



# ES Science Grade 8

## Smith ES Science, 8 Unit\_1

### Chemistry

**WAKE COUNTY SCHOOLS**

**2013 - 2014**

---

**ALL RIGHTS RESERVED**

Content of this booklet is subject to copyright and restrictions of several organizations, companies and authors. You may distribute this test only to the actively subscribed students during the specific subscription term and as per the subscription agreement terms

1. Scientists recently observed undersea volcanic eruptions off the coast of Oregon. They noted that the volcano ejected many different types of substances. Gaseous carbon dioxide bubbled upward for hundreds of meters. Basaltic magma poured down the slope of the vent, accumulating at its base. White floc was launched through the water, landing up to 200 meters from the vent or top of the volcano. What substance had the greatest density?

- A. the basaltic magma
- B. the gaseous carbon dioxide
- C. the ocean water
- D. the white floc

2. Adding so much sugar to water that the sugar does not dissolve in the water but sinks to the bottom of the container creates a saturated solution. Supersaturated solutions can be made, but the solvent must be altered. What could be done to make a supersaturated sugar solution?

- A. Cool the water.
- B. Heat the water.
- C. Use a bigger container.
- D. Use a smaller container.

3. Use the blank periodic table to answer the question.

The diagram shows a blank periodic table with four numbered boxes:

- Box 1: Located in the top-left corner, representing Hydrogen (H).
- Box 2: Located in the middle of the periodic table, representing a transition metal.
- Box 3: Located in the bottom-right corner, representing a noble gas.
- Box 4: Located in the top-right corner, representing Helium (He).

Which number would *most likely* represent a synthetic element?

- A. 1
- B. 2
- C. 3
- D. 4

4. Use the blank periodic table to answer the question.

Which word would *best* describe the element in the box numbered "2"?

- A. brittle
- B. gas
- C. malleable
- D. semiconductor

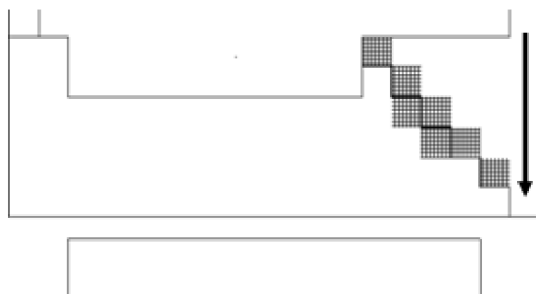
5. Review the portion of the periodic table shown.

6 <b>C</b> Carbon 12.011	7 <b>N</b> Nitrogen 14.007	8 <b>O</b> Oxygen 15.999
14 <b>Si</b> Silicon 28.086	15 <b>P</b> Phosphorus 30.974	16 <b>S</b> Sulfur 32.06

Which statement about the elements is true?

- A. Oxygen and sulfur share similar properties.
  - B. Carbon and nitrogen share similar properties.
  - C. Carbon and silicon have the same number of electrons.
  - D. Oxygen and phosphorus have the same number of protons.
6. An atom of a particular element has 15 protons, 16 neutrons and 15 electrons. What other atom would correspond to the same element on the periodic table?
- A. 13 protons, 18 neutrons, 15 electrons
  - B. 15 protons, 17 neutrons, 18 electrons
  - C. 16 protons, 15 neutrons, 15 electrons
  - D. 17 protons, 16 neutrons, 17 electrons

7. The periodic table organizes elements.



What is identified in the illustration?

- A. alkalines
  - B. metals
  - C. noble gases
  - D. transition metals
8. Which type of water has the *greatest* density?
- A. cold water
  - B. ice cubes
  - C. warm water
  - D. water vapor
9. Which is the *best* evidence that a chemical change has occurred?
- A. change in color
  - B. new substance is made
  - C. change in odor
  - D. a gas is produced

10. Review the table below.

Substance	Melting Point (°C)	Boiling Point (°C)
Water	0	100
Ethanol	-117	79
Propane	-190	-42
Table salt	801	1,465

At room temperature (approximately 20°C), what *best* describes ethanol's state of matter?

- A. gas
  - B. liquid
  - C. plasma
  - D. solid
11. Review the table that lists the densities of four common substances.

**Average Densities of Substances**

Substance	Density (g/mL)
Ethanol	0.81
Olive oil	0.92
Water	1.00
Glycerin	1.26

Which substance(s) would *most likely* float a solid ball with a density of 1.1 g/mL?

- A. olive oil and water
- B. water and glycerin
- C. water only
- D. glycerin only

12. Review the diagram of the ball in the beaker of liquid.

Density of liquid in beaker =  
1.05 g/mL

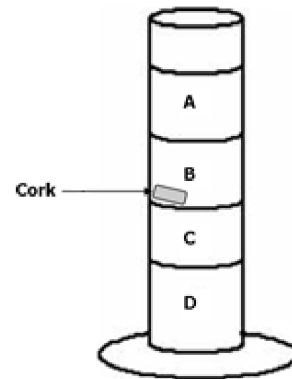
Density of ball =  
1.5 g/mL



What would happen if the density of the liquid in the beaker increases to 2.33 g/mL?

- A. The ball will remain at the bottom of the beaker.
- B. The ball will move to the middle of the liquid in the beaker.
- C. The ball will rise slowly, then sink to the bottom of the beaker.
- D. The ball will float on top of the liquid in the beaker.

13. Review the diagram of the density column.



Which statement *best* describes the density of the cork?

- A. The density of the cork is between that of Liquid A and Liquid B.
- B. The density of the cork is between that of Liquid B and Liquid C.
- C. The density of the cork is greater than the density of Liquid C.
- D. The density of the cork is less than the density of Liquid B.

14. Read the chart of material substance densities.

Substance	Density
Mercury	13.5 g/cm <sup>3</sup>
Mineral Oil	0.8 g/cm <sup>3</sup>
Water, fresh	1.0 g/cm <sup>3</sup>
Water, salt	1.03 g/cm <sup>3</sup>

What will happen when mercury is poured into a beaker of fresh water?

- A. The mercury will float.
- B. The mercury will mix with the water.
- C. The mercury will sink.
- D. The mercury will freeze.

15. Different substances and their densities are listed in the table.

Substance	Density (g/mL)
Ice	0.92
Corn oil	0.93
Corn syrup	1.38
Salt	2.16

Which substances will float in salt water which has a density of 1.25 g/mL?

- A. ice and salt
- B. ice and corn oil
- C. salt and corn syrup
- D. corn oil and corn syrup

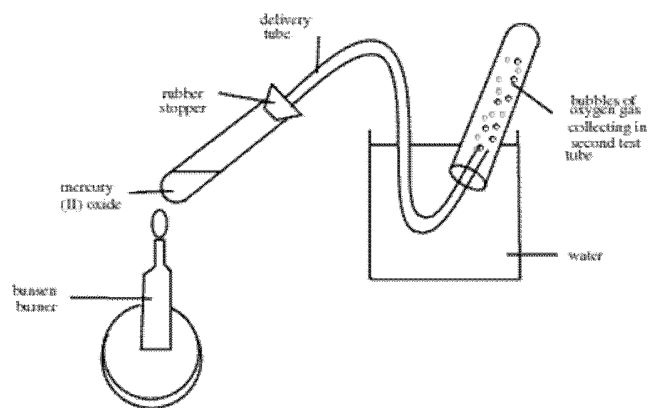
16. Different metals and their melting and boiling points in degrees Celsius (°C) are listed in the table.

Metals	Melting Point (°C)	Boiling Point (°C)
Iron	1535	2750
Copper	1083	2567
Silver	962	2212
Zinc	419	907

Which metal is in a liquid state at 1,000°C?

- A. copper
- B. iron
- C. silver
- D. zinc

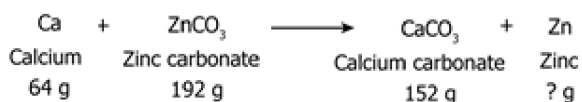
17. Matter has many characteristics.



Which is illustrated?

- A. atom
- B. chemical reaction
- C. element
- D. physical property

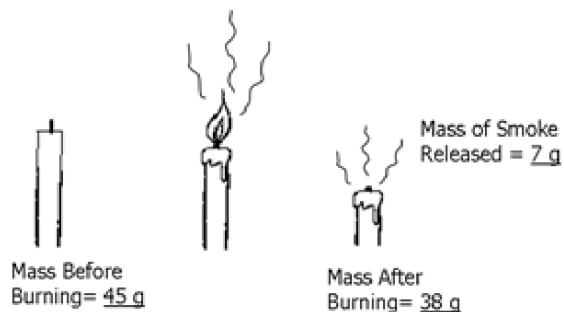
18. Which example represents an entirely physical change?
- Black iron turns to reddish-brown when it rusts.
  - Water boils which creates bubbles and water vapor.
  - Wood burns to produce ashes and gases.
  - Carbon dioxide combines with limewater to produce chalk.
19. What indicator is typically a sign that a chemical change has taken place?
- a change in the shape of the substance
  - a change in the size of the substance
  - the formation of a precipitate
  - the formation of a liquid from a solid
20. The reaction of calcium and zinc carbonate is represented by this chemical reaction.



What would be the amount of zinc formed in the reaction?

- The mass of zinc produced will be 104 g.
- The mass of zinc will be the same as that of zinc carbonate.
- The mass of zinc produced will be 52 g.
- The mass of zinc will be the same as that of calcium.

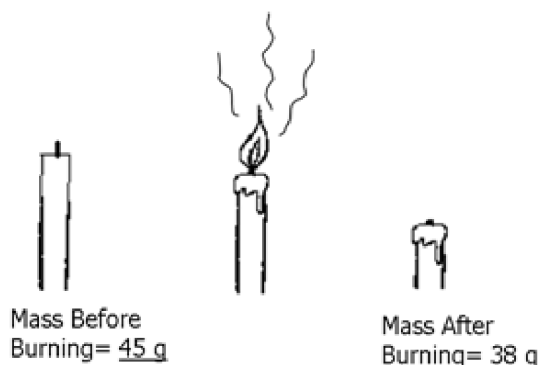
21. The diagram shows a candle before, during, and after burning. The mass of the candle before and after the reaction is also shown.



What does the experiment illustrate?

- During a chemical reaction, matter is neither created nor destroyed.
- The mass of the reactants is greater than the mass of the products.
- Changes in state always involve changes in the mass of the substances.
- The mass of the products is greater than the mass of the reactants.

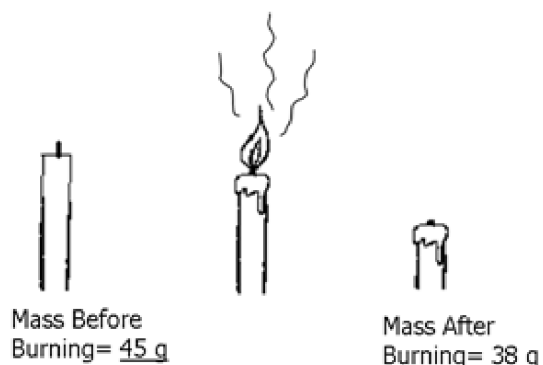
22. The diagram shows a candle before, during, and after burning. The mass before and after the reaction is also shown.



What *most likely* can be concluded about the reaction?

- A. When candle wax melts and re-solidifies, it is less dense than the original candle wax.
- B. Because the reaction only involved a change in state, the mass of the products is less.
- C. The mass of the candle is lower after burning because matter was destroyed during the reaction.
- D. Because matter is conserved in chemical reactions, the smoke released from burning had a mass of 7 g.

23. The diagram shows a candle before, during, and after burning. The mass before and after the reaction is also shown.

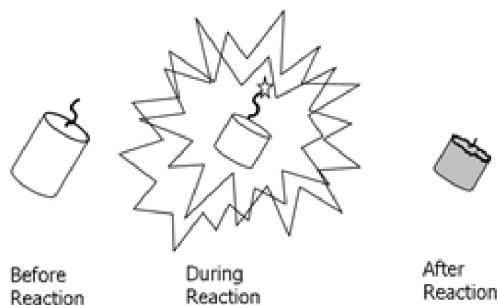


Which statement *best* explains why the mass of the candle before and after the reaction is different?

- A. Since some candle wax was destroyed in the burning reaction, the total mass was reduced.
- B. Melted wax has a lower mass than solid wax, so the end products will have a lower mass.
- C. Smoke was released as the candle's wick burned, which would account for the reduction in mass.
- D. The candle's wick was destroyed in the burning process, which caused the final mass to be lower.



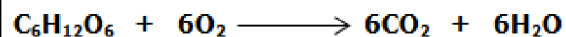
24. The diagram shows steps in the reaction of fireworks burning.



What happens to the atoms in the fireworks when they explode?

- A. They are destroyed, and the reaction creates new atoms with different properties.
- B. They rearrange and recombine to form ash and smoke, but no atoms are destroyed.
- C. They evaporate, and other atoms condense from the heat to form ash and smoke.
- D. They are stripped of electrons and protons leaving new atoms with lower molecular weights.

25. Respiration is essential for life and is represented by this equation.



What substances are the reactants for the reaction?

- A. sugar and oxygen
- B. sugar and water
- C. carbon dioxide and water
- D. oxygen and carbon dioxide

#	Answer	Objective
1.	A	Obj : 8.P.1.1. Classify matter as elements, compounds...
2.	B	Obj : 8.P.1.1. Classify matter as elements, compounds...
3.	C	Obj : 8.P.1.2. Explain how the physical properties of...
4.	C	Obj : 8.P.1.2. Explain how the physical properties of...
5.	A	Obj : 8.P.1.2. Explain how the physical properties of...
6.	B	Obj : 8.P.1.2. Explain how the physical properties of...
7.	C	Obj : 8.P.1.2. Explain how the physical properties of...
8.	A	Obj : 8.P.1.3. Compare physical changes such as size,...
9.	B	Obj : 8.P.1.3. Compare physical changes such as size,...
10.	B	Obj : 8.P.1.3. Compare physical changes such as size,...
11.	D	Obj : 8.P.1.3. Compare physical changes such as size,...
12.	D	Obj : 8.P.1.3. Compare physical changes such as size,...

#	Answer	Objective
13.	B	Obj : 8.P.1.3. Compare physical changes such as size,...
14.	C	Obj : 8.P.1.3. Compare physical changes such as size,...
15.	B	Obj : 8.P.1.3. Compare physical changes such as size,...
16.	C	Obj : 8.P.1.3. Compare physical changes such as size,...
17.	D	Obj : 8.P.1.3. Compare physical changes such as size,...
18.	B	Obj : 8.P.1.3. Compare physical changes such as size,...
19.	C	Obj : 8.P.1.3. Compare physical changes such as size,...
20.	A	Obj : 8.P.1.4. Explain how the idea of atoms and a ba...
21.	A	Obj : 8.P.1.4. Explain how the idea of atoms and a ba...
22.	D	Obj : 8.P.1.4. Explain how the idea of atoms and a ba...
23.	C	Obj : 8.P.1.4. Explain how the idea of atoms and a ba...
24.	B	Obj : 8.P.1.4. Explain how the idea of atoms and a ba...
25.	A	Obj : 8.P.1.4. Explain how the idea of atoms and a ba...

Objectives Measured:	Items	Questions measuring this objective
Obj : 8.P.1.1. Classify matter as elements, compounds...	2	1, 2
Obj : 8.P.1.2. Explain how the physical properties of...	5	3, 4, 5, 6, 7
Obj : 8.P.1.3. Compare physical changes such as size,...	12	8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19
Obj : 8.P.1.4. Explain how the idea of atoms and a ba...	6	20, 21, 22, 23, 24, 25

#	Key	Item ID
1.	A	MC 125812
2.	B	MC 125831
3.	C	MC 35131
4.	C	MC 35170
5.	A	MC 35141
6.	B	MC 125814
7.	C	MC 141077
8.	A	MC 34188
9.	B	MC 35129
10.	B	MC 35125
11.	D	MC 35118
12.	D	MC 35112

#	Key	Item ID
13.	B	MC 35111
14.	C	MC 35425
15.	B	MC 42785
16.	C	MC 42786
17.	D	MC 141090
18.	B	MC 152736
19.	C	MC 152737
20.	A	MC 42787
21.	A	MC 44417
22.	D	MC 44416
23.	C	MC 44415
24.	B	MC 44420
25.	A	MC 152744