



UNIT 4

B-1: Concepts of Physical Science



KEY VOCABULARY

Culturally Responsive & Place-Based Introduction of Science Vocabulary

MECHANICAL

Place-Based Perspective

Before the lesson begins, collect common items that were made by machines, such as clothing, tools, and dishes. Present the materials, calling upon the students to tell what is the same about all of the items. Lead them to suggest that all were made by machine; use this to introduce “mechanical”. Have the students cite other mechanically-produced items.

Heritage Cultural Perspective

Traditionally, the Native people of Southeast Alaska used mechanical inventions for survival. This included the use of snares to trap bears and special hooks with moveable parts to catch salmon. The bow and arrow was another mechanical device used.

SUBSTANCES

Place-Based Perspective

Show the students a sample of table salt. Have them identify its characteristics—it’s white, it’s solid, and it dissolves in liquid. Lead the students to understand that substances, like salt, are forms of matter that have constant properties. For example, salt that is dissolved in liquid still has the chemical properties of salt. Have the students name other substances in their environment.

Heritage Cultural Perspective

Traditionally, Native people rendered substances such as seal fat and hooligan into oil. While this changed the state of the fat from solid to liquid, the oil still had all the elements of the fat.

SOLIDS

Place-Based Perspective

Place a rock and a glass of water in front of the students. Have them contrast the two—lead the students to suggest that solids have a definite shape and size while water (as a liquid) takes the shape of what it is in. Have the students identify how solids can change (for example, solids melt, dissolve, and burn).

Heritage Cultural Perspective

Traditionally, Native people of Southeast Alaska would press salmon eggs until they became a solid block. The people would eat the solid egg mixture for energy. Hoonah people pressed black seaweed into solid blocks. Solids, such as speckled black and white granite rocks, were used for cooking. They would heat the rocks and put them in a cooking container, such as a bentwood box or carved bowl.

Culturally Responsive & Place-Based Introduction of Science Vocabulary

LIQUIDS

Place-Based Perspective

Show the students a large bottle of water and a picture of an airplane. Have them suggest the relationship between the two—the water would not be allowed on a plane if purchased before the security checkpoint. Have the students explain why this is so. Use this to introduce liquids—have the students name other liquids.

Heritage Cultural Perspective

The Native people of Southeast Alaska prepared many liquids. For example, they made fruit juice from berries and oils from hooligan and seal fat, and they brewed tea from Devil's Club.

GASES

Place-Based Perspective

Write the following numbers on the board: 78.09%, 20.95%, .93%, and .02%. Have the students suggest what the numbers might represent. Lead them to understand that they show the percentages of the major gases in the air: nitrogen—78.09%; oxygen—20.95%; argon—.93%; carbon dioxide—.02%. Use this to introduce the word “gases” to the students.

Heritage Cultural Perspective

Cottonwood or alderwood were and are still used by many Native people to smoke fish and meat. These woods emit a gas that protects the drying fish and a variety of game meats from flies. Fish heads would be buried in a pit until they fermented. In this process, they would emit a gas that would indicate their readiness for consumption. Steam, another form of gas, is used in the creation of bentwood boxes and the forming of canoes.

EXERT

Place-Based Perspective

Show a baseball and bat, a golf club and golf ball, a hammer and nail, or other similar materials. Have the students determine what is the same about all of the items. Lead them to understand that the items represent force that can be exerted on an item—the bat to the ball, hammer to the nail, etc. Have the students name other items that exert forces, including the force of the moon exerting force on the tides.

Heritage Cultural Perspective

Traditionally, daily life required exertion in a variety of ways. For example, the use of an adze, bow and arrow, a wedge, spears, knives and daggers, and clubs required exertion. The raising of a totem pole and the building of clan houses required great exertion. Creating dug-out canoes and paddling them also required exertion.

Culturally Responsive & Place-Based Introduction of Science Vocabulary

FORCE

Place-Based Perspective

Collect a variety of items that can be used to represent different types of forces (for example, a whisk, a badminton racket, and a basketball). Have the students identify the forces that are used with the items. Identify other items that use normal force, friction, and circular forces. This might include sand paper, stir spoons, a pool cue, etc.

Heritage Cultural Perspective

When making a dug-out canoe, the log is steamed and then a spreader is used to provide the force necessary to widen the canoe. A mallet is used to force the spreader into place. Historically, daily life called for the use of force in a variety of ways. This would have included the grinding of cottonwood bark and ash, as well as seaweed. Rock scrapers were used to force the flesh from hides.

GRAVITY

Place-Based Perspective

Locate an item that is broken (for example, a cup or plate). Have the students suggest how the item was broken. Lead them to understand that it may have fallen—use this to introduce gravity to the students. Have the students identify ways in which gravity affects our daily lives.

Heritage Cultural Perspective

Gravity played varied roles in traditional Southeast Alaska life. For example, halibut hooks were weighted and lowered deep into the ocean. Weavers who made Chilkat robes used weights attached to the strands in the weaving process.



LESSONS

Science Language for Success—Lesson 1

Introduce the key science vocabulary, using concrete materials and/or pictures.

LISTENING

Use the Mini Pictures activity page from the Student Support Materials. Have the students cut out the pictures. Say the key words and the students show the pictures.



Change

Group the students in pairs. There should be one student without a partner to be “it” for the first round of the activity. Have the students in each pair stand back to back, with elbows interlocked. Tell the students to listen for a specific word, sequence of words, or sentence. When the students hear the word, sequence, or sentence you said at the beginning of the round, they should drop arms and quickly find new partners. However, “it” must also find a partner—thus producing a new “it” for the next round of the activity.

Wild Cars

Make two “roads” on the floor using masking tape. Be certain that there are a number of curves and circles in the roads. The roads should stretch for at least ten feet. If you have a floor rug, chalk may be used to fashion the roads. Place a toy car at the beginning of each road. Lay the vocabulary pictures at the end of the roads. Have a student sit beside each car. Name one of the vocabulary pictures and say “Go.” The two students should “drive” their cars along the roads as quickly as they can. The winner is the player who first parks his car on the picture for the vocabulary word you said.

Student Support Materials

Have the students work on the activity pages from the Student Support Materials from this unit. Afterward, review their work.

SPEAKING



Cat’s Cradle

Group the students in a circle, sitting on the floor. Provide each student with a vocabulary picture (prepare extra pictures if necessary). The students should stand their vocabulary pictures on the floor, leaning against their legs. Give a student in the circle a ball of string. The student should hold the end of the ball of string and then say the name of a vocabulary picture that another student has. After identifying the picture, he/she should then toss the ball of string to the student who has that picture (being careful to hold tightly to his/her end of the string). The student who receives the ball of string must then repeat this process—tossing the ball of string to another student in the circle. The students should continue in this way until a “cat’s cradle” has been created with the string in the center of the circle. This activity may be repeated more than once by collecting and redistributing the pictures for each new round.

Science Language for Success—Lesson 2

SPEAKING (CONTINUED)



Roll ‘Em Again!

Mount the vocabulary pictures on the board. Number each picture using the numbers one to six (repeat a number as often as necessary). Then, group the students into two teams. Give the first player in each team a die. When you say “Go,” the first player in each team must roll his/her die. He/She should call the number showing on it and then say a complete sentence about a vocabulary picture on the board that has the same number. Repeat this process until all students have participated.

READING

Introduce the science sight words to the students—match the sight words with the vocabulary pictures. The sight words are included in the Student Support Materials, attached to these lesson plans.



Note: After each unit, mount a set of the unit’s words on the walls around the room. Use the “word walls” for review and reinforcement activities.

Configurations

Before the activity begins, print the sight words on an overhead transparency sheet (fill the transparency with words). Place the transparency on an overhead projector and project the sight words onto the board. Review the sight words with the students. Then, outline each of the sight words on the board with chalk. When a configuration has been created for each sight word, turn the overhead projector off. Then, point to one of the configurations and call upon a student to identify the sight word for the configuration. Continue in this way until all of the sight words have been correctly identified. You may wish to turn the projector on momentarily to verify a student’s response.

Letter Encode

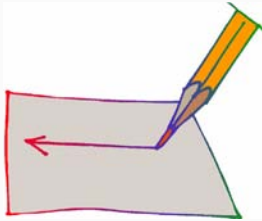
Give each student his/her envelope that contains the alphabet letters. Mount one of the science pictures on the board. The students must use the cut-out letters to spell the word. Review the students’ work. Repeat, until all of the words have been spelled in this way.

Student Support Materials

Have the students complete the sight recognition and encoding activities in the Student Support Materials. When finished, review their work.

Science Language for Success—Lesson 2

WRITING



Watch Your Half

Prepare a photocopy of each of the vocabulary pictures. Cut the photocopied pictures in half. Keep the picture halves in separate piles. Group the students into two teams. Give all of the picture halves from one pile to the players in Team One. Give the picture halves from the other pile to the players in Team Two. Say a vocabulary word. When you say “Go,” the student from each team who has the picture half for the vocabulary word you said should rush to the board and write the word on the board. The first player to do this correctly wins the round. Repeat until all players have participated. This activity may be played more than once by collecting, mixing, and redistributing the picture halves to the two teams.

Back Writing

Group the students into two teams. Have the first player from each team stand in front of the board. Use the index finger of your writing hand to “write” the first letter of a sight word on the two players’ backs. When you have done this, say “Go”. Each of the players should then write a sight word on the board that begins with that letter. Repeat with other pairs of players until all players in each team have played and until all sight words have been written a number of times.

Student Support Materials

Provide the students with a copy of the writing pages from the Student Support Materials. When finished, review the students’ work.



VOCABULARY PICTURES





EXERT





FORCE





GAS





GRAVITY





LIQUID





MECHANICAL





SOLID





SUBSTANCE

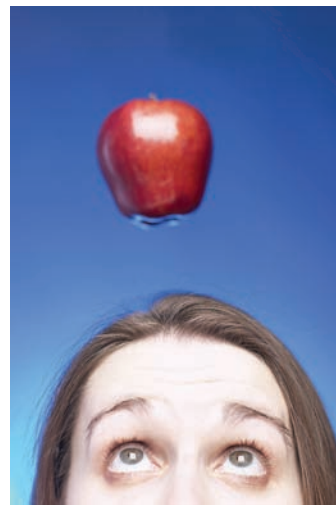
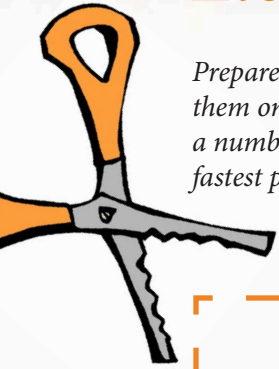


STUDENT SUPPORT MATERIALS

Listening • Mini Pictures

Listening: Mini Pictures

Prepare a copy of these pages for each student. The students should cut out the pictures and lay them on the floor or desk. Say the key words and the students should show you the pictures. Repeat a number of times. This activity can also be done with pairs of students to determine who is the fastest player.



Listening: Mini Pictures







STUDENT SUPPORT MATERIALS

Listening Comprehension

Listening Comprehension




Read the following sentences to the students. The students should circle “true” or “false” for each of the sentences. Review the students’ work.

- | | |
|---|---------------|
| ① Mechanical things never use force. | True
False |
| ② A substance is a form of energy that can be measured. | True
False |
| ③ A solid has a definite shape. | True
False |
| ④ A liquid can change its shape based on the container it is in. | True
False |
| ⑤ Gases fill whatever space is available. | True
False |
| ⑥ When playing baseball, no force is exerted on the baseball during a home run. | True
False |
| ⑦ Gravity exerts force on all things on the earth. | True
False |
| ⑧ Light is a force that exerts pressure on data. | True
False |



STUDENT SUPPORT MATERIALS

Sight Words



solid

substance

mechanical





exert

gas

liquid



force

gravity



STUDENT SUPPORT MATERIALS

Basic Reading • Sight Recognition

Sight Words Activity Page

Have the students highlight or circle the words in this word find. Words appear horizontally.



gas
liquid

solid
exert

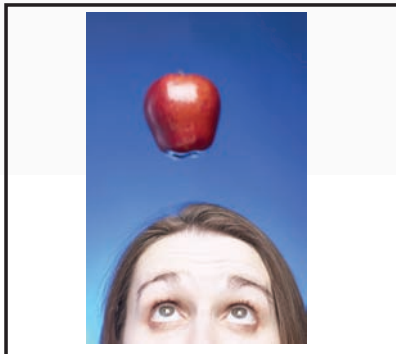
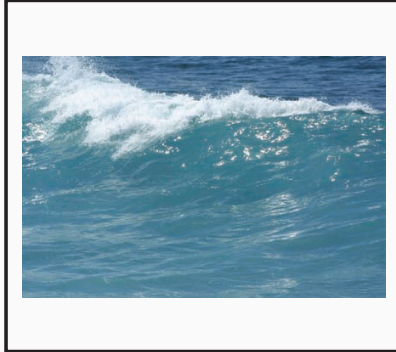
force
mechanical

gravity
substance

r m e l r a e l a a r l s c i s e q
b i a e l i q u c g r a v n t a i s
n c i e i r o x g r a v i t y s u a
x a l i q u i d n u d a s q t a a c
b m d m e c h a n i c a l a i r v d
c u s u b s t a n c e i o c g e i n
g h l m u a h s o l i d o q e v u v
d i e d e i g m u i n o n e x l a s
q s u a c n l o a c n d o c s l r u
m e i a d i h l a f o r c e q n s s
h t t t d e s a s y i r m x c n e q
e a c q d i a u c l e s y e s g i h
t i i c d r u i f o e a r i m a n t
e f g a s s u b s t a n c u e v t e
m e c h a n i c a c a y n n y d y e
i l i i e x e r t c i x a l e e e e
a s e t c e l d c i i t m e n o g i
d s o n q s a g e i g s n t a c s c
x d a l e t s c a s c f g l s n r c
e t e l a a u d b e c s i e i d d q

Sight Words Activity Page

Have the students cut out the key words and glue them at the bottom of their pictures.



mechanical	substance	solid	liquid
exert	gravity	gas	force



STUDENT SUPPORT MATERIALS

Basic Reading • Encoding

Encoding Activity Page

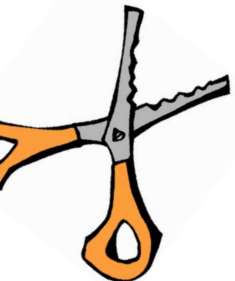
Have the students cut out and encode the syllables of the words, OR number the syllables in their correct sequence.



chan cal i me

ces sub stan

vi gra ty



Encoding Activity Page

Have the students cut out the word halves and glue them together to create the key words for this unit.



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sub

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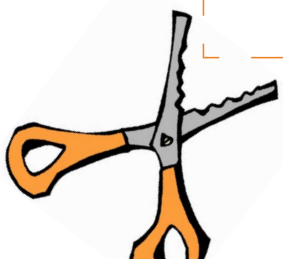
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STUDENT SUPPORT MATERIALS

Reading Comprehension

Reading Comprehension Activity Page

Have the students read the text and then select the correct answer for it. They should fill in the appropriate bullet beside the answer of their choice.



- ① Which of these is mechanical?
 - an apple
 - data
 - a machine
 - a gas

- ② How is a substance different from a mixture?
 - A substance is found in a state of electrical measurement.
 - A substance is pure and a mixture is not.
 - A substance has data that is not shared with a mixture.
 - A substance is a mix of matter and a mixture is pure.

- ③ What are the things that we know about solids.
 - Solids change their shapes based on the containers they are in.
 - Solids will fill up any space that they are put in.
 - Solids are a form of heat that causes chemical changes in matter.
 - Solids have both shape and size.

- ④ What are the things that we know about liquids?
 - You cannot measure liquids.
 - Liquids change their shapes based on the containers they are in.
 - Liquids are always pure.
 - Liquids always have the same shape and size.

- ⑤ What do we know about gases?
 - Gases are solids that identify data in matter.
 - Gases will fill whatever space they are in.
 - Gases melt in hot environments.
 - Gases create electrical energy that can be observed.

Reading Comprehension Activity Page



- 6 What does it mean to exert a force on something?
- It means to study the data from it.
 - It means to hypothesize about the state of the matter.
 - It means to put pressure on it.
 - It means to identify the best opinion for the problem.
- 7 Which one is caused by gravity?
- a mudslide
 - a hot-air balloon
 - a hypothesis
 - an environment
- 8 Which one of these uses a force?
- cutting an apple in half
 - looking at data
 - describing a communication you had
 - talking about the electrical light in the environment

Reading Comprehension Activity Page

Have the students write the letters for sentence halves that match.



- | | |
|-----------------------|--|
| ① Mechanical energy | ① fill whatever space it is in. |
| ② A substance | ② force on the earth. |
| ③ Solids | ③ by the moon. |
| ④ Liquids will | ④ is found in machines. |
| ⑤ A gas will | ⑤ have both shape and size. |
| ⑥ Gravity exerts | ⑥ when you pull a wagon. |
| ⑦ Gravity is affected | ⑦ is not a mixture. |
| ⑧ You use force | ⑧ change their shapes in different containers. |

1 → _____ 2 → _____ 3 → _____ 4 → _____

5 → _____ 6 → _____ 7 → _____ 8 → _____

Reading Comprehension Activity Page

Have the students cut out the words and glue them under their definitions.



This relates to machines.

Air is made of these.

This has shape and size that doesn't change on its own.

This keeps us from floating in space.

While their state may change, their properties remain the same.

to put force on something

This will fill any container and change shape.

This is what we exert when we push a car.



mechanical	substance	solid	liquid
exert	gravity	gas	force

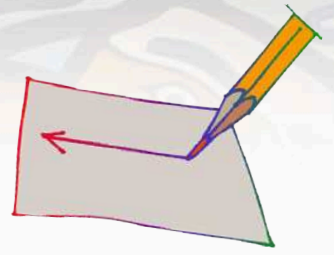


STUDENT SUPPORT MATERIALS

Basic Writing

Basic Writing Activity Page

Have the students write in the missing letters.



me _____ l

sub _____ e

s _____ d

l _____ d

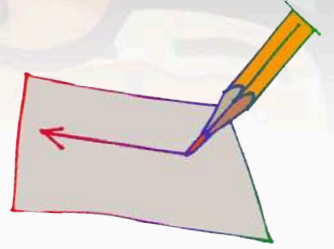
g _____

ex _____

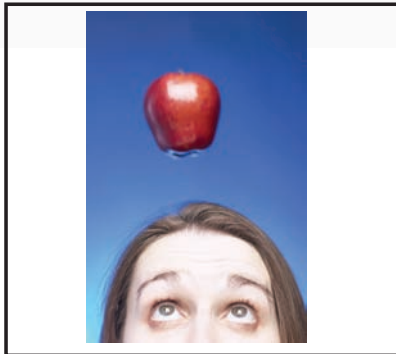
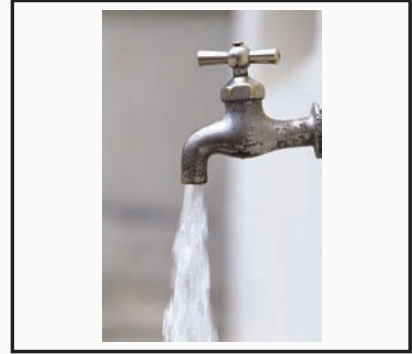
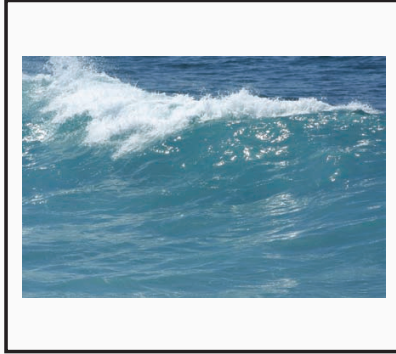
gr _____ y

f _____ e

Basic Writing Activity Page



Have the students write the word for each picture.

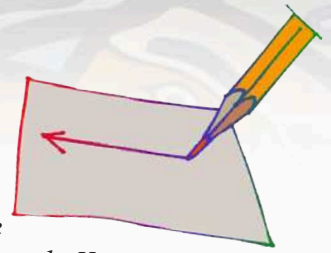




STUDENT SUPPORT MATERIALS

Creative Writing

Creative Writing Activity Page



Have the students write sentences of their own, using the key words from this unit. When the students' sentences are finished, have them take turns reading their sentences orally. The students should say "Blank" for the key words; the other students must name the "missing" words. You may wish to have the students write the "definitions" for the key words.

MECHANICAL

SUBSTANCE

SOLID

LIQUID

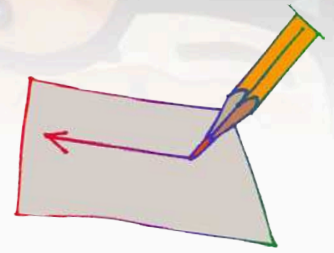
GAS

EXERT

GRAVITY

FORCE

Creative Writing Activity Page



Have the students write sentences of their own, based on the picture below. When finished, have each student read his/her sentences to the others.





UNIT ASSESSMENT

B-1: Concepts of Physical Science



SCIENCE PROGRAM

Unit Assessment Teacher's Notes
Grade 6 • Unit 4 (B-1)
Theme: Concepts of Physical Science

Date: _____



Unit Assessment

Provide each student with a copy of the students' pages. Read the following instructions aloud. The students should answer the questions on their copies of the assessment.

BASIC LISTENING

Turn to pages 1–2 in your test. Look at the pictures in the boxes.

1. Write the number 1 on top of the picture for **MECHANICAL**.
2. Write the number 2 on top of the picture for **SUBSTANCES**.
3. Write the number 3 on top of the picture for **SOLID**.
4. Write the number 4 on top of the picture for **LIQUID**.
5. Write the number 5 on top of the picture for **GAS**.
6. Write the number 6 on top of the picture for **EXERT**.
7. Write the number 7 on top of the picture for **GRAVITY**.
8. Write the number 8 on top of the picture for **FORCE**.

LISTENING COMPREHENSION

Turn to page 3 in your test. Listen to the sentences I say. Circle “T” for true and “F” for false sentences.”

1. Mechanical things help us to do things.
2. Data is one form of substance.
3. Air is an important solid.
4. Liquids can move from one area to another.
5. A gas is a solid that turns into a liquid.
6. We exert gravity on data when we hypothesize.
7. Gravity is a force that makes things fall to the earth.
8. Gas is a force that helps us to measure data.



Unit Assessment

Provide each student with a copy of the students' pages. Read the following instructions aloud. The students should answer the questions on their copies of the assessment.

SIGHT RECOGNITION

Turn to page 4 in your test. Look at the pictures in the boxes. Circle the word for each picture.

DECODING/ENCODING

Turn to page 5 in your test. Look at the word parts in the boxes. Circle the other half or part of each word.

READING COMPREHENSION

Turn to page 6 in your test. Read the sentence part and fill in the bullet for the correct sentence ending.

BASIC WRITING

Turn to page 7 in your test. Look at the pictures in the boxes. Write the word for each picture.

CREATIVE WRITING

Turn to page 8 in your test. Write a sentence of your own, using each word.

Teacher: To get a percentage for this student's assessment, divide the total number of questions correct by the total number of questions, then multiply this answer by 100 to determine the percentage of questions answered correctly.





SCIENCE PROGRAM

Unit Assessment Student Pages

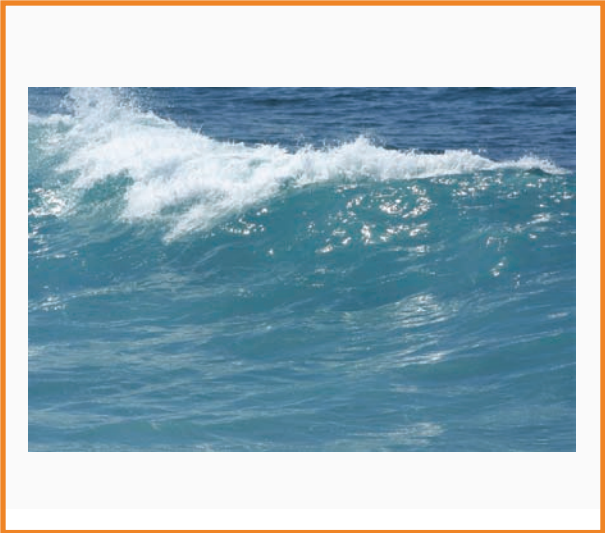
Grade 6 • Unit 4 (B-1)

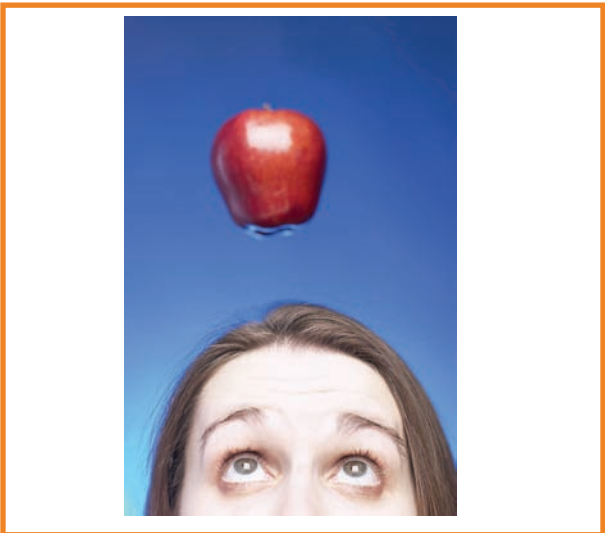
Theme: Concepts of Physical Science

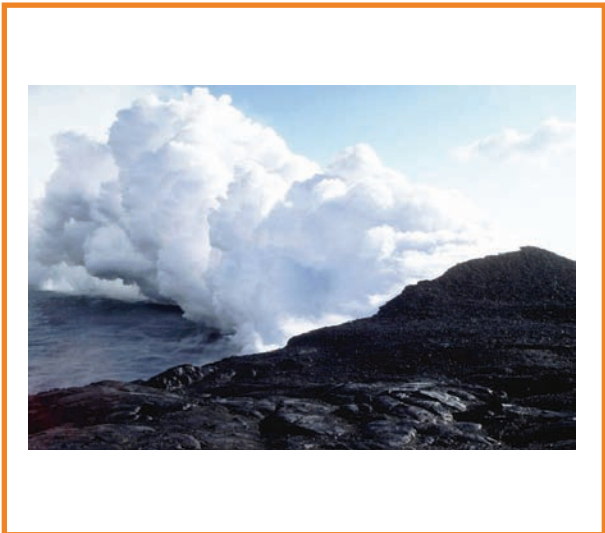
Date: _____ Student's Name: _____

Number Correct: _____ Percent Correct: _____







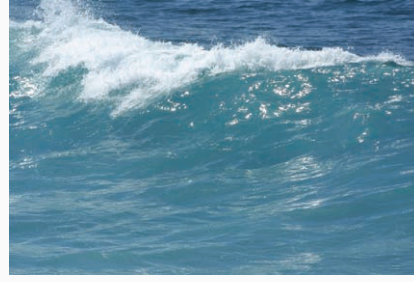




1. **T** **F**
2. **T** **F**
3. **T** **F**
4. **T** **F**
5. **T** **F**
6. **T** **F**
7. **T** **F**
8. **T** **F**



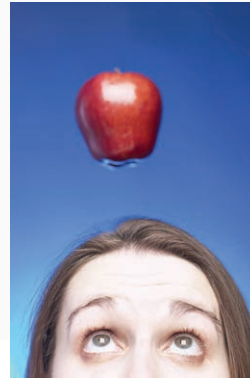
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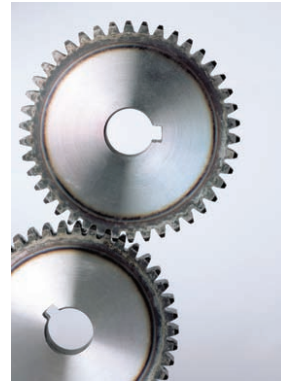
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- 
- 1 Mechanical things
- stop us from working.
 - can help us to work.
 - are gases.

- 2 Substances
- take up space.
 - identify data.
 - measure facts.

- 3 A solid
- is an opinion.
 - has shape.
 - is liquid.

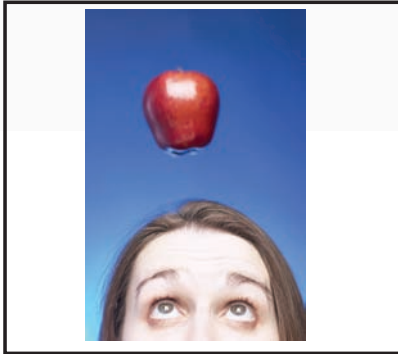
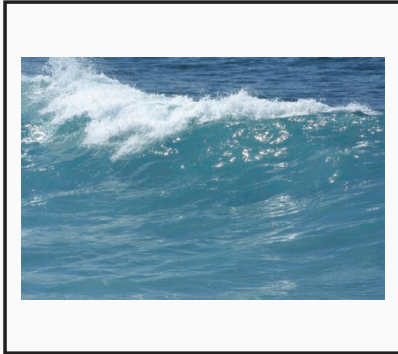
- 4 Liquids
- are solids.
 - are light energy.
 - can move.

- 5 Air is made of
- solids.
 - liquids.
 - gases.

- 6 We can exert energy on
- data.
 - opinions.
 - solids.

- 7 Gravity makes things
- go up.
 - fall down.
 - classify.

- 8 A force can make
- change.
 - no change.
 - infer data.





MECHANICAL

SUBSTANCES

SOLID

LIQUID

GAS

EXERTS

GRAVITY

FORCE
