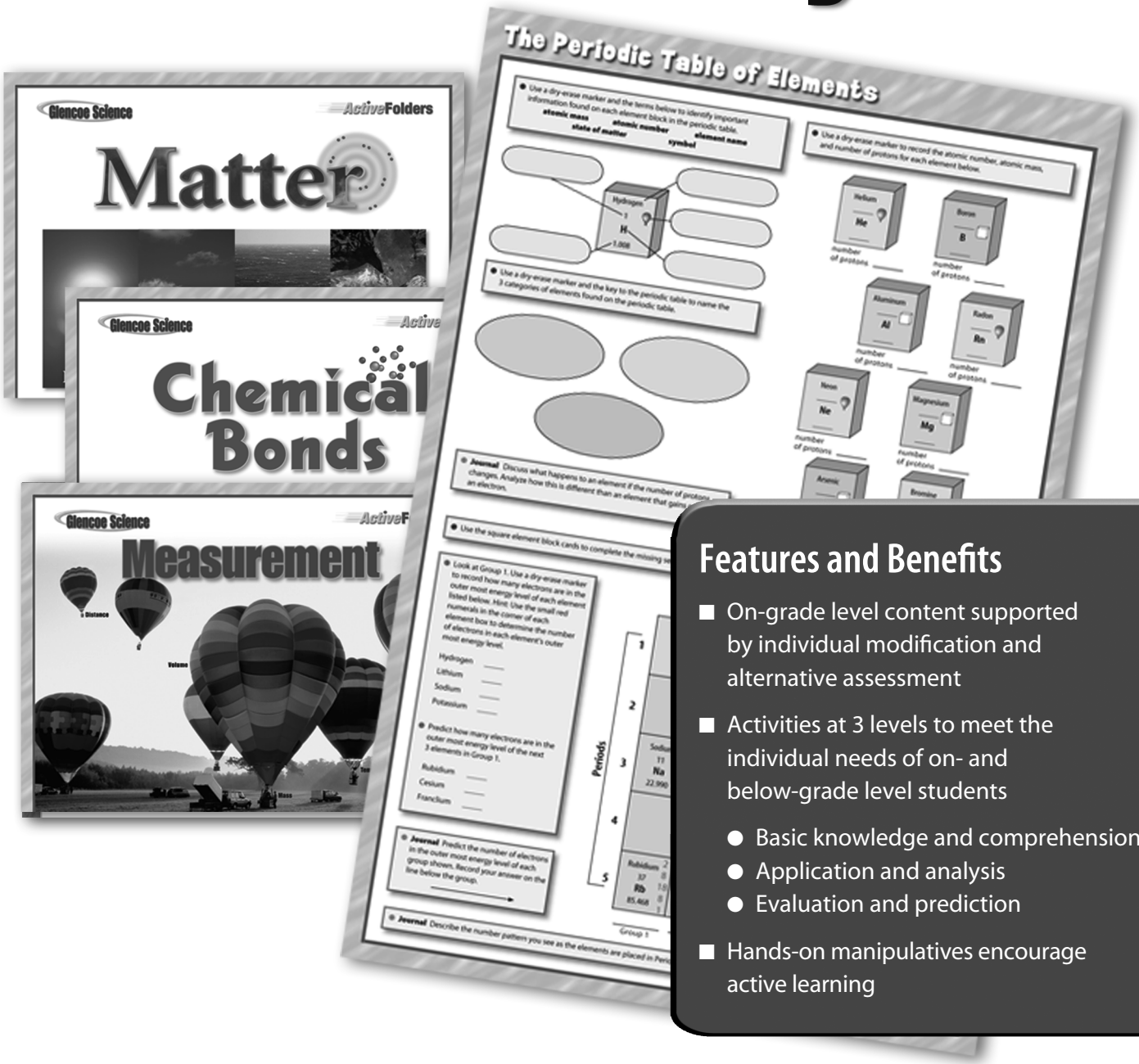
Glencoe Science

Teacher Guide

ActiveFolders

for Differentiated Instruction

Chemistry



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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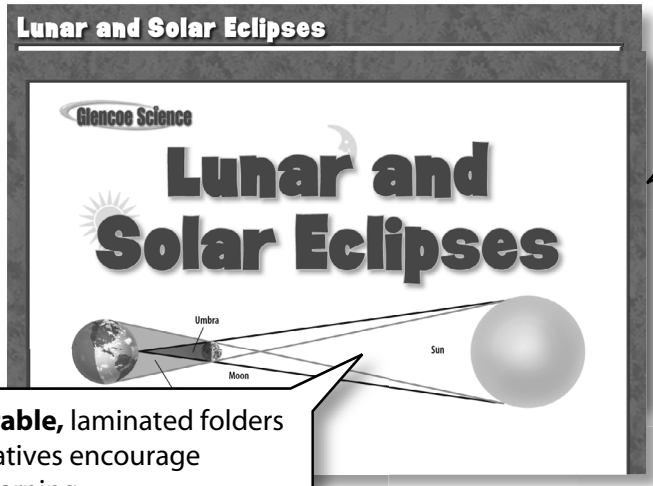
Active Folders for Differentiated Instruction

Overview of *Active*Folders for Differentiated Instruction

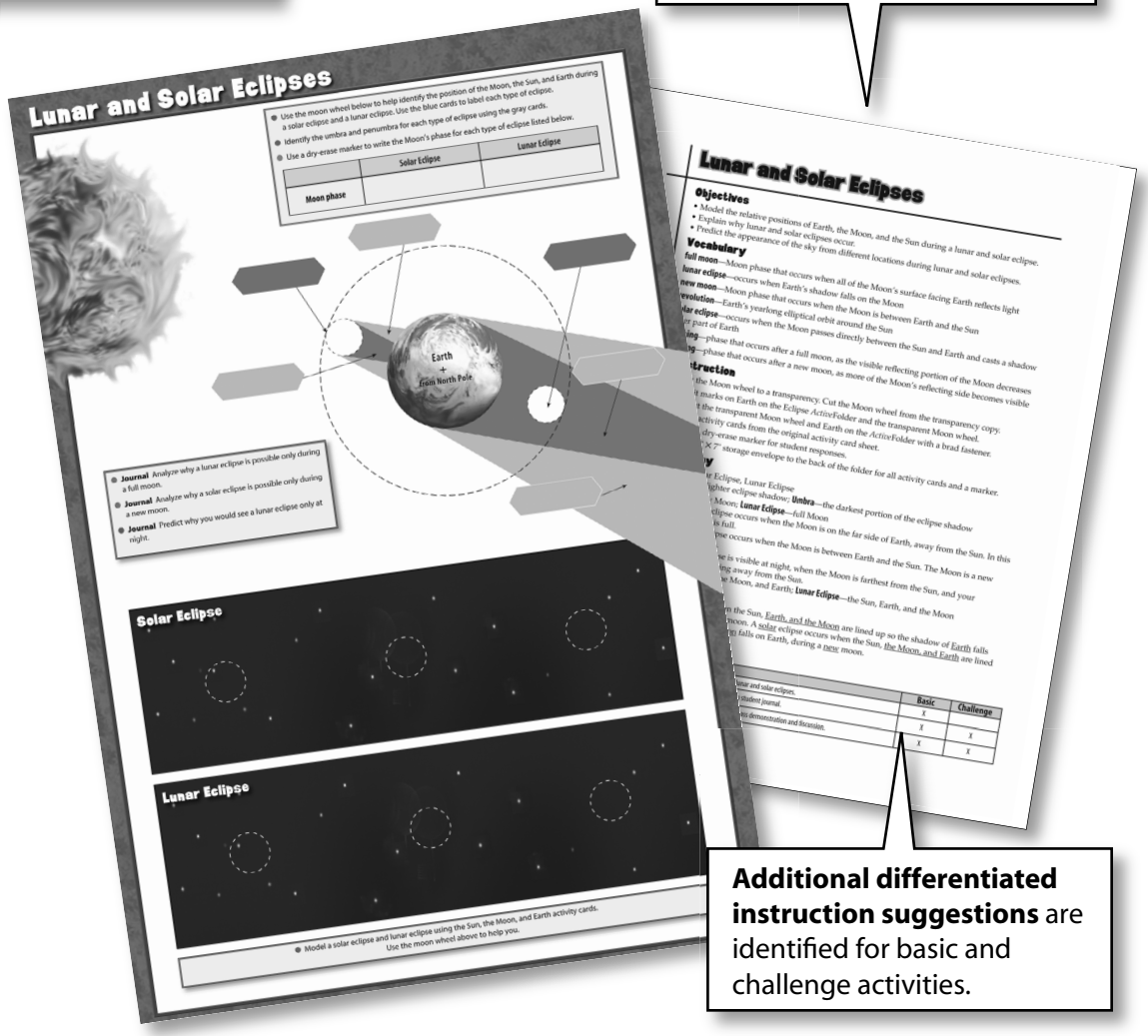
Hands-on activities that reinforce essential science concepts



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

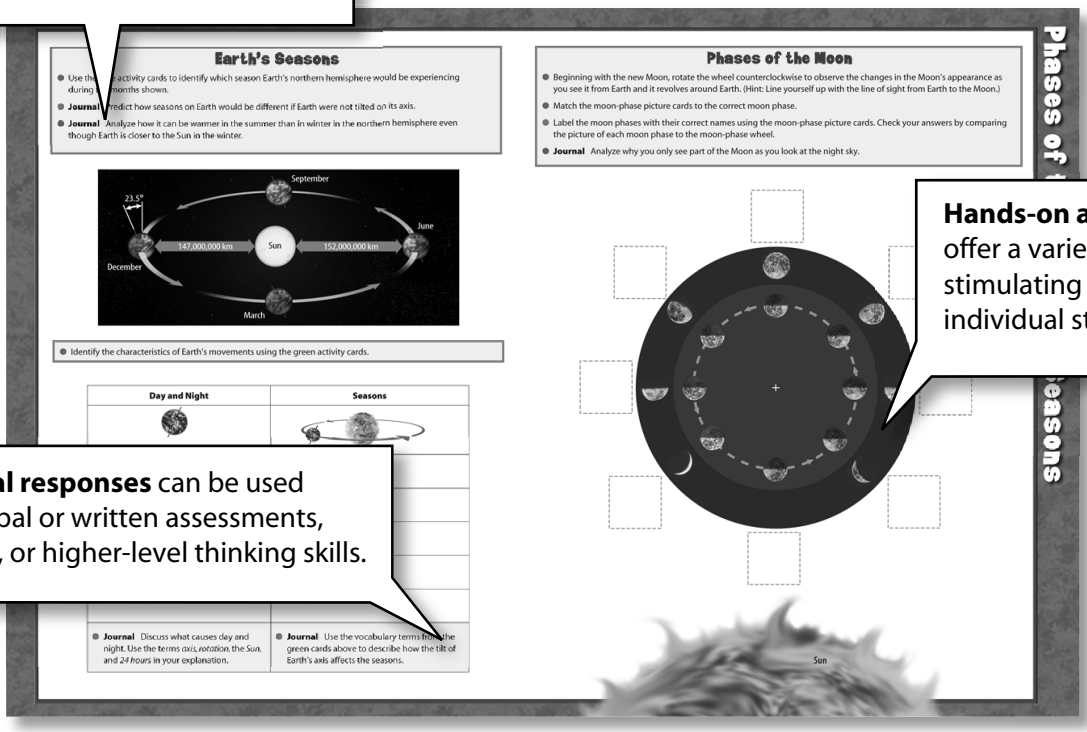
Colorful, durable, laminated folders and manipulatives encourage kinesthetic learning.

Detailed teacher guide contains objectives correlated to relevant science content.



Additional differentiated instruction suggestions are identified for basic and challenge activities.

Multilevel directions reach diverse student population.

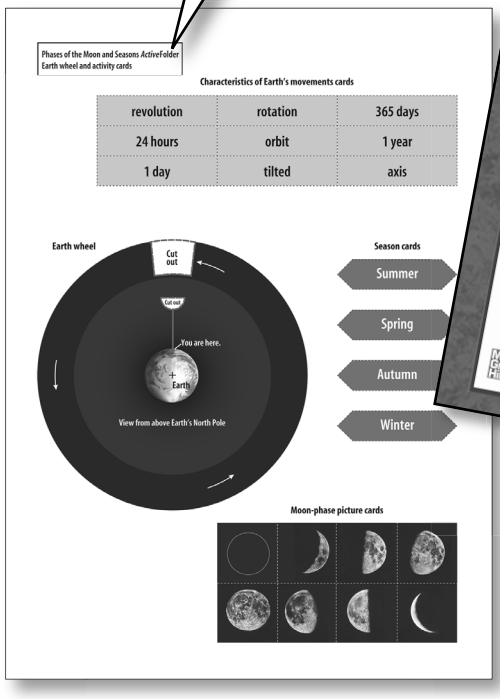


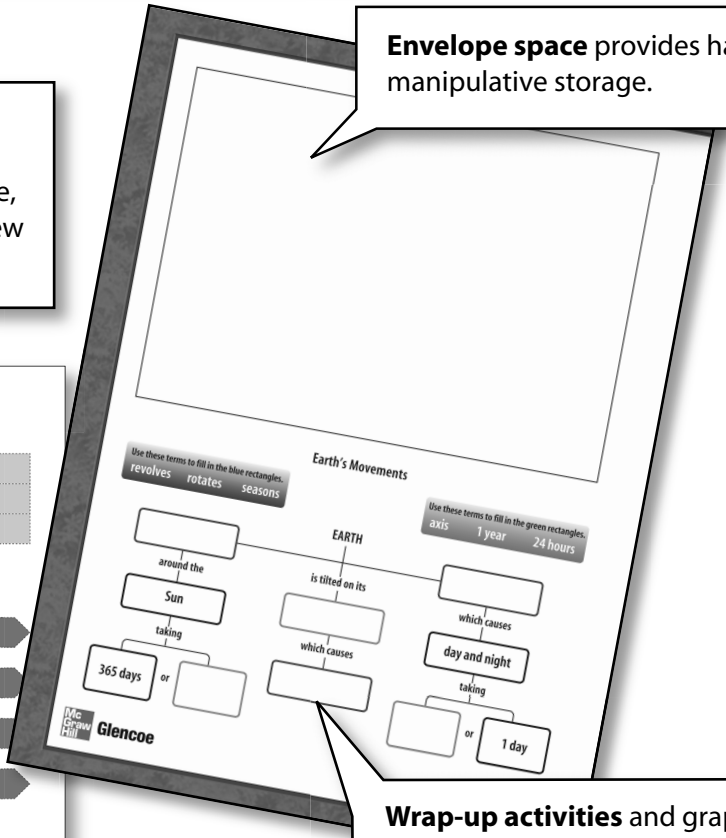
Hands-on activities offer a variety of stimulating tasks to meet individual student needs.

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

Envelope space provides handy manipulative storage.

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





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

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

	Student/Teacher Work Together	Pairs or Small Groups	Independent Student
Guided practice and reinforcement	• Student and teacher work as a team. • Student can respond verbally to better explain his or her response, ask questions, and clarify his or her knowledge. • Teacher works closely to interpret the student's reasoning and any misconceptions.	• Pairs or groups take turns completing a folder while others review vocabulary terms. • Pairs or groups take turns completing an activity and checking each other for accuracy and understanding. • If multiple copies of a folder are available, several groups can work through the activities, creating comprehension questions for the other groups.	• Student works independently to explore each concept, formulate his or her response, and adjust the manipulatives as he or she works through the folder.

	Student/Teacher Work Together	Pairs or Small Groups	Independent Student
Review	• Student works through the folder, responding in writing or verbally explaining his or her answer choices to the teacher. • Teacher can do the activity and ask the student to explain the approach used to complete the task.	• Students can take turns working through activities on the folder, challenging each other for understanding and clear explanations of concepts presented. • 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. • Students can design their own review questions to ask fellow classmates.	• Students work independently at their own pace.
Assessment	• Student talks with the teacher about each activity, demonstrating his or her knowledge through the manipulation of the activity.	• 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. • Student pairs can construct sentences with the key terms from the folder activities, using the terms in the correct scientific context.	• Independent students can work through the folder as an assessment. • Student can match vocabulary words to the correct definitions using the teacher-made vocabulary cards in a one-to-one correspondence.

*Active*Folders Purpose

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

*Active*Folders 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 *Active*Folders 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.

*Active*Folders 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, *Active*Folders challenge individuals through meaningful work to practice and master state-mandated objectives while increasing self-confidence and participation.

Advantages of *Active*Folders in the Differentiated Classroom

*Active*Folders 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 *Active*Folders 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.

*Active*Folders 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 *Active*Folders 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, and 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 administerng 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.

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Materials List

Materials needed to complete *Active*Folders

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 *Active*Folder 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 *Active*Folders.
- Answer keys are provided for quick reference.

Teacher Pages for Individual *Active*Folders

These pages contain the following for each *Active*Folder:

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

Acids and Bases

Objectives

- Identify physical properties of acids and bases.
- Become familiar with the practical uses of acids and bases.
- Discover how the pH scale displays strength of acids and bases.

Vocabulary

acid—substance that produces hydrogen ions (H^+), in a water solution

base—substance that forms hydroxide ions (HO^-) in a water solution

indicator—organic compound that changes color in acids and bases

neutralization—chemical reaction that occurs when an acid and a base combine to produce water molecules

pH—measure of how acidic or basic a solution is using a scale ranging from 0 to 14

physical property—any characteristic that can be observed without changing the identity of the material

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 the activity cards and marker.

Answer Key

pH scale—0–14

Acid—red, pH 0–6, lowest pH, sour taste, can cause severe burns, citrus fruit

Neutral—white, pH 7, water

Bases—blue, pH 8–14, highest pH, bitter taste, can cause severe burns, feels slippery

pH Pictures—battery acid, soft drinks, pickle, vinegar, tomato, coffee, milk, water, blood, baking soda, antacid, liquid detergent, ammonia, oven cleaner

Journal—Accept all reasonable responses. Students might infer that bases are used for cleaning.

Journal—Accept all reasonable responses. Students might conclude a pH similar to water will not irritate their skin.

Journal—Accept all reasonable responses. Students might predict that antacids might neutralize the pH of the acid of the spices.

Journal—Accept all reasonable responses. Students might reason that as a base, antacids are working to neutralize an acid.

Wrap-Up Assessment

Acids—pH 0–6, taste sour; coffee, soft drinks; can burn skin

Bases—pH 8–14, antacid, liquid detergent, may feel slippery, produces hydroxide ions

Additional Activities

Activity	Basic	Challenge
Create mini safety posters on the dangers of testing acids and bases in the lab.	X	
Have students make response cards for acids and bases. As characteristics, properties, and examples of acids and bases are called out, scan class for incorrect answers.	X	X
Bring in or draw common examples of acids and bases. Create a "live" three-dimensional pH scale with the common examples in the classroom.		X

Chemical and Physical Changes

Objectives

- Identify chemical changes.
- Compare and contrast chemical and physical changes.

Vocabulary

physical change—change in the size, shape, or state of matter in which the identity of the substance remains the same

chemical change—change of one substance into a new substance

Construction

1. Cut manipulatives and chemical and physical change wheel from the activity card page.

2. Use a hobby knife to cut out the two small circles on the chemical and physical change wheel.

3. Cut slit marks on both the change wheel and the base of the wheel on the folder.

4. Place the change wheel on top of the folder wheel. Insert a brad fastener through both wheels and attach firmly.

5. Provide a dry-erase marker for student responses.

6. Attach a 5" × 7" storage envelope to the back of the folder for the activity cards and marker.

Answer Key

Physical changes—eroding sand, melting ice, mixing paint, pouring liquid, melting ice cream, blowing bubbles

Chemical Changes—rusting chain, frying eggs, toasting bread, dying hair, burning candle, fireworks

Journal Accept all reasonable responses. Students might include color change, odor produced, light or heat produced, change cannot be reversed.

Journal Accept all reasonable responses. Students might state that both chemical and physical changes can happen in a rusting chain. However, scientists classify this process as a chemical change.

Chemical and Physical Characteristics—Chemical change–cannot be reversed, color change, food digesting, odor produced, composition of substance changes. Physical change–can be reversed, change in appearance but not composition, shape change, state change, wax melting.

Change Wheel—Responses should match answers above from the characteristics chart.

Journal—Compare responses to four clues for chemical change in earlier journal entry; responses might include color change, odor produced, light or heat produced, change cannot be reversed.

Wrap-Up Assessment

Apple–P, C; Wood–P, C; Steel–P, C; Paper–C, P

Additional Activities

Activity	Basic	Challenge
Make a response card for Physical Change and a response card for Chemical Change. Call out examples of physical/chemical changes. Scan class looking for any incorrect answers and misconceptions.	X	
Send students on a short walk looking for examples of physical and chemical changes. Have students record, take pictures, or draw personal examples.	X	X
Ask students to explain why the terms *physical change* and *chemical change* are used to describe changes in matter. Ask students to brainstorm new terms that could be used. Allow students to be creative.		X

Chemical Bonds

Objectives

- Demonstrate how electrons are arranged in an atom.
- Configure electron dot diagrams for selected molecules.

Vocabulary

chemical bond— force that holds atoms together in a compound

chemical formula—symbols that tell what elements make up a compound and their ratios

covalent bond—attraction formed between atoms when they share electrons

ion—charged particle that has either more or fewer electrons than protons

ionic bond—attraction between opposite charges of ions in an ionic compound

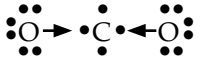
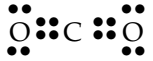
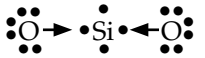
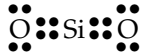
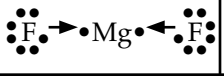
molecule—a neutral particle that forms as a result of electron sharing

Construction

1. Provide a dry-erase marker for student responses.

2. Attach a 5"× 7" storage envelope to the back of the folder for marker.

Answer Key

Energy Levels			Dot diagram model	Completed dot diagram	Molecule formula
2	8	8			H_2O
Energy levels	Electrons in outermost level	Dot diagram	Molecule diagram	Completed dot diagram	Molecule formula
2, 6	6				CO_2
2, 8, 4	4				SiO_2
2, 8, 2	2				MgF_2

Journal—Accept all reasonable responses. Answers should include information about outermost level electrons from each element bonding together to form stable molecules. When the elements are stable, the formula can be written with the correct ratio of elements.

Graphic Organizer Assessment

electrons, outer levels; electron dot diagrams, chemical symbols, dots

Additional Activities

Activity	Basic	Challenge
Design templates for an atom with two energy levels for each student. Using the template and clay, ask students to fashion models of the atoms for any of the elements in the first two periods. Have students attempt to join atoms with incomplete outer energy levels.	X	
Draw a template for an atom with three energy levels. Place a small cup in the center to be used as the nucleus. Use two candies for protons and neutrons with a smaller type of candy as electrons. As atomic numbers are given, ask students to place protons and electrons on the atom. Next, give the atomic mass and allow students to figure the number of neutrons to be placed in the nucleus.	X	X
Ask students to make pairs of cards showing elements in electron dot diagrams. Students can play a matching game to pair up elements that would bond.		X

Chemical Reactions

Objectives

- Identify whether or not a chemical reaction is occurring.
- Discover that some reactions release energy, and others absorb energy.
- Distinguish how factors can speed up or slow down a chemical reaction.

Vocabulary

catalyst—substance that speeds up a chemical reaction

chemical reaction—process that produces chemical change, resulting in new substances

concentration—comparison between amount of solute and amount of solvent in a solution

endergonic reaction—chemical reaction that requires energy in order to proceed

endothermic reaction—chemical reaction that requires heat energy in order to proceed

enzyme—catalyst that is a large protein molecule that speeds up reactions needed for cells to work

exergonic reaction—chemical reaction that releases some form of energy

exothermic reaction—chemical reaction in which energy is primarily given off as heat

inhibitor—substance that slows down a chemical reaction

product—substance that forms as a result of a reaction

reactant—substance present before a reaction

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 the activity cards and marker.

Answer Key

Reaction terms—exergonic, endergonic, exothermic, endothermic

Reaction definitions—releasing/producing energy, absorbing/requiring energy, releasing/producing heat energy, absorbing/requiring heat energy

Reaction vocabulary—enzyme, catalyst, inhibitor, product, concentration, reactant

Key terms—catalysts, speed up reactions, in cells; speeds up a chemical reaction; slows down a reaction; new substance, formed; solute, compared to, solvent; substance, before, reaction begins

Chemical reaction story—safety goggles, lab coat, change color, Endergonic, odor produced, produce light, exergonic, produce heat, exothermic, endothermic, love

Graphic Organizer Assessment

Chemical changes, new substances, color, heat, quickly absorb. Accept all reasonable examples.

Additional Activities

Activity	Basic	Challenge
Have students illustrate or collect pictures of substances before and after a chemical reaction. Ask students to sequence the picture cards according to the "before appearance" and the "after appearance" of each substance while giving an explanation for the change in appearance.	X	
Ask students to list clues indicating a chemical reaction for each set of pictures above.	X	X
Using a short narrative or picture cards created previously, ask students to speculate on heat absorbed or released, the reactant, and the product. Answers can be a class discussion or recorded in a journal.		X

Elements, Compounds, and Mixtures

Objectives

- Distinguish between elements, compounds, and mixtures.
- Identify two types of mixtures.
- Compare different types of solution.

Vocabulary

compound—substance formed from two or more different elements

concentration—compares the amount of solute to the amount of solvent in a solution

heterogeneous mixture—mixture with different materials unevenly distributed and easily identified

homogeneous mixture—mixture in which two or more substances are blended evenly

mixture—combination of substances not bonded together can be separated

saturated—solution that contains all the solute it can hold under the given condition

solute—substance that dissolves and seems to disappear in another substance

solution—homogeneous mixture with compounds evenly mixed but not bonded together

solvent—the substance that dissolves another substance

substance—compound that cannot be broken down into smaller components; maintains the properties of the original substances

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 the activity cards and marker.

Answer Key

Elements—same composition and property throughout; coal, helium

Compounds—more than one element bonded together to make a new substance; water, vinegar

Mixtures—two or more substances that come together but do not make a new substance; air, trail mix

Journal—Accept all reasonable responses. Students should include appropriate definition and classify mixtures as heterogeneous–sand and trail mix; homogeneous–sea water, air.

Parts of solutions—solute, solvent, solution

Solutions—Lemonade-lemons-liquid, sugar-solid, water-liquid; Soft drink–carbon dioxide–gas, flavor–liquid, water–liquid, liquid; Steel beam–carbon–solid, iron–solid, solid; Blood–oxygen-gas, water–liquid, liquid; Milk–water–liquid, liquid

Journal—Accept all reasonable responses. Students might discuss melting one or more solids to combine the substances and then cooling the mixture.

Graphic Organizer Assessment

Elements, compounds, mixtures. Accept all reasonable examples.

Additional Activities

Activity	Basic	Challenge
Ask students to identify the solute and solvents of at least three solutions that have been part of their day.	X	X
Have students use vocabulary flashcards in a memory or bingo-type game.	X	X
Have students prepare mixture recipes to demonstrate knowledge of solute, solvent, and solution. Label each substance in the recipe. Class presentations and a tasting party might be fun.		X

Matter

Objectives

- Identify characteristics of matter.
- Distinguish between the various models that have been used for atoms.
- Identify and label the parts of an atom.

Vocabulary

atom—smallest part of an element that still retains the properties of the element

electrons—particles surrounding the nucleus of an atom that have a negative charge

electron cloud—area around the nucleus of an atom where atom's electrons are most likely found

Ernest Rutherford—proposed that the atom was mostly empty space with mass concentrated in the positive center

John Dalton—proposed that the atom was a solid sphere

John Thomson—proposed that the atom was a positively charged ball with electrons embedded in it

matter—anything that takes up space and has mass

neutron—an uncharged particle located in the nucleus of an atom

Niels Bohr—proposed that electrons travel in fixed orbits around an atom's nucleus

nucleus—central part of an atom containing protons and neutrons

proton—positively charged particle in the nucleus

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 the activity cards and marker.

Answer Key

Matter is—mass, space, matter, atoms

Matter—ashes, gas, pottery, rock, water **Not Matter**—heat, ideas, light, rainbow, thoughts

Models—Dalton model, Thomson model, Rutherford model, Bohr Model, Electron Cloud model

Journal—Accept all reasonable responses. Students might conclude as technology has improved, scientists are able to detect smaller and smaller particles. The models show newly discovered details.

Parts of an atom—(clockwise from top) energy levels, neutron, nucleus, proton, electron cloud, electron

Your own atom—Accept all reasonable responses.

Journal—Accept all reasonable responses. Students should create an atom with appropriate number of electrons, neutrons, and protons. Encourage creative names.

Graphic Organizer

Atoms, protons, neutrons, found in the nucleus, electrons, found in the electron cloud

Additional Activities

Activity	Basic	Challenge
Create a simple scavenger hunt taking students from living to nonliving things. Use key terms of *matter* and *not matter* as clues.	X	
To help students understand the difficulties involved with creating models of things they cannot see, place a small mystery item in black, deflated balloons and then inflate. Ask students to explore and describe their mystery item without seeing it. Exchange balloons. Check predictions by popping the balloons.	X	X
Ask students to compose a list of everything that contains atoms. Clarify any misconceptions concerning types of matter that are omitted.		X

Measurement

Objectives

- Identify the purpose of SI.
- Identify the SI units of length, volume, mass, and temperature.
- Determine appropriate units of measurement.

Vocabulary

kilogram—base unit used when measuring mass

liter—base unit when measuring volume

mass—amount of matter present in an object

SI—International System of Units: method of measurement based on the metric system that is understood and accepted throughout the world

standard—an exact quantity people agree to use to compare measurements

volume—amount of space occupied by an object

Construction

1. Cut manipulatives and measurement wheel from the activity card page.

2. Use a hobby knife to cut out the four small circles on the measurement wheel.

3. Cut slit marks on both the measurement wheel and the base of the wheel on the folder.

4. Insert a brad fastener through both wheels and attach firmly to folder.

5. Provide a dry-erase marker for student responses.

6. Attach 5" × 7" storage envelope to the back of the folder for the activity cards and marker.

Answer Key

US units of measurement—yard; ounce and pound; cup, quart, gallon; Fahrenheit

SI units of measurement—meter; kilogram; liter; Kelvin scale

SI examples—kilometer, nanogram, milliliter, kiloliter, 373K, 273K

SI statement—International System of Units, compare goods and exchange information easily

Journal—Accept all reasonable responses.

Measurement wheel—Kelvin scale–thermometer, temperature, degrees, Liters–liquid, graduated cylinder, volume; Meters–ruler, meterstick, length; Kilogram–mass, spring scale, triple-beam balance

Appropriate units—Kelvin-temperature of water, boiling point; Kilograms–weight of human baby, mass of a car, salt in a box; Liters–content of milk carton, volume of a rock, liquid medicine; Meters–dime, football field

Journal—Accept all reasonable responses.

Wrap-Up Assessment

Volume, liter, graduated cylinder; length, meters, meterstick; mass, grams, triple-beam balance

Additional Activities

Activity	Basic	Challenge
Give students a short list of items to be measured for practice of accuracy.	X	
Students make cards labeled *Length, Volume*, and *Mass*. Call out units of measurement such as millimeter, kilogram, and liter, asking students to hold up measurement cards in reply.	X	X
Construct a measurement comparison chart enabling students to make connections between SI measurements and familiar everyday comparisons. Using all four SI units and common US measurements, ask students to measure items, estimate the measurement in the alternate units, and then check their own responses.		X

Periodic Table

Objectives

- Differentiate between atomic mass and atomic number.
- Recognize the arrangement of atoms in an element and the element's position on the periodic table.
- Become familiar with element symbols.

Vocabulary

atomic mass—average mass of an atom of that element
atomic number—number of protons in an atom's nucleus
element—substance with atoms that all are alike
group—vertical column in the periodic table; elements share same number of electrons in their outer energy levels
period—horizontal row in the periodic table; elements share the same number of energy levels
periodic table—organized list of all known elements arranged by increasing atomic number and by changes in chemical and physical properties

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 the activity cards and marker.

Answer Key

Element block—atomic number, atomic mass, element name, state of matter at room temperature, element symbol
Element categories—blue–metal, green-metalloid, yellow–nonmetal
Journal—Accept all reasonable responses. Without a proton, the element becomes a completely different element. If it loses or gains an electron, it becomes an ion.
Elements—Helium–2, 4.003, 2; Boron–5, 10.811, 6; Aluminum–13, 26.982, 14; Radon–86, 222, 136; Neon–10, 20.180, 10; Magnesium–12, 24.305, 12; Arsenic–33, 74.922, 42; Bromine–35, 79.904, 45
Periodic table—Hydrogen, Helium, Lithium, Beryllium, Boron, Nitrogen, Magnesium, Argon, Potassium, Gallium Arsenic
Outermost energy level—Hydrogen–1, Lithium–1, Sodium–1, Potassium–1; Rubidium–1, Cesium–1, Franclium–1
Journal—Group 1–1, Group 2–2, Group 13–3, Group 15–5, Group 18–8
Journal—Accept all reasonable responses. The elements are placed according to how many electrons are in the outermost energy level; increasing from left to right.

Wrap-Up Assessment

Potassium, neon, radon, nitrogen, bromine, lead, iodine, chlorine, tin, arsenic, carbon, calcium, oxygen; Periodic Table

Additional Activities

Activity	Basic	Challenge
Provide students with colored pencils, crayons, markers, and a periodic table void of color. Ask students to color and label metal, nonmetal, and metalloid sections.	X	
Provide students with bingo-type cards with element symbols, names, or atomic numbers. Be sure to make periodic tables available for reference to practice reading the table.	X	X
Make a large label with several different elements and their group numbers from each of the eight groups. Fasten them to the front of students' shirts and ask them to "pair up" with an element in another group to make a full outermost energy level.		X

Principles of Gases and Liquids

Objectives

- Analyze Archimedes' principle, Bernoulli's principle, and Pascal's principle.
- Compare and contrast Archimedes' principle, Bernoulli's principle, and Pascal's principle.

Vocabulary

Archimedes' principle—buoyant force on an object is equal to the weight of the fluid it displaces

Bernoulli's principle—as the speed of a fluid increases, the pressure applied by the fluid decreases

buoyant force—an upward force that is exerted by a fluid on any object in the fluid

density—the mass per unit volume of an object or fluid

fluid—any substance that has no definite shape and has the ability to flow; liquid or gas

Pascal's principle—as a force is applied to a fluid in a closed container, the pressure in the fluid increases everywhere by the same amount

pressure—amount of force exerted per unit area

Construction

1. Cut manipulatives from the activity card page.

2. Copy principle pockets onto a sheet of acetate. Tape pockets in place for sorting activity.

3. Provide a dry-erase marker for student responses.

4. Attach a 5" × 7" storage envelope to the back of the folder for the activity cards and marker.

Answer Key

Principle definitions—Archimedes–buoyant force on an object equals…; Bernoulli–pressure applied to a fluid increases…; Pascal–the speed of fluid increases…

Key terms—Check for accuracy of key terms.

Principle examples—Archimedes–foil sinking, marble sinking; Pascal–squeezing water bottle, inflated balloon; Bernoulli–smoke from chimney, windows blown out

Principle Pockets	Archimedes' Principle	Bernoulli's Principle	Pascal's Principle
Principle pictures	• Floating foil • Person floating	• Blowing can • Chimney smoke	• Car brake system • Inflated balloon
Principle definition	Fluid exerts upward buoyant force on an object.	When speed of a fluid increases, pressure exerted by fluid decreases.	When a force is applied a confined fluid, pressure is transmitted equally.
Principle characteristics	Object will float in a fluid more dense than itself.	Moving fluid causes the pressure to decrease.	Pressure of a fluid changes equally.

Journal—Accept all reasonable responses. Students might conclude that the key terms are important descriptive terms related to the definitions.

Wrap-Up Assessment

Buoyant, equals, displaces; speed, increase, decrease; pressure, increases, everywhere

Additional Activities

Activity	Basic	Challenge
Provide students with a beaker of water, small objects of varying density, paper, and a balloon. Ask students to demonstrate each of the principles of fluids with the objects given.	X	
Provide cans of a variety of regular soda and diet soda. Ask students to predict how each can will respond when placed in a clear container of water (an aquarium works well). Ask students to brainstorm the expected results.	X	X
Ask students to extend the soda can activity above. Students can do further testing with other sodas, other fluids, or design a survey of fellow students' predictions. Students can do class demonstrations or presentations to share their results.	X	X

States of Matter

Objectives

- Recognize that matter is made of particles in constant motion.
- Associate three states of matter with the arrangement of particles within them.
- Relate changes in thermal energy to changes in state.
- Differentiate between physical and chemical properties of matter.

Vocabulary

condensation—the change matter makes from a gas to a liquid

evaporation—the change matter makes from a liquid to a gas

freezing—the change matter makes from a liquid to a solid

gas—matter with no definite volume or shape

liquid—matter with a definite volume but no definite shape

melting—the change matter makes from a solid to a liquid

solid—matter with a definite volume and shape

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 the activity cards and marker.

Answer Key

State of Matter	Shape	Movement	Volume	Molecular Attractions
Solid	Does not take on shape of container	Particles are tightly held together	Definite volume and shape	Attraction between molecules is strong.
Liquid	Takes on shape of container	Particles move more freely	Definite volume, no definite shape	Some attraction between molecules
Gas	Fills a container	Particles move at high speed	No definite volume or shape	Attractions between molecules is weak.

Chemical and physical properties—Chemical–ability to rust, flammability; Physical–color, shape, length, state of matter

Journal—Accept all reasonable responses.

Changes in state—liquid to gas, add energy, increases particle movement; liquid to solid, remove energy, decreases particle movement; solid to liquid, add energy, increases particle movement

Wrap-Up Assessment

motion, solid, liquid, gas, move freely, slide past, vibrate tightly, changes, temperature change, state change

Additional Activities

Activity	Basic	Challenge
Ask students to produce two-sided response cards with the words *Freeze, Melt, Condensation,* and *Evaporation.* Show picture flashcards of state changes for review. As students reveal response cards, scan class for any misconceptions.	X	
Describe classroom objects by their chemical and physical characteristics. Students might classify whether the characteristic is physical or chemical.	X	X
Have students create a short scenario that includes substances demonstrating many changes of state. Students can design a simple comic book, skit, story board, or game to demonstrate their new knowledge.		X

ActiveFolders for Differentiated Instruction

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 Chain/Food Web/Energy Pyramid
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

- Meaningful work aimed at science content topics
- Challenge students at individual ability levels
- Increase self-confidence through participation
- Practice and mastery of state-mandated objectives
- Opportunities for regular education students to work with students with special needs
- Academic and social gains for students with special needs

Advantages for Teachers

- Variety in content presentation and assessment
- Modification of curriculum for special populations
- Increases student involvement
- Addresses textbook/state-mandated objectives
- Directly correlates objectives with relevant reinforcement activities
- Provides critical-thinking opportunities for special-needs students through on-grade level curriculum

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