

5 The table lists some physical properties of two objects.

Object 1	Object 2
Solid	Solid
Insulates thermal energy	Conducts thermal energy
Less dense than water	More dense than water
Poor electrical conductor	Good electrical conductor

Based on their properties, which of the objects is most likely a metal?

- A Object 1, because it is a solid that is less dense than water
- B Object 2, because all metals float in water
- C Object 2, because metals conduct thermal energy and electricity
- D Object 1, because it can be used to provide insulation for thermal energy

- 3 Students investigate the physical properties of some substances. They draw a table to show how the substances can be grouped. The students need to complete the table with column headings.

Physical Properties of Substances

?	?	?
<ul style="list-style-type: none"> • Aluminum foil • Brass key • Gold ring 	<ul style="list-style-type: none"> • Cooking oil • Soap bubble • Wood chip • Feather 	<ul style="list-style-type: none"> • Baking soda • Drink mix • White sugar

Which column headings should the students use for their table?

A

Good Insulators of Thermal Energy	Is Attracted by Magnets	Same Physical State
-----------------------------------	-------------------------	---------------------

B

Good Conductors of Electrical Energy	Less Dense than Water	Soluble in Water
--------------------------------------	-----------------------	------------------

C

Soluble in Water	Same Physical State	Less Dense than Water
------------------	---------------------	-----------------------

D

Is Attracted by Magnets	Good Conductors of Electrical Energy	Good Insulators of Thermal Energy
-------------------------	--------------------------------------	-----------------------------------

- 22 A student filled each of four beakers with 100 mL of water at 25 °C. The student added an equal amount of a different substance to each of the beakers of water.

Student Investigation

Substance	Appearance	Observations When Stirring	Observations After Stirring Stopped
Iron filings	Silvery gray	Particles swirling around	Particles settled to bottom of beaker
Papain	White powder	Cloudy changing to clear	Clear; no visible particles
Talcum powder	White powder	Floating on surface in clumps	Collected on beaker walls above liquid
Vegetable oil	Yellow liquid	Oil in clumps moving around	Formed a layer on top of water

Based on the student's observations in the table, how many of the substances did NOT dissolve in the water?

- F** 1 substance
- G** 2 substances
- H** 3 substances
- J** 4 substances

- 22 A student filled each of four beakers with 100 mL of water at 25 °C. The student added an equal amount of a different substance to each of the beakers of water.

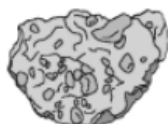
Student Investigation

Substance	Appearance	Observations When Stirring	Observations After Stirring Stopped
Iron filings	Silvery gray	Particles swirling around	Particles settled to bottom of beaker
Papain	White powder	Cloudy changing to clear	Clear; no visible particles
Talcum powder	White powder	Floating on surface in clumps	Collected on beaker walls above liquid
Vegetable oil	Yellow liquid	Oil in clumps moving around	Formed a layer on top of water

Based on the student's observations in the table, how many of the substances did NOT dissolve in the water?

- F 1 substance
- G 2 substances
- H 3 substances
- J 4 substances

- 16 A student compares the physical properties of the four objects shown.



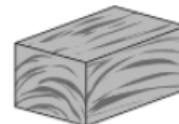
Rock



Rubber eraser



Paper cup



Wooden block

Which of these physical properties do all four objects have in common?

- F They all have the same physical state and conduct electricity.
- G They all conduct electricity and attract the same metal objects.
- H They all attract the same metal objects and are not soluble in water.
- J They all are not soluble in water and have the same physical state.

- 18** A student is asked to design a sleeve for a cup that will insulate thermal energy and not feel hot to the touch when the cup is filled with hot liquid.



The student has four materials to choose from. Which of these materials is least useful as an insulator?

- F** Cardboard
 - G** Aluminum
 - H** Rubber
 - J** Plastic
- 5** The table lists some physical properties of two objects.

Object 1	Object 2
Solid	Solid
Insulates thermal energy	Conducts thermal energy
Less dense than water	More dense than water
Poor electrical conductor	Good electrical conductor

Based on their properties, which of the objects is most likely a metal?

- A** Object 1, because it is a solid that is less dense than water
- B** Object 2, because all metals float in water
- C** Object 2, because metals conduct thermal energy and electricity
- D** Object 1, because it can be used to provide insulation for thermal energy

- 16 Students are investigating properties of objects. They observe four objects and record observations for each object in the table.

Properties of Four Objects

Object Label	Is a Liquid?	Is Attracted to a Magnet?	Is Soluble in Water?
K	Yes	No	No
L	No	Yes	No
M	No	No	Yes
N	No	No	No

Based on the students' observations, which of these tables properly identifies the objects?

F

Label	Object
K	Oil
L	Iron needle
M	Pancake syrup
N	Rubber ball

H

Label	Object
K	Pancake syrup
L	Safety pin
M	Cotton candy
N	Iron needle

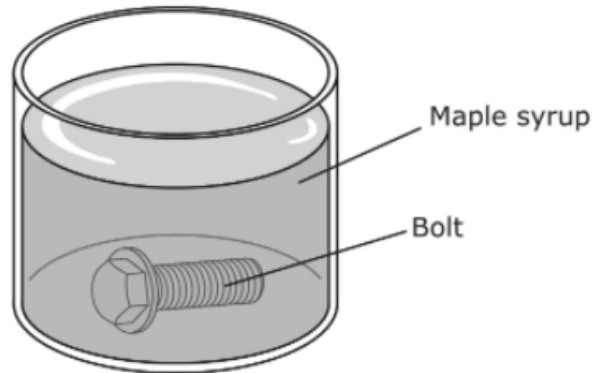
G

Label	Object
K	Pancake syrup
L	Sugar cube
M	Plastic dish
N	Cotton candy

J

Label	Object
K	Oil
L	Safety pin
M	Sugar cube
N	Rubber ball

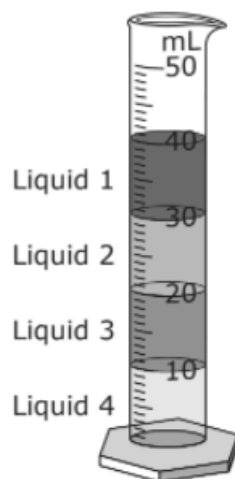
- 30** For an investigation a teacher dropped a bolt into a container of maple syrup and asked students to remove it without touching the syrup. The students first tried to use a strong magnet to remove the bolt, but it remained on the bottom of the container. They finally poured the syrup into another container to get the bolt out.



Which of these best describes some of the bolt's physical properties?

- F** The bolt is magnetic and has the same density as the maple syrup.
- G** The bolt is nonmagnetic and more dense than the maple syrup.
- H** The bolt is nonmagnetic and less dense than the maple syrup.
- J** The bolt is magnetic and less dense than the maple syrup.

- 29** A student measured out 10 mL of four clear liquids and added one drop of a different-colored dye to each liquid. One of the liquids was water. The student then carefully poured each liquid into a graduated cylinder and let the mixture settle for 30 minutes. The student observed that the liquids had separated into layers, as shown in the diagram.



Which of these procedures would help the student identify the layer of water?

- A** Stir the liquids, let them settle, and then identify the bottom layer as water
- B** Drop a piece of ice into the graduated cylinder, let the ice settle, and then identify the layer just above the ice as water
- C** Add water to the graduated cylinder, let the mixture settle, and then identify the layer that increases in volume as water
- D** Carefully pour each layer into separate plastic containers, place the containers in a freezer, and then identify the liquid that takes the longest to freeze as water

- 16 Students are investigating properties of objects. They observe four objects and record observations for each object in the table.

Properties of Four Objects

Object Label	Is a Liquid?	Is Attracted to a Magnet?	Is Soluble in Water?
K	Yes	No	No
L	No	Yes	No
M	No	No	Yes
N	No	No	No

Based on the students' observations, which of these tables properly identifies the objects?

F

Label	Object
K	Oil
L	Iron needle
M	Pancake syrup
N	Rubber ball

H

Label	Object
K	Pancake syrup
L	Safety pin
M	Cotton candy
N	Iron needle

G

Label	Object
K	Pancake syrup
L	Sugar cube
M	Plastic dish
N	Cotton candy

J

Label	Object
K	Oil
L	Safety pin
M	Sugar cube
N	Rubber ball

- 30** A student wants to classify four different objects based on physical properties. The student uses the questions shown in the table to test each object.

Materials	Physical Properties		
	Insulate Thermal Energy?	Float in Water?	Conduct Electrical Energy?
1	Yes	No	No
2	No	No	Yes
3	Yes	Yes	No
4	No	No	Yes

Materials



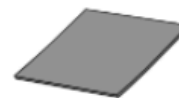
Aluminum washer



Copper wire



Rubber ball



Piece of cardboard

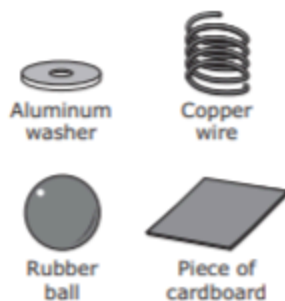
Which statement correctly identifies two of the materials based on the classification of properties in the table?

- F** Material 1 is a rubber ball.
Material 2 is a piece of cardboard.
- G** Material 2 is an aluminum washer.
Material 3 is a copper wire.
- H** Material 3 is a piece of cardboard.
Material 4 is an aluminum washer.
- J** Material 1 is a copper wire.
Material 4 is a rubber ball.

- 30 A student wants to classify four different objects based on physical properties. The student uses the questions shown in the table to test each object.

Materials	Physical Properties		
	Insulate Thermal Energy?	Float in Water?	Conduct Electrical Energy?
1	Yes	No	No
2	No	No	Yes
3	Yes	Yes	No
4	No	No	Yes

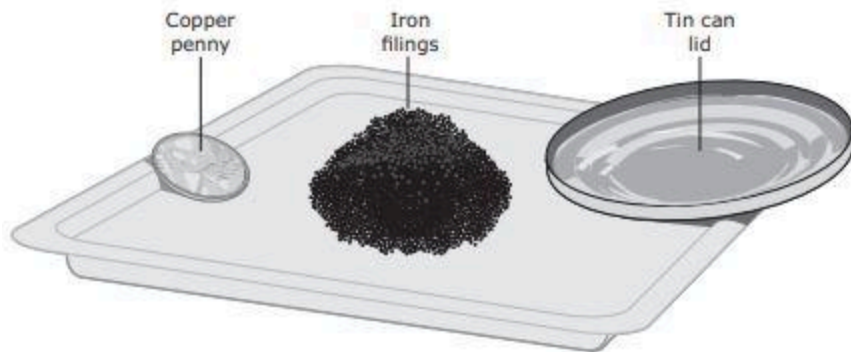
Materials



Which statement correctly identifies two of the materials based on the classification of properties in the table?

- F** Material 1 is a rubber ball.
Material 2 is a piece of cardboard.
- G** Material 2 is an aluminum washer.
Material 3 is a copper wire.
- H** Material 3 is a piece of cardboard.
Material 4 is an aluminum washer.
- J** Material 1 is a copper wire.
Material 4 is a rubber ball.

- 34 Students observe some objects on a lab tray. The students will classify the objects based on physical properties common to all of the objects.



Based on their common properties, how should these objects be classified?

- | | | | |
|----------|---|----------|--|
| F | <p>Insulate thermal energy</p> <p>Bendable</p> <p>Attract to magnets</p> | H | <p>Conduct electrical energy</p> <p>Bendable</p> <p>Soluble in water</p> |
| G | <p>Soluble in water</p> <p>Attract to magnets</p> <p>Conduct thermal energy</p> | J | <p>Conduct thermal energy</p> <p>Conduct electrical energy</p> <p>Not soluble in water</p> |

- 4 A student places objects in a bucket of water to determine if they will float.

Object
Toothpick
Plastic paper clip
Penny
Cork
Metal spoon
Vegetable oil

Which set of items is less dense than water?

- F** Plastic paper clip, penny, and cork
- G** Toothpick, metal spoon, and plastic paper clip
- H** Metal spoon, vegetable oil, and penny
- J** Toothpick, cork, and vegetable oil