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
Table of Contents

Active Folders for Differentiated Instruction

Overview of Active Folders for Differentiated Instruction .......... iv
Using Active Folders in Your Classroom ........................... vi
Active Folders Purpose ................................................... viii
Advantages of Active Folders in the Differentiated Classroom .... ix
The Need for Change ....................................................... x
Helpful Hints for Your Differentiated Classroom .................... xi
Bibliography ...................................................................... xii
Materials List ...................................................................... xiii
Teacher Pages for Individual Active Folders ......................... 1
  • Electricity ................................................................. 2
  • Energy ................................................................. 3
  • Law of Conservation of Energy ................................. 4
  • Magnetism ............................................................ 5
  • Newton's 1st Law of Motion and Forces .................. 6
  • Newton's 2nd Law of Motion .................................. 7
  • Newton's 3rd Law of Motion .................................. 8
  • Temperature and Thermal Energy ......................... 9
  • Waves ............................................................... 10
  • Work and Simple Machines .................................. 11
Overview of ActiveFolders for Differentiated Instruction

Hands-on activities that reinforce essential science concepts

Lunar and Solar Eclipses

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.

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

Multilevel directions reach diverse student population.

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.

Envelope space provides handy manipulative storage.

Wrap-up activities and graphic organizers provide student-friendly visual representation of content knowledge.
**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>• Pairs or groups take turns completing an activity and checking each other for accuracy and understanding.</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>
</tr>
<tr>
<td>• Student can respond verbally to better explain his or her response, ask questions, and clarify his or her knowledge.</td>
<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>
</tr>
<tr>
<td>Active Folders Teacher Guide vii</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Student/Teacher Work Together</strong></td>
<td><strong>Pairs or Small Groups</strong></td>
<td><strong>Independent Student</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Review</strong></td>
<td>• Student works through the folder, responding in writing or verbally explaining his or her answer choices to the teacher.</td>
<td>• Students can take turns working through activities on the folder, challenging each other for understanding and clear explanations of concepts presented.</td>
<td>• Students work independently at their own pace.</td>
</tr>
<tr>
<td></td>
<td>• Teacher can do the activity and ask the student to explain the approach used to complete the task.</td>
<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></td>
</tr>
<tr>
<td></td>
<td><strong>Assessment</strong></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>• Independent students can work through the folder as an assessment.</td>
</tr>
<tr>
<td></td>
<td>• Student talks with the teacher about each activity, demonstrating his or her knowledge through the manipulation of the activity.</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>• Student can match vocabulary words to the correct definitions using the teacher-made vocabulary cards in a one-to-one correspondence.</td>
</tr>
</tbody>
</table>
**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 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, 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 administering 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 as 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.
Bibliography


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
Electricity

Objectives
• Distinguish between electric conductors and insulators.
• Differentiate between series and parallel circuits.

Vocabulary
- **circuit**—electric charges will flow continuously only through a closed conducting loop
- **conductors**—materials through which it is easy to transfer heat; electrons are able to move easily
- **electric current**—flow of electric charge
- **insulators**—materials that trap heat; electrons are held tightly by atoms
- **static charge**—imbalance of electric charge

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
- **Plug diagram**—insulator, conductor
- **Insulator/Conductor**—insulator, conductor
- **Insulators**—plastic, glass, wood, rubber; **Conductors**—copper, gold, water, aluminum
- **Journal**—The insulator protects against electrical shock.
- **Circuits activity**—one, series; Removing one light bulb would disrupt the flow of electricity.
  two, parallel; Removing one light bulb would cause the bulb to burn less brightly. There is more than one electrical path.
- **Journal**—In a series circuit, the failure of one appliance would cause all other appliances and lights to fail.

Graphic Organizer Assessment
- insulator, plastic; parallel circuits, more than one path; series circuits, one path; conductor, copper

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allow students to look around the classroom to find materials that could be used as conductors and insulators.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Have students design a mini-poster using a T-chart for electrical dangers and safety procedures. Students can either write or illustrate their findings.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Have students model ways to create series and parallel circuits.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Energy

Objectives
- Distinguish between kinetic and potential energy.
- Identify various forms of energy.
- Compare renewable and nonrenewable resources.

Vocabulary
- energy—the ability to cause change
- fossil fuel—oil, coal, and natural gas made from ancient microscopic organisms
- geothermal energy—energy generated from deep inside Earth
- hydroelectric energy—potential water energy trapped behind human-made dams
- nuclear energy—energy released when the nucleus of an atom breaks apart
- nonrenewable resource—energy resource that is used up much faster than it can be replaced
- renewable resource—energy resource that is replenished continually
- solar energy—energy captured from the Sun
- wind energy—moving air caught by windmills where kinetic energy is converted to electrical energy

Construction
1. Cut manipulatives and the Energy wheel from the activity card page.
2. Use a hobby knife to cut out the two small circles on the energy wheel.
3. Cut slit marks on both the Energy wheel and the base of the energy wheel on the folder.
4. Insert a brad fastener through both wheels and attach firmly.
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
- Source—the Sun, heat in Earth, wind moving water, microscopic organisms, uranium
- Stored—solar panels, pockets in Earth’s crust, windmills and turbines, dams and water, fossil fuel, nuclear plant
- Renewable/Nonrenewable—R, R, R, R, N, N
- Journal—Accept all reasonable responses. Check for valid support for student choices.
- Journal—Accept all reasonable responses and logical reasoning.
- Causes pollution—nuclear, fossil fuels; Pollution-free—geothermal, wind, hydroelectric, solar
- Renewable—solar, geothermal, wind, hydroelectric; Nonrenewable—fossil fuel, nuclear
- Energy Wheel—self-check

Graphic Organizer Assessment
renewable resource; geothermal, solar, hydroelectric, and wind energy; an advantage is little, or no pollution; nonrenewable resource; fossil fuels and nuclear energy, a disadvantage is pollution.

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make a poster highlighting the ways to conserve energy, such as turning off lights when leaving the room.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Generate an Energy Survey to assess energy usage among classmates. A possible question might include: I use electrical energy … Answer choices might include: 1-4 hours a day, 4-8 hours, 8-16 hours, 16-24 hours.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Students graph the results from the Energy Survey above.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Law of Conservation of Energy

Objectives
• Define the law of conservation of energy.
• Identify how energy changes forms.
• Apply energy transformations to the law of conservation of energy.

Vocabulary
energy—the ability to cause change
law of conservation of energy—energy cannot be created nor destroyed, but can only be transformed from one form into another
kinetic energy—energy an object has due to its motion
potential energy—stored energy an object has due to its position

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
Mountain biking—P, K, P, K; potential, chemical, mechanical, potential, and kinetic
Energy transformations—Accept all reasonable responses.
Forms of energy—Chemical—fireworks, Electrical—computer, Heat—fire, Light—lightbulb, Mechanical—Ferris wheel, Nuclear—power plant, Sound—musical instrument
Journal—Accept all reasonable responses.

Graphic Organizer Assessment
destroyed, forms, chemical, heat, nuclear, sound, kinetic or potential

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use a yo-yo to demonstrate the continual exchange of kinetic and potential energy.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Have students create energy transformation flash cards through group brainstorming suggestions.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Have students write a brief scenario with a chain of energy transformations to demonstrate their knowledge of the law of conservation of energy.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Magnetism

Objectives

- Examine behavior of magnets.
- Relate behavior of magnets to magnetic fields.
- Explore how some objects become temporary magnets.

Vocabulary

- alternating current — electric current that changes its directions repeatedly
- electromagnet — a current-carrying wire wrapped around an iron core
- direct current — electrons flow in one direction
- magnet — an object with the ability to attract objects made of metal and to repel other magnets

Construction

1. Make a collection of small objects for student use. Suggestions for items to be placed in the storage envelope for student use: small magnets, paper clips, pencil, rubber band, penny, nickel, brad fastener, AA battery, key ring, ring binder, nuts and bolts, washer, nail, eraser, and coins.
2. Provide a dry-erase marker for student responses.
3. Attach a 5" × 7" storage envelope to the back of the folder for small object collection and marker.

Answer Key

Magnetic — brad fastener, AA battery, key ring, ring-binder, nuts and bolts, washer, nail, paper clips
Non-magnetic — pencil, rubber band, eraser, plastic, some metal, coins

Journal — Accept all reasonable responses. Answers may include ideas about electrons lining up in a magnetic field.

Journal — Accept all reasonable responses.

Journal — As electrons align, objects temporarily retain magnetic behaviors.

Magnetic Fields — N, S, S, N, repulsion; N, S, N, S, attraction; Illustrations should show iron filings pushing away from the center of the magnet.

Graphic Organizer Assessment

having the property of attracting iron and providing a magnetic field; south pole, magnetic field, unlike poles attract, examples will vary; Accept all reasonable responses.

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>With a magnet, allow students to go on an exploration walk, making a list of magnetic/nonmagnetic objects.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Allow students to further explore temporary magnets. Assist students in rubbing a magnet across a nail. Have students predict if the nail will then act as a magnet.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Have students brainstorm ways that magnets are used in their everyday lives.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Newton’s 1st Law of Motion and Forces

Objectives
- Define Newton’s first law of motion.
- Identify balanced and unbalanced forces.
- Distinguish between and label three different types of friction.

Vocabulary

**balanced forces**—two or more forces with effects that cancel each other out and do not change the motion of the object

**friction**—force that acts to oppose sliding between two surfaces that are touching

**force**—a push or pull

**net force**—the combination of all the forces acting on an object

**rolling friction**—friction that occurs between the ground and the part of a wheel or tire touching the ground

**sliding friction**—friction between an object and the floor

**static friction**—type of friction that prevents an object from moving when a force is applied

**unbalanced forces**—two or more forces acting on an object that do not cancel each other and cause the object to accelerate

Construction

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

Answer Key

**Balanced forces**—stationary yo-yo, pushing the wagon together, pulling the rope away from each other; **Unbalanced forces**—yo-yo going up, boy pulling rope to the left, two students pushing wagon

Journal—An object will remain at rest or in motion at the same speed and direction unless acted upon by an unbalanced force.

Journal—Accept all reasonable responses.

Journal—Accept all reasonable cartoons with accurate representations of Newton’s 1st law.

**Rolling friction**—bike, skateboard, wheelchairs, ball; **Sliding friction**—surfing, playing the violin, sliding, snowboarding; **Static friction**—catching a ball, running on track, dog sleeping, rock climbing

Journal—Accept all reasonable responses.

Graphic Organizer Assessment

rest, rest, motion, motion, unbalanced force, push, pull.

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Think-Pair-Share everyday examples of Newton’s 1st Law of motion.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Experience Newton’s 1st law by taking a jump forward. Observe how the body continues to move forward after feet are firmly planted on the floor. Discuss observations you can make about inertia from this activity.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Ask pairs of students to design a scenario for each of the three types of friction.</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Newton's 2nd Law of Motion

Objectives
- Define Newton's second law of motion.
- Discuss the importance of direction of force.
- Identify different forces at work.

Vocabulary
- air resistance—force that opposes objects that move through the air
- centripetal force—acceleration toward the center of a circular path
- friction—force that opposes the movement between two objects
- gravity—the attractive or pulling force between two objects
- mass—a measure of the amount of matter an object contains
- Newton's second law of motion—an object acted upon by an unbalanced force will accelerate in the direction of the force
- Weight—the measure of the pull of gravity on an object

Construction
1. Provide a dry-erase marker for student responses.
2. Attach a 5" × 7" storage envelope to the back of the folder for the marker.

Answer Key

Definition—unbalanced, direction, acceleration, mass

Bumper cars—The first blue car will push the orange car, causing the orange car to increase its speed. The blue will bounce back slightly. The second set of cars will hit and bounce back in the opposite directions from which they came. The third set of cars will transfer the force from the moving car to the stationary car, causing the moving orange car to stop and the second car to move in the same direction as the orange car was originally moving.

Mass and Acceleration—yellow; The more mass an object has, the slower the acceleration.

Journal—Students should show force arrows on all four cars with equal force from each green car, a greater acceleration shown for the purple car, and a smaller acceleration for the yellow car due to the greater mass of the yellow car.

Theme park ride—Accept all reasonable responses. The net force arrows should demonstrate the centripetal force on the riders causing them to move out and away from the center of the ride.

Centripetal force.

Wrap-Up Assessment
Accept all reasonable responses.

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allow students to make two paper airplanes with two different masses. Lead students to relate the increase in mass to less acceleration in the direction of force.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Ask students to create simple demonstrations of frictional forces, gravitational forces, centripetal forces, and air resistance in action. Students might predict how a change in mass would alter the outcome.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Encourage students to identify forces in the above forces demonstrations, justifying their answers.</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

ActiveFolders Teacher Guide 7
Newton's 3rd Law of Motion

Objectives

• Define Newton's third law of motion.
• Identify action and reaction forces.

Vocabulary

Newton's third law of motion—for every action there, is an equal and opposite reaction force
action force—force exerted on the first object of a force pair
reaction force—force exerted on the second object of a force pair

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

Working definition—action, reaction, Forces, equal, opposite
Vertical arrows—rocket launch, jumping rope, bouncing ball, geyser erupting
Horizontal arrows—moving car, pulling sled, catching soccer ball, golfing
Puzzle activity—puzzle completed, student is able to verbally explain the relationships between all concepts
Predictions—soccer ball, white shirt, pins, water, rocket, ground
Statements—equal force, ball, soccer player; equal force, less; equal force, pins, pins; equal force, less; equal force, greater

Graphic Organizer Assessment

action, equal, opposite, reaction; examples—Accept all reasonable responses.

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask a student to lean against a wall. Have students relate this action to Newton’s third law and identify the action and reaction forces.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Ask students to explain how seat belts relate to Newton’s third law during a car crash.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Ask pairs of students to design a story situation in which characters demonstrate Newton’s third law. Illustrations with “talking boxes” or “thought bubbles” will add to student understanding.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Temperature and Thermal Energy

Objectives
• Discuss thermal energy.
• Compare and contrast the three types of energy transfer.
• Relate temperature to kinetic energy.

Vocabulary
conduction—transfer of heat energy by collisions between the atoms in a material
convection—transfer of heat energy that occurs when particles move between objects or areas of different temperature
heat—transfer of thermal energy from a warmer material to a cooler material
radiation—transfer of heat energy by waves
temperature—measure of the kinetic energy of the atoms of an object
thermal energy—the sum of the kinetic and potential energy of all the molecules in an object

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
Temperature arrows—cold, cool, warm, hot
Particle movement—fastest-moving, red particles; slow-moving, green-blue particles; quickly moving, orange particles; slowest-moving, blue particles
Journal—Energy comes from the environment, a fire, stove, or appliance. Molecule movement would increase as kinetic energy increased. Accept all reasonable responses relevant to conduction, convection, and radiation.

Heat transfer—conduction, convection, radiation
Conduction—cold drink–hand, cold pack–arm, burner–pan of water
Convection—fireplace–air, hot charcoal–meat, oven–baker
Radiation—microwaves–food, the Sun’s radiation–skin, light–air
Campfire—Radiation from fire; convection as warm air wind blows the hair; conduction as hot metal fork touches hand

Wrap-Up Assessment
Objects, particles, potential energy, kinetic energy, thermal energy

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distinguish between conduction, radiation, and convection using teacher-made flash cards.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Provide cold, cool, warm, and hot liquids in clear beakers. Measure the temperature, and predict the particle movement for each of the different liquids through student-generated illustrations.</td>
<td></td>
<td>X X</td>
</tr>
<tr>
<td>Using pictures found in magazines, have students make a collage or flash cards of examples of conduction, radiation, and convection.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Waves

Objectives
• Identify properties of waves.
• Make a distinction between transverse waves and compressional waves.

Vocabulary
amplitude—distance between the crest or trough of a transverse wave and the rest position of the medium
compressional wave—type of mechanical wave in which the wave energy causes the matter to move forward and backward along the direction the wave travels
diffraction—bending of waves around a barrier
frequency—the number of wavelengths that pass a fixed point each second; expressed in Hertz (Hz)
mechanical wave—waves that use matter to transfer energy
rarefaction—the least dense regions of a compressional wave
transverse wave—a type of mechanical wave in which the wave energy causes the matter to move at right angles to the direction of the wave
wave—rhythmic disturbances that carry energy without carrying matter

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

Answer Key
Wave characteristics—transverse wave—crest, trough; wavelength, amplitude; compressional wave—rarefaction, compression
Journal—Transverse waves move up and down or back and forth. Compressional waves move forward and backward.
Journal—Sound waves are compressional waves. The amplitude and wavelength act on the eardrum to move it forward and backward.
Frequency—Frequency, increases, decreases; compressional wave, compressional wave
Wave behavior—reflection, refraction, diffraction

Graphic Organizer Assessment
Properties—frequency, wavelength; behaviors—diffraction, reflection, refraction; transverse waves—crests and troughs, compressional waves—compressions and rarefactions

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have each student make picture flash cards of transverse and compressional waves with labels. Ask questions about wave characteristics and behaviors. Students respond with appropriate wave card.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Have one student stand outside a door and tap a mystery object. Predict how wavelength and/or frequency changes with different voices and objects.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Using objects placed on different surfaces, ask students to make predictions about the sounds the objects will make when the surface is tapped. Ask students to predict how the sound would change with different size objects or surfaces.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

10 ActiveFolders Teacher Guide
Work and Simple Machines

Objectives
- Recognize when work is done.
- Identify how a machine makes work easier.
- Distinguish among the different simple machines.

Vocabulary
inclined plane—a sloping surface that reduces the amount of force required to do work
simple machine—a machine that does work with only one movement
lever—a bar that is free to pivot or turn around a fixed point
pulley—a grooved wheel with a rope, chain, or cable running along the groove
screw—an inclined plane wrapped in a spiral around a cylindrical post
wedge—an inclined plane with one or two sloping sides
wheel and axle—a shaft or axle attached to the center of a larger wheel
work—done when a force causes an object to move

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
Work definition—Work, No Work
Work—mowing the lawn, throwing a football, picking up books, skating
No work—carrying groceries, riding a bicycle, holding a pumpkin, playing volleyball
Journal—Answers will vary, but should include examples of objects moving in the direction of the force as work being done.
Simple Machines—pulley, wedge
Description—two cylindrical objects of different size that rotate together; inclined plane that is wrapped around a cylinder or post
Makes easier by—increasing input force or distance; increasing the distance
Examples—pulley to lift a heavy object, wheelbarrow, bicycle, ice skates, ramp, screw-on lid
Journal—Accept all student responses using at least four simple machines.

Graphic Organizer Assessment
Work, simple machines, pulley, screw, inclined plane, lever, wheel and axle, wedge

Additional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Basic</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use paper, brads, string, glue, and scissors to build examples of simple machines.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Brainstorm common objects that demonstrate simple machines. Have students sort objects listed according to the type of simple machine.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Discuss examples of simple tasks as presented by Rube Goldberg machines. Choose a simple task for students to create their own examples of a Rube Goldberg design using at least four different machines.</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
### 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

### Active Folders for Differentiated Instruction

<table>
<thead>
<tr>
<th>Chemistry 0-07-874106-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acids and Bases</td>
</tr>
<tr>
<td>Chemical and Physical Changes</td>
</tr>
<tr>
<td>Chemical Bonds</td>
</tr>
<tr>
<td>Chemical Reactions</td>
</tr>
<tr>
<td>Elements, Compounds, and Mixtures</td>
</tr>
<tr>
<td>Matter</td>
</tr>
<tr>
<td>Measurement</td>
</tr>
<tr>
<td>Periodic Table of Elements</td>
</tr>
<tr>
<td>Principles of Gases and Liquids</td>
</tr>
<tr>
<td>States of Matter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Earth Science 0-07-874107-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthquakes</td>
</tr>
<tr>
<td>Erosion</td>
</tr>
<tr>
<td>Lunar and Solar Eclipses</td>
</tr>
<tr>
<td>Our Solar System</td>
</tr>
<tr>
<td>Phases of the Moon and Seasons</td>
</tr>
<tr>
<td>Plate Tectonics</td>
</tr>
<tr>
<td>Rock Cycle</td>
</tr>
<tr>
<td>Volcanoes</td>
</tr>
<tr>
<td>Weather</td>
</tr>
<tr>
<td>Weathering</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Life Science 0-07-874108-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptations</td>
</tr>
<tr>
<td>Cell Processes</td>
</tr>
<tr>
<td>Cell Structure</td>
</tr>
<tr>
<td>Classification</td>
</tr>
<tr>
<td>Ecology</td>
</tr>
<tr>
<td>Food Chain/Food Web/Energy Pyramid</td>
</tr>
<tr>
<td>Heredity and Genetics</td>
</tr>
<tr>
<td>Human Body Systems</td>
</tr>
<tr>
<td>Mitosis and Meiosis</td>
</tr>
<tr>
<td>Plants</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physics 0-07-874109-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
</tr>
<tr>
<td>Energy</td>
</tr>
<tr>
<td>Law of Conservation of Energy</td>
</tr>
<tr>
<td>Magnetism</td>
</tr>
<tr>
<td>Newton's 1st Law of Motion and Forces</td>
</tr>
<tr>
<td>Newton's 2nd Law of Motion</td>
</tr>
<tr>
<td>Newton's 3rd Law of Motion</td>
</tr>
<tr>
<td>Temperature and Thermal Energy</td>
</tr>
<tr>
<td>Waves</td>
</tr>
<tr>
<td>Work and Simple Machines</td>
</tr>
</tbody>
</table>

---

**Glencoe**