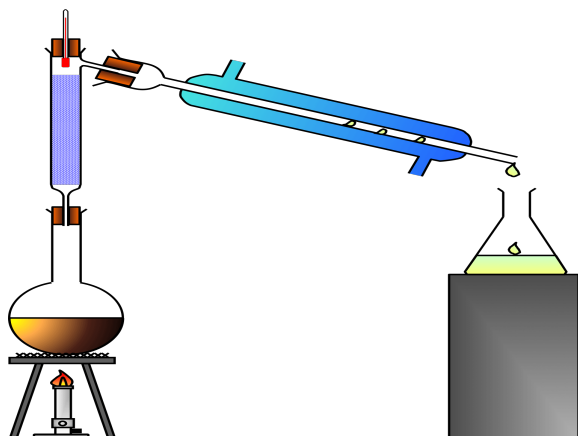


Dissolved Salts

Distillation is the process of separating the parts of a liquid solution



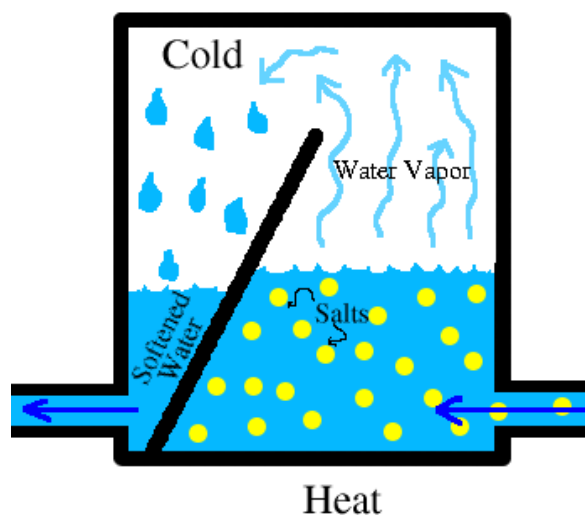
Distillation and Particle Theory



Distillation is a method use to separate parts of a liquid solution.

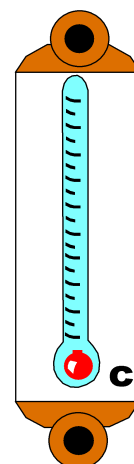
In distillation the solvent is heated to change it to a gas then condensed to a liquid again. The solute does not change state so it remains behind.

Condensation is the change from gas to liquid. The solutes do not change state and remain behind.



According to particle theory, solute particles and solvent particles must be attracted in order to form a solution and that particles are always moving.

Particles at a higher temperature are moving faster than those at a lower temperature.



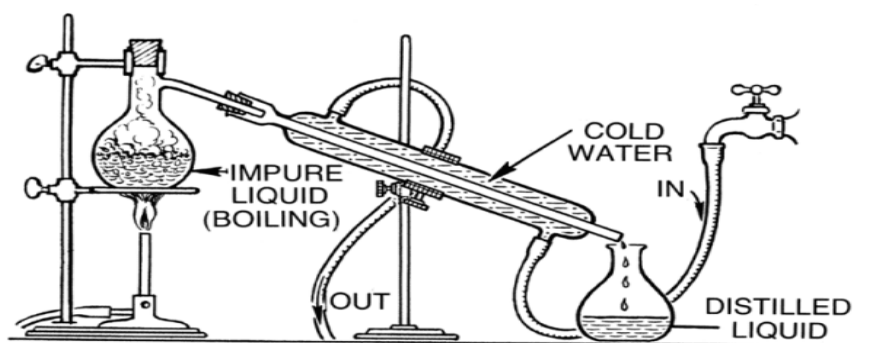
MORE ABOUT THE PARTICLE THEORY

1. Particles Attract each other
2. Particles are always moving
3. Particles at a higher temperature are moving faster than particles at a lower temperature.

The water and salt in the flask are at the same temperature. However, the water travels at a faster rate than salt. That is the reason that they separate.

In distillation heating causes all particles to move quickly. The water particles are moving faster than the salt and therefore escape.

Once in the tubing as a gas it cools, moves slowly and changes back to a liquid.



Dissolved Solids

Did you Know that not all the water is the same?

Even the water that we drink out of the tap is
different!!!!!!

Since rain water runs over rocks, and soil, minerals are
dissolved and carried away in the solution



Hard Water



Hard Water - Meaning water that contains a lot of dissolved minerals.

How do I know if I have Hard Water ?

Water that has been in contact with rock and soil will be hard.

On a bathtub - soap scum may start to form

(Soap does not suds up as much (Need more soap to do dishes))

Soft Water

Soft Water - Means water that has few dissolved minerals
- rain water

How do I know if I have soft water?

Water that is collected without coming in contact with minerals.

Thats great but how do I avoid the minerals?

What is Better Hard Water or Soft Water?

Hard water is perfectly fine - The only difference is the cleaning ability of hard water

Soft water is easier to clean with because it does not contain as many dissolved minerals - that makes it easier to dissolve other materials that need to be extracted.

Undissolved Solids

Settling - means that undissolved matter will, over time, settle to the bottom of a container.

If this method is too slow then it can be **filtered** by running it through a device to capture the undissolved parts.

Dissolving Gases

As we have learned throughout this lesson all water is not created equal.

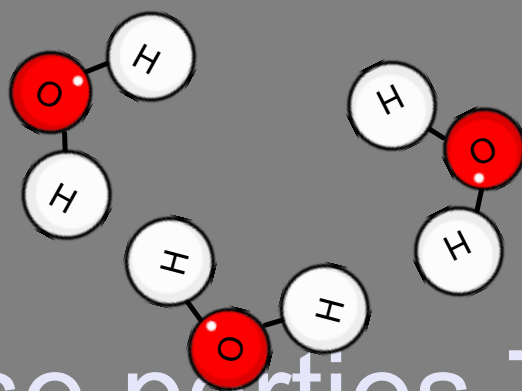
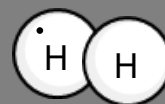
Warmer water contains less dissolved gases than cold water.

Dissolving Gases

Cold Water Contains sufficient oxygen and Carbon dioxide (both are dissolved gases)

As water becomes "warmed" dissolved materials become "undissolved" and escape.

Dissolving Gases



Because particles Travel
faster at high temp
(gas escapes)

Try these questions

1. I am the method of separation used with undissolved solids?

A. Distillation



B. Settling



C. Desalination



2. I am the component of the Particle Theory that explains why water separates from salt during distillation?

A. Particle attract each other



B. Particle at higher temperatures move faster then particles at lower temperatures



C. Particles are always moving



3. I am the result of having "Hard" Water?

A. Water will be less soluable and you will have a harder time cleaning clothes



B. You will get sick if you drink Hard Water, it is not safe.



C. Hard water is what you strive for, soft water will kill you.



4. Which of the following is true about dissolved gases?

A. Warm water is what fish need to live in.
Because, it contains more gases



B. Cold water at the ocean floor is actually
frozen and/or too cold for life



C. Cold water contains dissolved gases that
fish need to survive



3. I am the result of having "Hard" Water?

A. Water will be less soluable and you will have a harder time cleaning clothes




B. You will get sick if you drink Hard Water, it is not safe.



C. Hard water is what you strive for, soft water will kill you.



- Both of These Beakers are the same size (250 ML)
- Both contain the same amount of Solvent (200ML water)
- Both have a solute (red food coloring) added to them

Two identical 250 mL beakers are shown side-by-side on a white surface. Both beakers are labeled 'TEKK 250 mL' and 'KIMBLE, USA NO. 14000K'. They both contain a red liquid, but the liquid in the beaker on the right is a darker shade of red than the liquid in the beaker on the left. The beakers have a scale on the right side labeled 'APPROX. VOLUMES' with markings at 50, 100, 150, and 200 mL.

So Why are they not the same color?

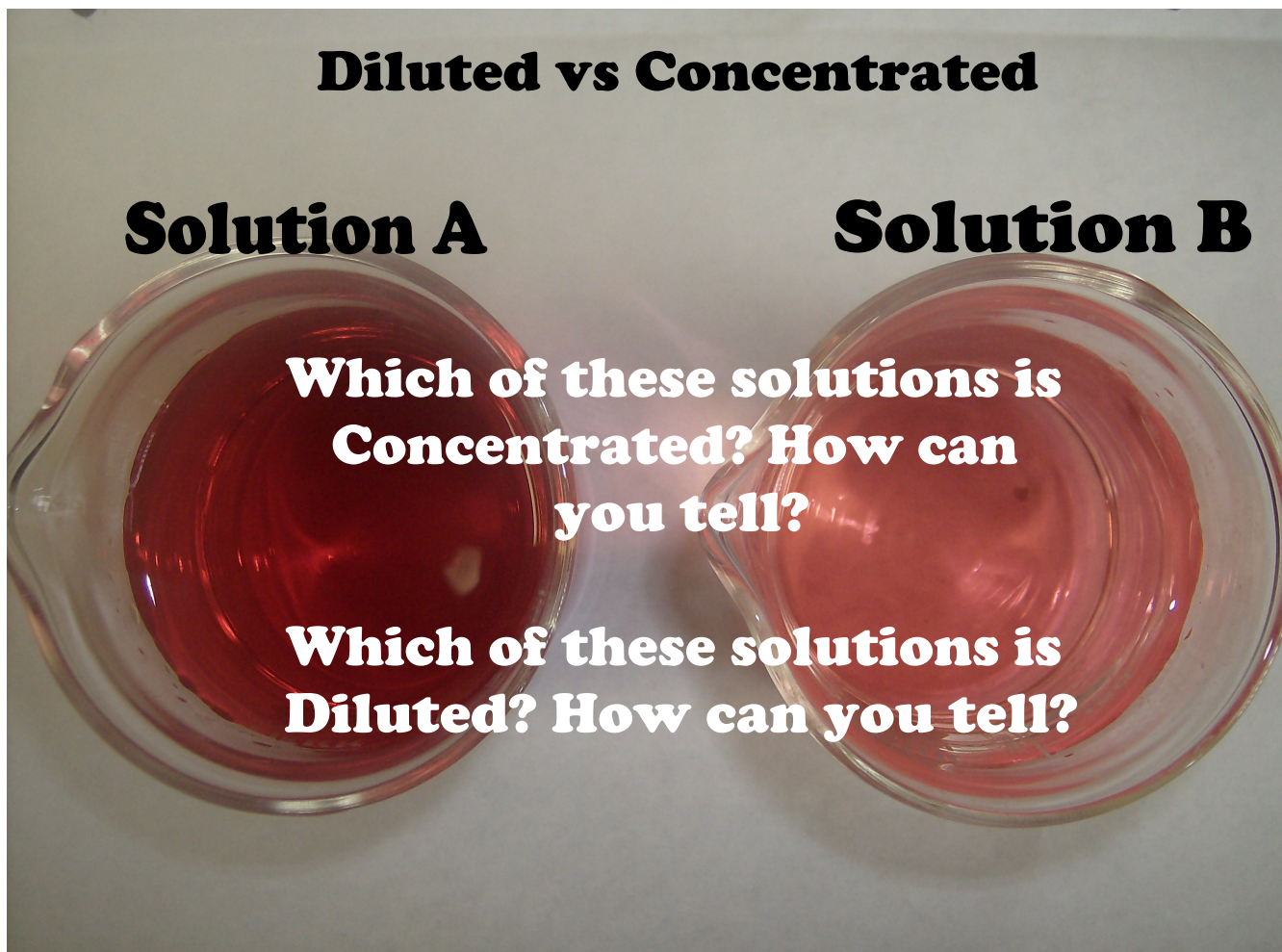
Diluted vs Concentrated

Solution A

Solution B

Which of these solutions is Concentrated? How can you tell?

Which of these solutions is Diluted? How can you tell?



Working With Solutions

Solute - (sugar) A substance that can be dissolved in a solvent.

Solvent - (Water) A Substance into which a solute may be dissolved.

Dilute - To weaken the strength of a solution by increasing the amount of solvent.

A Dilute solution contains very little solute.

Concentrated - A concentrated solution contains a lot of solute for the amount of solvent.

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- 139

Processing Maple Sap

The sap of a sugar maple tree carries nutrients to all parts of the tree. The sap is mostly a dilute solution of sugar in water, but there are also small amounts of many other substances needed by the tree. As the water is boiled off, all of the solutes become more concentrated. The combined flavours of these solutes give maple syrup its distinctive taste. Figure 5.13A shows the stages in the commercial production of maple syrup.

Figure 5.13A Stages in the commercial production of maple syrup

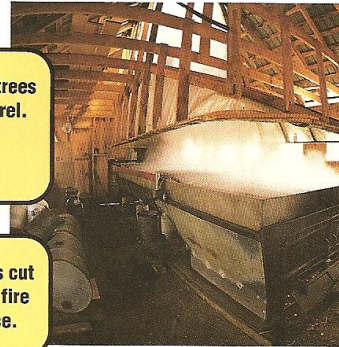
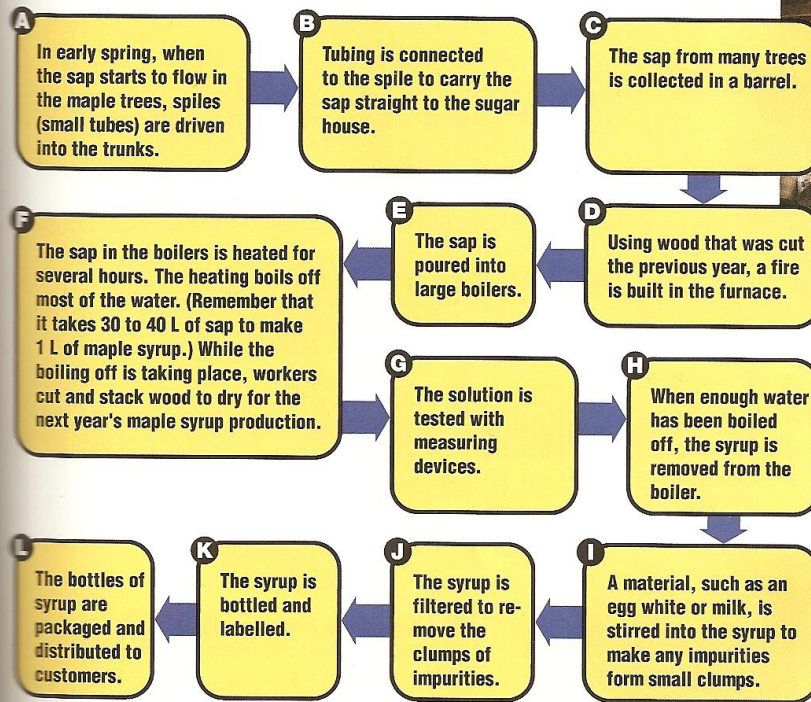


Figure 5.13B Maple syrup production

Making Sugar

In early days, the maple sap was usually boiled until almost all of the water was removed. This process produced solid maple sugar. Except for the slightly darker colour and different taste, maple sugar is very similar to the table sugar we use today. In fact, many of today's sugar bush operations produce small amounts of maple sugar to be sold as candy. Maple sugar is expensive to produce, however. Almost all of the sugar we buy today is produced from sugar cane and sugar beets. Most sugar refineries in eastern Canada use imported sugar cane as the raw ingredient. Most refineries in western Canada use domestically grown sugar beets (see Figure 5.14). Regardless of which raw material is used, the end products are very similar.

Figure 5.14 Sugar beets are grown in Québec, Manitoba, and Alberta.

