Lesson 1: Force

1. The student will orally define the term force as a push or a pull.

1. Write the word *force* on the chalkboard. Have the students give their definition and examples of force. Write the definition of force on the chalkboard. *Force is a push or a pull on an object caused by another object.*

2. The student will orally state that gravity is the force that pulls an object towards the earth.

2. Throw a ball into the air. Ask: *What happens to a ball when you throw it straight up into the air?* The ball goes up, stops, and comes down. *Which force- pushing or pulling - causes a ball to go up?* Pushing. *Where does this force come from?* The muscles in the arm. *Besides your muscles, what other forces can move an object?* Gravity, magnetism, wind, etc. *What force caused the ball to come down after I threw it up in the air?* Gravity. Have students describe examples of the action of gravity they have experienced in their lives. (Jumping, dropping objects, diving, etc.)

3. The student will classify actions as either a push or a pull by listing given actions in the appropriate column

.

3. Explain that they are going to play a game of "Forceful Charades." Each student will take turns acting out actions that involve some kind of force. The rest of the class must guess what action is being performed and tell whether the force is a push or a pull. (Some example: batter hitting a baseball, a person opening a door, a person kicking a football, a person with a wheelbarrow.)

Have the class list the actions involved in playing soccer. Write these on the chalkboard. Have the students make two columns on their paper (push and pull) and have them classify the actions.

4. The student will discover the 4 effects (change direction, start, stop, and change speed) force can have on an object.

4. Provide each pair of students with a marble. Inform them that they are to use force on the marble. Write on the chalkboard: *In how many ways can force act on your marble? List them.* After the students have worked with their marbles bring the class together and discuss their responses. Demonstrate with a soccer ball the four effects of force as they are brought up through discussion and to elicit any effects that are missing.

5. The student will infer the two properties of a force (magnitude and direction) and state them orally.

5. Show students three objects of different mass such as a pencil, a book and the teachers desk. Ask: *Which object would take the most force to lift? The least? What would we need to move the desk?* More force. *Could four students exert enough force to move the desk?* Yes. *What would happen if two of the people were to push from one side and the other two were to push in the opposite direction?* The forces would cancel each other out. *What would we need to change to move the desk?* The direction of the force. *What do we need for force to work?* Direction and magnitude (strength).

Lesson 2: Friction

1. The student will orally recall the definitions of force & gravity, the 4 effect of force and the 2 properties of force.

1. Orally review the previous day's lesson through questioning of students about what they have learned.

2. The student will orally define the term friction as a force that resists motion between two surfaces that touch.

2. Introduce what they will learn by writing the word *friction* on the chalkboard. Have the students give their definition and examples of friction. Ask: *Is friction a force?* Yes. Write the definition of friction on the chalkboard. *Friction is a force that slows that motion of moving objects.* Ask: *How does friction effect the magnitude of force needed to move an object?* The greater the friction the greater the amount of force that is needed.

3. The student will observe and describe in writing the effects of different surfaces on friction.

3. Provide each team of students with a board that has strips of sandpaper, a sheet of aluminum foil and a sheet of wax paper attached to its surface. Provide each team with a string, a small paper cup and 20 washers. Provide each student with an experiment sheet. The students will write a hypothesis about the effects of the different surfaces and then test their hypothesis using the plastic cup and 10 washers.

4. The student will observe and describe in writing the effects of different masses on friction.

4. For the second part of the experiment they will write a second hypothesis about the effects of mass on friction and test their hypothesis by increasing the mass to 20 washers.

5. The student will devise a way to reduce friction between two given surfaces. The student may write a descriptive paragraph or create a drawing.

5. Discuss the fact that some motion produces heat or sound. Ask: *What are some examples of heat being produced by friction.* Have them rub their hands together until they feel warm and lead them to the conclusion that the heat is a result of friction. Ask: *What are some examples of noise being produced by friction? Why is it important to reduce friction?* Decreases the amount of force needed. Efficiency. People who design machines try to overcome friction in order to make machines more efficient.

Write on the chalkboard: *How can I reduce the friction between a block of wood and the surface of a table?* Have the students answer the question on the back of their experiment sheet and turn them in. (Students who need extra time will be allowed to finish answering the question at a later time.)

6. The student will illustrate the different types of friction. For each type, the student will show a way to minimize the effects of the friction. (*Enrichment objective)*

6. Have the students use an encyclopedia and other resources to find out about the different kind of friction and the ways friction is minimized. Have the students make a poster describing what they have learned.

Lesson 3: Inertia

1. The students will orally recall concepts learned in the lessons on force and friction.	1. Orally review the previous days' lesson through questioning of students about what they have learned.
2. The student will orally define inertia.	2. Place a sheet of paper on a desk. Then, place a heavy book on the paper. Pull the book quickly across the desk by pulling on the paper. Suddenly stop pulling on the paper. Ask: *What happened to the book when I stopped pulling on the paper?* It kept moving. Then, place the book on the paper again and with a sudden movement, jerk the paper out from under the book. Ask: *What happened to the book?* It did not move. Repeat as needed and write observations on the board. *On object that is in motion tends to stay in motion. An object at rest tends to stay at rest.* Then, define this concept as *inertia.*
3. The student will observe the effects of inertia and identify the object upon which inertia was active.	3. Distribute experiment sheet "*To Move or Not to Move"* and the materials to each group of students. Go over the two experiments and then allow the groups to work on the experiment.
4. The student will write an argument for the use of safety belts using their knowledge of inertia.	4. Write on the chalkboard: *Think about the toy car and the sugar cube. Why do you think it is important to wear a seat belt in an automobile?* Have each student write the answer to the question on the back of his/her experiment sheet. (Students who need extra time will be allowed to finish answering the question at a later time.)

Lesson 4: Work

1. The student will orally recall concepts learned in the lessons on force, friction & inertia.

1. Orally review the previous days' lesson through questioning of students about what they have learned.

2. The student will orally define work.

2. Write the word *work* on the chalkboard. Have the students give their definition and examples of work. Write the scientific definition of work on the chalkboard. *Work is the result of a force moving an object.*

3. The student will describe orally the relationship between force and distance.

3. Pair students. Have one student hold a book in the palm at arm's length. The student must hold the book still for one minute. Have the second student sit at a desk and simply lift a book 3 cm off a desk and set it down. The student should repeat the activity as many times as possible in 1 minute. Ask: *Who used force?* Both students. *Who did the most work?* The person raising the book up and down. The other person did not do any work. *Why?* To have work there must be force and distance (movement).

Have students make two columns on a piece of paper: work and no work. Have them classify the following: opening a drawer, throwing a dart, a bulldozer pushing earth, braking a bicycle, trying to push a car that is stuck, a parked car, writing, standing still holding a box.

4. The student will measure the amount of work being done. The student will compare two pictures and select the one in which the greatest amount of work is being done by applying the relationship work = force x distance.

4. Write on the chalkboard: *Work = Force X Distance.* Show the students a spring scale. Explain that in the metric system, force is usually expressed in terms of Newtons. Work is measured in joules. The spring scale is marked in grams for mass measurements and in Newtons for force measurements. Have a student tie a length of string around a book so that it can be attached to the hook of a spring scale. Have a student lift it to the height of a chair seat while another student reads the pointer on the spring scale to see how much force is needed to lift the book. Record the force in Newtons. Then have a student measure the distance from the floor to the chair seat in meters and record. Ask: *How can we find out how much work was done when lifting the book?* Calculating Work = Force X Distance. Then, place a board on the floor with the other end resting on the seat of the chair. Have a student pull the book up the board with the spring scale. Measure and record the force and length of the board. Have the students calculate the amount of work done. Have students compare the distance, the force and the amount of work done. Lead students to conclude that the board decreased the amount of force needed but increased the distance. The amount of work being done remained the same.

Have students complete and turn in worksheet: "Doing Work."

Lesson 5: Energy

1. The student will recall in writing the basic concepts taught on force, friction, inertia and work.

1. Write the definitions of 5 to 7 of the vocabulary words on the chalkboard. Have the student take out a piece of paper and identify the word that matches each definition.

2. The student will define energy orally and in writing.

2. Have students give their definition of energy. Ask: *How does work relate to energy?* You must have energy to do work. Write the definition of energy on the chalkboard. *Energy is the ability to do work.*

3. The student will list the 6 common forms of energy and give examples of how people use these forms of energy. (mechanical, electrical, chemical, heat, sound, motion)

4. The student will give examples of how energy is changed from one form to another.

3. & 4. Provide each student with a video question guide. Have students watch the video "Bill Nye: Energy" and answer the questions as they are watching the video. Discuss the video. Have students write down the 6 forms of energy on the back of their video guide and have them give an example of how each form is used.
(Students who have the need will be allowed to review the video at a later time.)

5. The student will orally describe how energy changes involve some change to energy that is not useful.

5. Ask: *Whenever energy is changed from one form to another, some of it ends up as what type of energy?* Heat. *A light bulb changes electrical energy into what?* Light and heat. *Is the heat energy a useful change?* No. Discuss friction and other examples of heat energy being created as a result of energy change. Lead students to the conclusion that this heat energy is frequently an energy loss.

Lesson 6: Kinetic & Potential Energy

1. The student will orally recall concepts learned in the lessons on force, friction, inertia, work & energy.	1. Orally review the previous lessons through questioning of students about what they have learned.
2. The student will orally define kinetic and potential energy.	2. Hold a ball in the air. Ask: *Does the ball have any energy?* Yes. This energy is called potential energy or stored energy. Let go of the ball. Ask students to describe what the ball does. Explain that as the ball falls, the potential energy starts changing into kinetic energy, energy of motion. When the ball hits the floor, all the potential energy changes into kinetic energy. Then when it bounces back up again, the kinetic energy changes back into potential energy. When the ball stops moving, it has used up its energy. Write the definitions of kinetic & potential energy on the chalkboard. *Kinetic energy is the energy of motion. Potential energy is stored energy.*
3. The student will make a list classifying energy examples as being either kinetic or potential.	3. Have the students make two columns in their notebooks: potential energy & kinetic energy. Have them classify the following items & then discuss their responses. Classify: a parked car, a batter holding a bat, a pitcher throwing a ball, an arrow released from a bow, a rock at the top of a cliff, a rubber band stretched between your fingers, a moving car, a piece of wood lying on the ground, a diver at the edge of a diving board, a battery in a box.
4. The student will discover through observation and write an explanation of the relationship between the mass of an object and its kinetic energy.	4. Provide students with the experiment sheet & materials. The students will roll three marbles of different masses down an inclined plane & record the amount of work done. They will answer the questions on the experiment sheet & compare their hypothesis with the results.
5. The student will discover through observation and write an explanation of the relationship between potential energy and work.	5. After completing experiment #1, the students will then complete experiment #2. They will use the smallest marble & experiment with different heights for the inclined plane, increasing the potential energy of the marble. The students will compare their results with their hypothesis. This will be followed by a class discussion
6. The student will create a diagram of the energy path of a fossil fuel. The student will trace the stored energy back to the sun's energy. (*Enrichment Objective)*	6. Have students use reference materials and other sources to learn about fossil fuels such as coal, natural gas and oil. Have student learn about how they are formed and how the stored energy can be traced back to the sun's energy. They will prepare a report for the class.

Lesson 7: Simple Machines Part 1

1. The student will orally recall concepts learned in the lessons on force, friction, inertia, work & energy.

1. Orally review the previous lessons through questioning of students about what they have learned.

2. The student will orally define the term machine.

2. Write the word *machine* on the chalkboard. Ask for examples of machines. Ask: *Why do we use machines?* Machines make work easier. People use machines to do work.

3. The student will orally identify the inclined plane as a simple machine and describe how it uses energy to do work.

3. Describe some tasks that would be difficult for a person to do alone such as picking up one end of a car to change a tire, breaking a log in half or loading a new car onto a trailer. Have the students describe how they would accomplish these tasks and what devices they would use. Identify the simple machines they would use.

Place a board with one end on the ground and the other end on the seat of a chair. Ask: *What is this called?* A ramp or inclined plane. An inclined plan is a simple machine. Have students recall what they learned in lesson 4 about the effort required to lift the book and the distance it was lifted. Remind them that using a ramp made it easier to move the book, but the book had to be moved farther. To prove that it takes less force to pull a block up a ramp than it takes to lift the block straight up ties a string around the block and attach a large paper clip and then a rubber band to the string. Have one student lift the book straight up to the seat while another student measures the length of the stretched rubber band. Then, have one student pull the book up the inclined plane to the seat while another student measures the length of the stretched rubber band. Make sure the students understand that the inclined plane made it easier to move the block.

4. The student will orally identify the wedge as a simple machine and describe how it uses energy to do work.

4. Tell students that you want to prop open the door so that it can't moved. Give one student a block of wood with which to prop open the door. Ask: *Did the block work to hold the door open?* No. Give another student a door wedge to jam under the open door. Ask: *Did the door wedge hold the door better than the block of wood?* Yes. Remove the door wedge and let them observe it. Tell them that a wedge is a simple machine that is really a small inclined plane used as a tool. It is used to raise an object or to split an object apart. Ask: *What did the door wedge do?* It raised the door and exerted a strong force on it. Put a slab of clay on a table. Ask a student to use a flat side of a wooden block to cut the clay in two. Then ask the same student to use the door wedge to cut one piece of clay into two pieces. Ask: *Did the wedge make the task easier? What did the wedge do?* It split the object apart. Tell students that nearly all cutting tools make use of the wedge.

Lesson 7: Simple Machines Part 1 (continued)

5. The student will orally identify the lever as a simple machine and describe how it uses energy to do work.

5. Display a paint can with the lid firmly in place. Ask: *What device would you use to pry off the lid?* Paint can opener or screwdriver. *How would you describe the action you used to remove the lid?* Push down on one end to raise the lid. This is a simple machine called a lever. A lever is a simple machine that can help you lift an object. Place a triangular piece of wood on the floor, which will serve as a fulcrum. Then place a long board across the fulcrum. Place a stack of books on one end of the board. Have a student try to lift the books by pushing down on the other end. Tell the students that a lever is a bar that rests on and turns around a support called a fulcrum. Have students identify the bar and the fulcrum. Then move the fulcrum away from the center of the board and away from the books. Have the student push down on the board. Ask: *Did this require more force or less force than before?* More force. *Did the distance you had to push increase or decrease?* Decrease. *What are the two components of work?* Distance and force. As distance decreases the amount of force needed to do the same job increases.

6. The student will associate levers and wedges with parts of their body. (*Special Education Modification:* The student will associate levers, inclined planes and wedges with commonly used tools.)

6. Have the students name the parts of their bodies that are levers and wedges. Have them illustrate how these body parts work as simple machines. (*Special Education Modification:* Have the student cut out and label each tool with its name and type of simple machine.)

Lesson 8: Simple Machines part 2

1. The student will orally recall concepts learned in the lessons on force, friction, inertia, work & energy.

1. Orally review the previous lessons through questioning of students about what they have learned.

2. The student will orally identify screws as simple machines and describe how they use energy to do work

2. Give each student a screw. Tell students that a screw is a simple machine that is adapted from the inclined plane. Have each student take the point of a pencil and follow the thread of the screw from the tip of the screw. Ask: *Do you see the inclined plane constantly curving upward around the central rod?* Yes. Have different students come to the front of the room to practice putting a screw into a piece of wood. Have them observe that they have to turn the screw many times to make it go into the wood a short distance. They do a little work over a long distance.

3. The student will orally identify wheels and axles as simple machines and describe how they use energy to do work

3. Tell students that a wheel and axle is a simple machine that helps us apply more force or lift a heavy load with less effort. Have students describe a wheel and axle on a car. Then ask them to describe a second wheel and axle on a car. (The steering wheel on the car is connected to an axle inside the steering post.) Tell students that many tools and machines use the wheel and axle to increase force, but it is not always easy to recognize the wheel and axle. Hold up a screwdriver and ask if it is a wheel and axle. Explain that it is! The handle is the wheel and the shaft is the axle.

4. The student will orally identify pulleys as simple machines and describe how they use energy to do work

4. Let students look closely at a pulley. Have them observe that a pulley is a small wheel with a grove in which a rope or cord can be placed. Tell them that a pulley is a simple machine that can help us lift heavy objects. Fill a bleach bottle with sand and tie a cord around the handle of the bottle. Attach the free end of the cord to the hook on the end of a spring scale. Let one student life the bottle by lifting the spring scale. As the bottle is lifted, have another student measure and record the force it takes to lift the bottle. Thread a cord over the pulley and tie one end of the cord to the handle of the bleach bottle. Attach the free end to the hook at the end of the spring scale. Have the same student lift the bottle by pulling down on the spring scale. Have another student measure and record the force it takes to lift the bottle. Ask: *Is it easier to lift the bottle straight up or to use a pulley, so that you can pull down?* Using the pulley. Have students compare the amount of force required. The two numbers should be nearly the same. Explain that a pulley is useful because pulling a rope down is more comfortable than lifting an object up. The pulley changes the direction of the effort.

5. The student will identify in writing simple machines that can be found in everyday objects.

5. Provide each student with a copy of Science Discovery Center "Plane and Simple." Students will identify the simple machines in everyday kitchen utensils. (*Special Education Modification:* Have the student cut out and label each tool with its name and type of simple machine.)

Lesson 9: Compound Machine

1. The student will orally define compound machines.	1. Write these words on the chalkboard: *headlight, baseball, and windowsill.* Ask: *What do these words have in common?* They are all compound words. *Based upon what you know about compound words, what is a compound machine?* A machine that is made up of two or more machines. Write the definition on the board. Display a manual can opener. *What type of machine is this?* A compound machine. Have students list the simple machines it is made of the handles are levers; the blade is a wedge; the turn key is a wheel & axle. Discuss other compound machines such as pencil sharpeners, scissors and cars.
2. The student will demonstrate in writing his/her understanding of the work and energy concepts.	2. Distribute "Work and Energy" crossword puzzle to students. Monitor and assist the students as they work on the puzzle.

Lesson 10: Test

1. The student will demonstrate in writing his/her understanding of the concepts of work in energy by passing the test with a minimum score of 80%.

1. Brief review and collection of review puzzle. (*Special Education Modification:* Modified test.)

Forceful Charades Cards

Picking up a phone	Putting a screw in a board
Taking a book off a shelf	Tearing off a piece of paper
Pushing a wheelbarrow	Putting on a sock
Turning on a faucet	Taking a paper towel

Closing a zipper	Hitting a baseball
Lifting a book	Kicking a football
Lifting a fork	Opening a book
Pedaling a bike	Opening a door

OBSERVING FRICTION

NAME: ______________________________________

1. SURFACES

I. Question: Does the roughness of a surface affect friction?

II. Hypothesis: ____

III. Materials: a board with sand paper attached, a cup, masking tape, a rubber band, 10 marbles

IV. Procedures: 1. Tape the rubber band to the bottom of the paper cup and place ten marbles in the cup.

2. Drag the cup along the smooth surface of the board by pulling on the rubber band. Record whether the rubber band stretches a little or a lot and whether the cup is easy or hard to pull.

3. Pull the same cup slowly and steadily across the sandpaper. Observe how much the rubber band stretches and how much you pull. Compare these observations with your previous observations and record any differences.

4. Place a piece of aluminum foil over the smooth surface of the board. Pull the same cup slowly and steadily across the aluminum foil. Observe how much the rubber band stretches and how much you pull. Compare these observations with your previous observations and record any differences.

5. Place a piece of waxed paper over the smooth surface of the board. Pull the same cup slowly and steadily across the waxed paper. Observe how much the rubber band stretches and how much you pull. Compare these observations with your previous observations and record any differences.

V. Variables: manipulated variable: ____

responding variable: ____

control variables: ____

VI. Results:

VII. Conclusion:

How does the roughness of a surface affect friction? _________________________________

____

2. MASS and FRICTION

I. Question: Does the mass of an object affect friction?

II. Hypothesis: ____

III. Materials: a board , a cup, masking tape, a rubber band, 20 marbles

IV. Procedures: 1. Place ten marbles in the cup.

2. Drag the cup along the smooth surface of the board by pulling on the rubber band. Record whether the rubber band stretches a little or a lot and whether the cup is easy or hard to pull.

3. Add ten more marbles to the cup. Drag the cup along the smooth surface of the board. Observe how much the rubber band stretches and how much you pull. Compare these observations with your previous observations and record any differences.

V. Variables: manipulated variable: ____

responding variable: ____

control variables: ____

VI. Results: 10 marbles: ____

20 marbles: ____

VII. Conclusion:

How does the mass of an object affect friction? _________________________________

____

To Move or Not To Move

NAME: ___________________________________

Have you ever seen a magician pull a tablecloth off a table, leaving all the dishes on the table. This trick is possible because of inertia. Inertia is the resistance of any object to a change in its state of motion. Thus a moving object tends to keep moving. An object that is not moving tends to stay still. These activities will help you understand inertia.

1. Magic Penny

I. Question: If I place a penny on top of a card and pull on the card, will the penny move?

II. Hypothesis: ____

III. Materials: a cup, a penny, an index card

IV. Procedures: 1. Place the card over the top of the cup. Then put the penny on top of the paper.

2. Slowly slide the paper off of the cup.

V. Results:

What happens to the penny? ____

3. Set up the cup and penny again.

4. Now pull the slip of paper straight out from under the penny as fast as you can.

What happens to the penny? ____

Which object sows that an object that is not moving tends to stay still? ______________________________

What force acts on the penny after you pull away the slip of paper? ________________________________

2. Traveling Sugar Cube

I. What will happen to a sugar cube on top of a toy car when it stops?

II. Hypothesis: ____

III. Materials: toy car, sugar cube, book

IV. Procedures: Roll the car across the floor toward the book. Repeat two more times.

V. Results:

What happens to the toy car and the sugar cube when they hit the book? ____________________________

Which object shows that an object that is moving tends to keep moving? ______________________________

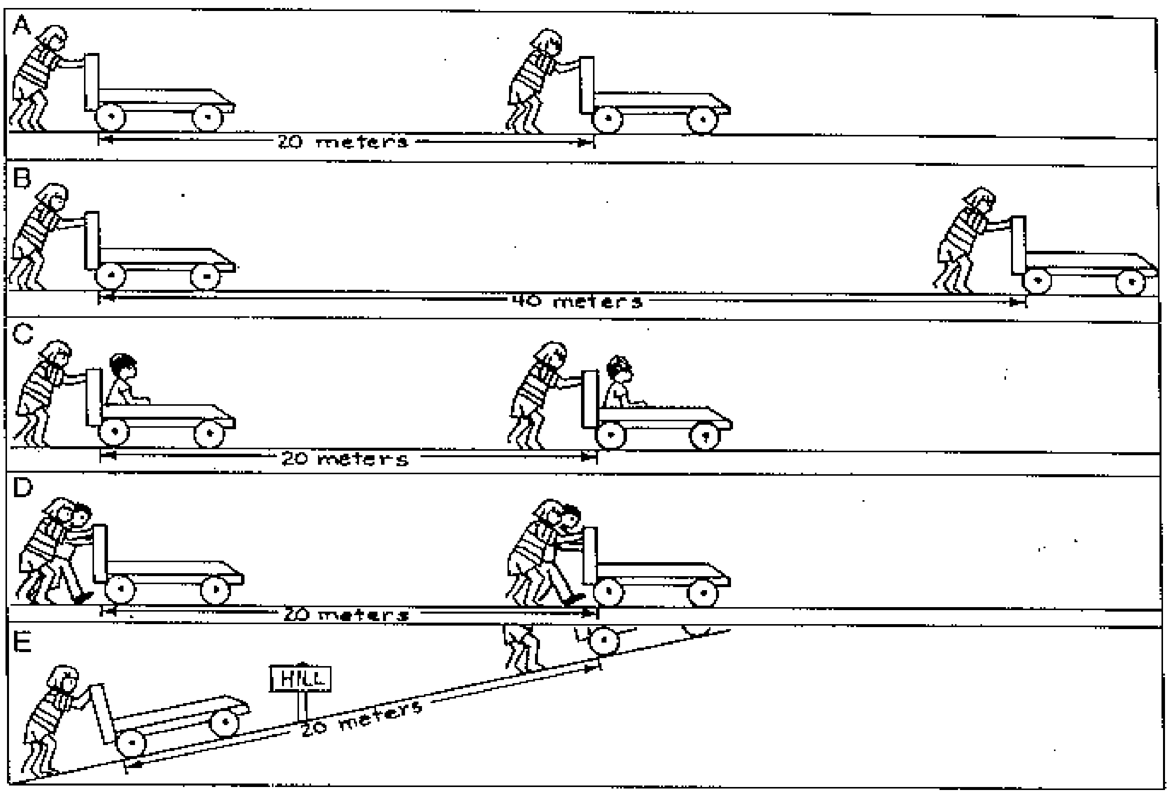
VI. Conclusions:

How do these activities show inertia? ____

____

Doing Work

Name: ____________________________



1. Is the girl doing more work in picture A or picture B? Why?

____

2. Is the girl doing more work in A or in C? Why?

____

3. Is the girl doing more work in A or in D? Why?

____

4. Is the girl doing more work in A or E? Why?

____

____

BILL NYE: ENERGY
Video Guide

NAME: ________________________________

1. What is his definition of energy? ____

____

2. During the video, Bill will talk about several different forms of energy. List them here:

________________ ________________

________________ ________________

________________ ________________

3. Define.

potential energy: ____

kinetic energy: ____

4. A rocket changes ________________ energy to _________________ energy.

5. Give two more examples from the video of energy changing form.

(1) ____

(2) ____

6. Bill talks about several different ways we get electricity. What are some of these ways?

____

____

____

7. Whenever energy is changed from one form to another,
some of it ends up as ________________ energy.

POTENTIAL AND KINETIC ENERGY

NAME: ______________________________________

1. MASS DIFFERENCE

I. Question: Does the mass of an object affect its potential and kinetic energy?

II. Hypothesis: ____

III. Materials: 3 marbles of different masses, cardboard tube, metric ruler, a milk carton

IV. Procedures: 1. Raise one end of the tube 4 cm to create a ramp.

2. Place the milk carton at the bottom of the ramp to catch the marble.

3. Place the heaviest marble inside the tube and let it roll down the ramp. Measure and record how far the milk carton moves.

4. Repeat step 3 with the other two marbles. Compare these observations with your previous observations and record any differences.

V. Variables: manipulated variable: ____

responding variable: ____

control variables: ____

VI. Results:

VII. Conclusion:

Which marble had the most energy? Why? ____

How does the mass of the marble affects its energy? ______________________________

____

2. HEIGHT DIFFERENCE

I. Question: Does the height of an object affect its potential and kinetic energy?

II. Hypothesis: ____

III. Materials: 1 marble, cardboard tube, metric ruler, a milk carton

IV. Procedures: 1. Raise one end of the tube 4 cm to create a ramp.

2. Place the milk carton at the bottom of the ramp to catch the marble.

3. Place the marble inside the tube and let it roll down the ramp. Measure and record how far the milk carton moves.

4. Raise the height of the ramp to 6 cm. Repeat step 3. Compare these observations with your previous observations and record any differences.

5. Raise the height of the ramp to 8 cm. Repeat step 3. Compare these observations with your previous observations and record any differences.

V. Variables: manipulated variable: ____

responding variable: ____

control variables: ____

VI. Results:

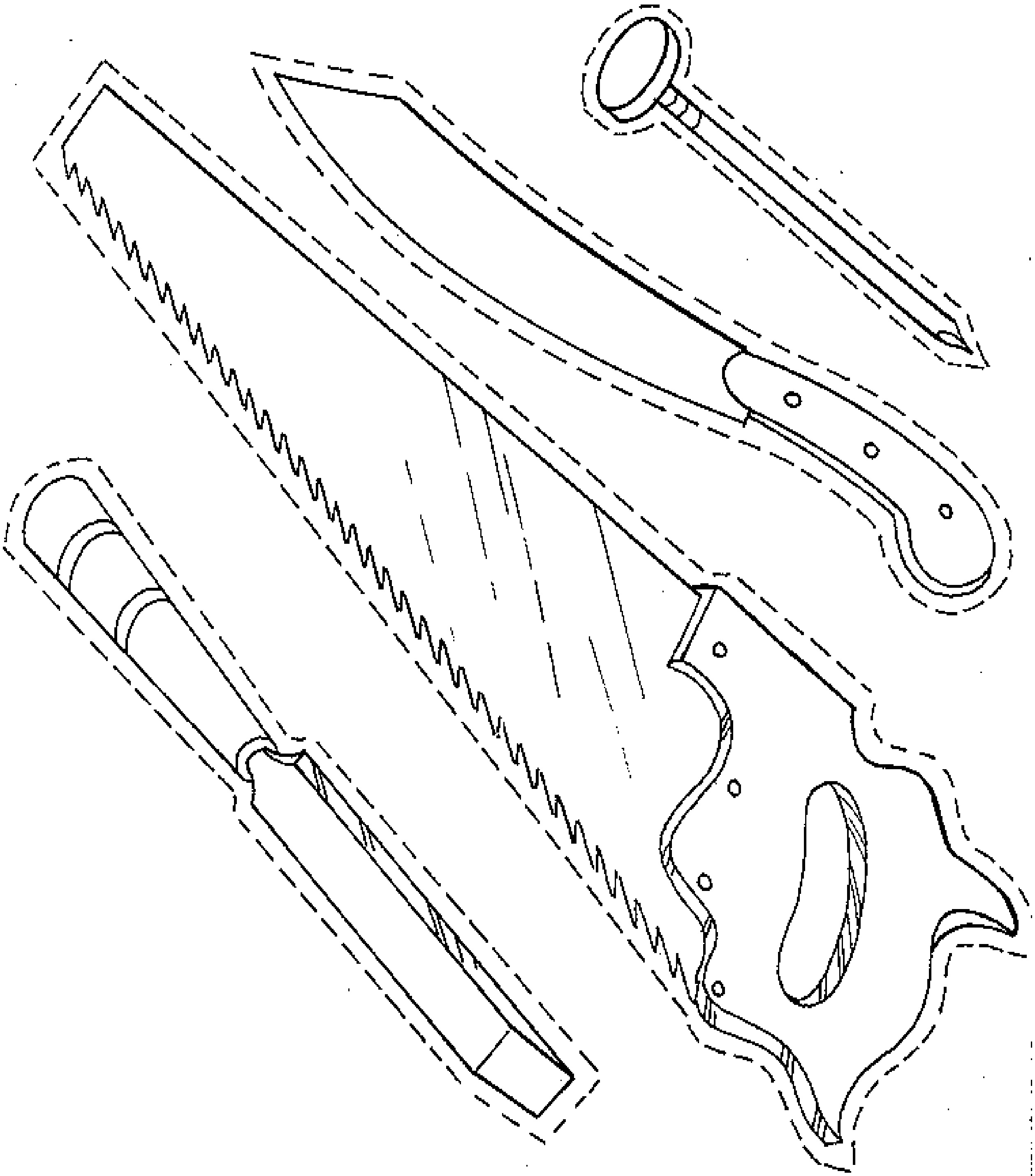
VII. Conclusion:

How does the height of a marble affect its energy? __________________________________

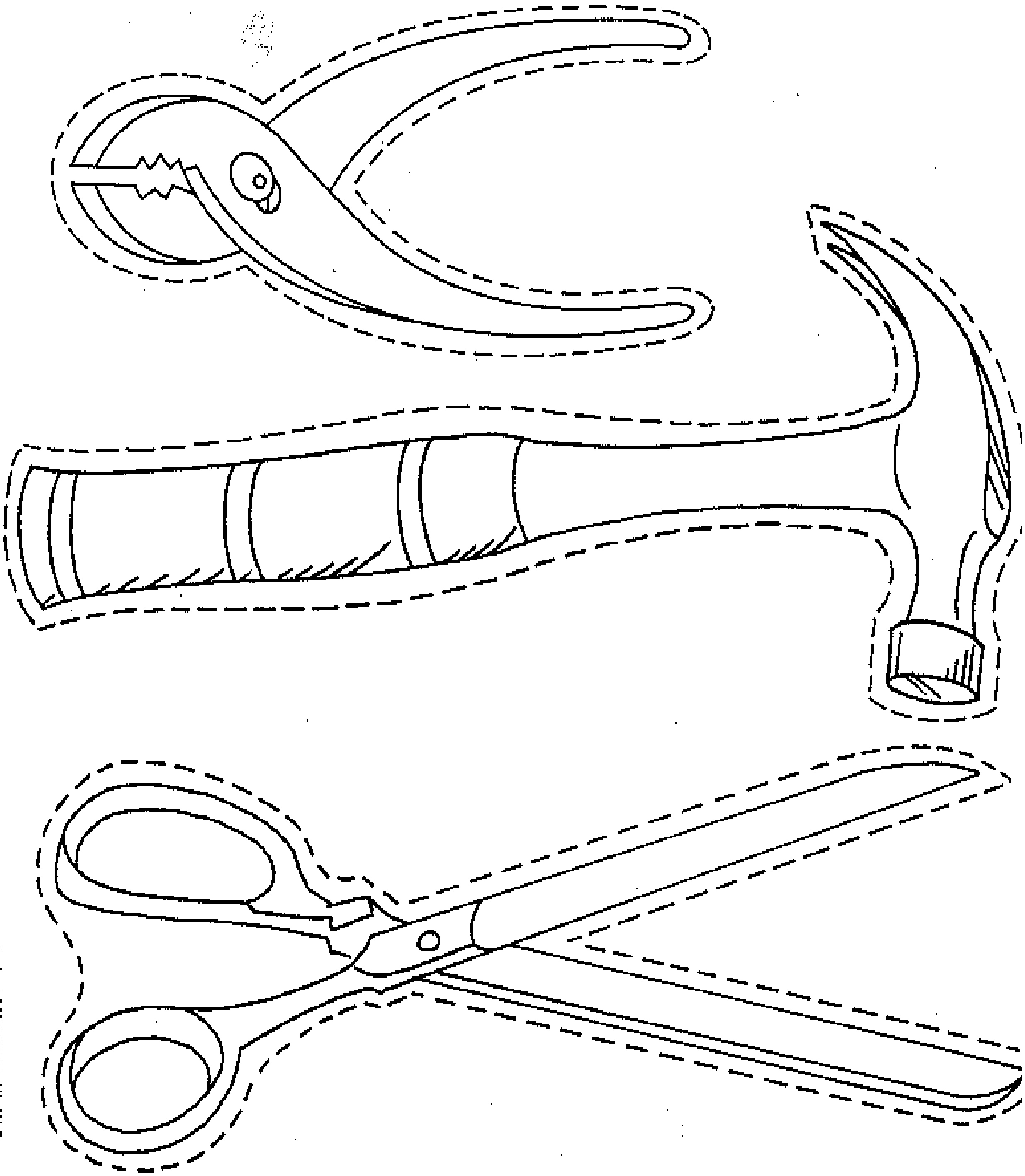
____

1. Color the tools and name labels.
2. Cut out the tools and labels.
3. Glue the label onto the tool it names.
4. Identify the type of simple machine that is a part of each tool.

Nail	Knife	Saw	Chisel

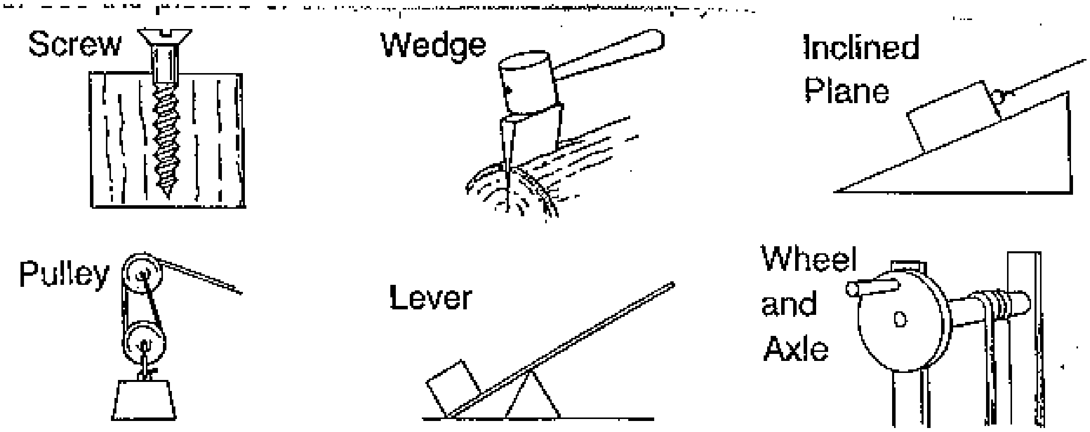


Pliers	Hammer	Scissors



Simple Machines

Name: ______________________________



1. Look at the edge of the knife blade. Which simple machine in the knife is being used when you slice a piece of bread? ____

2. Use the knife to pretend you are spreading butter. The knife is being used as which simple machine? ____

3. Look at the tines of a fork. What simple machines are they? _______________________

4. Pretend you are eating with a spoon. The spoon is being used as which simple machine? ____

5. Pick up the cup and pretend to take a drink. Your arm and wrist are like what simple machine? ____

6. Turn the gear of the can opener. What simple machine are you using? ________________

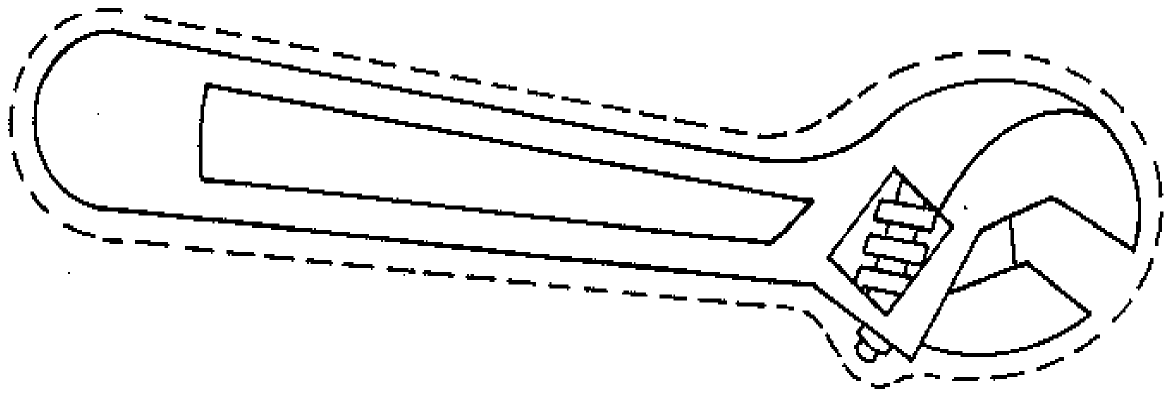
7. What simple machine is the blade of the can opener? _____________________________

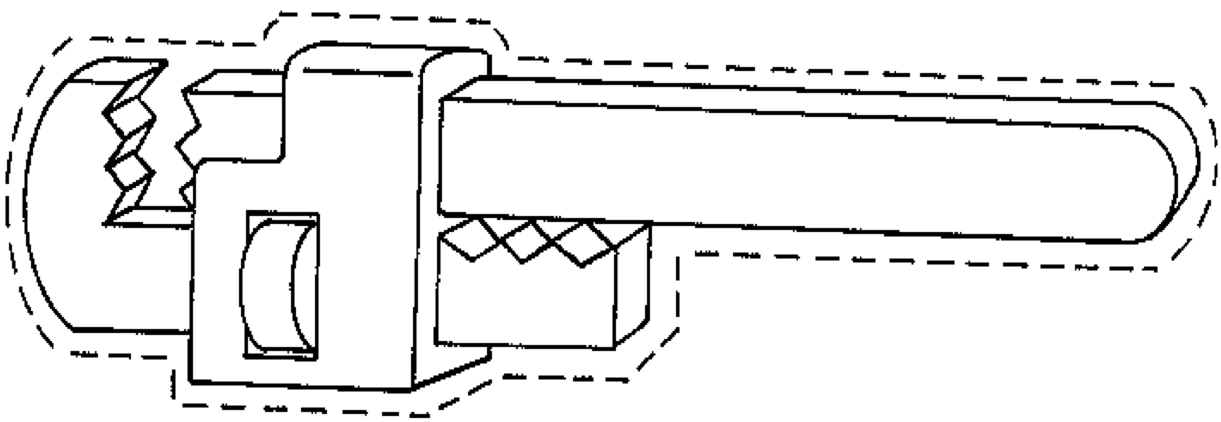
8. What simple machine makes it easier for you to close the handles of the opener when the blade is on the edge of a can? ____

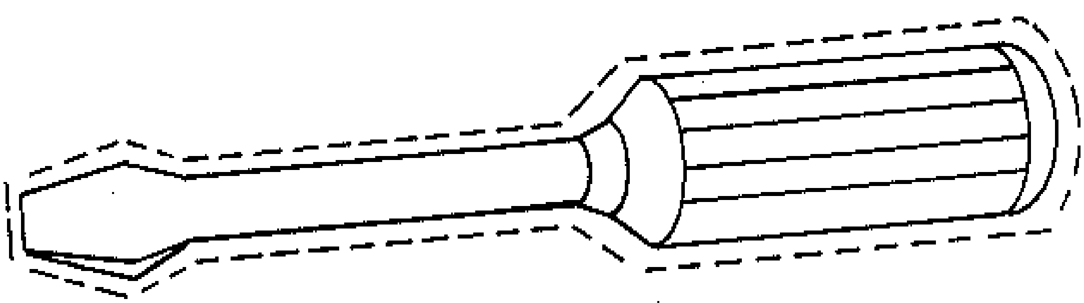
9. Now think of a corkscrew. Identify four simple machines in it.

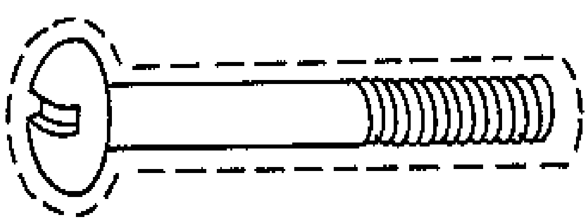
1. Color the tools and name labels.
2. Cut out the tools and labels.
3. Glue the label onto the tool it names.
4. Identify the type of simple that is a part of each tool.

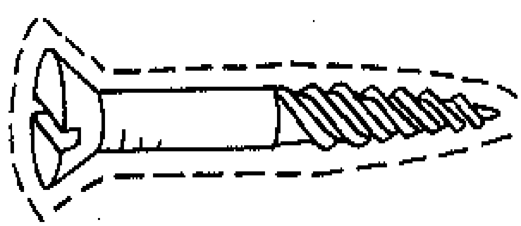
Wrench	Screwdriver	Bolt	Screw	Monkey Wrench





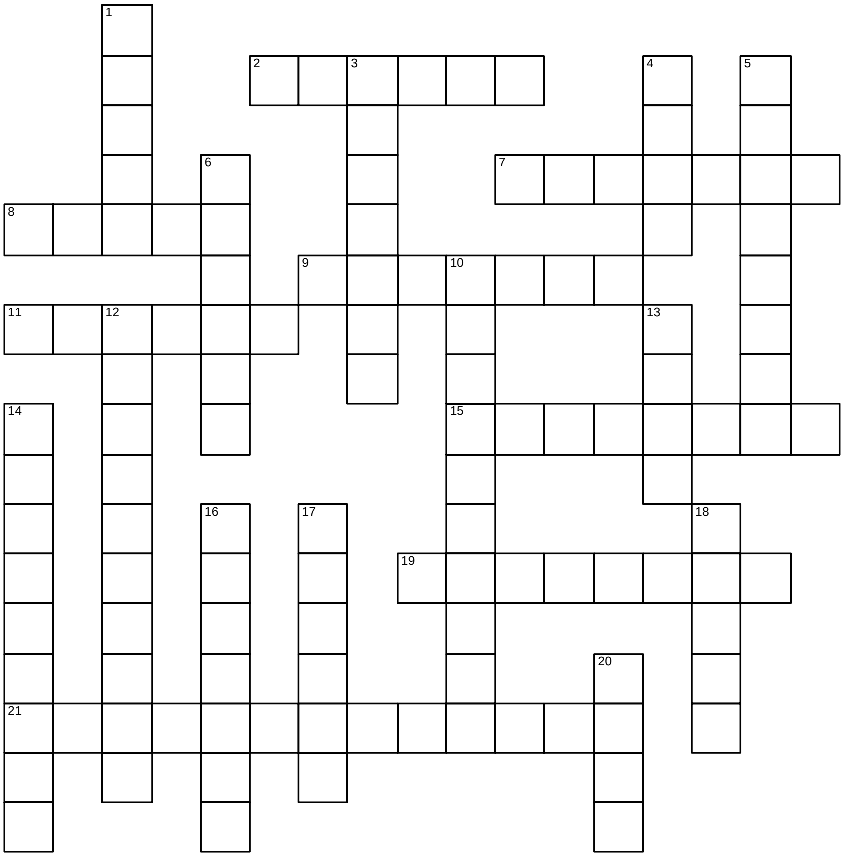






Chapter 6: Work and Energy

Name: ______________________________



Across

2. A machine made of only one or two parts.
7. The tendency of a moving object to stay in motion or a resting object to stay still.
8. A push or a pull on an object by another object.
9. Energy of motion.
11. The ability to do work.
15. A machine made of two or more simple machines.
19. work = force X ____________
21. A ramp is a simple machine called an _______.

Down

1. The three parts of this simple machine are load arm, force arm & fulcrum.
3. Any tool that makes work easier.
4. The result of a force moving an object.
5. A force that slows the motion of moving objects.
6. A nail and a knife are examples of simple machines called ______.
10. Mechanical, heat, motion, sound, chemical & ______ are the six common forms of energy.
12. The amount of work a machine does compared to the amount of energy put into using a machine.
13. The 4 affects of force are change speed, change direction, start and __________.
14. Stored energy.
16. A force that pulls any two objects together.
17. A simple machine made up of a wheel & axle and some rope.
18. An inclined plane wrapped around a rod.
20. Whenever energy changes form some of it ends up as ______ energy.

Science Test: Work and Energy

Name: ______________________________

Multiple Choice. Write the letter of the best answer in the blank.

1. _____ Any tool that makes work easier to do is called a

a. machine b. lever c. computer d. motor

2. _____ High efficiency means a lot of work is done for the amount of

a. energy used b. energy saved c. time taken d. friction

3. _____ An ax is a type of

a. complex machine b. compound machine

c. simple machine d. inclined plane

4. _____ The tendency of a moving object to stay in motion is called

a. friction b. inertiac. force d. gravity

5. _____ A simple machine made up of a wheel and a rope is a

a. wedgeb. pulleyc. axle d. inclined plane

6. _____ A ramp is a type of

a. wedgeb. inclined plane c. fulcrum d. complex machine.

7. _____ When you wind the rubber band on a model airplane you are storing

a. force b. friction c. mechanical energy d. compound energy

8. _____ Which simple machine has a fulcrum?

a. hedge clipper b. pencil sharpener c. car engine d. lever

9. _____ If you want to stop a moving object, you must use

a. speed b. gravity c. force d. efficiency

10. _____ When you move a box, you do

a. gravity b. inertiac. work d. speed

11. _____ If you use an inclined plane wrapped around a rod, you are using

a. a lever b. a pulley c. a wedge d. a screw

12. _____ The energy of motion is

a. gravity b. kinetic energy c. friction d. potential energy

Fill in the blank. Write either *potential* or *kinetic* in the blanks in each sentence.

13. A tractor pulling a plow has _________________________ energy.

14. A rooster sitting atop a fence has _________________________ energy.

15. The rooster's _________________________ energy changes to _________________________ energy when it jumps off the fence.

16. When a horse trots down a trail, it has _________________________ energy.

17. When a ball falls downward, it has _________________________ energy.

18. A parked car has _________________________ energy.

19. A rock at the top of a hill has _________________________ energy.

20. Winding a clock adds to its _________________________ energy.

21. What are four ways in which a force can be used? (4 points) ___________________________________

____

22. Explain why a car is a compound machine. ____

____

23. The amount of work done on an object depends on what two factors? (2 points) _____________________

____

24. What useful form of energy does an electric stove produce? _____________________________________

25. What useful form of energy does an electric can opener produce? __________________________________

26. A ball is rolling across the floor. You stop the ball with your finger. Was force applied? Was work done? Explain your answer. (3 points) ____

____

____

26. When a light bulb is a desk lamp is turned on, what form of energy is produced that is <u>not</u> useful? ______________

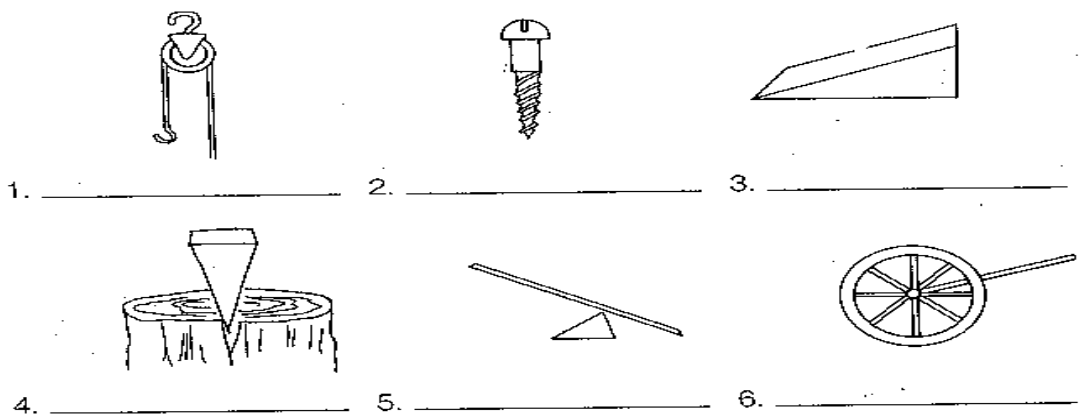
27. Suppose an adult lights a match.

(a) Did the match have kinetic or potential energy before it was lighted? ______________________

(b) What form of energy did the unlighted match have? ___________________________________

(c) What form of energy did that change to when the match was lighted? ______________________

SHORT ANSWER Write the name of each simple machine in the space below its picture. Use these words: wedge, screw, inclined plane, wheel and axle, pulley, lever.



1. The way my teacher taught this unit made it _________________________________.

2. My favorite part of this unit was ____.

3. I learned ______ very little _____ a little ______ a lot

4. After studying this unit I would like to know more about ______________________.