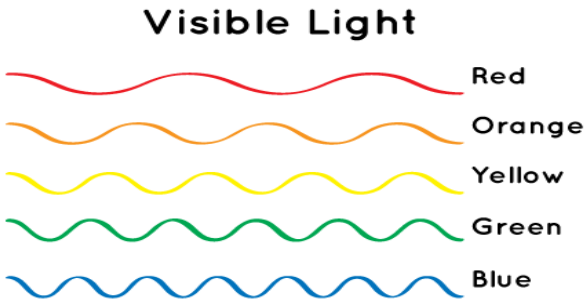
Rainbow Light

White light is made up of waves of colour. Each colour represents the energy level of that wave. Red light has low energy and so it travels in big long waves. Blue has lots of energy so it travels in lots of short waves.

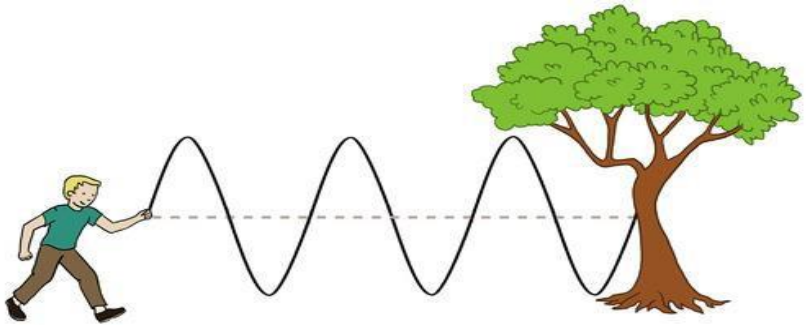


What we need

- long rope
- volunteers with lots of energy

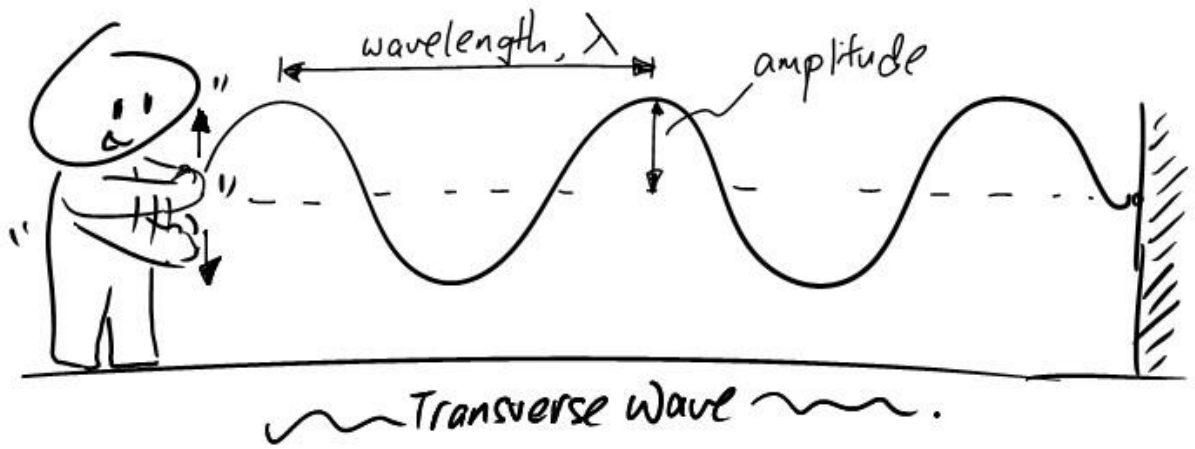
What to do?

- Which takes the most effort?
- A few long slow waves or lots of short waves?



What I think will happen is

What I observed; talk about what happened.



Questions?

Which waves took more effort?

Was it what you expected?

How does this experiment work?

Short waves require a rapid release of energy to set up the fast pattern. The long wave requires a slow release of energy and for us easier to make.

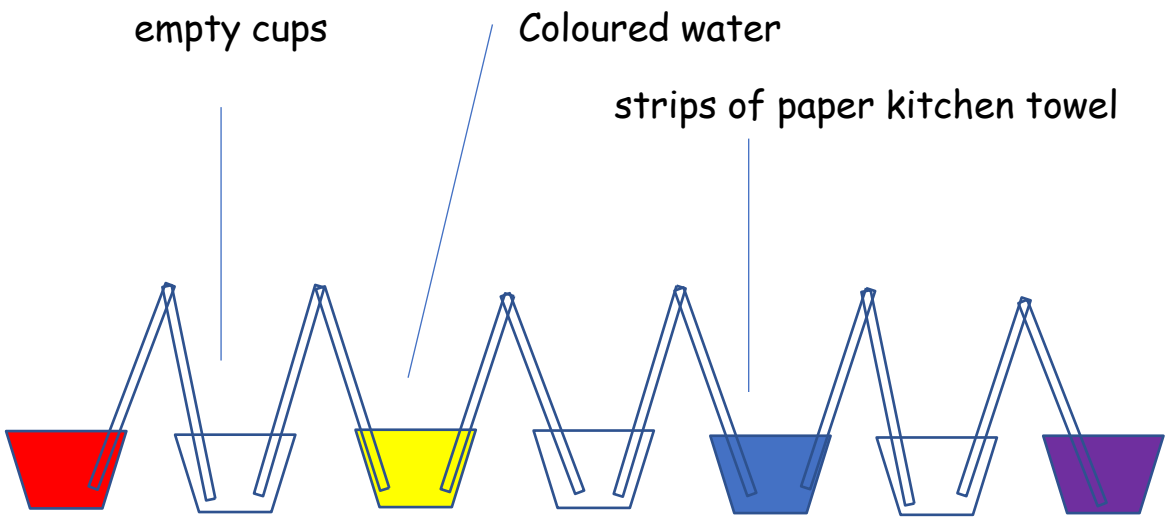
Did you know this wave nature of light is why we see colours in a rainbow. When sunlight strikes the water mist in the sky the slow wave colours of Red is bent more than the fast colours such as blue and purple.

Awesome Rainbow Walking Water

We need:

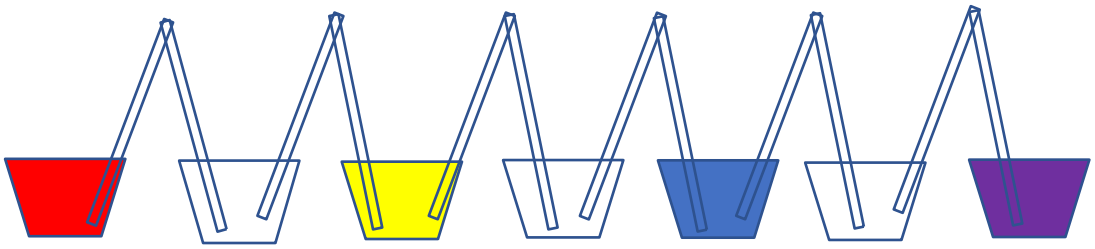
- plastic cups
- coloured water
- strips of kitchen paper towel.

What to do?



What I think will happen is

What I observed; draw what happened.



Questions?

What happened to the water?

Was it what you expected?

Why did the colours change?

How does water walk up against gravity?

How does this experiment work?

The kitchen paper is made from thin fibres which are very close together. The very long thin gaps between the fibres act like drinking straws. They pull the water upwards. The science name for this is *capillary action*.

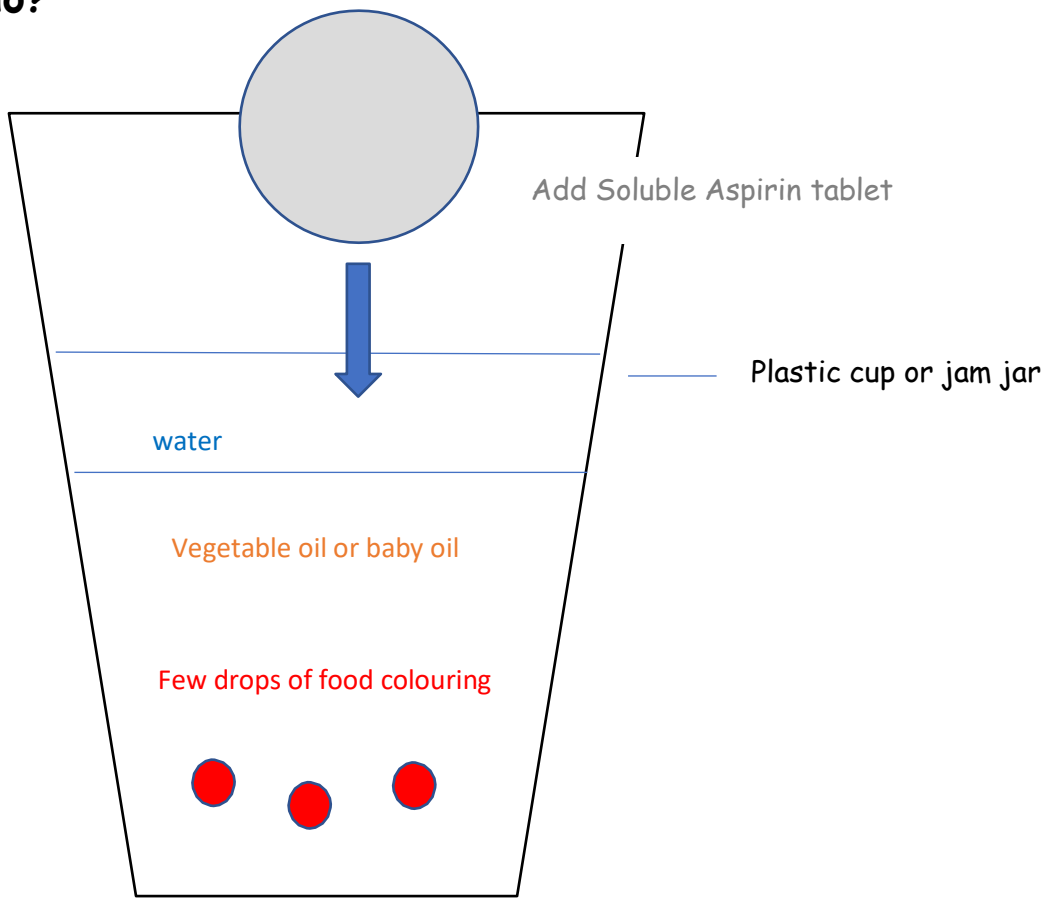
Did you know this is how plants and trees get water from their roots to the top of their leaves?

Magic Lava Lamp

We need:

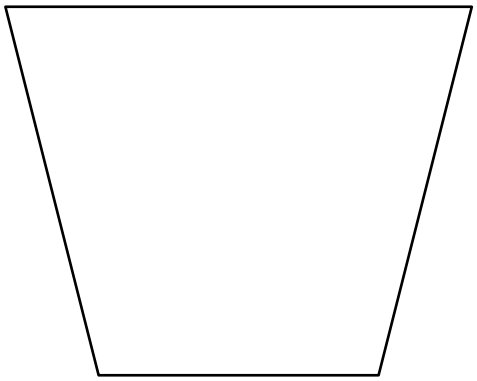
- plastic cup or jam jar
- vegetable oil
- water
- drops of food colouring
- 1x soluble Aspirin or Alker Seltzer tablet

What to do?



What I think will happen is

What I observed; draw what happened.



Questions?

What happened to the colour drops?

Was it what you expected?

Why did they start to jump and bubble up and down?

How does this experiment work?

This experiment demonstrates a chemical reaction. When the tablet dissolves it reacts with the water making bubbles of carbon dioxide gas which rise to the top of the mixture taking the food colour droplets with them. As the gas escapes from the top of the mixture into the air, the coloured water droplets fall to the bottom of the mixture. This reaction continues until the tablet has completely dissolved and no more carbon dioxide is made. To make your 'lamp' bubble again – just add another tablet and enjoy!

Did you know this same gas carbon dioxide makes the bubbles in fizzy drinks?

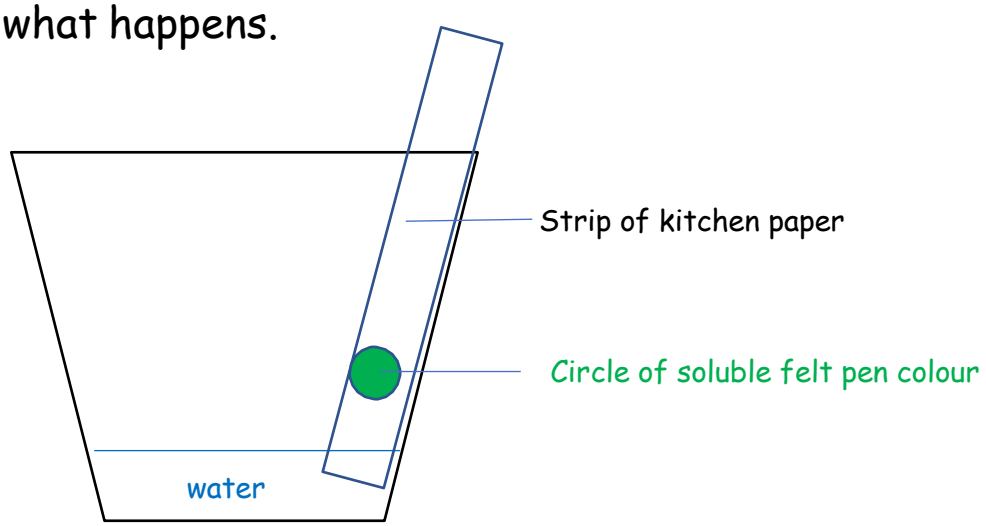
Rainbow Ribbons

We need:

- plastic cup, glass tumbler or jam jar
- water soluble felt pens
- water
- strips of kitchen paper towel or coffee filter paper

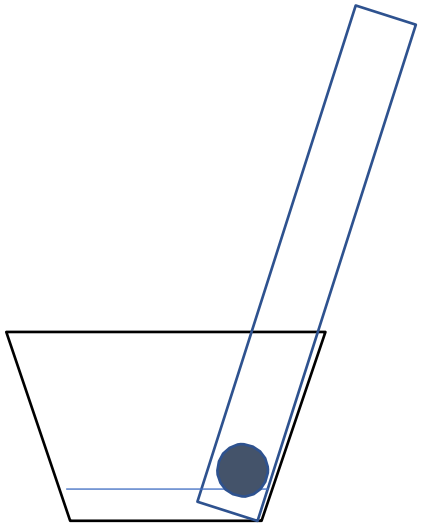
What to do?

1. cut a long strip of filter paper or kitchen paper
2. Draw and fill in a circle of colour on a strip of paper a few cm from the bottom
3. Add a few cm of water to the bottom of your cup
4. Dip the bottom of your strip into the water below the level of your colour circle
5. Fold the strip of paper over the edge of the cup and observe what happens.



What I think will happen is

What I observed; draw what happened.



Questions?

What happened to the colour circle?

Was it what you expected?

What caused this to happen?

How does this experiment work?

The colours we see in paint and marker pens are made up of several different chemicals to get the exact shade we want. *Capillary action* moves the water up the paper. When it reaches the colour the chemicals in the ink dissolve in the water at different rates, separating each of the chemicals in colour bands. This process of separating components in mixtures is called *chromatography*.

Did you know forensic scientists use this to tell which ink was used to write a letter! Try this process with different pens of the same colour – what do you notice?

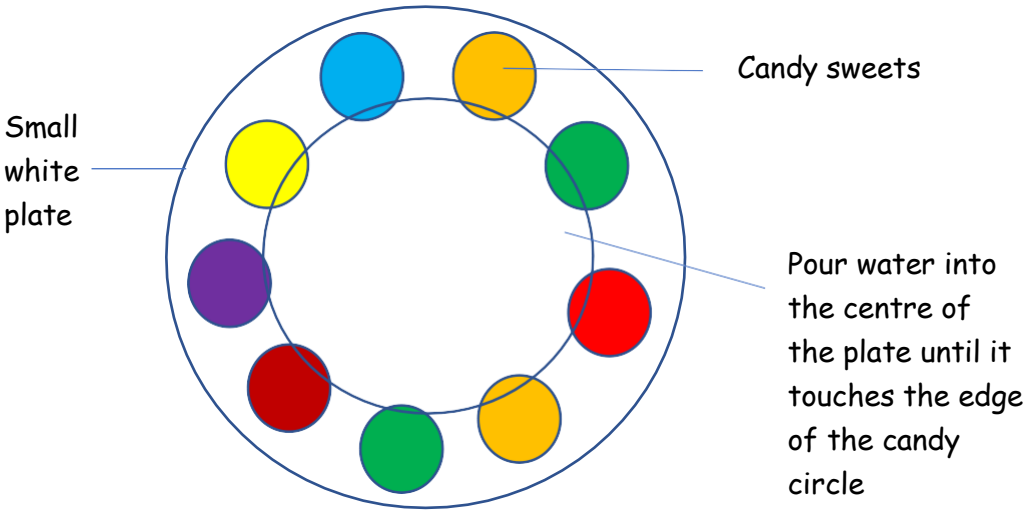
Skittle Science

We need:

- Small white plate
- Bag of *Skittles* or similar candy sweets
- water

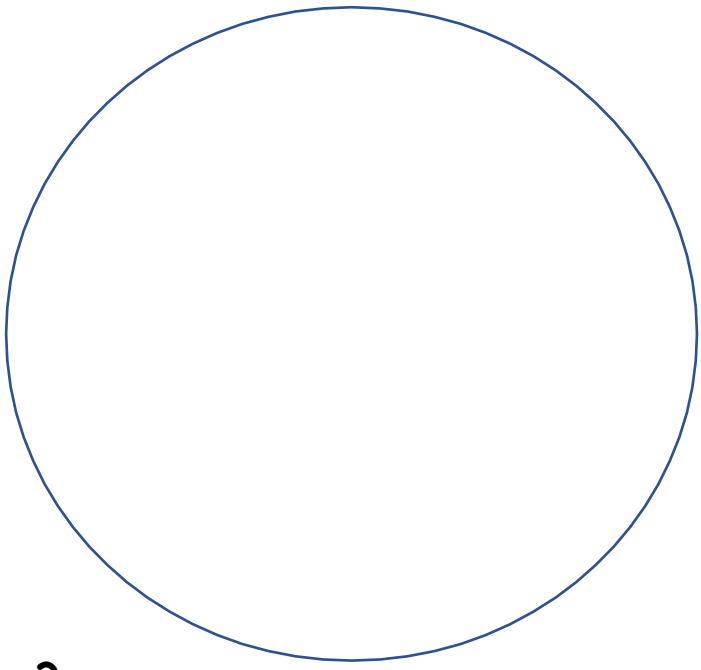
What to do?

1. Place Skittle candy in a circle around the edge of the plate
2. Slowly pour water into the circle allowing it to just touch the edge of the candy
3. Observe what happens



What I think will happen is

What I observed; draw what happened.



Questions?

What happened to the candy?

Was it what you expected?

Why didn't the colours mix?

What caused this to happen?

How does this experiment work?

The candy is coated in coloured sugar. The water dissolves the sugar coating allowing the colour dyes to spread through the water. This is called *water stratification*. Try this again at home using salty water, hot water, milk etc. Observe what happens! **Did you know** *water stratification* process is used in purifying drinking water?

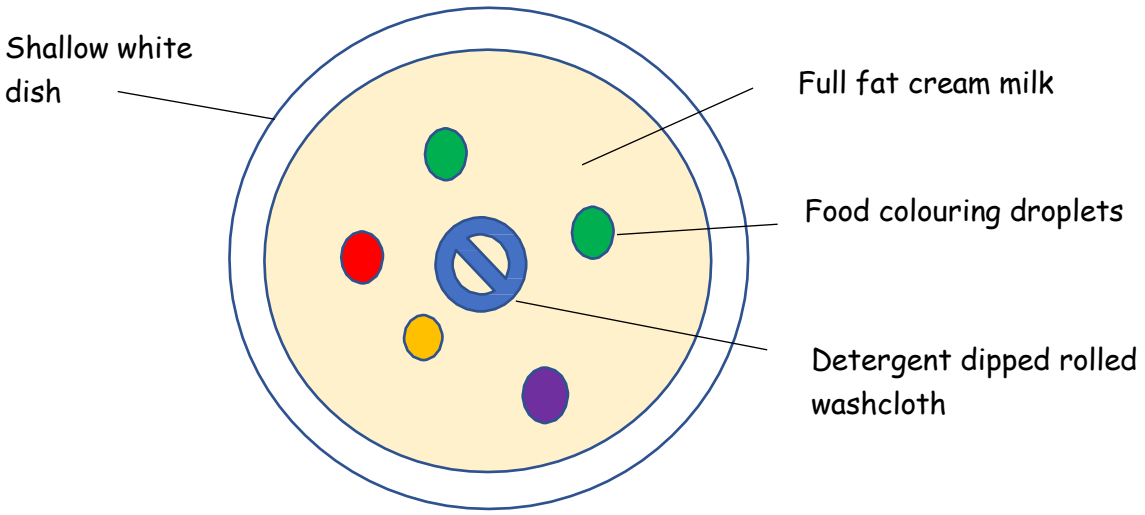
Rainbow Milk

We need:

- Shallow white dish
- Food colouring
- Full fat cram milk
- Capful of detergent liquid
- Small rolled clean dry wash cloth or cotton buds

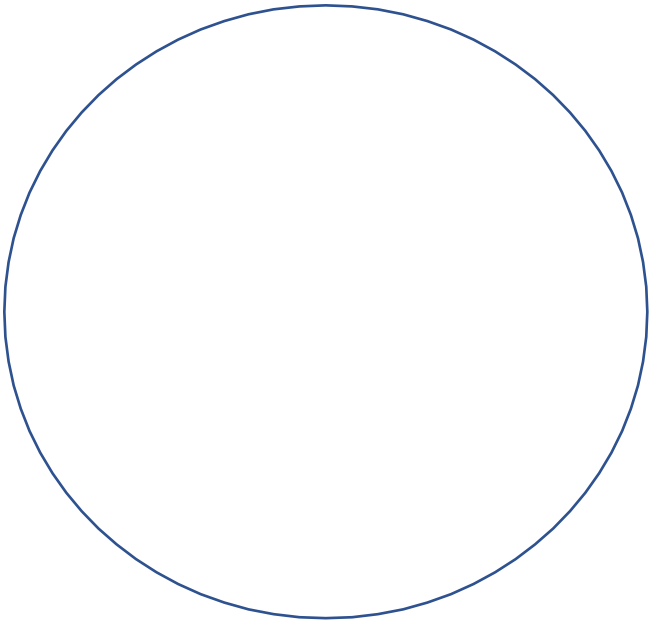
What to do?

1. Pour milk into dish
2. Drop spots of food colouring onto the milk surface
3. Dip end of rolled wash cloth or tips of cotton buds into detergent then into the surface of the milk
4. Observe what happens



What I think will happen is

What I observed; draw what happened.



Questions?

What happened to the colour droplets?

Was it what you expected?

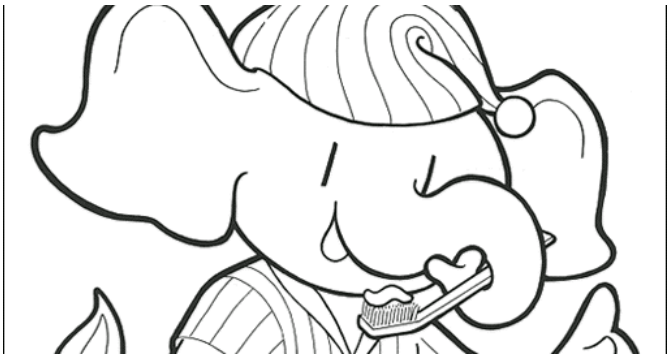
What is happening to the milk?

What caused this to happen?

How does this experiment work?

The dish detergent doesn't mix with the milk. Instead, it floats on top and spreads over the surface. As it spreads, it 'grabs' the food colouring. Detergent is a *degreaser* so the *molecules* in it break down the fat in the milk, causing *motion* which creates the swirling of the colours. **Did you know** this is how household cleaners work? Vinegar, baking soda, orange and lemon juice are all *degreasers* – happy cleaning!

Elephant Toothpaste



We need:

- 1/2 cup of 3% hydrogen peroxide liquid (Adult supervision required)
- 1 tablespoon of dry yeast
- 3 tablespoons of warm water
- Liquid dishwashing soap
- Food coloring
- Plastic soft drink bottle

What to do:

- Combine dish soap, food coloring, and 1/2 cup of hydrogen peroxide in the open plastic soft drink bottle
- Mix the yeast with the warm water.

What I think will happen is

What to do next:

- Pour the yeast mix through a funnel into your bottle.
- Stand back

What I observed; draw what happened.

Questions?

What happened to the liquid?

Was it what you expected?

What is happening to the yeast?

What caused this to happen?

How does this experiment work?

Yeast is used in cooking to make bread and cakes rise. Yeast when mixed with water releases the oxygen from the water. Causing it to foam up. Look closely at the inside of a cake or bread and you will see it is made up of lots of bubbles. Hydrogen peroxide has twice as much oxygen in it so we get more foam.