 <i>Activity</i> 148-149 <i>MiniLab</i> 112 <i>National Geographic</i> 110
32. explain methods of heat transfer. (example: conduction, radiation, convection)	SE: 164-167, 172-173, 178 <i>Activity</i> 171, 180-181 TWE: RE 170
33. relate conservation of matter and energy to the flow of energy through food webs.	SE: 114-115 <i>Environmental Science Integration</i> 111
34. describe the use of isotopic dating in determining the age of fossils.	SE: 266-267 <i>Problem Solving Activity</i> 552
35. interpret wave phenomena using models of transverse and longitudinal waves.	SE: 326-329, 332-337, 344-347, 363-365 <i>Activity</i> 338, 348-349 <i>Earth Science Integration</i> 331
36. analyze the different frequencies and wavelengths in the electromagnetic spectrum.	SE: 396-401, 403-408 <i>Activity</i> 410-411
37. investigate how light behaves in the fundamental processes of reflection, refraction, and image formation. (example: manipulate prisms, mirrors, lenses)	SE: 420-423, 452-458 <i>Activity</i> 441, 442-443, 459 <i>Explore Activity</i> 419
38. use single and multiple slits and diffraction gratings to demonstrate the wave properties of light.	SE: 422-423, 436 <i>Activity</i> 442-443 <i>Explore Activity</i> 419
GRADES 9-12 SCIENCE, TECHNOLOGY, ENVIRONMENT, AND SOCIETY STANDARDS	
STUDENTS WILL: 1. analyze the impact of scientific investigations and findings on human society. (example: issues surrounding genetic engineering)	SE: 676-677, 681-682, 685-690 <i>Accidents in Science</i> 282-283, 758-759 <i>National Geographic</i> 604-605 <i>Science and Society</i> 150-151, 314-315, 694-695, 788-789

STANDARDS	PAGE REFERENCES
2. explain how progress in science and technology can be affected by social issues and by challenges.	SE: 296-297, 305-310 <i>National Geographic</i> 2-3, 604-605 <i>Science and History</i> 250-251, 350-351 <i>Science and Society</i> 314-315, 476-477, 694-695, 788-789
3. explain the relationships between the maintenance and progress of society and of scientific advancement.	SE: 294-297, 301-303, 305-310, 672-677, 685-690 <i>National Geographic</i> 683 <i>Science and Society</i> 314-315, 382-383, 412-413, 694-695
4. describe and explain scientific factors that affect population size and growth. (example: birth and death rates, medical services, social services, quality of environment, disease, education)	SE: 296-297, 305-310 <i>Activity</i> 312-313, 756-757 <i>National Geographic</i> 166, 277 <i>Science and History</i> 250-251, 566-567 <i>Science and Society</i> 314-315, 788-789
5. evaluate the scientific accuracy of information relevant to a specific issue regarding local, national, and/or global agricultural practices that affect the environment.	TWE: CD 658 EX 611, 660 FYI 659
6. evaluate the impact of products made of natural materials or synthetic materials, or of a combination of the two.	SE: 645-647, 653-655, 687-690 <i>Activity</i> 692-693 <i>National Geographic</i> 652 <i>Science and Society</i> 694-695 TWE: IM 657
7. describe immediate and long-term consequences of potential solutions for technological-related issues. (example: natural catastrophes, interactions of populations, resources and environment, health, disease)	SE: 276-278, 295-297, 301-302, 305-310 <i>National Geographic</i> 466 <i>Problem Solving Activity</i> 303, 658 <i>Science and Society</i> 314-315, 788-789
8. evaluate factors that serve as potential constraints on technological design and use. (example: ethics, ecology, manufacturing processes, operation, maintenance, replacement, disposal, liability)	SE: 302-303 <i>Activity</i> 756-757 <i>Environmental Science Integration</i> 242, 686 <i>Life Science Integration</i> 300 <i>Problem Solving Activity</i> 680 <i>Science and Society</i> 314-315, 412-413
9. understand technological design. (example: identify appropriate problems for technological design, design a solution or product, implement a proposed design, evaluate technological designs or products, communicate the process of technological design)	SE: 677, 680, 689-690 <i>Activity</i> 474-475, 692-693 <i>MiniLab</i> 231 <i>National Geographic</i> 2-3, 652 <i>Problem Solving Activity</i> 303 TWE: CC 673
10. predict and evaluate how the characteristics of materials influence product design.	SE: 608-609, 612-613, 616, 686-690 <i>National Geographic</i> 2-3, 466, 702-703, 708 <i>Problem Solving Activity</i> 680 <i>Science and Society</i> 694-695
11. analyze the benefits, limitations, cost, and consequences involved in using, conserving, or recycling resources.	SE: 293-297, 301-303, 305-310 <i>Activity</i> 311, 312-313, 756-757 <i>Problem Solving Activity</i> 230 <i>Science and Society</i> 314-315, 788-789

STANDARDS	PAGE REFERENCES
12. explain how people control the outputs and impacts of our expanding technological activities in the areas of communication, construction, manufacturing, power and transportation, energy sources, health technology, and biotechnology.	SE: 293-297, 301-303, 305-310, 676-677, 685-690 <i>National Geographic</i> 190-191, 277, 604-605 <i>Problem Solving Activity</i> 230 <i>Science and History</i> 250-251
13. compare and contrast the positive and negative consequences of technology. (example: nuclear power for generating electricity)	SE: 296-297, 301-303, 305-310 <i>Activity</i> 312-313, 756-757 <i>Environmental Science Integration</i> 686 <i>Science and Society</i> 314-315, 382-383, 412-413, 788-789
14. describe possible consequences of reducing or of eliminating some of Earth's natural resources.	SE: 297, 305 <i>Environmental Science Integration</i> 400, 619, 686, 783 <i>Science and Society</i> 788-789

Codes Used for TWE Pages

A	Activity
CC	Curriculum Connection
CD	Cultural Diversity
CH	Challenge
DI	Discussion
EX	Extension
FYI	Teacher FYI
IM	Identifying Misconceptions
MM	Make a Model
QD	Quick Demo
RE	Reteach
SJ	Science Journal