

Unit 3—Simple Machines (DSM III Force and Motion)

Essential Question: How do simple machines affect the change in force applied and resulting motion to make work easier?

Major Understandings**Key Idea 4:**

Energy exists in many forms, and when these forms change energy is conserved.

4.1a Energy exists in various forms: heat, electric, sound, chemical, mechanical, light.

4.1b Energy can be transferred from one place to another.

Key Idea 5:

Energy and matter interact through forces that result in changes in motion.

Describe the effects of common forces (pushes and pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces.

5.1a The position of an object can be described by locating it relative to another object or the background (e.g., on top of, next to, over, under, etc.).

5.1b The position or direction of motion of an object can be changed by pushing or pulling.

5.1c The force of gravity pulls objects toward the center of Earth.

5.1d The amount of change in the motion of an object is affected by friction.

5.1f Mechanical energy may cause change in motion through the application of force and through the use of simple machines such as pulleys, levers, and inclined planes.

Grade 3

WEEK 1	<p>Lesson 1 (45 min) Objective(s): Compare with Summative Test at the end of the grading period.</p>		
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – From the T.G. Copymasters Section, duplicate copies for Unit Test, Assessment Section 1: Hands-On; Section 2: Visual Analysis; Section 3: Critical Thinking; and Unit Test. – <i>Push-Pull</i> Meters are required for Section 1. You may choose to not administer this Hands-On test part since students do not have experience with these devices. If you choose to administer this Section, the <i>Push-Pull Meters</i> will have to be constructed. – Allow 15-20 minutes additional time or an additional class period if you choose to administer Section 1 of the assessment. – For Lesson 2, you will need to obtain four full (unopened) soda cans and four empty soda cans. – Each team of two will need a dual-scale ruler, pair of scissors and a medium-size paperback in Lesson 2. 	<p style="text-align: center;">Investigation/Activity</p> <p>PRETESTS</p> <ul style="list-style-type: none"> – Unit test (Teacher Guide pages 119-123) – Section 1 (optional); Section 2; Section 3 (Parts A & B) and Unit Test (See Teacher Resources Tab, pages 135 and 136) Note: Duplication Masters are near the end of the Copymasters Section 	<p style="text-align: center;">Homework/Extra Practice</p> <p>Send Home Letter to Parents.</p>

Grade 3

WEEK 1 (continued)	<p>Lesson 2 (45 min) Objective(s):</p> <ul style="list-style-type: none"> • Observe the effect of pushing and pulling on objects • Make a “push-pull meter,” a device used to measure force • Use the push-pull meter to measure the amount of force it takes to move various objects 		
	<p>Advanced Planning/ Notes to Teacher</p> <ul style="list-style-type: none"> – T.G. page 13-14. – Cut string for each team of two and for demonstration. See <i>Preparation</i> numbers 2 and 3 on T.G., page 13. – You may wish to construct the push-pull meters for the students prior to the lesson. See <i>Preparation #5</i> on page 13 and <i>Guiding the Activity</i>, step 3, on page 17 in the Teacher Guide. – For Lesson 3, you will need to obtain, or have access to, a variety of surfaces to pull/push the objects used Lesson 2. Consider aluminum foil, wax paper, corrugated cardboard (top layer removed), concrete, carpet, sandpaper etc. 	<p>Investigation/Activity</p> <ul style="list-style-type: none"> – Activity 1: “Measuring Force” – Teacher Guide, pages 13-22 <p><i>Reflection:</i> One thing I will remember about today’s lesson is _____.</p>	<p>Homework/ Extra Practice</p> <p>Sit quietly somewhere in your home for 5 minutes. Make a list of all the sounds you heard.</p>
	<p>Lesson 3 (45 min) Objective(s):</p> <ul style="list-style-type: none"> • Observe the effect of pushing and pulling on objects over a variety of surfaces. • Use the push-pull meter to measure the amount of force it takes to move various objects over a variety of surfaces 		
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – T.G page 13-14 – Students will examine the effect of pushing/pulling the objects used in Lesson 2 over a variety of surfaces. Suggested surfaces might be aluminum foil, wax paper, corrugated cardboard (top layer removed), concrete, carpet, sandpaper etc. – Students will need to create a table on which to collect data. – Control the distance pulled on each surface. – The Investigative Question is: <i>Does the type of surface affect the amount of force needed to move an object?</i> 	<p>Investigation/Activity</p> <p>Activity 1, “Measuring Force” <i>Connections</i>” Science Extension, T.G. page 22.</p> <p><i>Reflection:</i> Next I would like to explore _____ because I wonder _____.</p>	<p>Homework/ Extra Practice</p> <p>Science at Home, T.G., p. 21.</p>

Grade 3

WEEK 1 (continued)	<p>Lesson 4 (45 min) Objective(s):</p> <ul style="list-style-type: none"> • Discuss the function of a table of contents, headings and glossary. • Interpret photographs and diagrams to answer questions. • Complete a KWL Chart. • Discuss homework assignment from T.G., page 21. 		
	<p>Advanced Planning/ Notes to Teacher</p> <ul style="list-style-type: none"> – Include in the lesson time to discuss the homework assignment made in lesson 3. – Delta Science Readers (DSR) will be used in this Lesson. – Create a KWL+ chart for discussion to build background knowledge. See T.G. page 128. This chart will be used in the DSR summary on T.G., page 134. – See suggestions for creating a word wall of the reader vocabulary on T.G., page 129. 	<p style="text-align: center;">Investigation/Activity</p> <ul style="list-style-type: none"> – Discuss <i>Homework</i> assignment from the previous lesson (T.G. pg. 21) – Delta Science Reader (DSR) <i>Preview the Reader</i>, Teacher Guide, pages 127-129 	<p style="text-align: center;">Homework/Extra Practice</p>

Grade 3

WEEK 2	Lesson 5 (45 min) Objective(s): <ul style="list-style-type: none"> Analyze the forces and motions involved in a game students play. Illustrate and label the actions in the game to include source of force and direction of motion. 		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> Science Notebooks can be used in this lesson. Delta Science Readers (DSR) will be used in this lesson. 	Investigation/Activity <ul style="list-style-type: none"> Activity 1, “Measuring Force” <i>Reinforcement</i>, T.G. page 21. Delta Science Reader (DSR) page 2, <i>What is Force?</i> Delta Science Reader tab, T.G. page 130. 	Homework/Extra Practice
	Lesson 6 (45 min) Objective(s): <ul style="list-style-type: none"> Discuss what it means to do work. Identify elements necessary for work to be accomplished. Compare the amount of work accomplished in moving objects a distance. Discuss ways in which machines help make work easier. 		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> T.G page 23 For Lesson 6, students will need to use one of their shoes per each team of two. Provide for each team of two: dual-scale ruler, pair of scissors and a medium-size paperback. Cut string for each team of two and for demonstration. See <i>Preparation</i> number 2 on T.G. page 23. For Lesson 7, prepare an area (e.g. bulletin board) for students to display the pictures they will bring in from the homework assignment. Create the title: “<i>Playing is Hard Work</i>” for the display. 	Investigation/Activity <p>Activity 2: “Work in Motion” Teacher Guide pages 13-22</p> <p><i>Reflection:</i> I’m still confused about _____.</p> <p>The reason I am confused is _____.</p> <p><i>or:</i></p> <p>The BIG IDEAS I gained from the Activity were: _____.</p>	Homework/Extra Practice <ul style="list-style-type: none"> Reinforcement T.G. page 28 Have students cut out pictures from newspaper or magazine articles of people engaged in recreational activities. www.FOSSweb.com <p>From the Home Page, select the following in order: K-2; Balance and Motion; Rollercoaster. This is an interactive game to build a rollercoaster.</p>

Grade 3

WEEK 2 (continued)	Lesson 7 (45 min) Objective(s): Calculate the amount of work a student does when he/she walks up a flight of stairs (15-17 steps).		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> – If possible, take students to an area in the school that has a flight of stairs. Students will need to measure the height of each step and count the number of steps. – Students may need calculators to multiply the height (in centimeters) of stairs by their weight in newtons. – To avoid embarrassment of students who are sensitive about their weight, create a scenario of 4 -6 students of varying weights and do the calculations as a class math problem. – Display pictures from the homework assignment on a bulletin board titled “<i>Playing is Hard Work.</i>” 	Investigation/Activity <ul style="list-style-type: none"> – <i>Science and Math Connection</i>, T.G., page 29. – Have students share and discuss the homework assignment from Lesson 6 and invite each to place his/her picture on the provided display. <p><i>Reflection:</i> At first I thought,</p> <p>_____</p> <p>but now I know</p> <p>_____</p>	Homework/ Extra Practice
	Lesson 8 (45 min) Objective(s): <ul style="list-style-type: none"> • Read about and distinguish between the concept of force and motion • Explain how energy is used to do work. • Summarize main ideas. • Identify antonyms within the context of a paragraph. 		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> – Delta Science Readers (DSR) will be used in this lesson. – Review DSR, page 2 “<i>What is a Force</i>” from Lesson 5 prior to reading DSR, page 3 in this lesson. – Obtain the Skillbuilder (4-page consumable student booklet) from Bin #1. There are 32 copies for the class. 	Investigation/Activity <ul style="list-style-type: none"> – Delta Science Reader (DSR) pages 2-3, <i>What is Motion?</i> and <i>Energy and Work</i> – Delta Science Reader tab, T.G., page 130 – <i>Skillbuilder</i> “Vocabulary” sheet page 4 on <i>Antonyms</i>. Follow the <i>Teacher Information/Sample Answers</i> guide that accompanies the Skillbuilders. 	Homework/ Extra Practice

Grade 3

WEEK 3	Lesson 9 (45 min) Objective(s): <ul style="list-style-type: none"> Identify a lever as a simple machine. Name the parts of a lever Use a lever to lift a load Discover how the position of the fulcrum affects the amount of force needed to lift the load Discuss the trade off between force and distance when using a lever to do work 		
	Advanced Planning/Notes to Teachers <ul style="list-style-type: none"> T.G., page 31. Replace any push-pull meter rubber bands that have lost some elasticity. Each team of two will need a 3cm long piece of masking tape. 	Investigation/Activity <ul style="list-style-type: none"> Activity 3: “Levers are for Lifting.” Teacher Guide, pages 31-39. <p><i>Reflection:</i> I was amazed/puzzled by _____.</p>	Homework/Extra Practice <ul style="list-style-type: none"> <i>Science at Home</i>, page 38. Students will need a pencil, ruler and 10 pennies to conduct this activity. Have students record their results.
	Lesson 10 (45 min) Objective(s): <ul style="list-style-type: none"> Name the parts of a lever Use a lever to lift a load Discover how the position of the fulcrum affects the amount of force needed to lift the load Discuss the trade off between force and distance when using a lever to do work 		
	Advanced Planning/Notes to Teachers <ul style="list-style-type: none"> Use this activity as a formative assessment opportunity. Have students write their response to the question in their Science Notebooks. Tell them to make a technical drawing to support their explanation. Students will need homework for class discussion. 	Investigation/Activity <ul style="list-style-type: none"> Activity 3: “Levers are for Lifting” <i>Reinforcement</i>. Teacher Guide page 38. Have students share their homework with classmates and discuss the results and conclusions. 	Homework/Extra Practice www.FOSSweb.com From the Home Page, select the following in order: 3-6; Levers and Pulleys; Websites; “Balancing Frogs.” This is an interactive game to balance frogs on a see saw according to weight and position on the board.

Grade 3

WEEK 3 (continued)

Lesson 11 (45 min)**Objective(s):**

- Conclude that simple machines have few or no moving parts and can increase and/or change the direction of force.
- Read about identify, and discuss the parts of a lever and the three types or classes of levers.

**Advanced Planning/
Notes to Teachers**

- Delta Science Readers (DSR) will be used in this lesson.
- Do the three parts of this lesson in this sequence: DSR Science Challenge, Concept Map.
- Duplicate the concept.

Investigation/Activity

- Delta Science Reader (DSR), “What are Simple Machines?” (page 5); and “Lever” (page 6).
- Delta Science Reader T.G., page 131 (teaching suggestions include left column only).
- Activity 3: “Connections” T.G., page 39, *Science Challenge*. Use the suggested directions to teach the three classes of levers.
- “Lever” Concept Definition Map located at the end of this document (NYC Pacing Calendar for Force and Motion).

Homework/Extra Practice**Lesson 12 (45 min)****Objective(s):**

- Observe the effects of friction on a moving object.
- Discover how lubrication reduces friction between an object and the surface over which it moves.
- Suggest additional ways to reduce friction between objects.

**Advanced Planning/
Notes to Teachers**

- *Preparation*, T.G., page 41.
- A mixture of soap and water will need to be prepared for this lesson.
- Obtain plenty of paper towels for this activity.
- Show students how to do a shoe sole imprint prior to assigning the *Science At Home* activity. Directions are in the description of the activity.

Investigation/Activity

- Activity 4: “Friction Stops Motion”
 - Teacher Guide pages 41-47
- Reflection:* I still wonder what would happen if
-

Homework/Extra Practice

Science at Home T.G., page 46.

Grade 3

WEEK 4	Lesson 13 (45 min) Objective(s): <ul style="list-style-type: none"> • Measure the force required to overcome friction of various surfaces. • Create a bar graph the results. 		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> – This activity is similar to Lesson 3, however in this investigation variables are controlled and data is collected. – Students will be creating a bar graph. Appropriate graph paper will be needed. – Obtain surface materials such as aluminum foil, sandpaper, terry toweling, waxed paper, and diluted detergent (used in Lesson 12). – For each team of four, use masking tape to mark starting and stopping points, 30.48 cm apart, on desk tops or floor. – Obtain pictures of pyramids and a world map for Lesson 14 (optional). 	Investigation/Activity <ul style="list-style-type: none"> – “Activity 4: “Connections,” <i>Science and Math</i>. – Teacher Guide page 47. – Students work in groups of four. <p>Homework Discussion: Invite students share the shoe sole prints they gathered from family member’s shoes. Discuss similarities and differences.</p>	Homework/ Extra Practice
	Lesson 14 (45 min) Objective(s): <ul style="list-style-type: none"> • Measure the amount of force it takes to drag a load. • Measure the amount of force it takes to roll a load on dowels. • Conclude that event he most primitive wheels reduce friction between an object and the surface over which it moves. 		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> – <i>Preparation</i>, T.G., page 49. – Cut one 1-m string for each team of four. – Obtain pictures of pyramids and a world map (optional). – An overhead projector is needed for this lesson. – Students will be measuring the force needed to pull bricks. This will not work on a carpeted floor. See page 51 for alternate suggestions. – For Lesson 15, obtain 4-6 marbles and a large jar top for each group of four students. 	Investigation/Activity <ul style="list-style-type: none"> – Activity 5: “Wheels Overcome Friction.” – Teacher Guide, pages 49-55. <p><i>Reflection:</i> When I started the investigation, I knew _____ and now I also have learned _____.</p>	Homework/ Extra Practice

Grade 3

WEEK 4 (continued)

Lesson 15 (45 min)**Objective(s):**

- Measure the amount of force it takes to drag a load.
- Measure the amount of force it takes to roll a load using spherical rollers.
- Conclude that spherical rollers allow movement in all directions and are more efficient than rollers.

**Advanced Planning/
Notes to Teachers**

- 4-6 marbles and a large jar top are needed for each group of four students.
- Same equipment from Lesson 14 will be used except dowels.

Investigation/Activity

- Delta Science Reader (DSR), page 15, *About Friction*.
- Delta Science Reader tab, T.G. page 133: begin with 5th bullet.
- “Activity 5: “Connections,” *Science Challenge* followed by *Science Extension*”. Teacher Guide, page 55.
- Students will work in groups of four. Begin activity by discussing the results in Lesson 14.

Reflection: The big ideas I gained from this experiment were:

_____.

Homework/Extra Practice**Lesson 16 (45 min)****Objective(s):**

- Identify the parts of a wheel and axle.
- Observe how force is transferred between the wheel and axle.
- Use a wheel and axle to lift a load.
- Investigate the tradeoff of force for distance when using a wheel and axle machine.

**Advanced Planning/
Notes to Teachers**

- *Preparation*, T.G. page 49.
- Cut a 1-meter length of string for each team of two.
- This activity begins with a demonstration of a door knob (wheel and axle) If your classroom does not have one, arrange to take students to a door that does.

Investigation/Activity

- Activity 6: “Wheel and Axle.”
Teacher Guide, pages 57-63.

Reflection: Next I would like to explore

_____.

because I wonder _____.

Homework/Extra Practice

Science At Home T.G., page 63.

Grade 3

WEEK 5	Lesson 17 (45 min) Objective(s): <ul style="list-style-type: none"> • Observe how gears transfer force. • Observe how force is transferred between the wheel and axle. 		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> – <i>Preparation</i> T.G., p. 65 – Practice putting the gear systems together prior to doing the activity with students. – Fit several gear bases together and add gears to see how a complex gear system works. 	Investigation/Activity <ul style="list-style-type: none"> – Activity 7: “Gears: Wheels with Teeth.” – Teacher Guide pages 65-71. – Invite students to share the riddles of the wheels and axels they found at home from their homework assignment given in Lesson 16. <p><i>Reflection:</i> Three main points I have learned today are: _____, _____ and _____.</p>	Homework/Extra Practice
	Lesson 18 (45 min) Objective(s): <ul style="list-style-type: none"> • Observe how gears transfer force. • Observe how force is transferred between the wheel and axle. 		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> – Obtain a machine with a two-gear system such as a rotary beater for the <i>Science and Math</i> activity. – The <i>Science and Math</i> Connection introduces students to ratio. 	Investigation/Activity <ul style="list-style-type: none"> – “Activity 7: “Reinforcement”, T.G., page 71, 2nd bullet. Use as an assessment opportunity. – “Activity 7: “Connections,” <i>Science and Math</i>, Teacher Guide, page 72. – Student website: http://www.howstuffworks.com/gears.htm 	Homework/Extra Practice <i>Science at Home</i> , page 71. (Optional – this activity requires access to a bicycle with gears.)

Grade 3

WEEK 5 (continued)	Lesson 19 (45 min) Objective(s): <ul style="list-style-type: none"> • Make a single, fixed pulley and use it to lift a load. • Observe that a fixed pulley reverses the direction of applied force. 		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> – Note: Activity 8 will be divided into <i>two Lessons</i>: Single, fixed pulley and single moveable pulley. – Lesson 19 is the study of the <i>single fixed pulley</i> only. – <i>Preparation</i>, T.G., p. 73 for Lessons 19 and 20. – Replace any over-stretched rubber bands prior to doing the activity. 	Investigation/Activity <ul style="list-style-type: none"> – Activity 8: “Pulleys: Groovy Wheels,” Teacher Guide, pages 75-78 (Steps 1-6). – Complete <i>Guiding the Activity</i> steps 1-6 in this session (7-10 will be completed in Lesson 20). 	Homework/Extra Practice
	Lesson 20 (45 min) Objective(s): <ul style="list-style-type: none"> • Make a single, movable pulley and use it to lift a load. • Observe that a movable pulley reduces the amount of force required to lift a load. 		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> – <i>Preparation</i> T.G., p. 73 for Lessons 19 and 20. – Lesson 20 is the study of the <i>single moveable pulley</i> only. – Begin the Lesson 20 by reviewing the single fixed pulley studied in Lesson 19. 	Investigation/Activity <ul style="list-style-type: none"> – Activity 8: “Pulleys: Groovy Wheels,” Teacher Guide pages 78-80, Steps 7-10 (1-6 were completed in Lesson 19). <p><i>Reflection:</i> When I started the investigation, I knew _____ and now I also have learned _____.</p>	Homework/Extra Practice www.FOSSweb.com Click on the following sequence: grades 3-6; Levers and Pulleys; “Build a Robe Goldberg Machine.” Follow the instructions for the interactive activity.

Grade 3

WEEK 6	Lesson 21 (45 min) Objective(s): <ul style="list-style-type: none"> • Build fixed and movable pulley systems without using pulley wheels. • Discover that the wheel inside a pulley system reduces friction that could cause the string/rope to break. • Read about how simple machines reduce work by reducing force or changing the direction of force. 		
	Advanced Planning/Notes to Teachers <ul style="list-style-type: none"> – The “Reinforcement” on T.G., p. 81, can be used as a formative assessment. – Groups of students will need string, dowel, tape, ring and load of washers from Lesson 20. – Delta Science Readers are needed for this lesson. – Prior to Lesson 22, obtain books to make a four-inch stack for each group of students. 	Investigation/Activity <ul style="list-style-type: none"> – “Activity 8: “Reinforcement”, T.G., page 81. Use as an assessment opportunity. – Delta Science Reader (DSR) pages 5-8, <i>What are simple Machines?; Lever and Wheel and Axle; Pulley.</i> – Delta Science Reader tab, T.G., pages 130-131; begin with 2nd bullet. 	Homework/Extra Practice
	Lesson 22 (45 min) Objective(s): <ul style="list-style-type: none"> • Measure the amount of force it takes to lift a load. • Measure the amount of force it takes to drag the same load up and inclined plane. • Discuss the tradeoff force for distance when using an inclined plane. 		
	Advanced Planning/Notes to Teachers <ul style="list-style-type: none"> – <i>Preparation</i> T.G., p. 83. – Add two more rubber bands to each of the push-pull meters to make them strong enough to lift bricks. – Cut one length of string 1 m for each team of four. – Each group of students will need books to make a four-inch stack in this Lesson. 	Investigation/Activity <ul style="list-style-type: none"> – Activity 9: “Inclined Planes.” – Teacher Guide, pages 83-89. <p><i>Reflection:</i> One thing I still have circling around is _____.</p>	Homework/Extra Practice

Grade 3

WEEK 6 (continued)	<p>Lesson 23 (45 min) Objective(s):</p> <ul style="list-style-type: none"> • Read about how inclined planes are used to reduce work. • Site examples of inclined planes in the everyday world. • Use a graphic organizer (Frayer Model) to explain what an incline plane is and is not. 		
	<p>Advanced Planning/Notes to Teachers</p> <ul style="list-style-type: none"> – Delta Science Readers are needed for this lesson. – Duplicate the Frayer Model Graphic Organizer <i>Inclined Plane</i> for each student located at the end of this document. 	<p>Investigation/Activity</p> <ul style="list-style-type: none"> – Delta Science Reader (DSR) page 9, <i>Inclined Plane</i>. – Delta Science Reader tab, T.G. pages 131-132; begin with 3rd bullet under pages 8 and 9. – “<i>Inclined Plane</i>” Frayer Model Graphic Organizer located at the end of this document (NYC Pacing Calendar for Force and Motion). 	<p>Homework/Extra Practice</p> <p><i>Science at Home</i>, T.G., p. 89.</p>
	<p>Lesson 24 (45 min) Objective(s):</p> <ul style="list-style-type: none"> • Write a sequence of instructions on how to move a large object using simple machines. • Discuss how simple machines reduce effort to move a large object. 		
	<p>Advanced Planning/Notes to Teachers</p> <ul style="list-style-type: none"> – Obtain the Skillbuilder (4-page consumable student booklet) from Bin #1. There are 32 copies for the class. – For Lesson 24, students will need paper for graphing and equipment for changing the angle of a ramp or the load used in Lesson 22. 	<p>Investigation/Activity</p> <ul style="list-style-type: none"> – Discuss <i>Science At Home</i> experiment results assigned in Lesson 22. – Obtain the DSR <i>Force and Motion</i> for each student. Review pages 6-9. Discuss the simple machines that might be used to move a heavy object. – <i>Skillbuilder</i> “Writing” sheet page 3 on <i>Instructions</i>. Follow the <i>Teacher Information/Sample Answers</i> guide that accompanies the Skillbuilders. 	<p>Homework/Extra Practice</p>

Grade 3

WEEK 7	Lesson 25 (45 min) Objective(s): <ul style="list-style-type: none"> • Measure the amount of force it takes to drag a load up and inclined plane. • Design an experiment to investigate other variables including height of the angle, or the weight of the load. • Create a bar graph to show the relationship of the variables (angle or mass of the load). 		
	Advanced Planning/Notes to Teachers <ul style="list-style-type: none"> – Obtain materials that can change the mass of the load (other than bricks) and the angle (height) of the ramp. – Students will need paper (e.g., graph paper) to create a bar graph to show how the variable they chose to investigate. – See T.G., p. 90. <i>Science and Math</i>, for suggestions for making the graph. – A rubber door stop is needed in Lesson 25. 	Investigation/Activity Activity 9, “Connections” Science Challenge and Science and Math , T.G., page 90.	Homework/Extra Practice
	Lesson 26 (45 min) Objective(s): <ul style="list-style-type: none"> • Observe how a wedge changes the direction of applied force. • Use a wedge to lift a load. • Discuss the tradeoff of force for distance when using a wedge. 		
	Advanced Planning/Notes to Teachers <ul style="list-style-type: none"> – <i>Preparation</i>, T.G., p. 91 – Cut a 1-m string for each team of two students. – Obtain two hardcover books for each pair of students. – Have a rubber door stop on hand. – Replace any push-pull meter rubber bands that have become over-stretched. – A copy of the Screw Pattern (in Copy-masters section) will need to be enlarged 110% and photo-copied) for Lesson 26. – Obtain a hammer and screwdriver for Lesson 26. 	Investigation/Activity <ul style="list-style-type: none"> – Activity 10: “Wedges.” – Teacher Guide, pages 91-98. – Discuss Reinforcement on T.G., page 98. <p><i>Reflection:</i> One thing I will remember about today’s lesson is _____.</p>	Homework/Extra Practice www.FOSSweb.com From the Home Page, select the following in order: 3-6; Levers and Pulleys; Websites; “Simple Machines from Ed Heads.” This is an interactive game where students find simple machines in various settings and are quizzed about how they work.

Grade 3

WEEK 7 (continued)

Lesson 27 (45 min)**Objective(s):**

- Discover that a screw is an inclined plane wrapped around a cylinder.
- Observe how screws change the direction of force.
- Compare the amount of force it takes to drive a nail and a screw into a piece of wood.
- Discuss the tradeoff force for distance when using a screw.

**Advanced Planning/
Notes to Teachers**

- *Preparation*, T.G., p. 101.
- You will need a hammer and screwdriver.
- Each student will need a pencil, fairly unused.
- Cut two 30-cm lengths of string for each student.
- One pair of safety goggles is recommended for this lesson.

Investigation/Activity

- Activity 11: “Screws.”
- Teacher Guide, pages 101-108.
- Discuss **Reinforcement** on T.G., page 108.

Reflection: The new learning I feel I really understand is _____.

Homework/Extra Practice**Lesson 28 (45 min)****Objective(s):**

- Read about the relationship between an inclined plane, wedge and a screw.
- Discuss the function of a screw.
- Infer that many common tools contain wedges.
- Conclude that a wedge changes the direction of a force.
- Apply the grammar skill of using *is* and *are*.

**Advanced Planning/
Notes to Teachers**

- Obtain the Skillbuilder (4-page consumable student booklet) from Bin #1. There are 32 copies for the class.
- Students will use DSR page 11 to complete the *Grammar Skillbuilder* activity.
- For Lesson 28, many household objects will be needed. See *Preparation*, T.G., p. 111 for suggested items. Invite students to bring in examples of the gadgets. Consider safety in transporting the objects.

Investigation/Activity

- Delta Science Reader (DSR) pages 10 and 11, *Inclined Plane and Screw*.
- Delta Science Reader tab, T.G., pages 132.
- *Skillbuilder* “Grammar” sheet page 2 on *Using Is and Are*. Follow the *Teacher Information/Sample Answers* guide that accompanies the Skillbuilders.

Homework/Extra Practice

Grade 3

WEEK 8	<p>Lesson 29 (45 min) Objective(s):</p> <ul style="list-style-type: none"> • Review the six types of simple machines. • Examine a variety of common objects and discuss the features that make them simple machines. • Describe how each item makes work easier. 		
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – It will take three consecutive class sessions to complete this Activity (Lessons 28, 29, and 30). – Many household objects are needed in this lesson. See <i>Preparation</i>, T.G., p. 111 for suggested items. These will be used in all three sessions. – Label each object with masking tape. – Students will complete Activity Sheet 12 Part A in this session. – Duplicate Copymaster <i>Word Work</i> (in Copymaster Section) for each student to take home for homework. 	<p>Investigation/Activity</p> <ul style="list-style-type: none"> – Activity 12: “Handy Dandy Simple Machines.” – Teacher Guide, pages 111-117. – Session I (T.G., pages 113-114). 	<p>Homework/Extra Practice</p> <p>Science at Home (T.G., p. 116) Word Work. See Copymaster section of the Teacher Guide.)</p>
	<p>Lesson 30 (45 min) Objective(s):</p> <ul style="list-style-type: none"> • Review the six types of simple machines. • Examine a variety of common objects and discuss the features that make them simple machines. • Describe how each item makes work easier. 		
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – This is the second session of three consecutive class sessions for this Activity (Lessons 28, 29, and 30). – Students will need Activity Sheet 12, Part A and will complete Part B in this session. – Students work in groups to write infomercials during Lesson 29. – Reserve an AV recorder for Lesson 30 if you wish to tape the performance of the infomercials students developed in this lesson. 	<p>Investigation/Activity</p> <ul style="list-style-type: none"> – Activity 12: “Handy Dandy Simple Machines.” – Teacher Guide, pages 111-117. – Session II (T.G., pages 114-115). 	<p>Homework/Extra Practice</p>

Grade 3

WEEK 8 (continued)	Lesson 31 (45 min) Objective(s): <ul style="list-style-type: none"> Review the six types of simple machines. Examine a variety of common objects and discuss the features that make them simple machines. Describe how each item makes work easier. 		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> This is the third session of three consecutive class sessions for this Activity (Lessons 28, 29, and 30). Students will need Activity Sheet 12, Part B. Students perform the infomercials planned in Lesson 29. Obtain an AV recorder if you wish to tape the performance of the infomercials students developed in Lesson 29. 	Investigation/Activity <ul style="list-style-type: none"> Activity 12: “Handy Dandy Simple Machines.” Teacher Guide pages 111-117. Session III (T.G., page 115). <p><i>Reflection:</i> One thing I will remember about today’s lesson is _____.</p>	Homework/Extra Practice
	Lesson 32 (45 min) Objective(s): <ul style="list-style-type: none"> Use a Venn diagram to compare and contrast an antique bicycle with a modern day bicycle. Read about historical changes in bicycle design in the 1800’s. 		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> Obtain the Skillbuilder (4-page consumable student booklet) from Bin #1. Students will use DSR pages 12 and 13 to complete the <i>Reading</i> activity on the Skillbuilder. Note this is the last Skillbuilder page students will be needing to complete. 	Investigation/Activity <ul style="list-style-type: none"> Delta Science Reader (DSR) pages 12 and 13, <i>Bicycle Inventors</i>. Delta Science Reader tab, T.G., pages 132-133. <i>Skillbuilder</i> “Reading” sheet page 1 on <i>Comparing and Contrasting</i>. Follow the <i>Teacher Information/Sample Answers</i> guide that accompanies the Skillbuilders. 	Homework/Extra Practice

Grade 3

WEEK 9	Lesson 33 (45 min) Objective(s): <ul style="list-style-type: none"> • Develop a bar graph to show the frequency of number of certain simple machines found in household gadgets. • Read about and draw inferences about how a waterwheel used waterpower to grind grain into flour. 		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> – Students will need graph paper to develop a bar graph comparing the number of times simple machines are used in household gadgets they studied in Lesson 28. – Students will need data from Activity Sheet 12, Part A for the <i>Math and Science</i> “Connections” activity. – Note: <i>About Friction</i> (p. 15) was read and discussed in Lesson 15. You may review this page in reference to friction that grounds the grain into flour. 	Investigation/Activity <ul style="list-style-type: none"> – Delta Science Reader (DSR) page 14, <i>How Waterwheels Work</i> (Bullets 1-4) – Delta Science Reader tab, T.G., page 133; – “Connections” <i>Science and Math</i>, T.G., page 117. 	Homework/Extra Practice www.FOSSweb.com From the FOSS Home Page, <u>select the following in order</u> : 3-6; Levers and Pulleys; Websites; <i>Simple Machines from Edheads</i> ; Edheads “Odd Machine;” <i>Start</i> : This is an interactive game where students learn how forces and simple machines can work together to create The Compound Machine!. It is similar to a Rube Goldberg design.
	Lesson 34 (45 min) Objective(s): <ul style="list-style-type: none"> • Complete the KWL Chart established at the introduction to DSR Force and Motion. • Review key vocabulary and science concepts related to force, motion and simple machines found in the Delta Science Readers. 		
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> – Students will need the Force and Motion Delta Science Reader to review concepts in the readers. – Obtain the KWL Chart that was introduced at the introduction of the Force and Motion Delta Science Reader. (See T.G., p. 128.) – The Module Assessments do contain content questions from the DSR. 	Investigation/Activity <ul style="list-style-type: none"> – Delta Science Reader (DSR). – Review for the Assessments. – Delta Science Reader tab, T.G., page 134. 	Homework/Extra Practice Students should be encouraged to study at home for their upcoming assessment in Lessons 34-36.

Grade 3

WEEK 9 (continued)	<p>Lesson 35 (45 min) Objective(s): Complete two of the three assessment sessions.</p>		
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – <i>Preparation</i>, T.G., pp. 119-120. – Assessment Sections 1, 2, and 3 take about 20 minutes each. You may wish to divide the students into three groups and rotate two subgroups through different sections of the test during the 45-minute period. This should leave one 20-minute assessment section for each during Lesson 35. (See T.G., p. 120, #4 and Assessment Procedure.) – Allow time for setting up before and cleaning up after students complete the <i>Hands-on</i> assessment. – Duplicate one copymaster for each student to use in each of the three sessions. 	<p>Investigation/Activity Assessment Sections 1-3, T.G., pages 119-123.</p>	<p>Homework/Extra Practice</p>
	<p>Lesson 36 (45 min) Objective(s):</p> <ul style="list-style-type: none"> • Complete one of the three assessment sessions. • Students share out some of their <i>Reflection</i> responses the documented in their science journals. 		
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – See Lesson 34 for directions. – This Lesson should take about 20 minutes. – Students will need their Science Journals. – During the remainder of the class period, invite students share some of the <i>Reflection</i> responses they documented in their science journals following every Activity. They may do this within their group of four or with the entire class. 	<p>Investigation/Activity</p> <ul style="list-style-type: none"> – Assessment Sections 1-3, T.G., pages 119-123. – Students share out some of their <i>Reflection</i> responses the documented in their science journals. 	<p>Homework/Extra Practice</p>

Grade 3

WEEK 9 (continued)	<p>Lesson 37 (45 min) Objective(s): Assess key vocabulary and science concepts related to force, motion and simple machines in the module from the activities and Delta Science Readers.</p>		
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Copymaster sheets for the Unit test are at the end of the Activity Copymaster sheets. – The answer key for the Unit test is on pages 135-136. – This section was given as a pre-test. Retrieve this earlier assessment and compare the results to the post-test. 	<p>Investigation/Activity</p> <p>Unit Test Post-test T.G., pages 135 and 136.</p>	<p>Homework/Extra Practice</p>