5th Grade Mixtures & Solutions

Read and answer each question carefully.

1) The smallest particle of matter is
   
   A) an atom.  
   B) a compound.  
   C) a solute.  
   D) a molecule.  

2) Which scientist made an important contribution to the science of chemistry and is considered to be the "father of chemistry"?
   
   A) James Andrew Harris  
   B) Robert Boyle  
   C) Charles Goodyear  
   D) George Washington Carver  

3) Since the invention of cars, more and more harmful chemicals have been added to our air. What is this called?
   
   A) pollution  
   B) filtration  
   C) evaporation  
   D) condensation  

4) Ali combined baking soda, calcium chloride, and water. The solution began to fizz. What best describes what happened?
   
   A) A chemical reaction was created.  
   B) A precipitate formed.  
   C) The chemicals were separated.  
   D) Evaporation took place.
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5) Andrew wants to find out how many grams of salt it takes to saturate 50 ml of water. Once the solution is saturated, what should Andrew do to find out how much salt is actually dissolved in the water?

A) Filter out the undissolved salt. Weigh the solution. Then subtract the weight of the water.
B) Filter out the undissolved salt. Then weigh the solution.
C) Pour the solution into another container on the scale and weight it. Then filter the solution.
D) Weigh the number of scoops of salt he added to the water. Record the weight.

6) Sue found that it took 15 grams of salt to saturate 50 ml of water. In another investigation she found it took 60 grams of citric acid to saturate 50 ml of water. What conclusion did Sue most likely reach?

A) Citric acid is heavier than salt.
B) Citric acid is more soluble than salt.
C) Salt is more soluble than citric acid.
D) Salt is heavier than citric acid.

7) In a solution, what is the solid called that dissolves in the liquid?

A) solute
B) solvent
C) crystal
D) precipitate

8) Which of these materials is **most** soluble in water?

A) gravel
B) salt
C) baking soda
D) citric acid
9) Brian figured out that it takes 35 grams of sugar to saturate a glass of iced tea (250 ml). Which amount of sugar might it take to saturate the same amount of hot tea?
   A) 25 grams
   B) 60 grams
   C) 10 grams
   D) 35 grams

Use the following information below to answer questions 10, 11, and 12.

Jim used salt and water to make the mixtures below. He stirred each one and observed the results.

<table>
<thead>
<tr>
<th>Mixture 1</th>
<th>Mixture 2</th>
<th>Mixture 3</th>
<th>Mixture 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Spoon salt: 100 ml water</td>
<td>?</td>
<td>Clear — nothing on bottom</td>
<td>Clear — material on bottom</td>
</tr>
<tr>
<td>Clear — nothing on bottom</td>
<td>Clear — nothing on bottom</td>
<td>Clear — material on bottom</td>
<td></td>
</tr>
</tbody>
</table>

10) What evidence does Jim have that salt and water make a solution?
   A) There is material left on the bottom of one of the cups.
   B) There are different amounts of salt in the cups.
   C) The solution is clear and the salt seems to disappear.
   D) There are equal amounts of water in all the cups.

11) Which of Jim's mixtures are saturated?
   A) Mixture 4
   B) Mixture 3
   C) Mixtures 3 and 4
   D) Mixtures 1 and 3
12) If Jim made Mixture 2 with 2 spoons of salt in 100 ml of water, what do you think he would observe?

A) The solution would be clear with nothing on the bottom.
B) The solution would be cloudy with material on the bottom.
C) The solution would be cloudy with nothing on the bottom.
D) The solution would be clear with material on the bottom.

13) What is the best definition for concentration?
Concentration is:

A) a new substance created as a result of a chemical reaction.
B) the amount of material dissolved in a measure of liquid.
C) the process by which water changes from a liquid to a gas.
D) the three-dimensional space occupied by something.

Beth compared the three colorless solutions shown below.

Use her observations to answer questions 14 and 15.

14) Which statement is true about the concentration of the solutions?

A) All the solutions have the same concentration.
B) Solution 1 is the most concentrated.
C) Solution 1 and 2 have the same concentration.
D) Solution 2 is the most concentrated.
15) Which of the following will be true if Beth adds 1 more spoon of salt to Solution 1?

A) The concentrations of the three solutions will be the same.
B) There will be no change in the concentration of the solutions.
C) Solution 1 will be the most concentrated solution.
D) Solutions 1 and 3 will have the same concentration.

16) Which is NOT an example of a mixture?

A) Kool-Aid
B) salt
C) chocolate milk
D) cake batter

17) Which is an example of a solution?

A) gravel
B) chocolate milk
C) oxygen
D) Kool-Aid

18) Which statement is true about solutions?

A) All mixtures are solutions.
B) Solutions are special types of mixtures.
C) Solutions and mixtures are completely different.
D) Solutions cannot be separated.

19) Solutions can best be separated by using

A) a solvent.
B) a filter.
C) a screen.
D) evaporation.
20) Marie combined sugar, milk, strawberries, and vanilla. She put this into the freezer and made ice cream. Which statement best describes what happened?

A) All the ingredients dissolved and made a solution.
B) A physical change took place with the ingredients.
C) There was no observable change in the ingredients.
D) A chemical change took place with the ingredients.

21) We know a chemical reaction has taken place when

A) a new chemical is produced.
B) one chemical dissolves.
C) one chemical disappears.
D) one chemical evaporates.

22) The creation of a new substance, the formation of a gas, and the production of heat are all evidence of

A) a physical change.
B) separation.
C) evaporation.
D) a chemical change.

23) The increased use of fossil fuels puts more carbon dioxide in Earth’s atmosphere. This increased concentration of carbon dioxide in the atmosphere causes

A) vulcanization
B) global warming
C) radioactivity
D) decompression sickness
24) The Kool-Aid tastes too strong because the solution is too concentrated. In order to dilute the solution you need to

   A) stir it more.
   B) add more water.
   C) pour 50 ml. out.
   D) add more Kool-Aid powder.

25) There are two changes in matter; physical change and chemical change. Select the example of a chemical change.

   A) adding sugar to ice tea
   B) freezing water
   C) ripping paper
   D) burning of wood