Teacher Guide

Active Folders
for Differentiated Instruction
Earth Science

Features and Benefits

■ On-grade level content supported by individual modification and alternative assessment

■ Activities at 3 levels to meet the individual needs of on- and below-grade level students
  ● Basic knowledge and comprehension
  ● Application and analysis
  ● Evaluation and prediction

■ Hands-on manipulatives encourage active learning
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Overview of ActiveFolders for Differentiated Instruction

Hands-on activities that reinforce essential science concepts

Engaging cover diagram offers opportunity for pre-assessment and student discussions.

Colorful, durable, laminated folders and manipulatives encourage kinesthetic learning.

Detailed teacher guide contains objectives correlated to relevant science content.

Additional differentiated instruction suggestions are identified for basic and challenge activities.
Hands-on activities offer a variety of stimulating tasks to meet individual student needs.

Journal responses can be used for verbal or written assessments, review, or higher-level thinking skills.

Interactive manipulatives motivate students to model, classify, identify, sequence, organize, compare, and contrast as they review essential science concepts.

Multilevel directions reach diverse student population.

Wrap-up activities and graphic organizers provide student-friendly visual representation of content knowledge.

Envelope space provides handy manipulative storage.
Using **ActiveFolders** in Your Classroom

**Meeting Objectives**  National and state science standards provide the focus for each folder. Specific objectives for each folder are listed on the teacher page.

**Teaching Vocabulary**  Key terms and their definitions for each *ActiveFolder* are listed for easy reference. Using the vocabulary terms provided, the teacher or students can copy the definitions to make a set of vocabulary review cards for each folder. Individual students can create their own set of vocabulary terms and definitions for home study, matching memory games, or small group-review games.

**Discussing Journal Entries**  Topics provide opportunities for higher-level thinking, problem solving, and application skills. They can be used either as journal-writing prompts or to encourage group discussion. Students should support their reasoning and opinions on relevant concepts and current scientific issues.

**Using ActiveFolders**  Each folder is designed to meet the needs of individual students in the least restrictive environment. *ActiveFolders* can be used to pre-assess a student and to uncover student misconceptions. *ActiveFolders* also can be used for small groups, discussion-starters, guided practice, review, reinforcement, and alternative assessment. Specific suggestions for use of *ActiveFolders* in the classroom are listed below.

<table>
<thead>
<tr>
<th>Guided practice and reinforcement</th>
<th>Student/Teacher Work Together</th>
<th>Pairs or Small Groups</th>
<th>Independent Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Student and teacher work as a team.</td>
<td>• Pairs or groups take turns completing a folder while others review vocabulary terms.</td>
<td>• Student works independently to explore each concept, formulate his or her response, and adjust the manipulatives as he or she works through the folder.</td>
<td></td>
</tr>
<tr>
<td>• Student can respond verbally to better explain his or her response, ask questions, and clarify his or her knowledge.</td>
<td>• Pairs or groups take turns completing an activity and checking each other for accuracy and understanding.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Teacher works closely to interpret the student’s reasoning and any misconceptions.</td>
<td>• If multiple copies of a folder are available, several groups can work through the activities, creating comprehension questions for the other groups.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student/Teacher Work Together</td>
<td>Pairs or Small Groups</td>
<td>Independent Student</td>
<td></td>
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<tr>
<td>-------------------------------</td>
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<td></td>
</tr>
<tr>
<td><strong>Review</strong></td>
<td><strong>Assessment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Student works through the folder, responding in writing or verbally explaining his or her answer choices to the teacher.</td>
<td>• As one student completes the folder, other students in the group can match key terms and definitions, play a vocabulary game, or complete a vocabulary quiz.</td>
<td>• Students work independently at their own pace.</td>
<td></td>
</tr>
<tr>
<td>• Teacher can do the activity and ask the student to explain the approach used to complete the task.</td>
<td>• Student pairs can construct sentences with the key terms from the folder activities, using the terms in the correct scientific context.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Students can take turns working through activities on the folder, challenging each other for understanding and clear explanations of concepts presented.</td>
<td>• Independent students can work through the folder as an assessment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Folder activities can be used in a game situation. Teacher can provide a spinner or die to allow students to take turns with creative directions, such as double play, skip turns, or double points.</td>
<td>• Student can match vocabulary words to the correct definitions using the teacher-made vocabulary cards in a one-to-one correspondence.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Students can design their own review questions to ask fellow classmates.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Active Folders Purpose

Purpose: ActiveFolders differentiate science instruction to meet the individual needs of struggling learners and reinforce, reteach, and assess at-risk students using a variety of techniques.

ActiveFolders provide science content that sparks the interest of struggling learners, English-language learners, highly visual students, attention deficient students, tactile kinesthetic learners, and students with learning disabilities to process the pertinent science content using a variety of motivating manipulatives. Using tactile kinesthetic models, these at-risk students build self confidence and, therefore, are better prepared to share their acquired knowledge, analyze new information, and participate in class discussions, lab settings, and group activities.

Research identifying the most difficult and commonly misunderstood concepts suggests that the use of supplemental materials that support the text will best aid the classroom teacher and the students. Forty ActiveFolders have been developed to address critical chemistry, Earth science, life science, and physics topics. Using manipulatives, students move objects and models, use vocabulary cards, draw examples, identify concepts, and write personal interpretations in their journals. Higher-level thinking skills are applied using motivational layouts and instructions given in three ability levels. The teacher guide provides clear objectives correlated to Glencoe Science topics, specific content, vocabulary terms and definitions, and a guide to student responses. Suggestions for further student study, consisting of basic and challenge extension activities, also are provided. Graphic organizers provide a visual representation of a student’s knowledge, as well as an opportunity for the student’s verbal explanation of his or her scientific understanding.

ActiveFolders review and reteach science content through multisensory activities, peer tutoring, reinforcement of content, and differentiated-assessment tools. Students meet success as they manipulate vocabulary terms, model concepts, and verbalize their understanding and critical-thinking skills. By addressing the needs of all students, from struggling learners, gifted and talented students, and English-language learners to students with extended absences, ActiveFolders challenge individuals through meaningful work to practice and master state-mandated objectives while increasing self-confidence and participation.
Advantages of ActiveFolders in the Differentiated Classroom

ActiveFolders offer a high-interest, hands-on approach to science that provides an opportunity to motivate and challenge struggling students as they practice concepts and state-mandated standards.

Advantages of ActiveFolders for Students
● Meaningful work covers content topics.
● Three ability levels challenge individual students.
● Positive participation increases self-confidence.
● Practice offers mastery of state-mandated objectives.
● Interactive approach provides opportunities for regular education students to collaborate with special-needs students.
● Students gain academic and social skills through peer interactions.

ActiveFolders provide differentiated instruction for all students through easy-to-assemble folders on specific science topics in support of classroom teaching with 40 of the most difficult science concepts.

Advantages of ActiveFolders for Teachers
● Relevant modifications of curriculum offer review for special populations.
● More variety of content presents assessment options.
● Hands-on manipulatives increase student involvement.
● Textbook/state-mandated objectives are addressed with relevant reinforcement activities.
● Special-needs students explore critical-thinking opportunities without watering down the curriculum.
● Minimal-assembly kits allow more teacher-student interaction time.
The Need for Change

In every group of individuals, learning styles vary. It can be difficult to address many different learning styles in one classroom. If teaching involves lecturing as a primary means to deliver information, students who are not auditory learners likely will struggle. We must serve students who are attention deficient, learning disabled, other health impaired, English-language learners, and gifted/talented, in addition to students who exhibit behavioral problems, experience difficult home situations, struggle with drugs/alcohol. As student populations become more diverse, the need for differentiated instruction increases.

With new laws, accountability is increasing as well. What follows are a few of the many laws dictating changes in education today.

**IDEA—Individuals with Disabilities Education Act (Public Law 94-142)**
- General-education classroom must be the first placement considered.
- A strong preference for educating students with disabilities in regular classes with appropriate modifications, aids, and services
- Educators must consider how supplementary aids, services, and other supports can be used to ensure that the student can be educated in the general-education classroom.
- Emphasizes student involvement in the general curriculum

**NCLB—No Child Left Behind**
- Designed to improve student achievement and change the culture of America’s schools
- Four main common sense pillars: accountability, flexibility, research-based reforms, and parental involvement

**LRE—Least Restrictive Environment**
- Public Law 94–142 mandates the concept of least restrictive environment.
- Students with disabilities must be educated in the least restrictive environment in which they can succeed with support.
- For most students, this environment is the general-education classroom.
Helpful Hints for Your Differentiated Classroom

- **Read the lesson aloud to target all learners.** Students with low reading levels, physical handicaps, and ADHD, as well as ESL, kinesthetic, and auditory learners will not benefit from silent reading.

- **Encourage students to remain actively engaged.** Point out headings, sub-headings, objectives, vocabulary terms, pictures, charts, and graphs. Compare the objectives to the end-of-section questions, pointing out what is most essential. With practice, students will begin predicting, analyzing, and questioning.

- **Guide student practice through a variety of assignments.** Whether administering a written assignment, modifying a written assignment to meet individual needs, assigning a folder activity, or implementing whole class usage of folder activities for practice and review, flexibility and adaptation are key to individual success.

- **Offer alternate assessments.** Most students will be able to complete a written test successfully. Others will require a modified version of the test, and a handful will require alternative assessments that are unique to their individual needs, such as oral assessment, folder activity, or other skills assessment related to their IEP.

- **An oral assessment paired with a folder activity allows a more accurate interpretation of student understanding.** The teacher should assess the student. The classroom teacher is knowledgeable of the subject and can assess the student’s grasp of the subject content. Oral assessments paired with folder activities can be a unique tool to offer insight into student misconceptions and acquired knowledge.

- **Grading should be versatile.** Teachers are the best judges of what each student needs to learn, whether or not he or she has learned it, and how he or she is able to recall information. Therefore, grading should be based on individual student goals rather than comparing the student to the rest of the class.


Materials List

Materials needed to complete ActiveFolders
- Brad fasteners
- Transparencies
- Scissors/paper cutter
- Hobby knife
- Hook-and-loop tape (optional)
- Heavy plastic envelopes with wrap string closure
- Dry-erase markers
- Miscellaneous objects as listed for each kit

General ActiveFolder Information
- Each discipline is color-coded for easy reference.
- Each folder is labeled according to the topic and activity.
- Each folder includes three levels of directions—purple, green, and orange.
- Students can be assigned any/all levels according to their abilities.
- Extension activities can be found in the teacher guide information for each folder.
- Wrap-up activities and graphic organizers are provided on the back of each folder for assessment.
- Hook-and-loop tape for manipulative attachment is optional.
- A space for storage envelopes is provided on the back of each folder.
- Dry-erase markers will be needed for student responses on some ActiveFolders.
- Answer keys are provided for quick reference.
Teacher Pages
for Individual
ActiveFolders

These pages contain the following for each ActiveFolder:

• Objectives
• Vocabulary
• Construction Information
• Answer Key
• Graphic Organizer/Wrap-Up Key
• Additional Activities
Teacher Pages for Individual ActiveFolders

These pages contain the following for each ActiveFolder:

- Objectives
- Vocabulary
- Construction Information
- Answer Key
- Graphic Organizer/Wrap-Up Key
- Additional Activities
Earthquakes

Objectives
- Distinguish between normal, reverse, and strike-slip faults.
- Discover how earthquake energy travels in seismic waves.
- Identify the layers of Earth’s interior structure.

Vocabulary
earthquake—vibrations produced when rocks break along a fault
epicenter—point on Earth’s surface directly above an earthquake’s focus
fault—surface along which rocks move when they pass their elastic limit and break
focus—point below Earth’s surface where energy is released in the form of seismic waves
normal—break in rock caused by tension forces
reverse fault—break in rock caused by compression forces
seismic wave—wave generated by an earthquake
strike-slip—break in rock caused by shear forces

Construction
1. Cut out manipulatives from the activity card page. Cut out the layers of Earth’s interior structure discs.
2. Cut slit marks as indicated on all discs and the folder.
3. Sequence the layers of Earth’s interior. Carefully align slits on discs and folder, and connect with brad fastener.
5. Attach a 5” × 7” storage envelope to the back of the folder for all activity cards and marker.

Answer Key
Earthquake Summary—Direction of land movement—Arrows should match the arrows shown on the diagram of the fault movements. Definition of fault type—Normal fault—break in rock caused by tension forces…; Reverse fault—break in rock caused by compression forces; Strike-Slip fault—break in rock caused by shear forces…; Key ideas of fault movement—Normal fault—down and out; Reverse fault—up and over; Strike-slip fault—twist past
Journal—Underlined letters are found in both the name and description of the action taking place.
Journal—Accept all reasonable responses.
Journal—Accept all reasonable responses.
Model of Earth’s Layers—core, iron, nickel, solid, iron, nickel, magnetic field, two, upper mantle, iron, asthenosphere, flow slowly, crust, 5, 60, lithosphere, plates, earthquake, crust, focus, epicenter

Graphic Organizer
Earthquakes—plates, focus, epicenter, normal fault, reverse fault, strike-slip fault; Earth’s layers—crust, lower mantle, inner core, outer core, upper mantle

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students use modeling, clay or construction paper to build a model of Earth’s interior structure. Remind students to make the layers proportional.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Use miniature candy bars to simulate the different movements of faults. The candy bar will represent Earth’s crust. As students simulate each fault movement, discuss how the crust has changed as a result of the movement.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Students collect samples to make an analogy between the layers of Earth’s interior structure and common objects (hard-boiled egg, orange, peach, or golf ball).</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
**Erosion**

**Objectives**
- Summarize characteristics of the stages of stream development.
- Identify the agents of erosion.
- Compare the effects of the agents of erosion.

**Vocabulary**
- **abrasion**—occurs when windblown sediments strike rocks, polishing and pitting their surfaces
- **creep**—movement of sediments as they slowly shift their positions downhill
- **deflation**—occurs when wind blows over loose sediments, removes small particles, and leaves behind coarser sediments
- **deposition**—the dropping of sediments that occurs as an agent of erosion loses energy
- **dune**—mound formed when windblown sediments pile up behind an obstacle
- **erosion**—a process that wears away surface materials and moves them from one place to another
- **loess**—windblown deposit of tightly packed, fine-grained sediments
- **moraine**—large ridge of rocks and soil deposited by a glacier when it stops moving forward
- **outwash**—material deposited by meltwater from a glacier
- **slump**—mass movement of material as it slips down along a curved surface.
- **till**—a mixture of different-sized sediments left behind as a glacier melts and begins to retreat

**Construction**
1. Cut manipulatives from the activity card page.
2. Provide a dry-erase marker for student responses.
3. Attach a 5” × 7” storage envelope to the back of the folder for all activity cards and marker.

**Answer Key**

**Stream Development**—Students should show the newer stream with the waterfall at the top, progressing to the older stream with the delta at the bottom of the puzzle.

**Stream Characteristics**—newer stream—waterfalls, steep valleys, fastest water; rocks and rapids, deep bottom erosion, swift water; sediments deposited, sides erode, curves, gently moving water; floodplain, meanders, slow water; delta, wide, flat drainage basin, flows into ocean

**Journal**—Accept all reasonable responses.

**Definition of Erosion**—process, materials, moves, place, another

**Agents of Erosion**—Order of agents will vary.

**Effects of Erosion**—Glaciers—esker, moraine, till; Gravity—creep, rockfall, slump; Water—cave, channel, delta; Wind—abrasion, dune, loess

**Graphic Organizer**

**Agents of Erosion**—Order of agents of erosion will vary. Gravity—slump, mud flow; Glacier—moraine, esker; Wind—loess, dunes; Water—floods, caves

**Additional Activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students work in small groups to create a short scenario about an avalanche, landslide, flood, or cave adventure. Information should be included that explains how erosion affects the situation.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Ask students to prepare response cards for each agent of erosion. Call out definitions and examples caused by these agents. Students respond with agent of erosion cards.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Ask students to write or record a short story as if they were a river. Remind the students of all activity (wildlife, entertainment, weather, natural disasters) that surround a body of water over time.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Lunar and Solar Eclipses

Objectives
• Model the relative positions of Earth, the Moon, and the Sun during a lunar and solar eclipse.
• Explain why lunar and solar eclipses occur.
• Predict the appearance of the sky from different locations during lunar and solar eclipses.

Vocabulary
full moon—Moon phase that occurs when all of the Moon’s surface facing Earth reflects light
lunar eclipse—occurs when Earth’s shadow falls on the Moon
new moon—Moon phase that occurs when the Moon is between Earth and the Sun
revolution—Earth’s yearlong elliptical orbit around the Sun
solar eclipse—occurs when the Moon passes directly between the Sun and Earth and casts a shadow over part of Earth
waning—phase that occurs after a full moon, as the visible reflecting portion of the Moon decreases
waxing—phase that occurs after a new moon, as more of the Moon’s reflecting side becomes visible

Construction
1. Copy the Moon wheel to a transparency. Cut the Moon wheel from the transparency copy.
2. Cut slit marks on Earth on the Eclipse ActiveFolder and the transparent Moon wheel.
3. Connect the transparent Moon wheel and Earth on the ActiveFolder with a brad fastener.
4. Cut out activity cards from the original activity card sheet.
5. Provide a dry-erase marker for student responses.
6. Attach a 5” × 7” storage envelope to the back of the folder for all activity cards and a marker.

Answer Key
Blue cards—Solar Eclipse, Lunar Eclipse
Penumbra—the lighter eclipse shadow; Umbra—the darkest portion of the eclipse shadow
Solar Eclipse—new Moon; Lunar Eclipse—full Moon
Journal—A lunar eclipse occurs when the Moon is on the far side of Earth, away from the Sun. In this position, the Moon is full.
Journal—A solar eclipse occurs when the Moon is between Earth and the Sun. The Moon is a new moon in this position.
Journal—A lunar eclipse is visible at night, when the Moon is farthest from the Sun, and your position on Earth is facing away from the Sun.
Solar Eclipse—the Sun, the Moon, and Earth; Lunar Eclipse—the Sun, Earth, and the Moon

Graphic Organizer
A lunar eclipse occurs when the Sun, Earth, and the Moon are lined up so the shadow of Earth falls on the Moon, during a full moon. A solar eclipse occurs when the Sun, the Moon, and Earth are lined up so the shadow of the Moon falls on Earth, during a new moon.

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use various sizes of round objects to simulate lunar and solar eclipses.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Compare and contrast lunar and solar eclipses in student journal.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Use the Moon wheel as a transparency for a full class demonstration and discussion.</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
**Our Solar System**

**Objectives**
- List the planets and the asteroid belt in order.
- Compare and contrast the inner planets.
- Describe the characteristics of the outer planets.

**Vocabulary**
- **astronomical unit**—unit of measure used to determine distances between objects in the solar system
- **Earth**—third inner planet from the Sun with an atmosphere that supports life
- **Jupiter**—fifth outer planet, and the largest of all planets in the solar system
- **Mars**—fourth inner planet from the Sun, often called the “red planet”
- **Mercury**—inner planet closest to the Sun
- **Neptune**—usually eighth outer planet from the Sun with dark-colored storms in its atmosphere
- **Pluto**—last outer planet from the Sun; smallest of all the planets
- **Saturn**—sixth outer planet from the Sun with a colorful ring system
- **solar system**—includes the Sun, planets, comets, meteoroids, and other objects that orbit the Sun
- **Uranus**—seventh outer planet from the Sun with a distinct bluish-green color
- **Venus**—second inner planet from the Sun; sometimes called Earth’s twin

**Construction**
1. Cut the manipulatives from the activity card page.
2. Provide a dry-erase marker for student responses.
3. Attach a 5” × 7” storage envelope to the back of the folder for all activity cards and marker.

**Answer Key**
- **Planets**—Mercury, Venus, Earth, Mars, asteroid belt, Jupiter, Saturn, Uranus, Neptune, Pluto
- **Fact cards**—Check the back of each card for the correct fact and planet identification.
- **Journal**—Accept all reasonable responses.

**Average Distance from Each Planet to the Sun**

<table>
<thead>
<tr>
<th>Planet</th>
<th>Distance from the Sun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>0.4 AU</td>
</tr>
<tr>
<td>Venus</td>
<td>0.7 AU</td>
</tr>
<tr>
<td>Earth</td>
<td>1.0 AU</td>
</tr>
<tr>
<td>Mars</td>
<td>1.5 AU</td>
</tr>
<tr>
<td>Jupiter</td>
<td>5.2 AU</td>
</tr>
<tr>
<td>Saturn</td>
<td>9.5 AU</td>
</tr>
<tr>
<td>Uranus</td>
<td>19.2 AU</td>
</tr>
<tr>
<td>Neptune</td>
<td>30.0 AU</td>
</tr>
<tr>
<td>Pluto</td>
<td>39.5 AU</td>
</tr>
</tbody>
</table>

**Journal**—Approximately—Mercury 0.6 AU, Venus 0.3 AU, Mars 0.5 AU, Jupiter 4.2 AU, Saturn 8.5 AU, Uranus 18.2 AU, Neptune 29.0 AU, Pluto 38.5 AU; Earth to asteroid belt 0.5–4.0 AU, Earth to the Sun 1 AU

**Graphic Organizer Assessment**
- **Our Solar System**—Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, rock, asteroid, gases

**Additional Activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students create a mnemonic for the order of the planets and demonstrate it in a song or chant.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Write a story about life on one of the inner planets using scientific facts.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Read <em>The Magic School Bus Lost in the Solar System</em>, and create a sequence of events chart.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Phases of the Moon and Seasons

Objectives
• Differentiate between rotation and revolution.
• Explain what causes Earth’s seasons.
• Understand what causes day and night.
• Identify phases of the Moon and their cause.

Vocabulary
axis—imaginary vertical line that cuts through the center of Earth and around which Earth spins
moon phase—change in appearance of the Moon, due to the relative positions of Earth, the Moon, and the Sun
new moon—Moon phase that occurs when the Moon is between Earth and the Sun
orbit—curved path followed by a satellite as it revolves around an object
reflection—occurs when light strikes an object and bounces off
revolution—Earth’s yearlong elliptical orbit around the Sun
rotation—spinning of Earth on its imaginary axis
waxing—phases following a new moon, as the visible reflecting portion increases
waning—phases following a full moon, as the visible reflecting portion decreases

Construction
1. Cut manipulatives from activity card page.
2. Use a hobby knife to cut away the cut-outs from the dark blue Earth wheel.
3. Cut slits for the fastener placement on the folder wheel and Earth wheel; connect with a brad fastener.
5. Attach a 5” × 7” storage envelope to the back of the folder for all activity cards and marker.

Answer Key
Earth’s Seasons—December–Winter; March–Spring; June–Summer; September–Autumn
Journal—Accept all reasonable responses. Seasons would probably be the same year-round.
Journal—Accept all reasonable responses which discuss the Sun’s direct rays caused by the tilt of Earth.
Earth’s Movements—Day and Night—24 hours, rotation, 1 day, axis; Seasons—revolution, 365 days, orbit, tilted, 1 year
Journal—Day and night are caused by the Sun shining on Earth during rotation on its axis every 24 hours.
Journal—Seasons are caused by the tilt of Earth during its revolution around the Sun. When the hemisphere is tilted toward the Sun, it receives a longer period of sunlight and more total radiation.
Phases of the Moon—Check student responses with the back of each moon-phase card. Check the name of each phase to ensure it matches the moon-phase photo.
Journal—You cannot see the far side of the Moon, only the part with the Sun’s rays shining on it.

Graphic Organizer
Earth—revolves, 1 year, axis, seasons, rotates, 24 hours

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students illustrate the pattern of moon phases.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Students record moon-gazing observations in their science journals.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Students act as meteorologists to predict the weather for Canada and Australia on January 1.</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Plate Tectonics

Objectives
- Identify evidence supporting continental drift.
- Compare and contrast different types of plate boundaries.

Vocabulary
- asthenosphere — layer of Earth on which the lithosphere plates float and move around
- continental drift — hypothesis that states continents have moved slowly to their current locations
- convection current — current in Earth’s mantle that transfers heat and is the force for plate tectonics
- lithosphere — rigid layer of Earth about 100 km thick, made of the crust and a part of the upper mantle
- Pangaea — large, ancient landmass that was composed of all the continents joined together
- plate — sections that move on a plasticlike layer of the mantle
- plate tectonics — Earth’s crust and part of the upper mantle broken into sections, move slowly
- seafloor spreading — theory that states hot, less dense material below Earth’s crust rises toward the surface at the mid-ocean ridges as the lithosphere moves apart

Construction
1. Cut manipulative cards from the activity card page.
2. Copy the continental drift overlay art onto an acetate transparency for overlays.
3. Cut the continental drift overlay art out of the transparency.
4. Carefully align the registration marks for the 135 million years ago overlay. Tape the left side only.
5. Carefully align the registration marks for the present-day Earth overlay. Tape the right side only.
7. Attach a 5” × 7” storage envelope to the back of the folder for all activity cards and marker.

Answer Key
Continental Drift — Wegener, Pangaea, puzzle, animals, plants, rock, climate, continental drift
Journal — Accept all reasonable responses. Landmasses have drifted and changed shape over time.

<table>
<thead>
<tr>
<th>Convergent</th>
<th>Divergent</th>
<th>Transform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mountain ranges</td>
<td>Volcanoes</td>
<td>Mid-ocean ridges</td>
</tr>
<tr>
<td>Continental plates collide</td>
<td>Oceanic and continental plates</td>
<td>Oceanic plates move apart</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Journal — Accept all reasonable responses.

Graphic Organizer
Plate Tectonics — convergent, transform, divergent, mountains, volcanoes, faults/earthquakes, rift valleys, seafloor spreading

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students use moist, sandy soil placed on two sheets of paper. Ask students to move paper, simulating plate movement. Students should see models of mountains, rift valleys, and faults.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Students use large paper, maps and/or an atlas to create a large drawing of one of the seven continents. Students draw major landforms and identify the type of plate movement that formed each.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Students research a local plate tectonic landform. Their research might include such topics as landforms, names of plates involved, and type of movement. Photos and any interesting information can be presented in a travel brochure.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Rock Cycle

Objectives
• Discover how all rocks are linked by the rock cycle.
• Identify what conditions are needed for different rocks to form.
• Summarize the rock cycle and some changes that a rock could undergo.

Vocabulary
compaction—process that forms sedimentary rocks when layers of sediments are pressed together by the weight of the layers above them
extrusive—type of igneous rock that forms when magma cools quickly at or near Earth’s surface
foliated—type of metamorphic rock with mineral grains lined up in parallel layers
igneous rock—rock formed when lava or magma cools and hardens
intrusive—type of igneous rock that forms when magma cools slowly beneath Earth’s surface
metamorphic rock—rock formed because of a change in temperature or pressure or the presence of hot, watery fluids
non-foliated—type of metamorphic rock in which mineral grains do not line up in parallel layers
rock—mixture of one or more minerals, rock fragments, organic matter, or volcanic glass
sediment—loose material such as rock fragments, mineral grains, and bits of shell that have been moved by wind, water, ice, or gravity
sedimentary rock—rock formed when sediments are pressed and cemented together

Construction
1. Cut manipulatives from the activity card page.
2. Provide a dry-erase marker for student responses.
3. Attach a 5” × 7” storage envelope to the back of the folder for all activity cards and marker.

Answer Key
Rock and Mineral Summary—change, beginning, end, processes, Rocks, rock fragments, organic matter, sedimentary, metamorphic, atomic, minerals
Portrait of a Rock—Intrusive igneous rock, Granite; Extrusive igneous rock, Obsidian; Sedimentary rock, sandstone; Metamorphic rock, Gneiss
Key terms—Intrusive—large crystals, magma cools beneath surface; Extrusive—fine-grained, lava cools quickly near surface; Sedimentary—compacted, cemented; Metamorphic—heat, pressure, fluids act to change composition
Rock Process Arrows—Check arrow placement for accuracy.
Rock Process Labels—weathering and erosion, heat and pressure

Graphic Organizer
Formation of Rocks—sediments, pressed, cemented; heat, pressure, composition; lava, hardens, above, beneath

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students write a brief, creative, narrative history of a rock sample.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Students create a drama to portray the rock cycle. Dialogue and movements should demonstrate the processes involved as rocks constantly change.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Students brainstorm ways in which metamorphic, igneous, and sedimentary rocks are used for building and construction or for decorative purposes.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Volcanoes

Objectives
• Discover the relationship between tectonic plate boundaries and the three main types of volcanoes.
• Sequence the process by which a volcano erupts.

Vocabulary
- cinder cone volcano—steep-sided, loosely packed volcano formed from tephra
- composite volcano—formed by alternating layers of tephra and lava
- crater—steep-walled depression located around a volcano’s vent
- hot spot—unusually hot area between Earth’s mantle and core
- shield volcano—broad, gently sloping volcano formed by quiet eruptions of lava
- tephra—bits of rock or solidified lava dropped from the air
- vent—opening of a volcano through which lava flows

Construction
1. Cut manipulative cards from the activity card page.
2. Copy the earthquake and volcano world map overlay art onto acetate transparencies.
3. Cut the overlay art out of the transparencies.
4. Carefully align the registration marks for the volcano overlay. Tape the left side only.
5. Carefully align the registration marks for the earthquake overlay. Tape the right side only.
7. Attach a 5” × 7” storage envelope to the back of the folder for all activity cards and marker.

Answer Key
- Parts of a Volcano—(from bottom to top) magma, pipes, crater, lava, vent, tephra
- Formation of a Volcano—(from bottom to top) Rock material melts…; Magma collects…; Pressure forces magma…; Magma reaches…; Lava cools quickly…; Ash, lava, and gases erupt…

Journal—Accept all reasonable responses.

<table>
<thead>
<tr>
<th>Volcanoes</th>
<th>Type of Volcano</th>
<th>Volcano Description</th>
<th>Type of Eruption</th>
<th>Common Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shield volcano</td>
<td>broad, gently sloping volcano…</td>
<td>quiet, flowing</td>
<td>mid-ocean ridges, hot spots</td>
<td></td>
</tr>
<tr>
<td>Cinder cone volcano</td>
<td>steep-sided, explosive volcano…</td>
<td>explosive eruption</td>
<td>along plate boundaries</td>
<td></td>
</tr>
<tr>
<td>Composite volcano</td>
<td>… produce layers of tephra and lava</td>
<td>quiet and explosive</td>
<td>subduction zones</td>
<td></td>
</tr>
</tbody>
</table>

Journal—Accept all reasonable responses.

Journal—Accept all reasonable responses.

Graphic Organizer
Volcanoes—Formed by—heat and pressure, rock to melt, are located—plate boundaries, hot spots, include—cinder cone volcanoes, composite volcanoes, shield volcanoes

Additional Activities

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Groups of students use modeling clay or paper to create the three types of volcanoes.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Students use modeling clay or paper to make a cross section of a volcano.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Students design creative methods to model volcanic features and how erosion affects geology.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

ActiveFolders Teacher Guide 9
Weather

Objectives
• Demonstrate how rain, hail, sleet, and snow develop.
• Identify types of precipitation.
• Analyze characteristics and dangers of severe weather.

Vocabulary
blizzard—winter storm that lasts at least 3 h with temperatures of –12°C or below
humidity—amount of air vapor held in the air
hurricane—large, severe storm that forms over a tropical ocean
precipitation—water falling from clouds; includes rain, snow, sleet, and hail
thunderstorm—storm in which heavy rain falls, lightning flashes, thunder roars, and hail might fall
tornado—violent, whirling windstorm that crosses land in a narrow path
weather—state of the atmosphere at a specific time and place

Construction
1. Cut manipulatives from activity card page.
2. Use a hobby knife to cut away the small circles from the weather wheel.
3. Cut slits on the folder wheel and weather wheel. Connect with a brad fastener.
5. Attach a 5" × 7" storage envelope to the back of the folder for all activity cards and marker.

Answer Key
Predicting Severe Weather—Check student work for accuracy.
Journal—Accept all reasonable responses.
Fill in—National Weather Service
Journal—Accept all reasonable responses. Watch—weather conditions are suitable for a tornado; Warning—a tornado has been sighted in the immediate area
Type of Precipitation—rain, sleet, hail, snow
Description of Precipitation—precipitation that falls when temperatures are above freezing; precipitation that passes through freezing air…; icy precipitation that grows larger…; precipitation formed when air temperatures are so cold…
Journal—Accept all reasonable responses.
Journal—Accept all reasonable responses.

Graphic Organizer
Blizzard—temperatures, snow; Hurricane—winds, oceans; Thunderstorm—rain, lightning; Tornado—windstorm, thunderhead

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Students illustrate examples of the four types of precipitation and the hazards associated with each.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Students research and forecast the weather for your area in a creative, informative format.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Students collect several weather maps and glue to construction paper. Laminate for durability. Students analyze their maps and write questions relating to the map key, temperatures, fronts, etc. Students trade maps and questions with a peer and answer the questions.</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Weathering

Objectives
• Contrast mechanical and chemical weathering.
• Illustrate how weathering affects Earth’s surface.
• Analyze how climate affects weathering.

Vocabulary
chemical weathering—occurs when chemical reactions dissolve or change the minerals in rocks
climate—average weather pattern in an area over a long period of time
erosion—process in which surface materials are worn away and transported from one place to
another by agents such as gravity, water, wind, and glaciers
ice wedging—occurs when water freezes in the cracks of rocks and expands
mechanical weathering—physical processes that break apart rock without changing the chemical makeup
oxidation—occurs when some materials are exposed to oxygen and water over time
weathering—chemical or mechanical surface processes that break rock into smaller and smaller pieces

Construction
1. Cut manipulatives from the activity card page.
2. Provide a dry-erase marker for student responses.
3. Attach a 5” × 7” storage envelope to the back of the folder for all activity cards and marker.

Answer Key
Erosion—...worn away and transported...by agents such as gravity, water, wind, and glaciers
Weathering—...break rock into smaller pieces
Journal—Accept all reasonable responses.
Climate Locations—Accept all reasonable responses.
Types of Weathering—Students should infer that mechanical weathering is more common in dry
areas. Chemical weathering is more common in warm, wet areas.
Journal—Accept all reasonable responses.
Journal—Accept all reasonable responses.
Soil Horizons—Horizon A—covered with litter..., contains the fewest rocks and the most humus...,
generally dark...; Horizon B—less organic material..., contains material from leaching process..., 
water reacts with humus and carbon dioxide..., Horizon C—contains coarsest sediments..., does not
contain much organic material..., bottom horizon
Journal—Accept all reasonable responses.

Graphic Organizer
Chemical—formation of natural acids, animals and plants decaying, rust oxidation, found more often
in wet climates; Both—affected by climate, breaking down rocks; Mechanical—plant roots, animals
burrowing, ice wedging, found more often in dry climates

Additional Activities

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Students compose a list of mechanical and chemical weathering examples. Call out examples of these changes. Scan class for misconceptions and discuss as necessary.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Students use rock candy to represent a rock sample. Students might design simple experiments to increase or decrease the rate of weathering through chemical and mechanical methods.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Students create photo art through photographs or drawings of chemical and/or mechanical weathering.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
## Chemistry 0-07-874106-8
- Acids and Bases
- Chemical and Physical Changes
- Chemical Bonds
- Chemical Reactions
- Elements, Compounds, and Mixtures
- Matter
- Measurement
- Periodic Table of Elements
- Principles of Gases and Liquids
- States of Matter

## Earth Science 0-07-874107-6
- Earthquakes
- Erosion
- Lunar and Solar Eclipses
- Our Solar System
- Phases of the Moon and Seasons
- Plate Tectonics
- Rock Cycle
- Volcanoes
- Weather
- Weathering

## Life Science 0-07-874108-4
- Adaptations
- Cell Processes
- Cell Structure
- Classification
- Ecology
- Food Chains, Food Webs, and Energy Pyramids
- Heredity and Genetics
- Human Body Systems
- Mitosis and Meiosis
- Plants

## Physics 0-07-874109-2
- Electricity
- Energy
- Law of Conservation of Energy
- Magnetism
- Newton’s 1st Law of Motion and Forces
- Newton’s 2nd Law of Motion
- Newton’s 3rd Law of Motion
- Temperature and Thermal Energy
- Waves
- Work and Simple Machines

## Advantages for Students
- Assign meaningful work aimed at science content topics
- Challenge students at individual ability levels
- Increase self-confidence through participation
- Facilitate practice and mastery of state-mandated objectives
- Provide opportunities for regular education students to work with students with special needs
- Initiate academic and social gains for students with special needs

## Advantages for Teachers
- Vary content presentation and assessment
- Modify curriculum for special populations
- Increase student involvement
- Address textbook/state-mandated objectives
- Directly correlate objectives with relevant reinforcement activities
- Provide critical-thinking opportunities for special-needs students through on-grade level curriculum