Contents

TEACHER GUIDE

STUDENT HANDOUTS

EASY-MARKING™ ANSWER KEY

COLOR MINI POSTERS

NAME: _____

Before You Read

Simple Machines

1. Circle T if the sentence is True or F if it is False.

T	F	a)	A small car is a simple machine.
T	F	b)	A ball is a simple machine.
T	F	c)	A hammer is a simple machine.
T	F	d)	We can sit back and watch while a simple machine does our work.
T	F	e)	Simple machines make work easier.

2. Put a check mark (✓) next to the answer that is the most right.

a) Which is a simple machine?

- ○ **A** a rope
- ○ **B** a wedge
- ○ **C** eye glasses
- ○ **D** an electric fan

b) All of these are simple machines, except _____.

- ○ **A** a pulley
- ○ **B** a screw
- ○ **C** a fence
- ○ **D** an inclined plane

c) What kind of simple machine is an oar that is used to row a boat?

- ○ **A** a lever
- ○ **B** a wedge
- ○ **C** a wheel and axle
- ○ **D** an inclined plane

NAME: _____

Reading Passage

Simple Machines

STOP

What kind of simple machine is a knife?

_____

_____

Finally, we have pulleys. Pulleys are made of ropes and wheels. You pull with a small force on a rope and the thing you are lifting is pulled with a large force. If it is easy to pull the rope, you will have to pull a lot of rope to raise the load a little bit.

Usually we use a simple machine to turn a small force into a big force. Sometimes it is the other way around. We use a big force to make a small force that acts over a big distance. Think about using a hammer to pound a nail instead of pulling one out. You swing the hammer with a big force, and the hammerhead hits the nail head. It drives the nail in because we have made the hammerhead go very fast. You couldn't push a nail into wood with your thumb, could you? Baseball bats work the same way. We put a lot of force on one end so that the other end is going very fast when it hits the ball (.. unless we miss).

The crane uses a pulley to lift heavy things.

Sometimes putting together two or more simple machines makes a new machine. These new machines are called compound machines. One example is an axe. The handle is a lever, and the head is a wedge. Another is a can opener. We turn the wheel of a wheel and axle with our fingers while a wedge cuts through the top of the can.

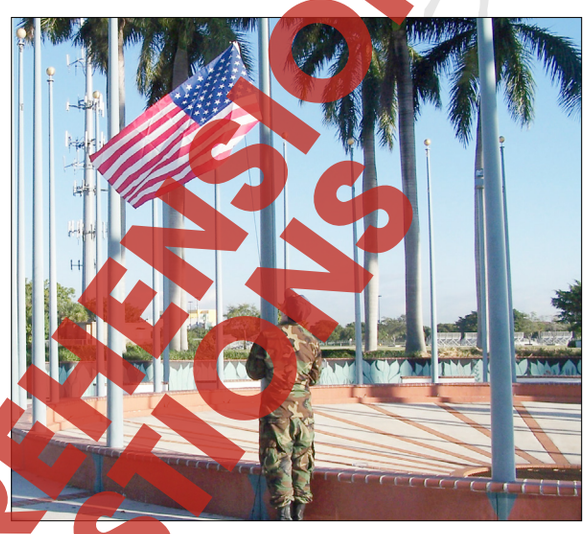
After You Read

NAME: _____

Simple Machines

1. Look at the picture of the person raising a flag. Which simple machine is he using?

- ○ **A** lever
- ○ **B** pulley
- ○ **C** screw
- ○ **D** wedge



2. Circle T if the sentence is True or F if it is False.

T	F	a)	Simple machines can increase force.
T	F	b)	The head of an axe is a wedge.
T	F	c)	An inclined plane is two wedges side by side.
T	F	d)	When we pull a nail from a board with a hammer, we are using a pulley.
T	F	e)	A wheel and axle can also be seen as a kind of lever.

After You Read

NAME: _____

Simple Machines

3. Answer the questions in full sentences.

a) Explain why a wedge is a kind of inclined plane.

_____

_____

_____

b) Pick a simple machine. Explain its main advantage and its main disadvantage.

_____

_____

_____

_____

Extension & Application

4. Use the graphic organizer on page 12 to finish this activity. Draw each of the simple machines. The drawing can be very simple. For each simple machine, show where you would push or pull when you use it. Draw an arrow pointing to that spot and the letter F, like this: F ----->.

Then, get into groups and experiment with each simple machine. Make a compound machine. Use at least two simple machines.

How does your machine work?
How does it help you?

Hands-On Experiment # 6

Air is Something. (It is not Nothing.)

We walk into an empty room. We say that there is nothing in the room. This is not true. The room is filled with air. Air is something. It is matter because it has mass and takes up space. In this activity, we will see that air takes up space and that it can flow like water.

This is what you will need:
- a plastic spring water bottle (It should be very light and be able to bend easily.)
- a sink with a hot water tap
- a refrigerator

This is what you do:
1. Empty as much of the water out of the bottle as you can. (Now it is filled with just air.)
2. Fill the sink with hot water from the tap. It should be just a little deeper than the height of the bottle.
3. Take the top off the bottle and hold it in the hot water. Don't let any water get inside.
4. While the bottle is still in the hot water put the cap on tightly.
5. Put the bottle in the freezer. Leave it there for about 15 minutes.
6. Take the bottle out and look for any changes in its shape.
7. Take the cap off. Make the bottle the shape it was before you put it in the freezer.
8. Put the bottle back in the freezer with the cap off.
9. After 15 minutes, take the bottle out and quickly put the cap on.
10. Take the cap off. Right away pretend you are pouring water from it onto your hand.
11. Notice what you feel.

Cold air takes up less space than hot air. How does this explain what you saw in step 6? Cold air is heavier than hot air. How does this explain what you felt in step 11?

After You Read NAME: _____

Word Search

Find all of the words in the Word Search. Words are written across, up, down, on an angle, and some are even written backwards.

amplitude	heat energy	negative charge	stored
balanced	lever	particles	vapor
charge	light energy	positive	wedge
energy	magnet	properties	wheel and axle
food	mass	screw	
force	matter	sound	
gravity	motion	sound waves	

S	O	U	N	D	W	A	V	E	S	A	B	C	D	N
E	F	G	S	H	H	I	C	H	A	R	G	E	E	E
J	K	Y	E	L	E	R	E	V	E	L	M	V	N	G
O	M	G	L	T	E	N	G	A	M	P	I	Q	R	A
F	O	R	C	E	L	S	T	V	U	T	W	X	Y	T
Z	T	E	I	A	A	M	P	L	I	T	U	D	E	I
B	I	N	T	C	N	D	S	S	E	F	G	E	H	V
W	O	E	R	V	D	S	O	U	N	D	M	R	Y	E
E	N	T	A	J	A	P	K	L	M	N	A	O	T	C
R	O	H	P	M	X	P	F	E	E	Q	T	T	I	H
C	W	G	R	S	L	T	O	U	V	N	T	S	V	A
S	E	I	T	R	E	P	O	R	P	E	E	X	A	R
Y	D	L	Z	A	B	C	D	D	E	F	R	R	R	G
G	G	H	D	E	C	N	A	L	A	B	I	J	G	E
H	E	A	T	E	N	E	R	G	Y	L	M	N	O	Y

After You Read NAME: _____

Comprehension Quiz

Part C

Answer each question in full sentences.

1. Wavelength and amplitude have to do with waves. Explain what wavelength means. Explain what amplitude means. (2)

2. Explain two things that light can do when it meets a solid object. (2)

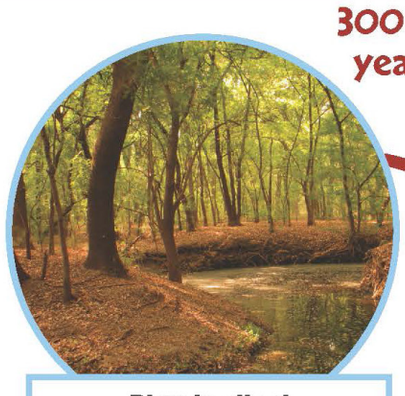
3. Explain what happens when a bolt of lightning jumps from a cloud to the ground. (2)

4. Explain how a solid, a liquid, and a gas are different. Talk about particles to explain the differences. (3)

5. Explain how you would use two pulleys and a rope to lift a heavy object. (4)

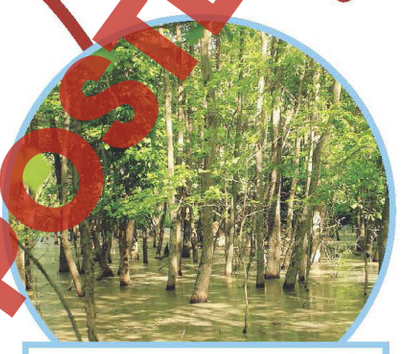
SUBTOTAL: /13

Coal Formation Timeline



300 million years ago

Plants died in swamps.



100 million years ago

Plants were covered by water and dirt.

Heat and weight turned plants into coal.

Over millions of years

After You Read

NAME: _____

Simple Machines

1. Look at the picture of the person raising a flag. Which simple machine is he using?

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- ○ **C** screw
- ○ **D** wedge

2. Circle T if the sentence is True or F if it is False.

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EASY MARKING ANSWER KEY

1.

B

2.

a) T
b) T
c) F
d) F
e) T

3.

a) A wedge is two inclined planes back to back.

b) A simple machine has the advantage that it increases force. A simple machine has the disadvantage that the force must be done over a long distance.

4.

Drawings will vary.