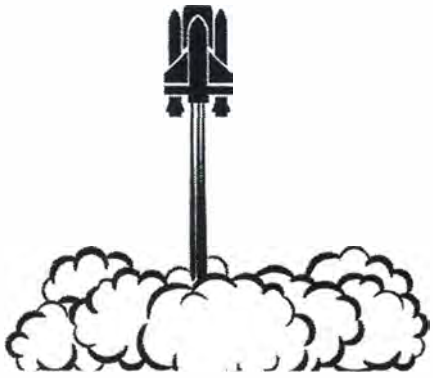
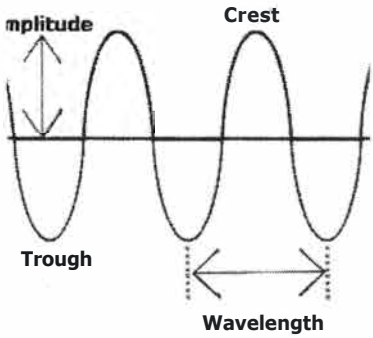
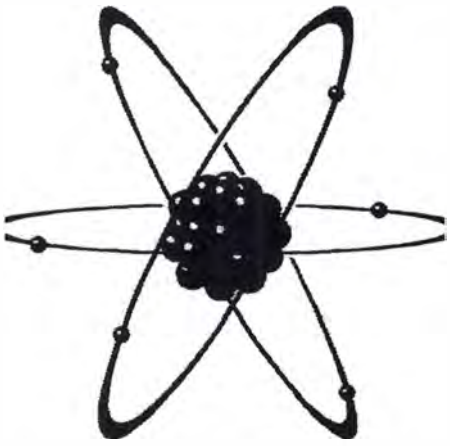






Students Entering Physical Science

Physical Science Gilted/Honors Summer Packet

Summer2017

Student Name: _____

2017-2018: Teacher: _____

1. You spill a little water on a tile floor but don't have time to wipe it up. A few hours later, most of the water is gone. What happened to the water?

   A. The water molecules were destroyed.

   B. The water molecules got smaller and now take up less space.

   C. The water molecules became a gas and are now part of the air.

   D. The water molecules broke down into hydrogen and oxygen atoms, which are now in the air.

2. You wash a pair of jeans. You hang the wet jeans on a clothesline. A few hours later, the jeans are dry. What happened to the water molecules?

   A. The water molecules became part of the jeans.

   B. The water molecules disappeared and no longer exist.

   C. The water molecules moved faster and became part of the air.

   D. The water molecules broke down into hydrogen and oxygen atoms.

3. In a cup of liquid water, when would the water molecules stop moving?

   A. The molecules would stop moving if the liquid water in the cup became a solid.

   B. The molecules would stop moving if the liquid water in the cup became a gas.

   C. The molecules would stop moving if the liquid water in the cup became still.

   D. The molecules would not stop moving in the cup of liquid water.

4. A balloon full of air is placed on a chair. Which of the following statements about the atoms and molecules of the chair and the atoms and molecules of the air in the balloon is TRUE?

   A. The atoms and molecules of both the chair and the air in the balloon are moving.

   B. The atoms and molecules of both the chair and the air in the balloon are not moving.

   C. The atoms and molecules of the chair are not moving, and the atoms and molecules of the air in the balloon are moving.

   D. The atoms and molecules of the chair are moving, and the atoms and molecules of the air in the balloon are not moving.

5. The windows of your school are made of glass. Which of the following statements describes the motion of the molecules that make up the glass?

   A. The molecules of the glass are never moving.

   B. The molecules of the glass are always moving.

   C. The molecules of the glass move only when the sun warms the window.

   D. The molecules of the glass move only when the window is being opened or closed.

6. In which state of matter is the connection between the molecules the strongest?

   A. A gas

   B. A liquid

   C. A solid

   D. All are equal.

7. There is a solid wooden table with a cup of water sitting on it. Which of the following statements about the atoms and molecules of the table and the atoms and molecules of the water is TRUE?

   A. The atoms and molecules of both the liquid water and the table are moving.

   B. The atoms and molecules of both the liquid water and the table are not moving.

   C. The atoms and molecules of the liquid water are not moving, and the atoms and molecules of the table are moving.

   D. The atoms and molecules of the liquid water are moving, and the atoms and molecules of the table are not moving.

8. A piece of solid wax is placed in a pan and heated on a stove. After a while, the solid wax becomes a liquid. Which one of the following explains why the wax becomes a liquid?

   A. Some of the wax molecules get smaller.

   B. Some of the wax molecules are destroyed.

   C. The wax molecules change into water molecules.

   D. The wax molecules are more loosely connected to each other.

9. Why can gases be compressed more easily than solids?

   A. Because the molecules of gases are softer than the molecules of solids

   B. Because the molecules of gases weigh less than the molecules of solids

   C. Because the molecules of gases move faster than the molecules of solids

   D. Because the molecules of gases are farther apart than the molecules of solids

10. A consumer group wants to find out which of two new car models gets the best gas mileage. A car's gas mileage is the number of miles a car can go for each gallon of gas it uses.

They decide to fill the gas tanks of each car with the same amount of gas and compare how far each car goes. They use "regular" grade gas in both cars. Neither car gets the "premium" grade gas.


CAR MODEL A


CAR MODEL B

Why is it important that the two cars get the same grade of gas?

A. By using the same grade of gas, the consumer group can learn both which car model gets the best mileage and which grade of gas gives the best mileage.

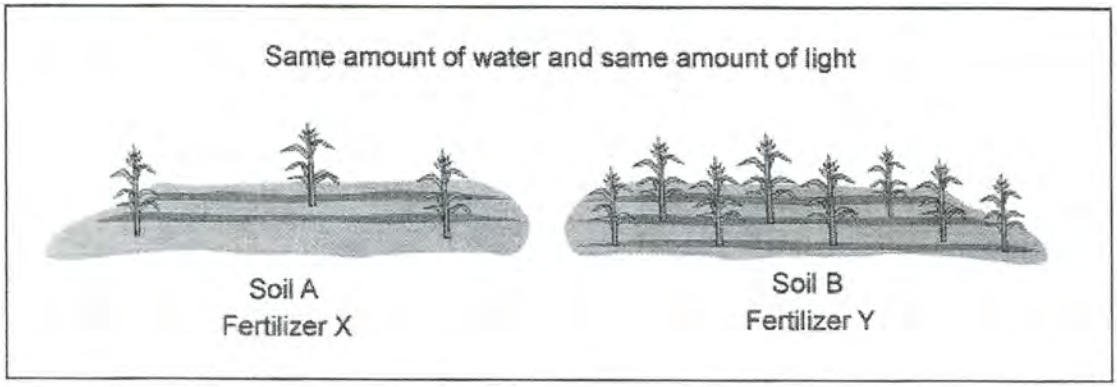
B. By using the same grade of gas, the consumer group can learn which grade of gas gives the best mileage.

C. If the cars do not get the same grade of gas, the consumer group cannot find out which car model has the best mileage.

D. It is NOT important for both cars to have the same grade of gas because they are not testing which grade of gas gives the best mileage.

11. A farmer wants to find out which type of soil is best for growing his corn. He also wants to find out which type of fertilizer is best for growing his corn.

He does the following experiment using two different types of soil and two different types of fertilizer:



What can the farmer conclude from this experiment?

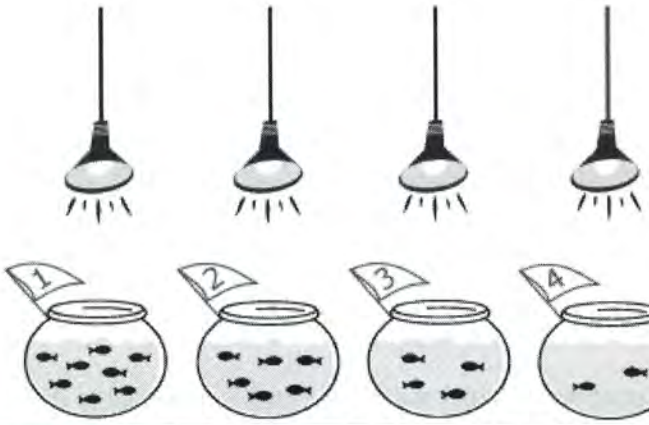
A. He can conclude that Soil B is the best soil for growing his corn.

B. He can conclude that Fertilizer Y is the best fertilizer for growing his corn.

C. He can conclude that Soil B is the best soil for growing his corn and that Fertilizer Y is the best fertilizer for growing his corn.

D. It is NOT possible to conclude from this experiment which soil is best for growing his corn or which fertilizer is best for growing his corn.

12. A student is interested in the behavior of fish. He has 4 fish bowls and 20 goldfish. He puts 8 fish in the first bowl, 6 fish in the second bowl, 4 fish in the third bowl and 2 fish in the fourth bowl.He places each fish bowl under light, he keeps the temperature at 75°F for all four bowls, and he observes the behavior of the fish.



Number of fish	8 fish	6 fish	4 fish	2 fish
Temperature	75°F	75°F	75°F	75°F

What can the student find out from doing just this experiment?

A. If the number of fish in the fish bowl affects the behavior of the fish.

B. If the temperature of the fish bowl affects the behavior of the fish.

C. If the temperature of the fish bowl and the amount of light affect the behavior of the fish.

D. If the number of fish, the temperature, and the amount of light affect the behavior of the fish.

13. A student wants to find out if a particular kind of plant grows better in the sun or in the shade. She has two identical plants. She places one plant in sand and sets the plant in the sunlight. She adds minerals and water to the sand.

Sunlight

Water and minerals

Which of the following conditions should she use for the second plant to determine the effect of light?

A. Sunlight

Water and minerals

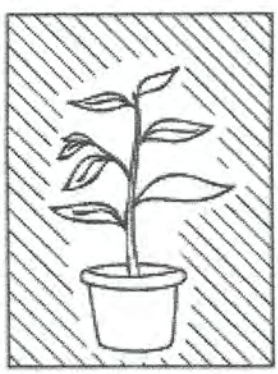
B. Sunlight

Water

C. Shade

Water and minerals

D. Shade



Water

14. To conserve energy, a college student wants to find out the lowest water temperature and the shortest length of time that is needed to wash his clothes and get them clean.

    First he tests the effect of water temperature. He washes one shirt in hot water, one shirt in warm water, and one shirt in cold water. The shirts are identical and have identical stains. He uses the same detergent and washes the shirts for the same length of time.

    Why is it important to wash the shirts for the same length of time?

    A. By washing the shirts for the same length of time the student can find out both the lowest temperature and the shortest length of time that is needed.

    B. By washing the shirts for the same length of time the student can find out the shortest length of time that is needed.

    C. If he does not wash the shirts for the same length of time the student cannot find the lowest water temperature that is needed.

    D. It is NOT important to wash each shirt for the same length of time because the student is not testing the length of time that is needed.

15. Balloon 1 and Balloon 2 are filled with the same amount of air. The air in Balloon 1 is cooled so that it is at a lower temperature than the air in Balloon 2. The air in which of these balloons has less thermal energy?

    A. The air in Balloon 1 has less thermal energy.

    B. The air in Balloon 2 has less thermal energy.

    C. The air in Balloon 1 and the air in Balloon 2 have the same amount of thermal energy.

    D. Neither the air in Balloon 1 nor the air in Balloon 2 has any thermal energy.

16. The temperature of a clay ball is 50°F and the temperature of the water in a bucket is 80°F. A student places the clay ball into the bucket of water. Which of the following describes how thermal energy is transferred between the ball and the water?

    A. Thermal energy is transferred from the ball to the water until they are both at 75°F.

    B. Thermal energy is transferred from the water to the ball until they are both at 75°F.

    C. Thermal energy is transferred from the water to the ball until the ball is at 80°F and the water is at 50°F.

    D. No thermal energy would be transferred between the ball and the water, so the ball will stay at 50°F and the water will stay at 80°F.

17. Two cars are traveling down a road at the same speed. Car 1 has more motion energy (kinetic energy) than Car 2. Does Car 1 weigh more than, less than, or the same as Car 2?

    A. Car 1 weighs more than Car 2.

    B. Car 1 weighs less than Car 2.

    C. Car 1 weighs the same as Car 2.

    D. More information is needed to compare the weights of the cars.

18. A cold object is in contact with a warm object. Which of the following describes the transfer of energy between the two objects?

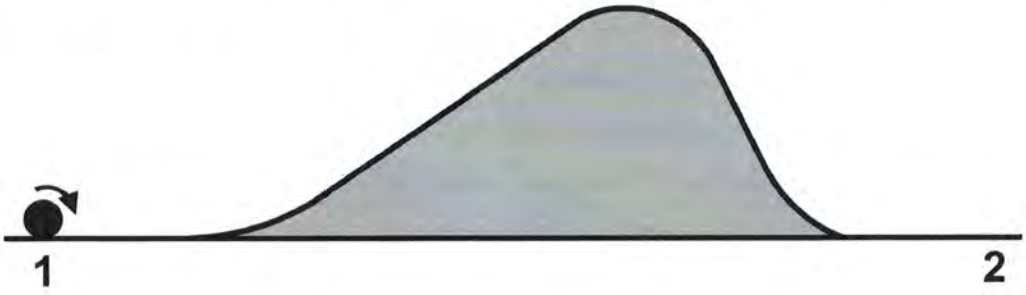
    A. Thermal energy is transferred from the warm object to the cold object.

    B. Cold energy is transferred from the cold object to the warm object.

    C. Thermal energy is transferred from the warm object to the cold object, and cold energy is transferred from the cold object to the warm object.

    D. No energy is transferred between the cold object and the warm object.

19. Imagine a ball on a track where no energy is transferred between the ball and the track or between the ball and the air around it. It is going fast enough at Position 1 so that it will go over a hill on the track and past Position 2. Position 1 and Position 2 are at the same height.



Will it be going faster, slower, or at the same speed at Position 2 compared to Position 1 and why? (Remember that no energy is transferred between the ball and the track or between the ball and the air around it.)

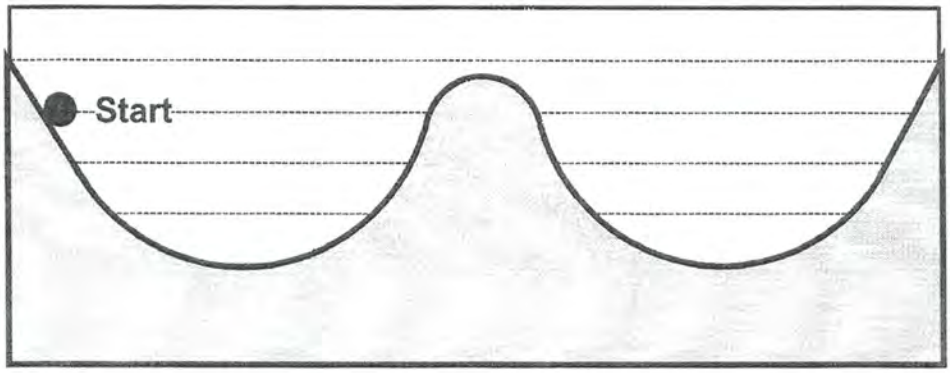
A. Faster, because new energy in the form of motion energy (kinetic energy) was made when the ball went down the steep side of the hill

B. Slower, because motion energy (kinetic energy) was used up when the ball went up the long side of the hill

C. The same speed, because the amount of motion energy (kinetic energy) that the ball has remained the same the entire time it was moving along the track

D. The same speed, because the total amount of energy in the system (ball and track) did not change as the ball moved along the track

20. Imagine a ball on a track where no energy is transferred between the ball and the track or between the ball and the air around it. The ball starts from rest at the position labeled Start.



Will the ball have enough energy to go over the hill on the track and why? (Remember that no energy is transferred between the ball and the track or between the ball and the air around it.)

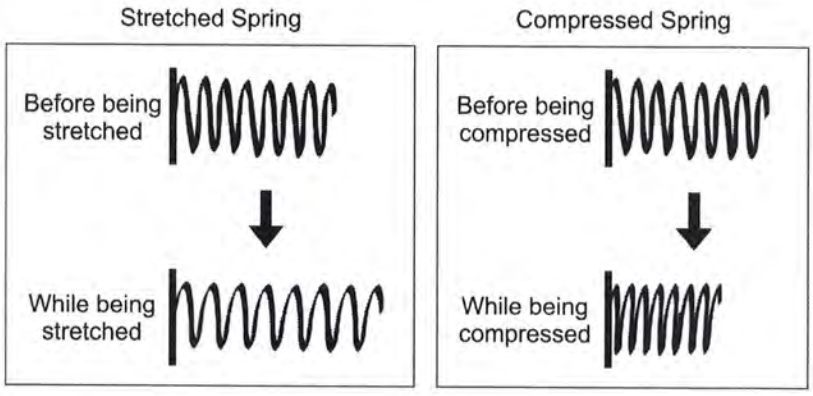
A. Yes, because the energy that the ball gains as it goes down the first part of the track will be greater than the amount of energy it will lose as it goes up the hill

B. Yes, because the ball gains energy the entire time it is moving, so it will have enough energy to go over the hill

C. No, because the total amount of energy in the system remains the same, which means that the ball cannot go any higher than the point which it started from

D. No, because the total amount of energy of the ball will decrease as it moves along the track, and it will not have enough energy to go over the hill

21. A student has two identical springs. He stretches one spring and compresses the other spring.



Which of the following describes the elastic energy of the springs while they are being stretched or compressed?

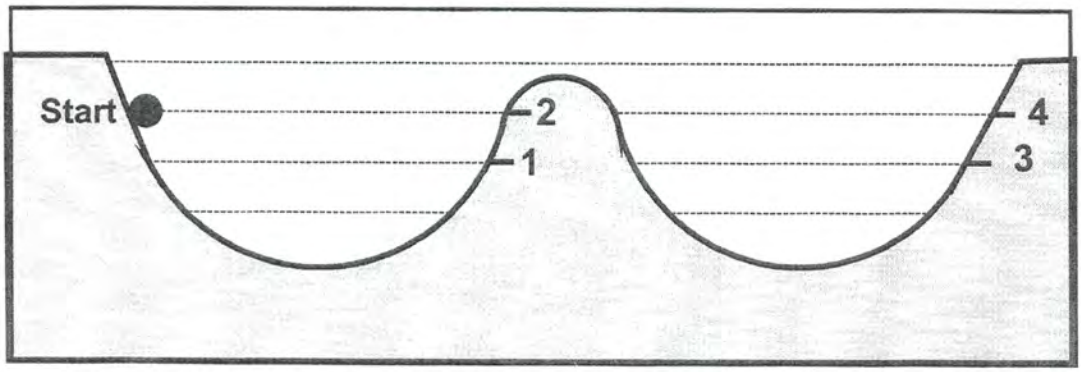
A. Both the compressed spring and the stretched spring have elastic energy.

B. The compressed spring has elastic energy, but the stretched spring does not.

C. The stretched spring has elastic energy, but the compressed spring does not.

D. Neither the compressed spring nor the stretched spring has elastic energy.

22. Imagine a ball on a track where no energy is transferred between the ball and the track or between the ball and the air around it. The ball starts from rest at the position labeled Start and moves along the track toward Positions 1, 2, 3, and 4.



What is the highest position the ball will reach before stopping and going back down the track? (Remember that no energy is transferred between the ball and the track or between the ball and the air around it.)

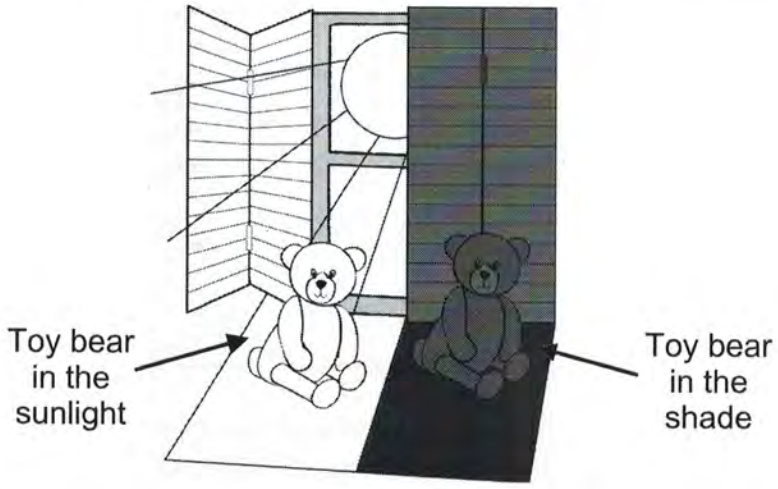
A. Position 1

B. Position 2

C. Position 3

D. Position 4

23. A student places two identical toy bears on a shelf near a window. The bears are at the same temperature. Then the student opens the shutters on the window so that the sun shines on one of the bears but not on the other.



Which of the following describes the thermal energy of the bears?

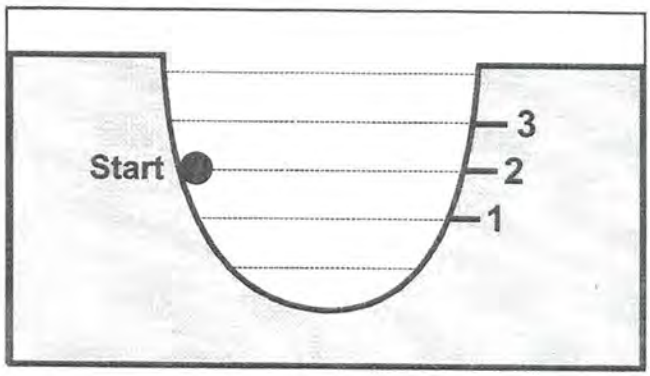
A. The thermal energy of both bears will be the same because they are both in the same room.

B. The thermal energy of both bears will be the same because they are identical bears and started out at the same temperature.

C. The thermal energy of the bear in the sunlight will be greater than the thermal energy of the bear in the shade because more energy was transferred directly from the sun to the bear in the sunlight.

D. The thermal energy of the bear in the sunlight will be greater than the thermal energy of the bear in the shade because more energy was transferred from the air to the bear in the sunlight but not directly from the sun.

24. Imagine a ball on a track where no energy is transferred between the ball and the track or between the ball and the air around it. The ball starts from rest at the position labeled Start and moves along the track toward Positions 1, 2, and 3.



What is the highest position the ball will reach before stopping and going back down the track? (Remember that no energy is transferred between the ball and the track or between the ball and the air around it.)

A. Position 1

B. Position 2

C. Position 3

D. It depends on how much the ball weighs.

25. A cook uses an iron frying pan to cook a meal. After cooking, he places the hot frying pan on the counter. After a while, the frying pan, the counter, and the air in the room will be at the same temperature. Why?

A. Because thermal energy will be transferred from the frying pan to the counter and from the frying pan to the air

B. Because coldness will be transferred from the counter to the frying pan and from the air to the frying pan

C. Because thermal energy will be transferred from the frying pan to the counter and from the frying pan to the air, and coldness will be transferred from the counter to the frying pan and from the air to the frying pan

D. Because thermal energy will be transferred from the frying pan to the air, but thermal energy will not be transferred from the frying pan to the counter.

26. Consider the following situations:

Situation 1: A cold spoon is placed in a cup of hot tea.

Situation 2: A spring is used to roll a ball across the floor.

Is energy being transferred in either of these situations?

A. Energy is transferred in both situations.

B. Energy is NOT transferred in either situation.

C. Energy is transferred when a cold spoon is placed in a cup of hot tea, but energy is NOT transferred when a spring is used to roll a ball across the floor.

D. Energy is transferred when a spring is used to roll a ball across the floor, but energy is NOT transferred when a cold spoon is placed in a cup of hot tea.

27. A student determines the volume, density, and boiling point of three colorless liquids and lists them in the table below.

	Volume (mL)	Density (g/mL)	Boiling Point (°C)	Color
Liquid 1	10	0.79	56	colorless
Liquid 2	50	0.79	78	colorless
Liquid 3	10	1.0	100	colorless

Could any of the liquids be the same substance?

A. Liquids 1 and 2 could be the same substance.

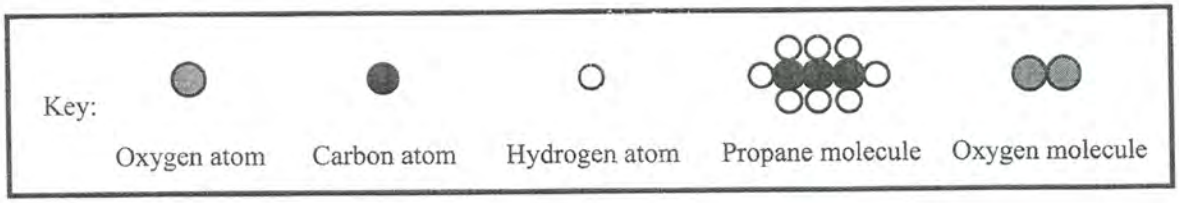
B. Liquids 1 and 3 could be the same substance.

C. All of the liquids could be the same substance.

D. None of the liquids could be the same substance.

28. In the diagrams below, atoms are represented by circles, and molecules are represented by circles that are connected to each other. The different colored circles represent different kinds of atoms.

A propane molecule is made up of 3 carbon atoms and 8 hydrogen atoms. An oxygen molecule is made up of 2 oxygen atoms.

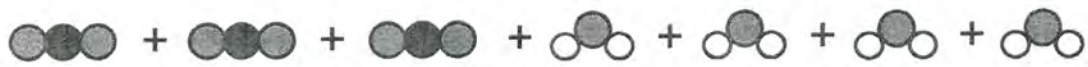


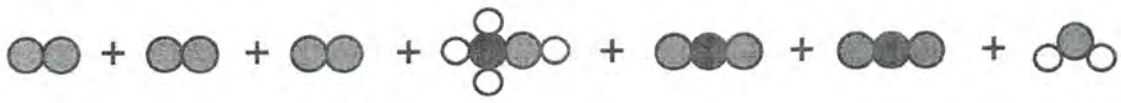
This diagram shows one propane molecule and five oxygen molecules.

Which of the following diagrams could represent the molecules formed when propane and oxygen molecules react?

A. 

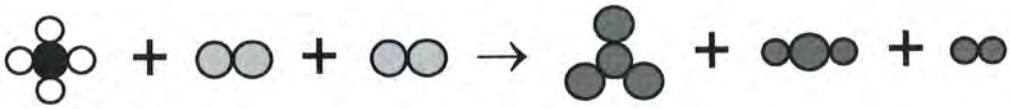
B. 

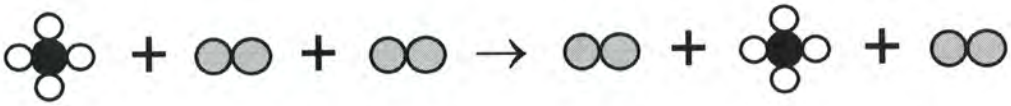
C. 

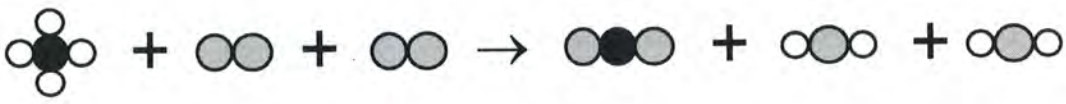
D. 

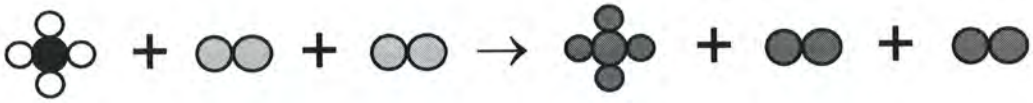
29. Which of the following could represent a chemical reaction?

Atoms are represented by circles, and molecules are represented by circles that are connected to each other. The different colored circles represent different kinds of atoms.

A. 

B. 

C. 

D. 

30. A student determines the density, solubility, and boiling point of two liquids, Liquid 1 and Liquid 2. Then he stirs the two liquids together and heats them. After stirring and heating the liquids, two different liquids form, Liquid 3 and Liquid 4. Then the student determines the density, solubility, and boiling point of Liquids 3 and 4. He concludes that a chemical reaction occurred. Here are his results:

		Density (g/mL)	Soluble in Water	Boiling Point (°C)
Before stirring and heating	Liquid 1	0.96	Yes	164
	Liquid 2	0.81	Yes	118
After stirring and heating	Liquid 3	0.87	Yes	166
	Liquid 4	1.00	Yes	100

How does the student know that a chemical reaction has occurred?

A. The student knows that a chemical reaction has occurred because Liquid 3 has different properties than Liquid 4.

B. The student knows that a chemical reaction has occurred because Liquid 1 has different properties than Liquid 2.

C. The student knows that a chemical reaction has occurred because Liquids 3 and 4 have different properties than Liquids 1 and 2.

D. The student knows that a chemical reaction has occurred because a chemical reaction always occurs when two liquids are mixed together.

31. The table below gives the speed of an object every minute from 9:00 am to 9:06 am.

Time →	9:00 am	9:01 am	9:02 am	9:03 am	9:04 am	9:05 am	9:06 am
Speed →	10 m/s	10 m/s	10 m/s	10 m/s	11 m/s	12 m/s	13 m/s

Which of the following sets of forces could cause this motion?

A. From 9:00 am to 9:03 am, there is a single force of constant strength acting on the object. From 9:03 am to 9:06 am, there are no forces acting on the object.

B. From 9:00 am to 9:03 am, there are no forces acting on the object. From 9:03 am to 9:06 am, there is a single force of constant strength acting on the object.

C. From 9:00 am to 9:03 am, there is a single force of constant strength acting on the object. From 9:03 am to 9:06 am, there is a single force of increasing strength acting on the object.

D. From 9:00 am to 9:03 am, there is a single force of constant strength acting on the object. From 9:03 am to 9:06 am, there is another constant force of greater strength acting on the object.

32. Using the information about the four liquids in the table below, which of the following liquids could be the same substance?

	Volume (mL)	Boiling Point (°C)	Color
Liquid 1	25	100	colorless
Liquid 2	50	100	colorless
Liquid 3	25	78	colorless
Liquid 4	25	100	yellow

A. Liquids 1 and 2

B. Liquids 1 and 3

C. Liquids 1 and 4

D. None of the liquids could be the same substance.

33. Which of the following is an example of a chemical reaction?

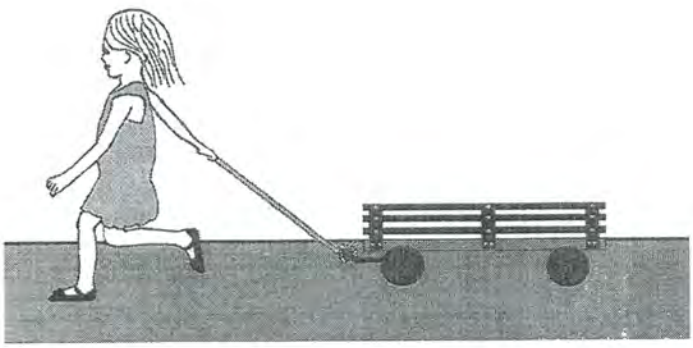
A. A piece of wax melting and forming a liquid

B. A piece of chalk making white marks on a chalkboard

C. Bubbles of gas forming when a seashell is placed in vinegar

D. A powder dissolving in hot water to make hot chocolate

34. A girl is pulling a wagon on level ground. She is running at constant speed and pulling on the wagon with constant force.



Could the wagon move faster than the girl is running?

A. Yes, but only if she wasn't running fast.

B. Yes, but only if she pulled harder and harder.

C. Yes, but only if the force of her pull on the wagon was greater than the force of friction on the wagon.

D. No, because if she was pulling with constant force, the wagon would have to move at constant speed.

35. Which of the following statements about chemical reactions is TRUE?

A. Chemical reactions produce solids, liquids, or gases.

B. Chemical reactions produce solids and gases but not liquids.

C. Chemical reactions occur between liquids but not between gases or solids.

D. Chemical reactions occur between solids and liquids but not between solids and gases.

36. Which of the following is a characteristic property of a pure substance?

A. How much of the substance dissolves in water

B. How much space the substance takes up

C. What the temperature of the substance is

D. What the width of the substance is

37. Which of the following is an example of a chemical reaction?

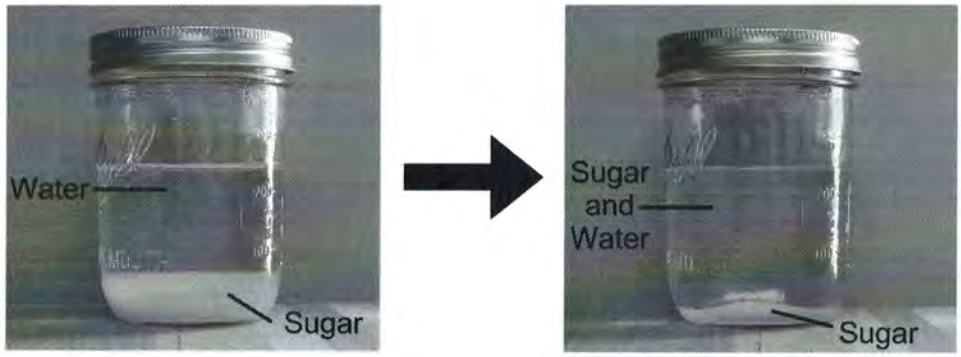
A. A marshmallow turning black when heated over a fire

B. A powder dissolving in water to make lemonade

C. An ice cube melting into a puddle of water

D. Salt crystals being crushed into a powder

38. A student adds water and sugar to a jar and seals the jar so that nothing can get in or out. The student then weighs the jar containing the water and sugar. After some sugar dissolves, the student weighs the jar and its contents again.



What will happen to the weight of the jar containing the water and sugar after some of the sugar dissolves?

A. The weight will stay the same.

B. The weight will increase.

C. The weight will decrease.

D. The weight will depend on how much sugar dissolves.

39. A reaction occurs between two liquid substances in a sealed jar. What will happen to the mass of the sealed jar and its contents after the reaction occurs?

A. The mass will change if a gas is formed, and it will change if a solid is formed.

B. The mass will change if a gas is formed, but it will not change if a solid is formed.

C. The mass will change if a solid is formed, but it will not change if a gas is formed.

D. The mass will not change if a gas is formed, and it will not change if a solid is formed.

40. Which of the following could represent a chemical reaction?

Atoms are represented by circles, and molecules are represented by circles that are connected to each other. The different colored circles represent different kinds of atoms.

A. 

B. 

C. 

D. 

41. Which of the following is an example of a chemical reaction?

A. Aluminum foil being cut into smaller pieces

B. A drop of food coloring dissolving in water

C. Melted butter becoming a solid when placed in the refrigerator

D. The surface of a copper penny changing color after being in a drawer for years