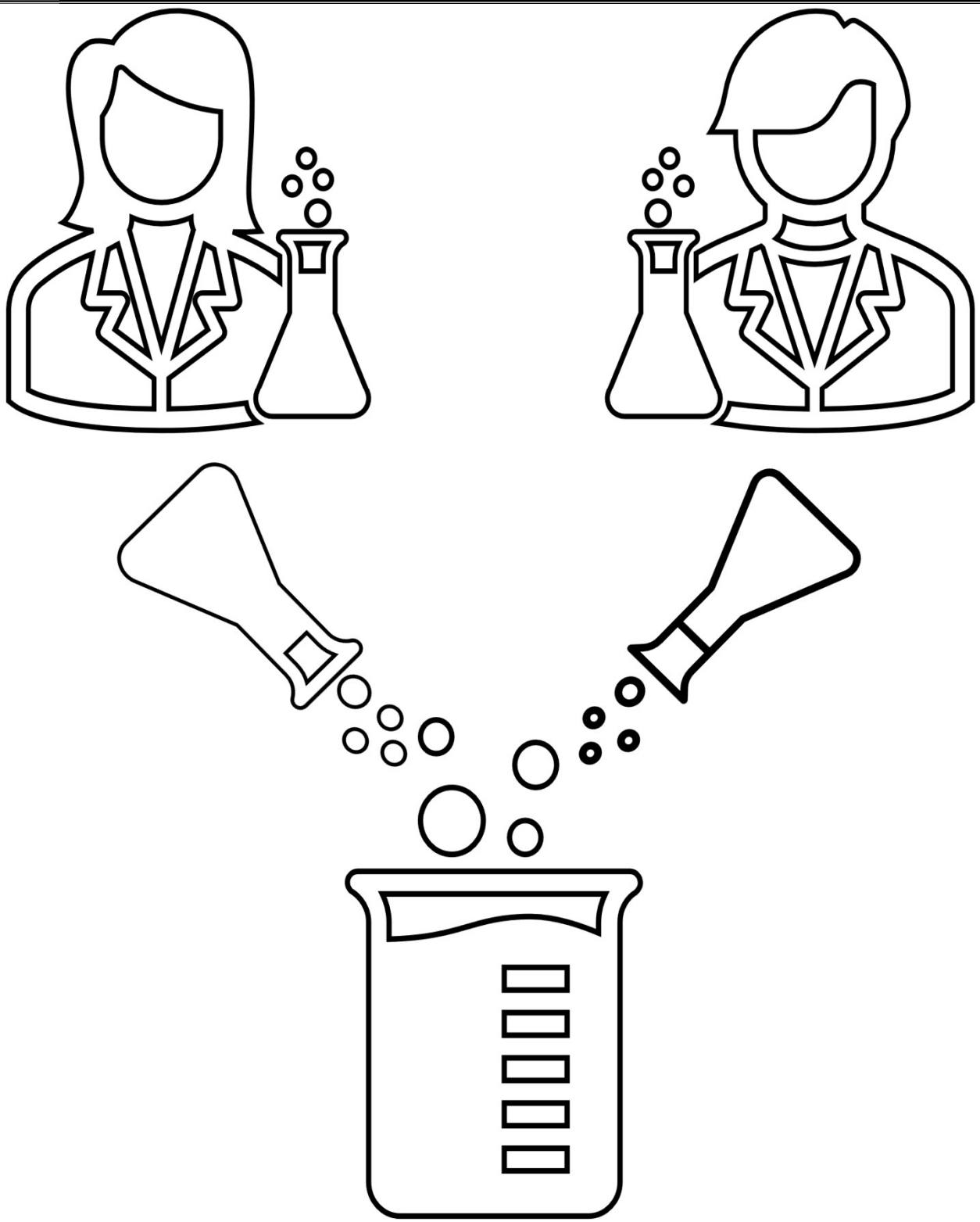
SOLUTIONS



Name	Number	Class	Group	Career

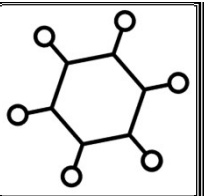
SOLUTIONS

TARGETS

The grade 5 English science unit, Dissolution and solution, meets the academic content standards set in the Korean curriculum, which state students should:

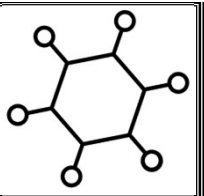
A. Compare the weights of a solid before and after dissolving it and understand the phenomenon of dissolution through the perspective of particle theory.
B. Learn that the dissolving volumes of solids differ according to the types and volumes of solute through the activities of dissolving a variety of solids in water.
C. Develop new methods to compare concentrations of solutions.
D. Confirm via experiment that the temperature of water is a major factor affecting a solute's volume when dissolved.

SOLUTIONS



Concentration	집중 濃厚	To make a liquid thicker or denser by adding something or removing the liquid.
Dissolve	녹이다 溶解する	The process of something coming into existence, as in the formation of a crystal.
Formation	형성 形成	The process of something coming into existence, as in the formation of a crystal.
Gas	가스 気体	A substance, such as, air, that will spread to fill any space that contains it.
$KAl(SO_4)_2$	명반 ミョウバン	The chemical formula for alum.
Liquid	액체 液体	A substance that flows readily and can be poured.
Mass	질량 質量	In science, the amount of physical matter that an object contains.
Molecules	분자 分子	The smallest unit that a chemical can be divided into. Molecules are made of more than one atom.
NaCl	소금 塩	The chemical formula for table salt.

SOLUTIONS



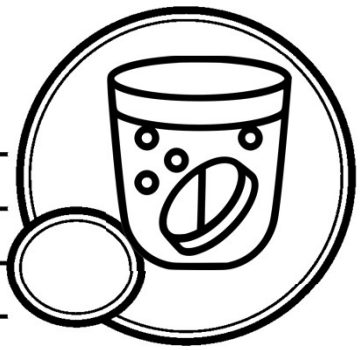
Particle	입자 粒子	An extremely small piece or amount of something.
Saturated	가득한 飽和	To be full of somethings.
Solid	고체 固体	Hard and firm; not a liquid or gas.
Soluble	녹는 可溶性	Easily dissolved in liquid, especially water.
Solute	용질 溶質	the minor component in a solution, dissolved in the solvent.
Solution	용액 解決	A mixture made of a solute put inside a solvent(Liquid).
Solvent	용매 溶媒	A substance, usually a liquid, that can make another solute dissolve.
Supersaturated	과포화 過飽和	Having more of a solute in a solvent than it normally can hold either by heating or cooling the solvent.
Vinegar	식초 お酢	A sour liquid made from fermented wine, cider, or other juices, and used to flavor and preserve food.

VOCABULARY 1

Definition is the green star.

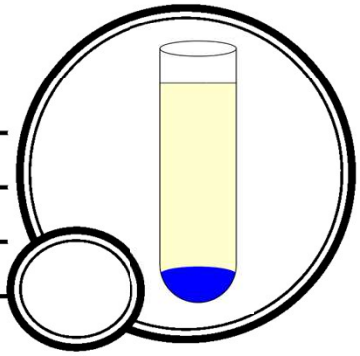
My sentence is the blue star.

Concentration

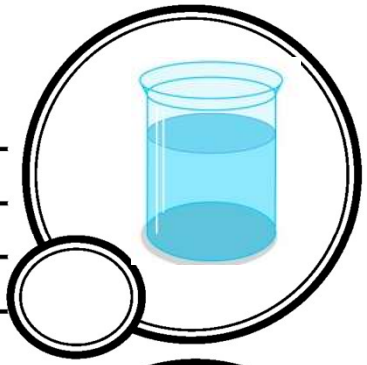


Dissolve

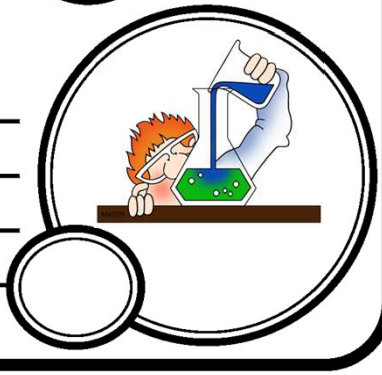
Solute



Solvent



Solution



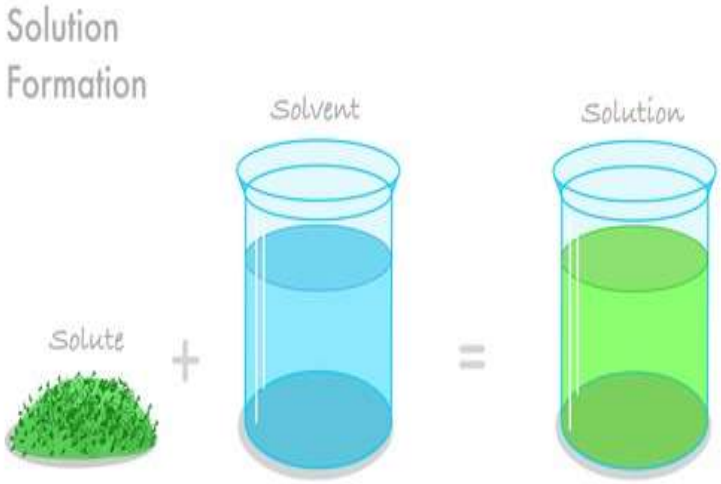
SOLUTIONS

READING

A solution is made when a solute dissolves in a solvent. The solutions we will look at are either:

a solid (solute) and a liquid (solvent).	**a liquid (solute) and a liquid (solvent).**

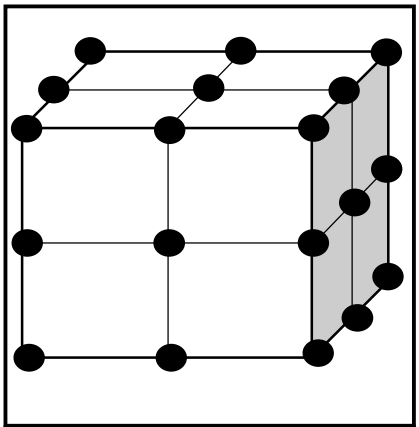
There is always more solvent than solute: Solvent (50g) and Solute (10g).



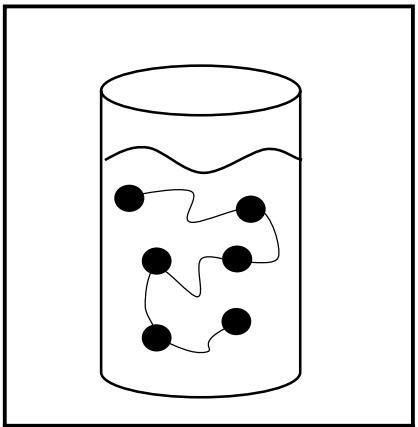
When we mix two or more things the weight will always stay the same as the two things mixed. If you mix **50g** of water with **20g** of salt the total weight will be **70g**. The mass doesn't change when we mix a solute with a solvent, the solution just becomes denser.

Concentration

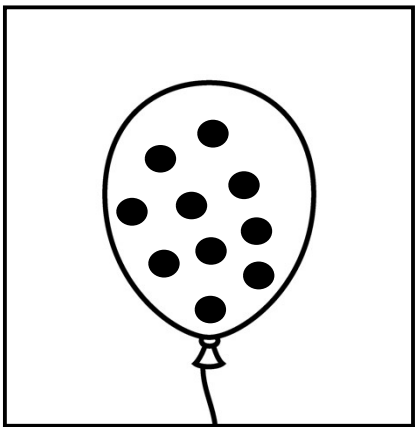
Concentration is measure in how much solute per solvent there is in our solution. Concentration can be measure in **%** or in **g/ml**. If we mix 10g of salt(solute) into 100ml of water(solvent) the concentration would be 10g/100ml.



Solid:
Particles are connected, and it is hard to move.
Ice



Liquid:
Particles are still connected, but it is easier to move.
Water

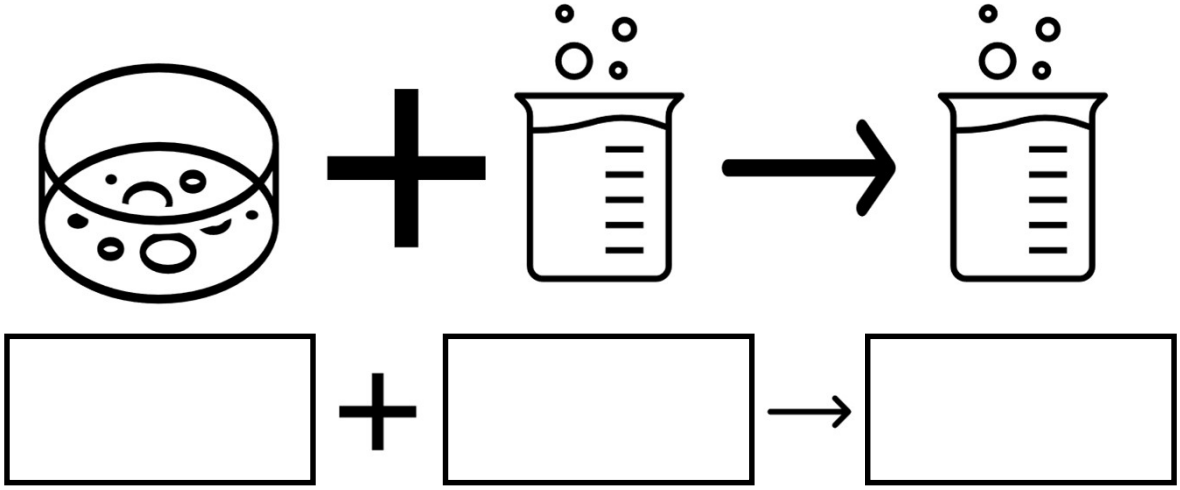


Gas:
Particles are not connected, and it is easy to move.
Steam

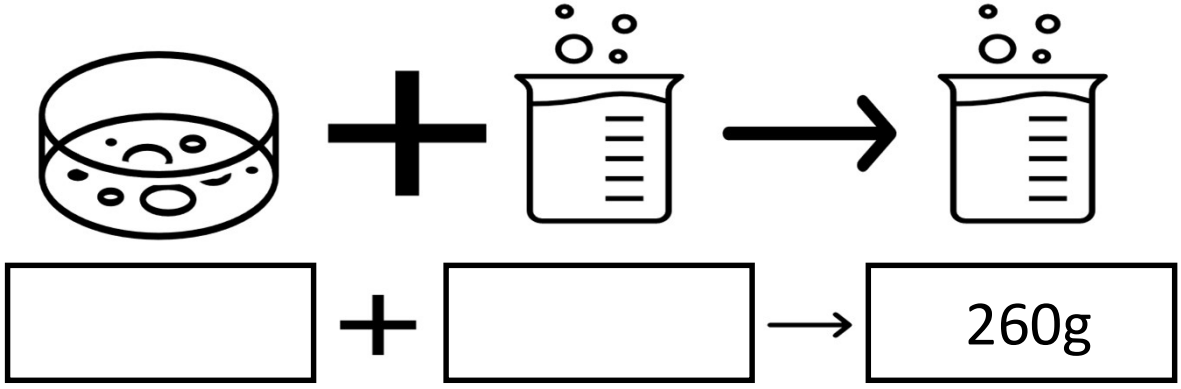
SOLUTIONS

HOMEWORK

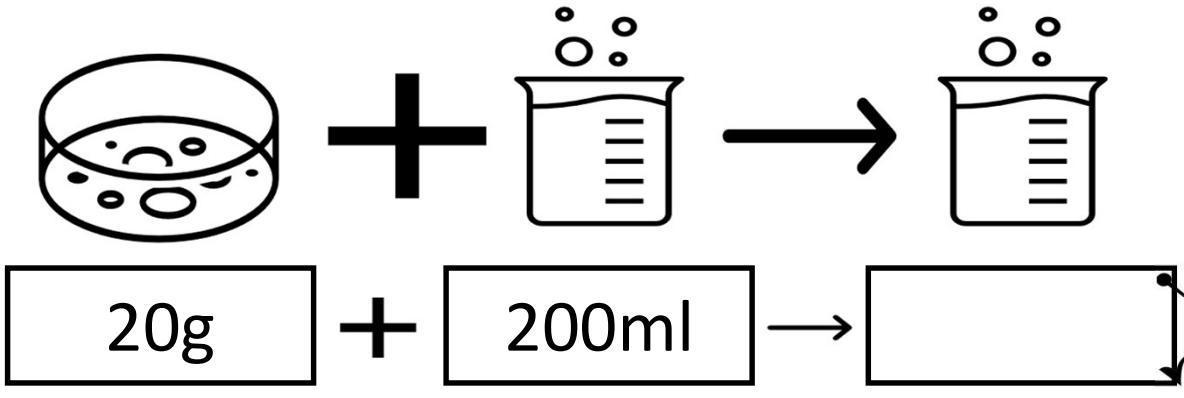
1. Color and write down the names of the pictures correctly.



2. Solve the equation and colour the mixtures correctly.



3. Solve the equation and colour the mixtures correctly.



SOLUTIONS

GUIDE

Convection:

Convection is the way liquids and gases move. When a liquid is denser it will naturally move down, and when it is less dense it will naturally move up.

Density can be changed in the same liquid through 2 ways. First is through heat. The hot and less dense liquid moves up, the cold and denser liquid moves down.

The second way is by mixing a solute in the water, making the concentration of solute higher, and thereby making the solution denser.

Safety

Hypothesis: Draw how you expect the liquids to move.

Salt/Water concentration is 15g/100ml

More than 15g of salt Per 100ml

Less than 15g of salt Per 100ml

SOLUTIONS

OBSERVATION

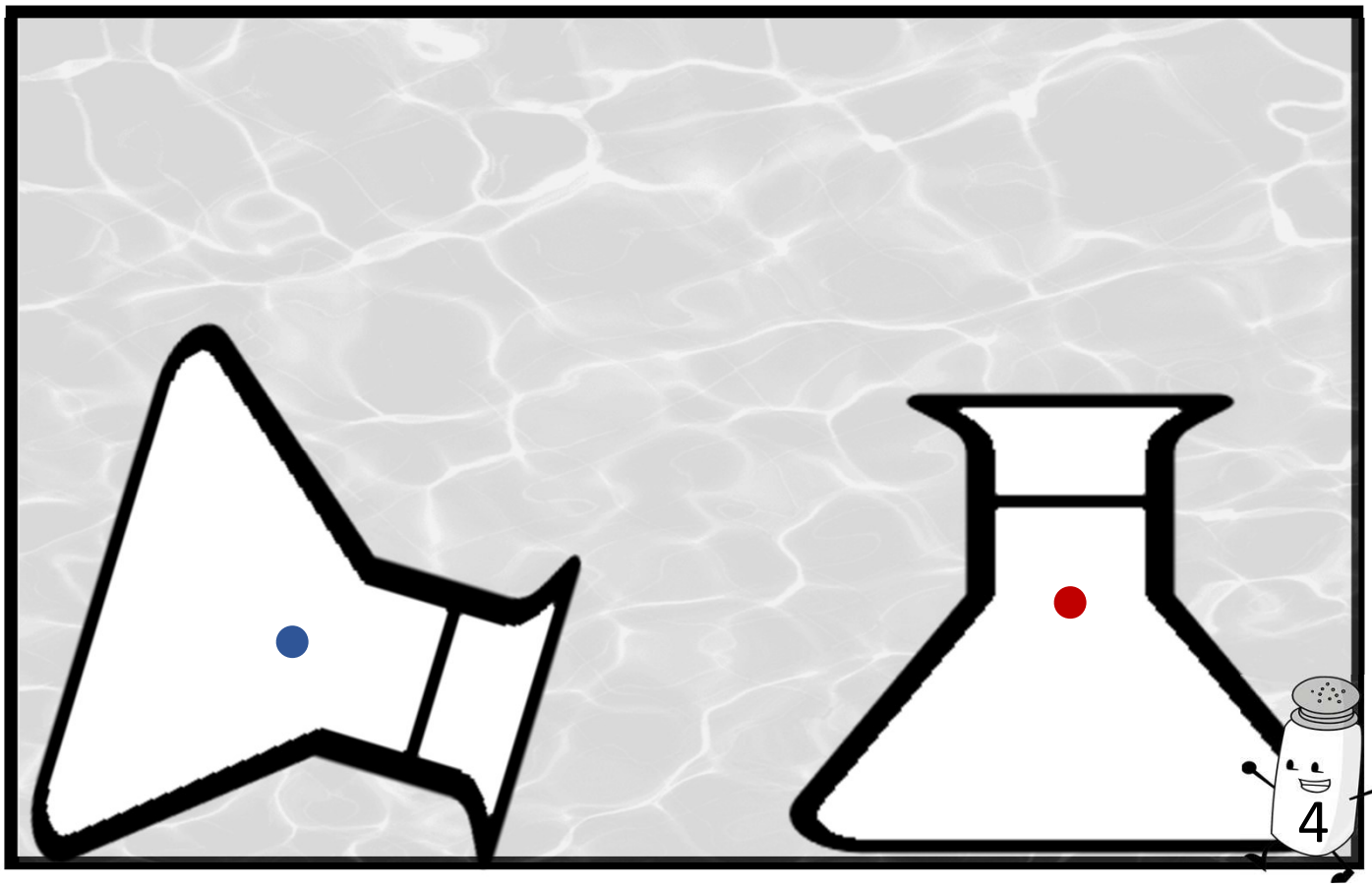
Why did the red liquid go up?

_____

What happened when you added too much salt?

_____

Draw what happened in the experiment.



VOCABULARY 2

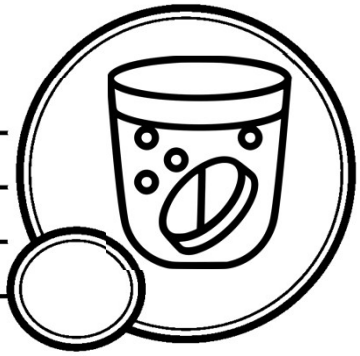
Definition is the green star.

My sentence is the blue star.

Vinegar

Gas

Soluble



Solvent

Solution

SOLUTIONS

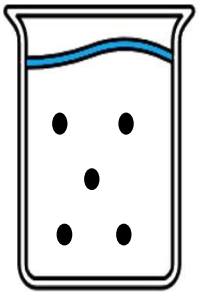
READING

A solution is made when a solute dissolves in a solvent. However, the concentration can be different, we call this saturation.

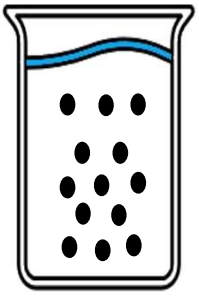
mildly saturated means there is space for more solute in the solvent.

Saturated, means there can no longer fit anymore solute in the solvent.

In this weeks experiment the solute will be Salt(NaCl) In the picture the salt is shown as a particle.



mildly saturated



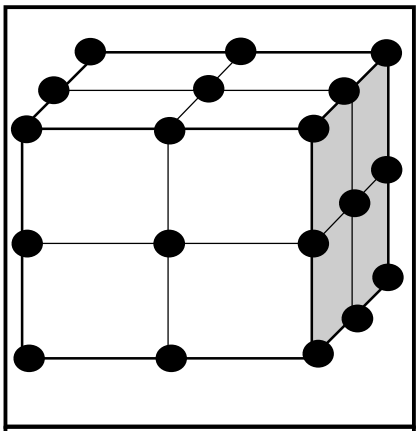
Saturated

Saturation.

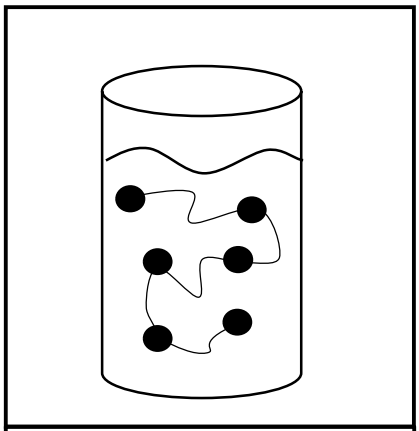
Saturation is how much you can put of one solute into a solvent. Different **solvents** have different saturations. You can only put **36g** of salt into **100ml** of water, before the water is saturated (Full of salt). But you can put **200g** of sugar into **100ml** of water before the solvent is saturated.

When we mix two or more things the weight will always stay the same as the two things mixed. If you mix **50g** of water with **20g** of salt the total weight will be **70g**. The mass doesn't change when we mix a solute with a solvent, the solution just becomes denser.

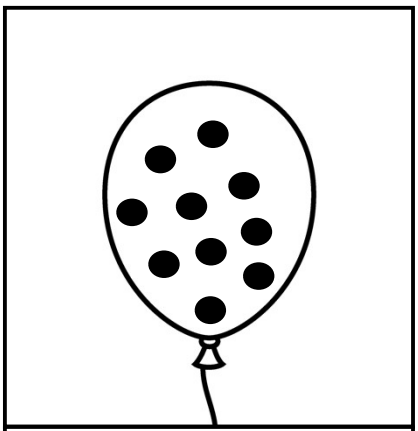
But this is not always correct, sometimes mixing a solute and a solvent will create a gas, releasing some of the mass into the air, where it escape out.



Solid:
Particles are connected, and it is hard to move.
Ice



Liquid:
Particles are still connected, but it is easier to move.
Water

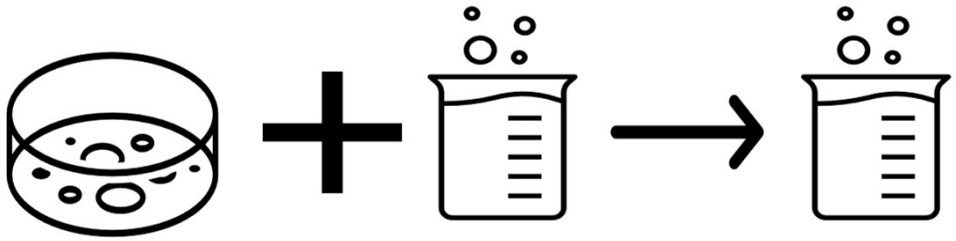


Gas:
Particles are not connected, and it is easy to move.
Steam

SOLUTIONS

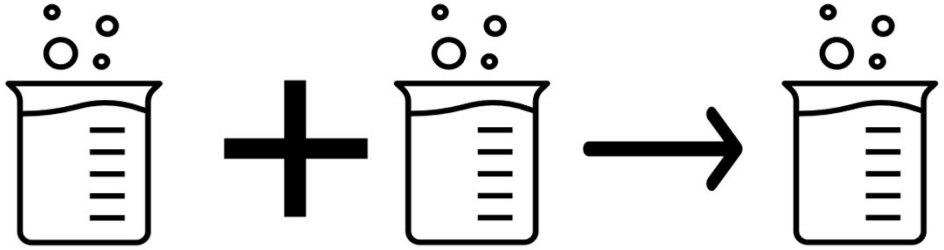
HOMEWORK

1. Solve the equation and color the picture.



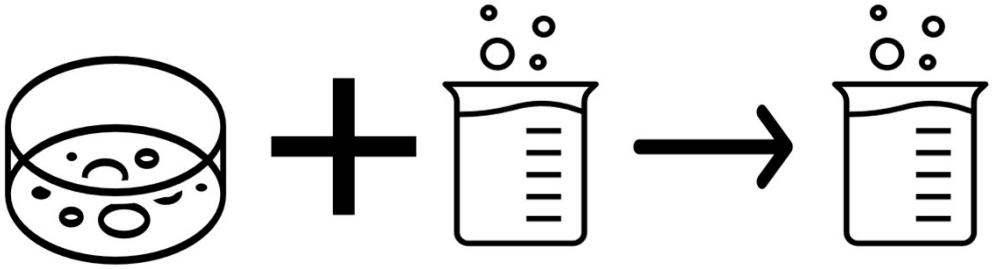
22g + 50g =

2. Solve the equation and color the picture.



____ + ____ = 137g

3. Solve the equation and color the picture.



42g + ____ = ____

SOLUTIONS

GUIDE

Solubility.

Different solvents can hold different amounts of solute. When we make a solution, if the solution becomes satiated it will make precipitate. Precipitate is left over solute that forms in the bottom of the solution.

Today we are experimenting with salt and sugar to see which one is more soluble.

Safety

Experiment 1

Solute	Solute mass until precipitate	Solvent (water) and Beaker mass	Total mass after precipitate
Example	20g	156g	176g
Salt			
Sugar			

Experiment 2

Solute	Solute mass	Solvent (vinegar) and Beaker mass	Total mass before mixing (Calculated)	Total mass after mixing
Baking powder	10g			

SOLUTIONS

OBSERVATION

1. Draw what you saw happen when we added baking powder to the vinegar.

2. Where did the mass go from the solution in experiment 2?

_____

_____

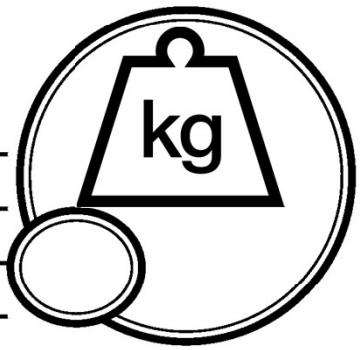
_____

VOCABULARY 3

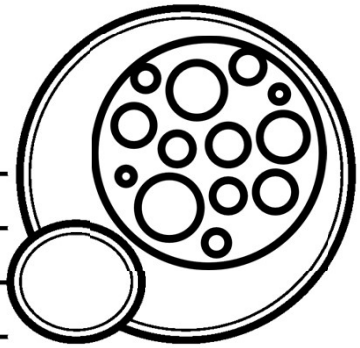
Definition is the green star.

My sentence is the blue star.

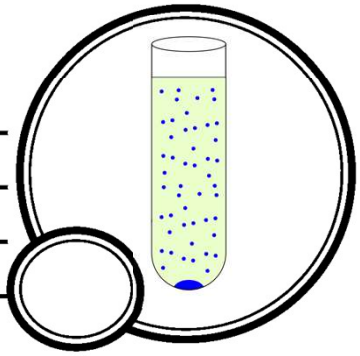
Mass



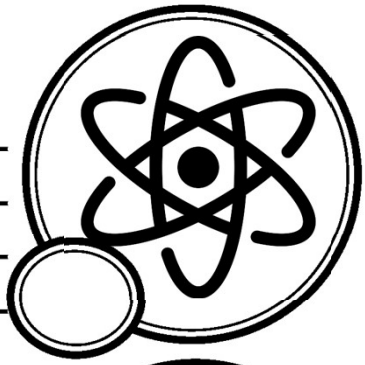
Density



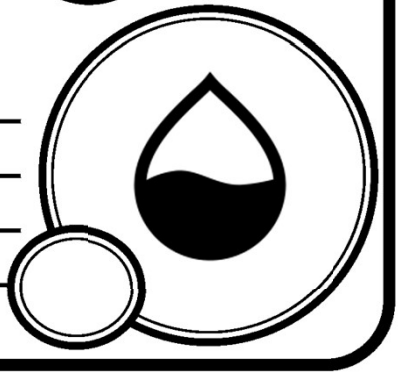
Saturated



Particle



Saturation



SOLUTIONS

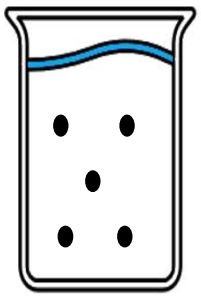
READING

A solution is made when a solute dissolves in a solvent. However, the concentration can be different, we call this saturation.

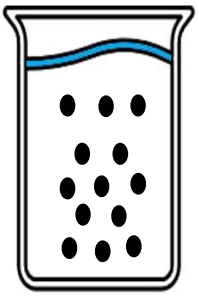
mildly saturated means there is space for more solute in the solvent.

Saturated, means there can no longer fit anymore solute in the solvent.

In this weeks experiment the solute will be Salt(NaCl) In the picture the salt is shown as a particle. ●



mildly saturated



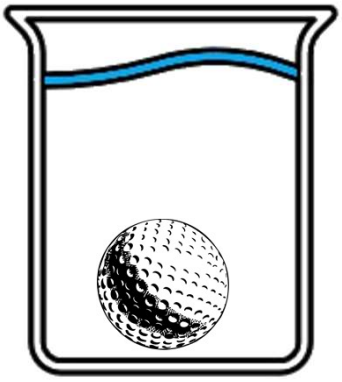
Saturated

Saturation.

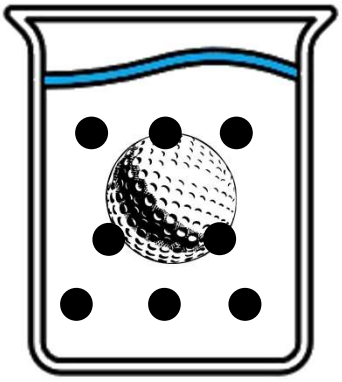
Saturation is how much you can put of one solute into a solvent. Different **solvents** have different saturations. You can only put **36g** of salt into **100ml** of water, before the water is saturated (Full of salt). But you can put **200g** of sugar into **100ml** of water before the solvent is saturated.

It is not only the solvent that decides the saturation, but also the temperature. The higher the temperature the more solute you need to reach a saturated solvent. We will talk more about this in next weeks experiment!

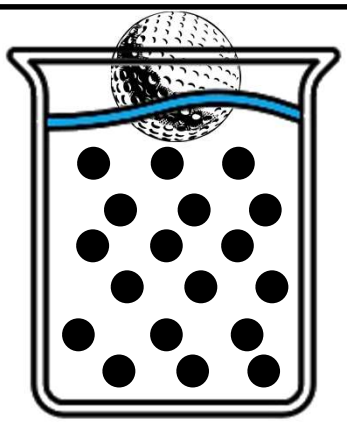
Remember, mixing a solute and a solvent makes the solution denser, it keeps the combined mass but does not always change its volume. We can use this to make things, that normally does not float, float! This week we will do two experiments! One to show that denser solutions float down, and one experiment that shows denser solutions can make less dense materials float.



No Saturation



Mildly Saturated



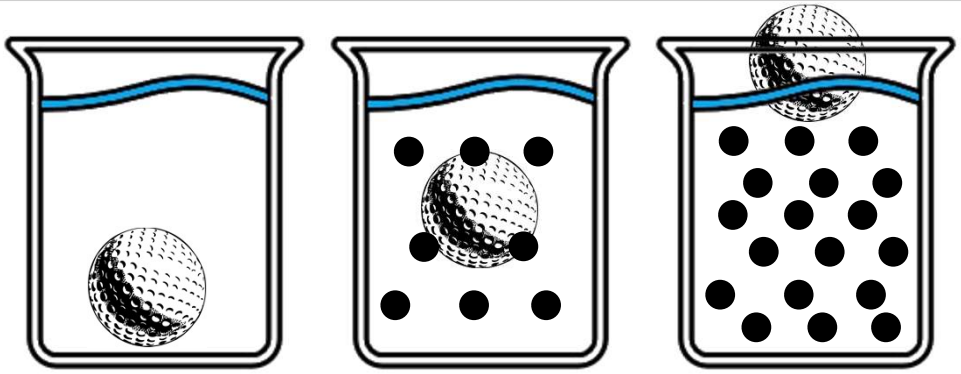
Saturated

● Is shown as Salt(NaCl) particle

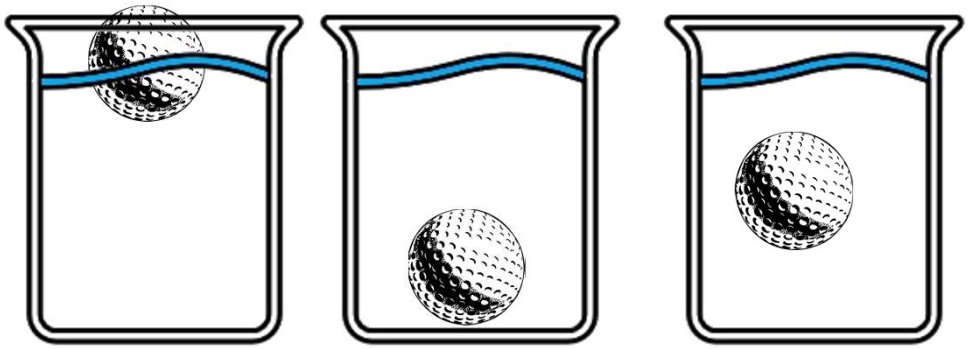
SOLUTIONS

HOMEWORK

1. Write the correct state of the solution

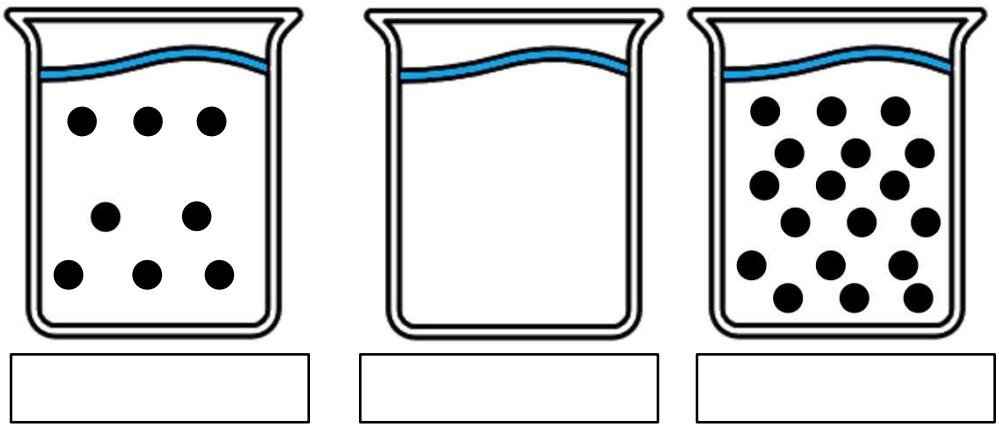


2. Draw the salt particles



Saturated	No saturation	Mildly saturated

3. Draw the golf ball and write the correct state of the solution



SOLUTIONS

HOMEWORK

4. Why would the golf ball float when there is more salt in the solution?

_____

_____

_____

5. What happens when we add salt to a solution?

_____

_____

_____

6. What can we use this information for?

_____

_____

_____

SOLUTIONS

GUIDE

Density.

When we mix two or more things the weight will always stay the same as the two things mixed. If you mix **50g** of water with **20g** of salt the total weight will be **70g**. The mass doesn't change when we mix a solute with a solvent, the solution just becomes denser.

Safety

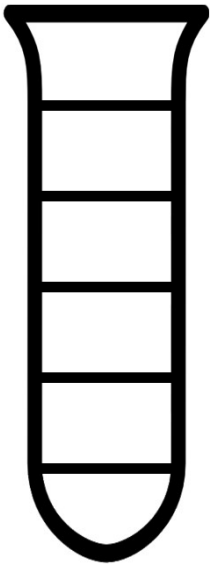
Density experiment.

Solute	Density	Colour	Order from 1-6
Water	0.99g/ml	Blue	
Oil	0.92g/ml		
Dish detergent	1.03g/ml		
Sirup	1.37g/ml		
Salt water	1.20g/ml	Red	
Soya Sauce	1.08g/ml		

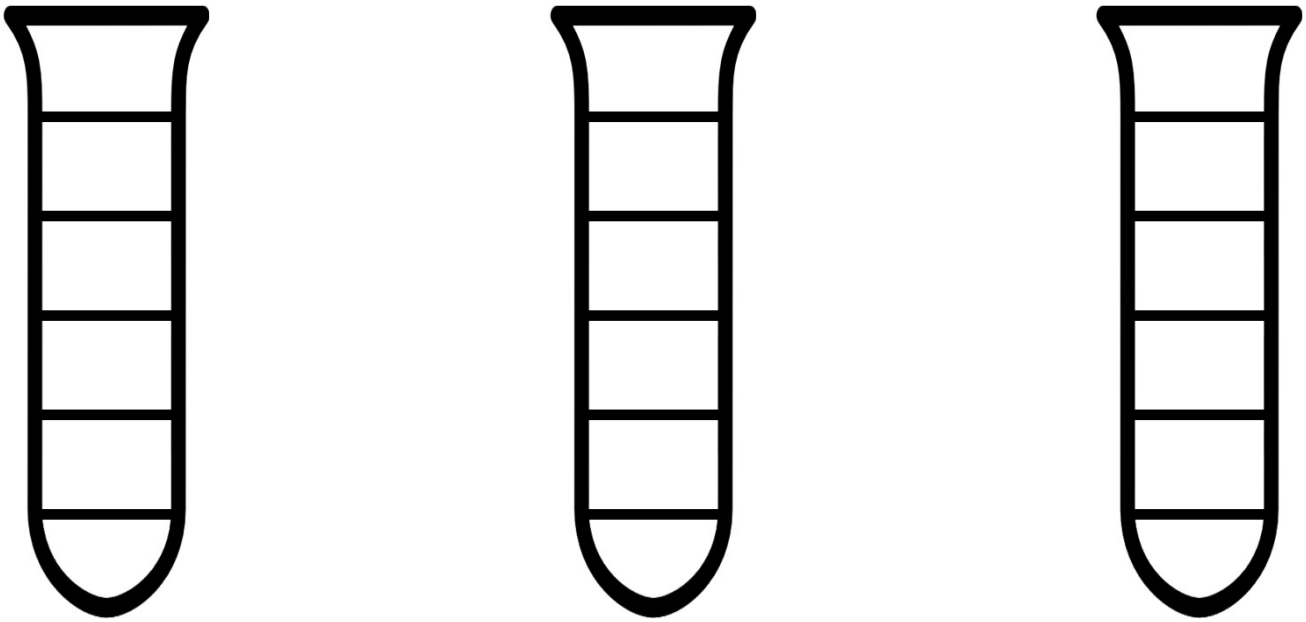
SOLUTIONS

OBSERVATION

1. In what order do you think you should place the solutions?



2. Color in your experiment. How did the solutions mix?



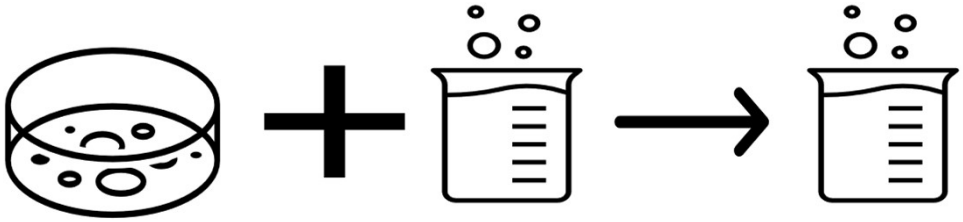
3. Why did the solutions not mix?

SOLUTIONS

REVIEW

Signature	_____	___/21

1. Color the pictures and solve the math problem.



23g	+		→	86g

2. Color the pictures and write the names of the pictures.

		Solution

3. Write the definition and make a sentence. (Bonus. Draw a picture that matches the word

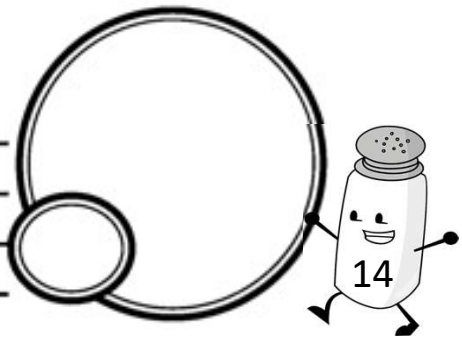
Dissolve _____

★ _____

_____

★ _____

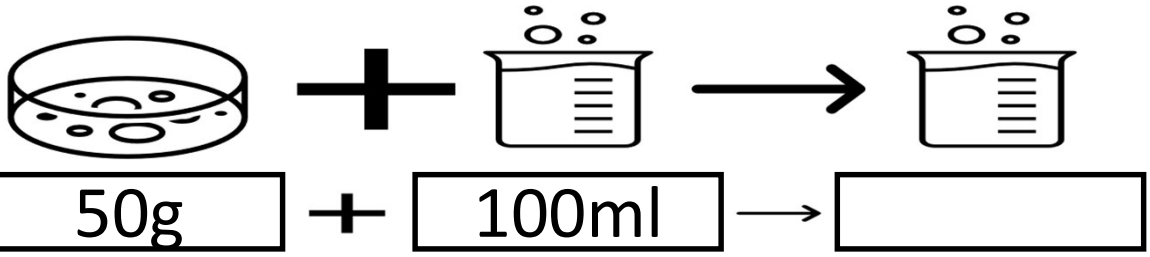
_____



SOLUTIONS

REVIEW

4. Solve the equation and colour the mixtures correctly.



50g	+	100ml	→	

5. What happens when we add salt to a solution?

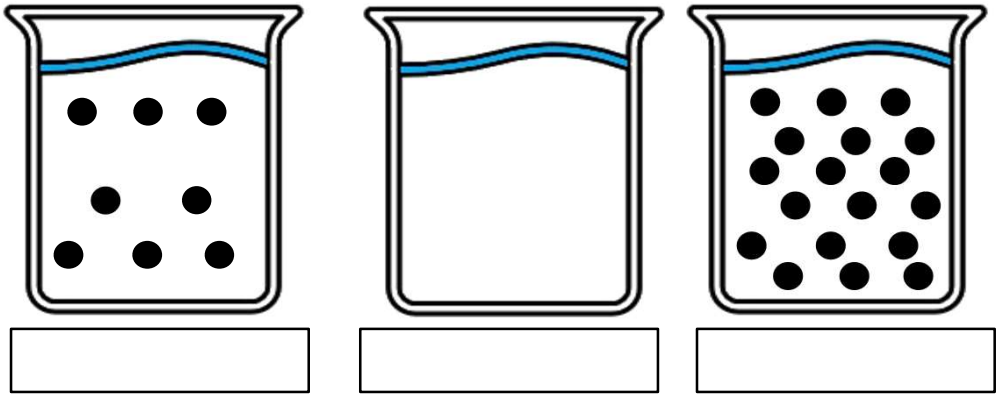
_____

_____

6. What gas does vinegar, and Baking soda make? (Color the right answer)

Carbon Dioxide (CO_2)	Oxygen (O_2)	Steam(H_2O)

7. Draw the golf ball and write the correct state of the solution.

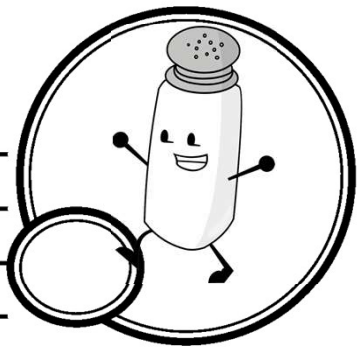


VOCABULARY 4

Definition is the green star.

My sentence is the blue star.

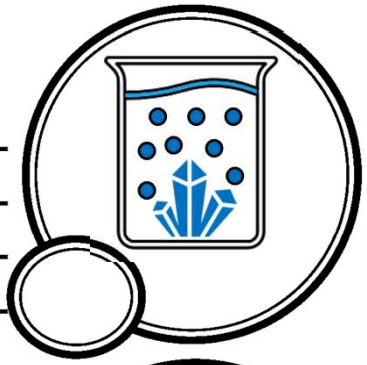
NaCl



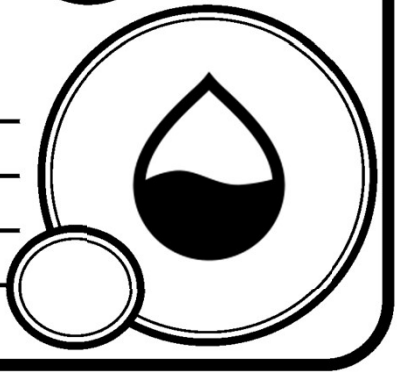
$(KAl(SO_4)_2)$

Super Saturated

Formation



Saturation



SOLUTIONS

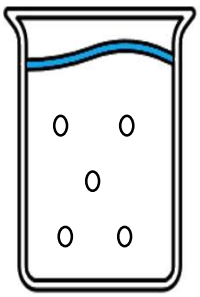
READING

A solution is made when a solute dissolves in a solvent. However, the concentration can be different, we call this saturation.

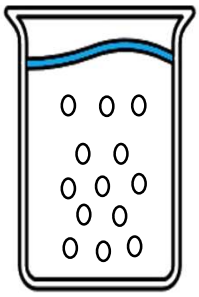
mildly saturated means there is space for more solute in the solvent.

Saturated, means there can no longer fit anymore solute in the solvent.

In this weeks experiment the solute will be Alum ($KAl(SO_4)_2$). In the picture the Alum is shown as a particle. ◯



mildly saturated



Saturated

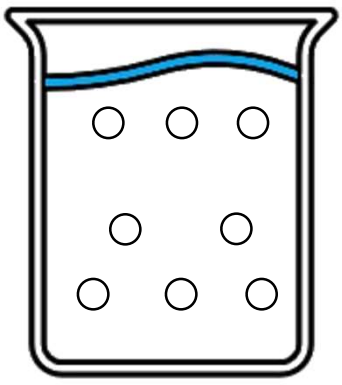
Saturation.

Saturation is how much you can put of one solute into a solvent. Different **solvents** have different saturations. You can only put **36g** of salt into **100ml** of water, before the water is saturated (Full of salt). But you can put **200g** of sugar into **100ml** of water before the solvent is saturated.

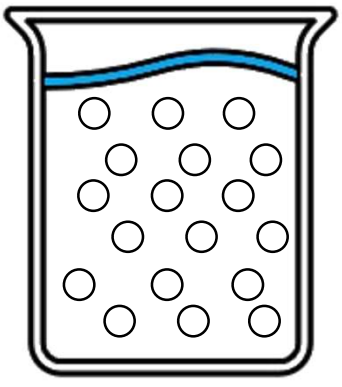
It is not only the solvent that decides the saturation, but also the temperature. The higher the temperature the more solvent you need, to reach a saturated solvent.

Supersaturation:

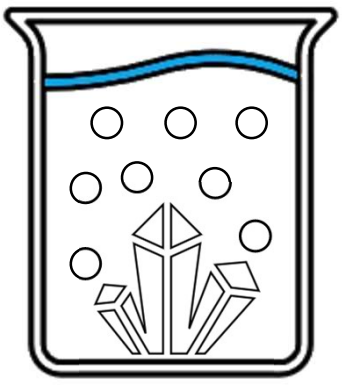
Saturation is based on temperature. The higher the temperature the more solute is needed to saturate the solvent. When we heat up the water it is capable to get more solute, in this case Alum ($KAl(SO_4)_2$). But what happens when the solution cools down? The Alum that can no longer mix with the solvent and begins mixing with itself, and creates crystal like formations, this is called super**saturation**.



Mildly Saturated

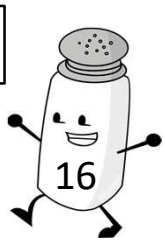


Saturated



Super Saturated

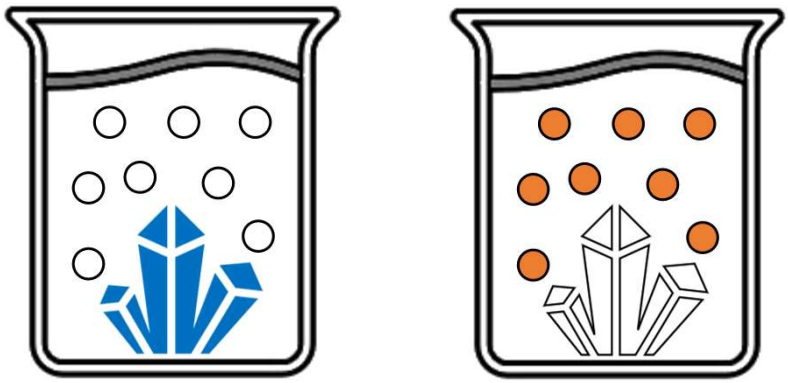
◯ Is shown as Alum ($KAl(SO_4)_2$). Particles.



SOLUTIONS

HOMEWORK

1. Color the particles and crystals to match the solution.



2. How can we make something super saturated. (Color the correct answer)

By increasing the temperature and then lowering it	By lowering the temperature and then increasing it	By adding more solvent to the mix

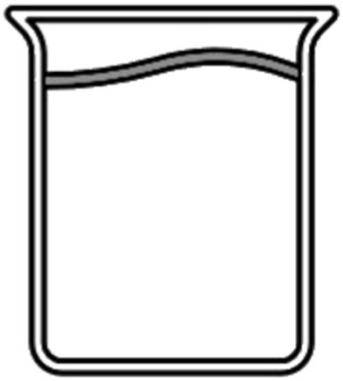
3. What are some safety measures you should do when working with hot liquids? (Color the correct answer)

Don’t lift anything	Stay seated	Don’t run around the classroom
Wear protective gloves	Wear protective glasses	Wear protective hat

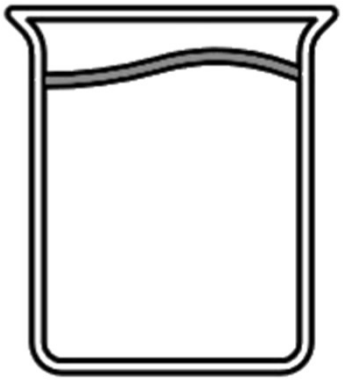
SOLUTIONS

OBSERVATION

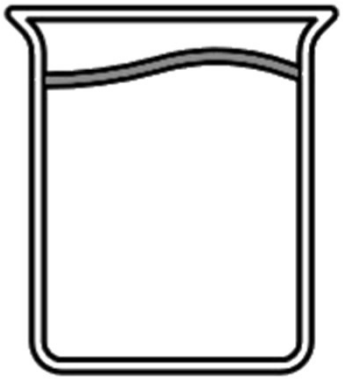
1. Color the beaker before adding alum. Draw particles that are inside the beaker.



2. Color the beaker after adding alum. Draw particles that are inside the beaker.



3. Color the beaker after waiting one week. Draw particles that are inside the beaker.



SOLUTIONS

EXTRA

SOLUTIONS

EXTRA

Draw your favorite character.

Tell me about them!

_____

_____

_____

_____

_____

SOLUTIONS

EXTRA

Draw yourself doing an experiment

SOLUTIONS

EXTRA

Write about what you like in science