GLENCOE CORRELATION

EARTH SCIENCE: GEOLOGY, THE ENVIRONMENT, AND THE UNIVERSE

NEW JERSEY

Core Curriculum Content Standards for Science

Grade 12

STANDARDS	PAGE REFERENCES
STANDARD 5.1 (SCIENTIFIC PROCESSES) ALL STUDENTS WILL DEVELOP PROBLEM-SOLVING, DECISION-MAKING AND INQUIRY SKILLS, REFLECTED BY FORMULATING USABLE QUESTIONS AND HYPOTHESES, PLANNING EXPERIMENTS, CONDUCTING SYSTEMATIC OBSERVATIONS, INTERPRETING AND ANALYZING DATA, DRAWING CONCLUSIONS, AND COMMUNICATING RESULTS.	
Building upon knowledge and skills gained in the preceding grades, by the end of Grade 12, students:	
A. Habits of Mind	
1. When making decisions, evaluate conclusions, weigh evidence, and recognize that arguments may not have equal merit.	SE: 11-13 *Design Your Own GeoLab* 92-93, 704-705 *Science & the Environment* 176, 234 *Science & Technology* 324 TWE: TPK 11 D 632
2. Assess the risks and benefits associated with alternative solutions.	SE: *GeoLab* 114-115 *Activity* 234, 324 *Science & the Environment* 736 TWE: TS 294
3. Engage in collaboration, peer review, and accurate reporting of findings.	SE: *GeoLab* 20-21, 114-115, 140-141 *Design Your Own GeoLab* 92-93 TWE: CL 157, 184, 215, 684 CFU 675
4. Explore cases that demonstrate the interdisciplinary nature of the scientific enterprise.	SE: 60-66, 155-161 *Science & Technology* 22, 72 *MiniLab* 55 *Science & the Environment* 432 *Discovery Lab* 683 TWE: EC 273 AC 286, 633
B. Inquiry and Problem Solving	
1. Select and use appropriate instrumentation to design and conduct investigations.	SE: *GeoLab* 70-71, 114-115, 174-175, 406-407 *Design Your Own GeoLab* 92-93, 378-379, 798-799
2. Show that experimental results can lead to new questions and further investigations.	SE: 13 *GeoLab* 174-175, 292-293 *MiniLab* 290, 349 TWE: A 12, 163, 290, 302, 328
C. Safety	
1. Understand, evaluate and practice safe procedures for conducting science investigations.	SE: 12-13, 24 #15, 25 #19, 910-911 *GeoLab* 20-21, 70-71, 114-115, 174-175, 292-293 *Design Your Own GeoLab* 92-93

STANDARDS	PAGE REFERENCES
STANDARD 5.2 (SCIENCE AND SOCIETY) ALL STUDENTS WILL DEVELOP AN UNDERSTANDING OF HOW PEOPLE OF VARIOUS CULTURES HAVE CONTRIBUTED TO THE ADVANCEMENT OF SCIENCE AND TECHNOLOGY, AND HOW MAJOR DISCOVERIES AND EVENTS HAVE ADVANCED SCIENCE AND TECHNOLOGY.	
Building upon knowledge and skills gained in the preceding grades, by the end of Grade 12, students:	
A. Cultural Contributions	
1. Recognize the role of the scientific community in responding to changing social and political conditions and how scientific and technological achievement effect historical events.	SE: *Science & the Environment* 176 *Science in the News* 234, 294 *Science & Technology* 324
B. Historical Perspectives	
1. Examine the lives and contributions of important scientists who effected major breakthroughs in our understanding of the natural and designed world.	SE: 442-447 TWE: CB 4C, 442B CD 30, 287, 555, 719, 781 AC 314, 700
2. Discuss significant technological achievements in which science has played an important part as well as technological advances that have contributed directly to the advancement of scientific knowledge.	SE: 37-41, 312-316, 384-385, 448-454, 747-752 *Science & Technology* 22, 72, 354, 466 TWE: CB 449
3. Describe the historical origin of important scientific developments such as atomic theory, genetics, plate tectonics, etc., showing how scientific theories develop, are tested, and can be replaced or modified in light of new information and improved investigative techniques.	SE: 19, 442-447, 448-454, 455-459, 460-463, 756-757, 775-779, 847-851
STANDARD 5.3 (MATHEMATICAL APPLICATIONS) ALL STUDENTS WILL INTEGRATE MATHEMATICS AS A TOOL FOR PROBLEM-SOLVING IN SCIENCE, AND AS A MEANS OF EXPRESSING AND/OR MODELING SCIENTIFIC THEORIES.	
Building upon knowledge and skills gained in the preceding grades, by the end of Grade 12, students:	
A. Numerical Operations	
1. Reinforce indicators from previous grade level.	SE: *Science & Math* 44, 94, 542 *Using Math* 420 TWE: A 31 AC 154, 185, 424, 484 R 391
B. Geometry and Measurement	
1. When performing mathematical operations with measured quantities, express answers to reflect the degree of precision and accuracy of the input data.	SE: *GeoLab* 232-233, 406-407, 826-827 *MiniLab* 394, 428 *Design Your Own GeoLab* 798-799 TWE: MIN 427
C. Patterns and Algebra	
1. Apply mathematical models that describe physical phenomena to predict real world events.	SE: *Using Math* 778 *Problem-Solving Lab* 791 TWE: CB 384D, 403, 494C-D, 506 MIN 427, 502, 749, 777

STANDARDS	PAGE REFERENCES
D. Data Analysis and Probability	
1. Construct and interpret graphs of data to represent inverse and non-linear relationships, and statistical distributions.	SE: *Problem-Solving Lab* 200, 253, 283, 350, 401 *GeoLab* 232-233, 292-293 *Design Your Own GeoLab* 378-379 *Science & Math* 380
STANDARD 5.4 (NATURE AND PROCESS OF TECHNOLOGY) ALL STUDENTS WILL UNDERSTAND THE INTERRELATIONSHIPS BETWEEN SCIENCE AND TECHNOLOGY AND DEVELOP A CONCEPTUAL UNDERSTANDING OF THE NATURE AND PROCESS OF TECHNOLOGY.	
Building upon knowledge and skills gained in the preceding grades, by the end of Grade 12, students:	
A. Science and Technology	
1. Know that scientific inquiry is driven by the desire to understand the natural world and seeks to answer questions that may or may not directly influence humans, while technology is driven by the need to meet human needs and solve human problems.	SE: 5-10, 24 #8
B. Nature of Technology	
1. Assess the impacts of introducing a new technology in terms of alternative solutions, costs, tradeoffs, risks, benefits and environmental impact.	SE: 690-697 *Science in the News* 142, 294 *Science & the Environment* 234 *Science & Technology* 324, 736 TWE: CB 260
C. Technological Design	
1. Plan, develop, and implement a proposal to solve an authentic, technological problem.	SE: *Design Your Own Experiment* 676-677, 704-705 TWE: P 685 M 692, 695
STANDARD 5.5 (CHARACTERISTICS OF LIFE) ALL STUDENTS WILL GAIN AN UNDERSTANDING OF THE STRUCTURE, CHARACTERISTICS, AND BASIC NEEDS OF ORGANISMS AND WILL INVESTIGATE THE DIVERSITY OF LIFE.	
Building upon knowledge and skills gained in the preceding grades, by the end of Grade 12, students:	
A. Matter, Energy and Organization in Living Systems	
1. Relate the structure of molecules to their function in cellular structure and metabolism.	See Glencoe's *Biology: The Dynamics of Life.*
2. Explain how plants convert light energy to chemical energy.	SE: 585 TWE: E 65
3. Describe how plants produce substances high in energy content that become the primary source of energy for life.	SE: 628
4. Relate disease in humans and other organisms to infections or intrinsic failures of system.	See Glencoe's *Biology: The Dynamics of Life.*
B. Diversity and Biological Evolution	
1. Explain that through evolution the Earth's present species developed from earlier distinctly different species.	SE: 566, 592-593, 604, 609-611, 615-617, 628-634, 639-641 TWE: CB 600C-D, 624D

STANDARDS	PAGE REFERENCES
2. Explain how the theory of natural selection accounts for extinction as well as an increase in the proportion of individuals with advantageous characteristics within a species.	See Glencoe's *Biology: The Dynamics of Life.*
C. Reproduction and Heredity	
1. Describe how information is encoded and transmitted in genetic material.	SE: 590-591
2. Explain how genetic material can be altered by natural and/or artificial means; mutations and new gene combinations may have positive, negative, or no effect on organisms or species.	TWE: E 712
3. Assess the impact of current and emerging technologies on our understanding of inherited human characteristics.	TWE: TS 572
STANDARD 5.8 (EARTH SCIENCE) ALL STUDENTS WILL GAIN AN UNDERSTANDING OF THE STRUCTURE, DYNAMICS, AND GEOPHYSICAL SYSTEMS OF THE EARTH.	
Building upon knowledge and skills gained in the preceding grades, by the end of Grade 12, students:	
A. Earth's Properties and Materials	
1. Explain the interrelationship of the geosphere, hydrosphere, and the atmosphere.	SE: 5-10, 153-161, 170-173, 211-214, 359-363 TWE: ITU 3 A 9 R 10 CB 152C-D, 416
B. Atmosphere and Water	
1. Describe how weather (in the short term) and climate (in the long term) involve the transfer of energy in and out of the atmosphere.	SE: 275-277, 299-304, 305-311, 329-333, 341-346, 359-363 *MiniLab* 376 TWE: CB 300 CON 330 TPK 343
C. Processes that Shape the Earth	
1. Use the theory of plate tectonics to explain the relationship among earthquakes, volcanoes, mid-ocean ridges, and deep-sea trenches.	SE: 455-459, 460-463, 484-487, 509-510, 528-534 *MiniLab* 456 TWE: AC 457 CB 462 ITI 485, 509
2. Know that Earth is a system in which chemical elements exist in fixed amounts and move through the solid Earth, oceans, atmosphere, and living things as part of geochemical cycles.	SE: 53-59, 80-83, 138-139, 211-212, 290-291, 664-667 TWE: A 139 CB 147
3. Recognize that the evolution of life on Earth has changed the composition of Earth's atmosphere through time.	SE: 584-588, 664 TWE: CB 576C-D

STANDARDS	PAGE REFERENCES
D. How We Study the Earth	
1. Analyze the evidence produced by a variety of techniques that is used to understand changes in the Earth that have occurred over time. • topography • fossils • rock stratification • ice cores • radiometric data	SE: 443-446, 557-561, 562-565, 566-569 *Mapping GeoLab* 464-465 *MiniLab* 558 *Problem-Solving Lab* 560 *Science in the News* 572 TWE: P 445 CB 552C-D
STANDARD 5.9 (ASTRONOMY & SPACE SCIENCE) ALL STUDENTS WILL GAIN AN UNDERSTANDING OF THE ORIGIN, EVOLUTION, AND STRUCTURE OF THE UNIVERSE	
Building upon knowledge and skills gained in the preceding grades, by the end of Grade 12, students:	
A. Earth, Moon, Sun System	
1. Reinforce indicators from previous grade level.	SE: 753-757, 758-767, 775-779, 780-785, 786-792 *MiniLab* 761 *Science & Math* 770 TWE: MIN 763
B. Solar System	
1. Explain that our solar system coalesced from a nebular cloud of gas and dust left from exploding stars.	SE: 793-797 TWE: AC 794 UA 794 ITI 795
C. Stars	
1. Describe the physical characteristics, stages of development, and the apparent motions of stars.	SE: 805-812, 813-820, 821-825 *MiniLab* 817 *GeoLab* 826-827 TWE: CB 804C-D DE 815 R 820 MIN 822 A 825
D. Galaxies and Universe	
1. Describe data gathering and observation technologies and explain how they are used to explore the solar system and beyond.	SE: 747-752, 902-907 *Discovery Lab* 775 *Science in the News* 800, 828 *Science & Technology* 854 TWE: CB 746C ACT 848 AS 907
2. Cite evidence to describe the scientific theory of the origin of the universe and the current explanations of its evolution.	SE: 842-846, 847-851 *Problem-Solving Lab* 843 *MiniLab* 845 TWE: CB 832D CFU 851

STANDARDS	PAGE REFERENCES
STANDARD 5.10 (ENVIRONMENTAL STUDIES) ALL STUDENTS WILL DEVELOP AN UNDERSTANDING OF THE ENVIRONMENT AS A SYSTEM OF INTERDEPENDENT COMPONENTS AFFECTED BY HUMAN ACTIVITY AND NATURAL PHENOMENA.	
Building upon knowledge and skills gained in the preceding grades, by the end of Grade 12, students:	
A. Natural Systems and Interactions	
1. Distinguish naturally occurring process from those believed to have been modified by human interaction or activity. • climate change • ozone production • erosion and deposition • threatened and endangered species	SE: 189-190, 229-231, 249-257, 367-368, 369-374, 375-377 *Science & the Environment* 176 *Science in the News* 294 TWE: EC 189, 216
B. Human Interactions and Impact	
1. Assess the impact of human activities on the cycling of matter and the flow of energy through ecosystems.	SE: 254-257, 666-668, 724-729, 730-733 *Science & the Environment* 234, 260 *Science in the News* 294 TWE: EC 9 AC 720
2. Use scientific, economic, and other data to assess environmental risks and benefits associated with societal activity.	SE: 254-257, 711-715, 716-723, 724-729, 730-733 *Science & the Environment* 176, 234, 260 *Science in the News* 294 TWE: AES 230

Codes Used for TWE Pages

A	Assessment
AC	Across the Curriculum
ACT	Activity
AES	Applying Earth Science
AS	Assignment
CB	Content Background
CD	Cultural Diversity
CFU	Check for Understanding
CL	Collaborative Learning
CON	Concept Development
D	Discussion
DE	Demo
E	Enrichment
EC	Environmental Connection
ITI	Interpreting the Illustration
ITU	Interpreting the Unit
M	Modeling
MIN	Meeting Individual Needs
P	Project
R	Reteach
TPK	Tying to Previous Knowledge
TS	Teaching Strategy
UA	Using an Analogy