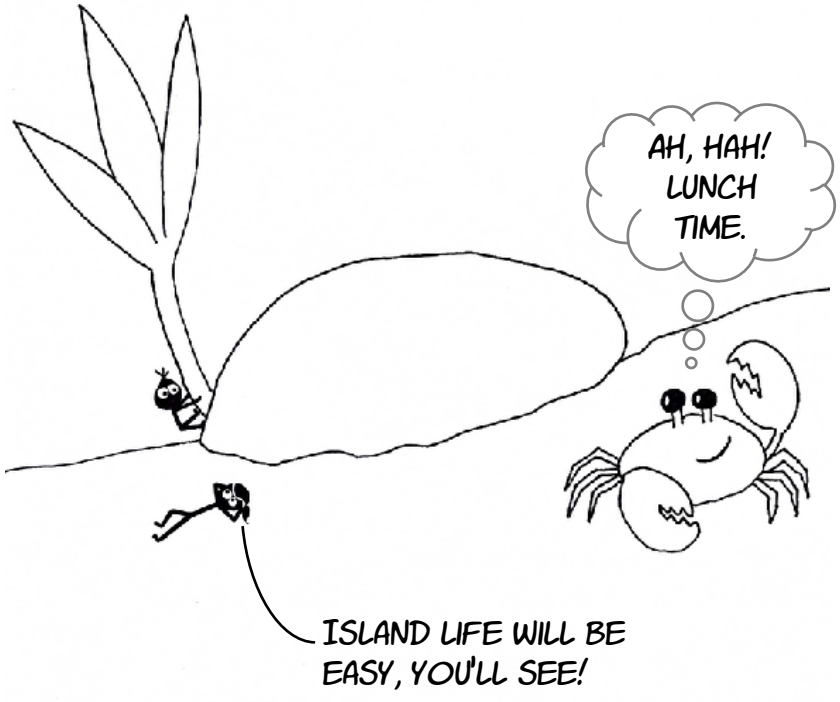
SMG #7



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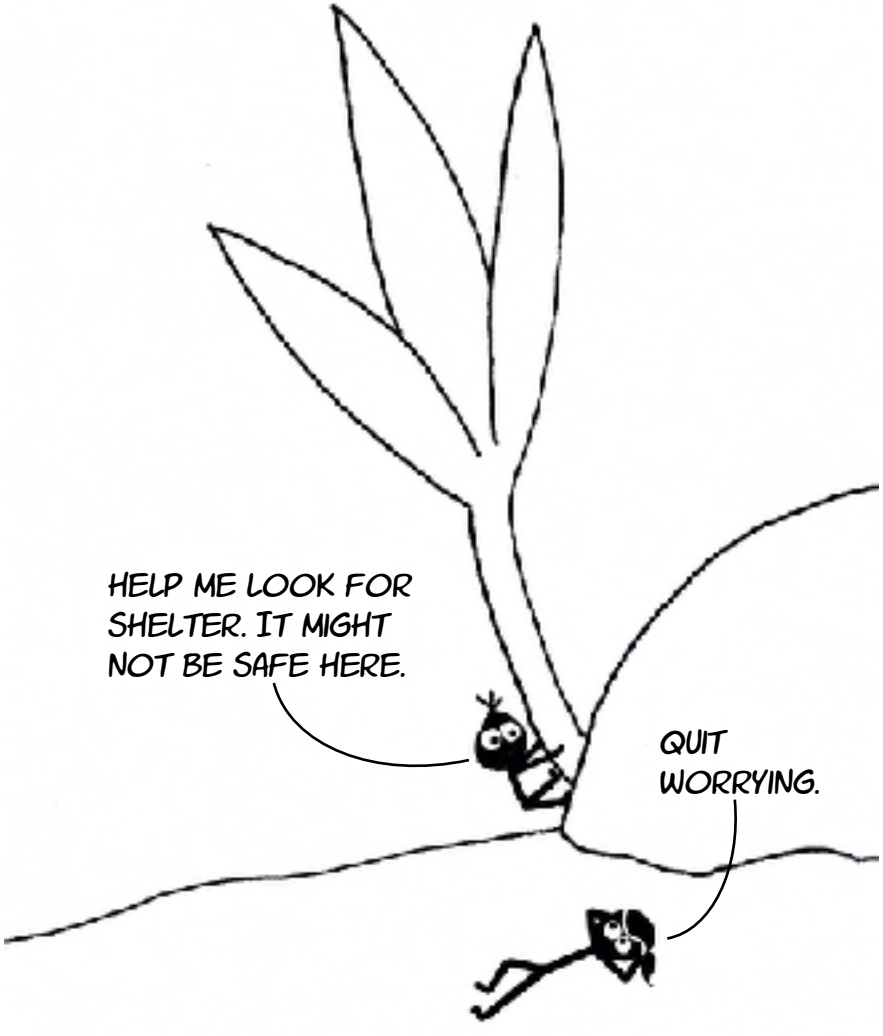
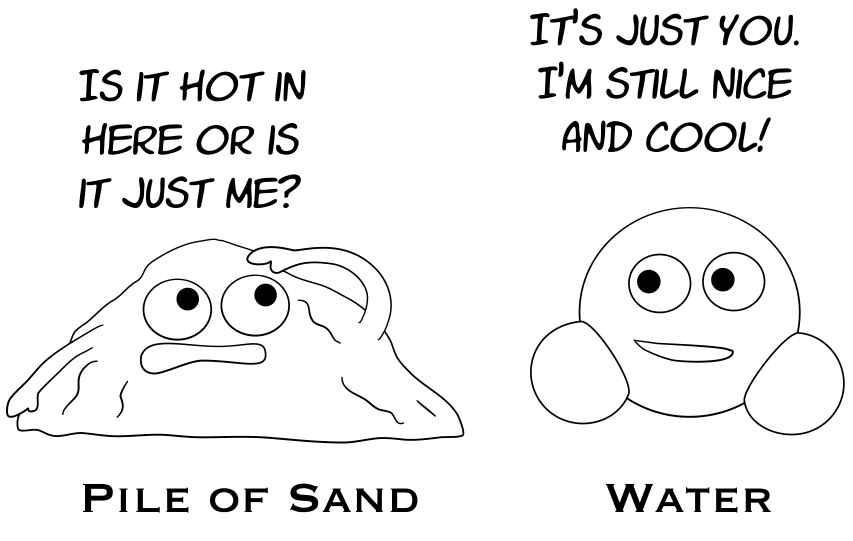
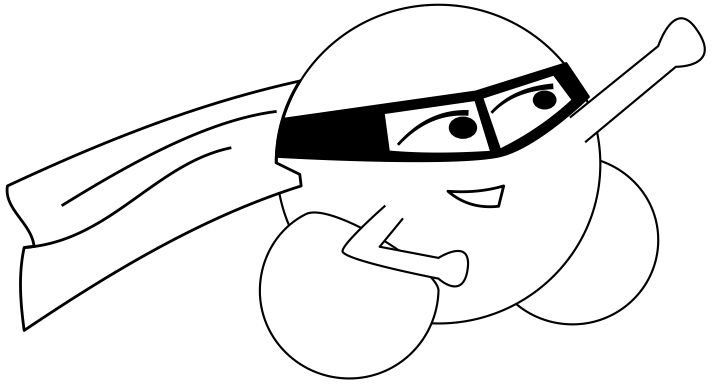
Guide to WATER, Part 7



If you add the same amount of heat to water and sand, the sand will heat up FIVE times more than the water. It's almost as if water has a super power to be resistant to changes in temperature.

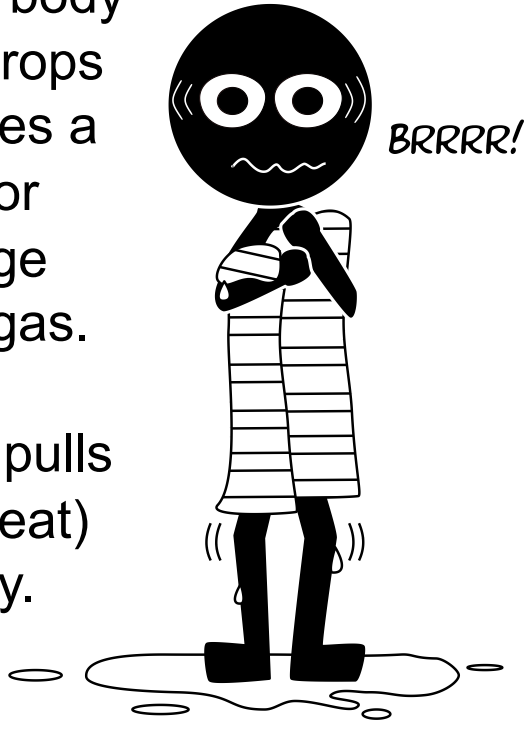


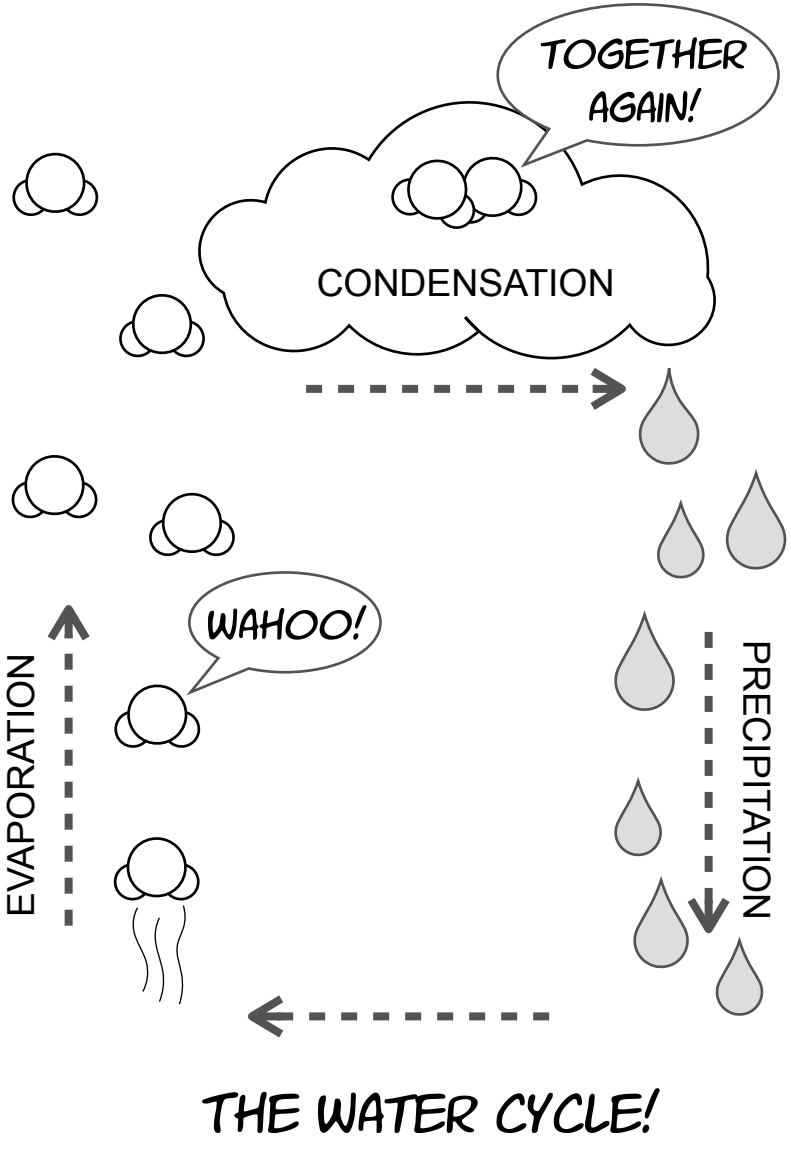


The ability of water to absorb a lot of heat before changing temperature is known as having a "high specific heat capacity." This attribute of water regulates the temperature of our planet, helps us cool down when we sweat, and much more.

SPECIFIC HEAT CAPACITY = THE AMOUNT OF HEAT ONE GRAM ABSORBS OR LOSES TO CHANGE TEMPERATURE BY 1 DEGREES CELSIUS. WATER HAS A SPECIFIC HEAT OF 1 CALORIE (OR 4.18 JOULES)

Water's high specific heat also plays a big role in how and when water changes between being solid, liquid, or gas. Have you ever gotten out of a shower or bath and noticed how cold you feel while you're wet? That's because of **evaporative cooling**. Your body temperature drops because it takes a lot of energy for water to change from liquid to gas. As the water evaporates, it pulls that energy (heat) from your body.





1. Evaporation Sensation

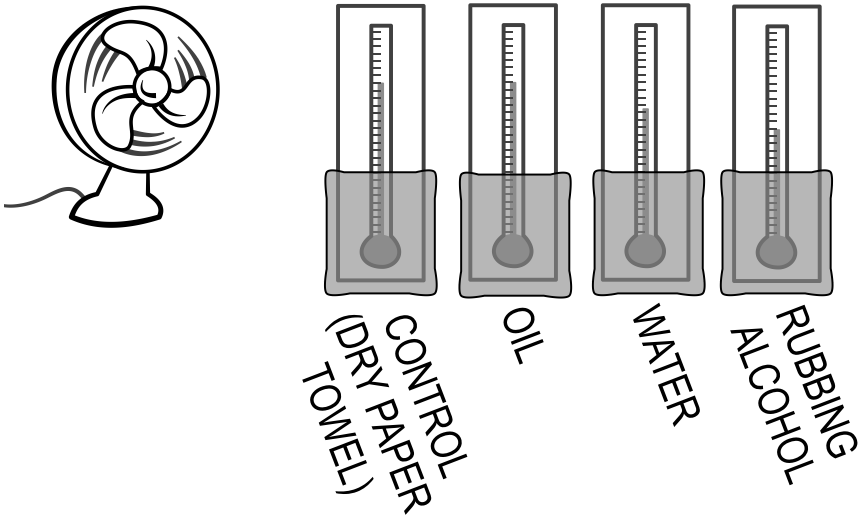
Materials:

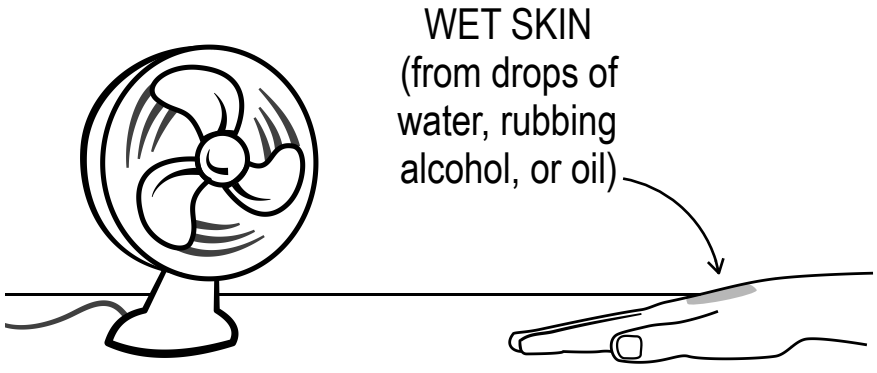
- Water
- Oil
- Rubbing Alcohol
- A fan
- Thermometers (optional)

Method:

a) Put a small bit of water on the top of your hand.
b) Place your hand in front of the fan so that the wind is flowing over it for at least 20 seconds. Make note of how much colder the wet part of your skin feels.
c) Repeat with the rubbing alcohol and oil.

Optional variation: place paper towels soaked in different liquids over the thermometers. Observe the change in temperature over 5 to 10 minutes.





2. Water Cycle in a Jar

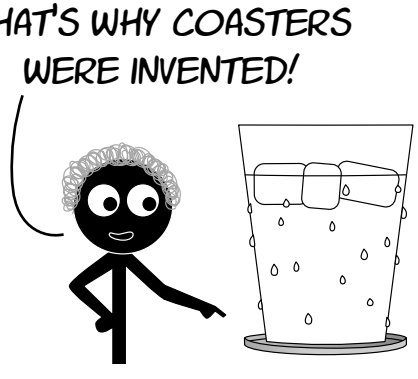
Materials:

- Clear jar or cup
- Hot water
- Ice
- Plate

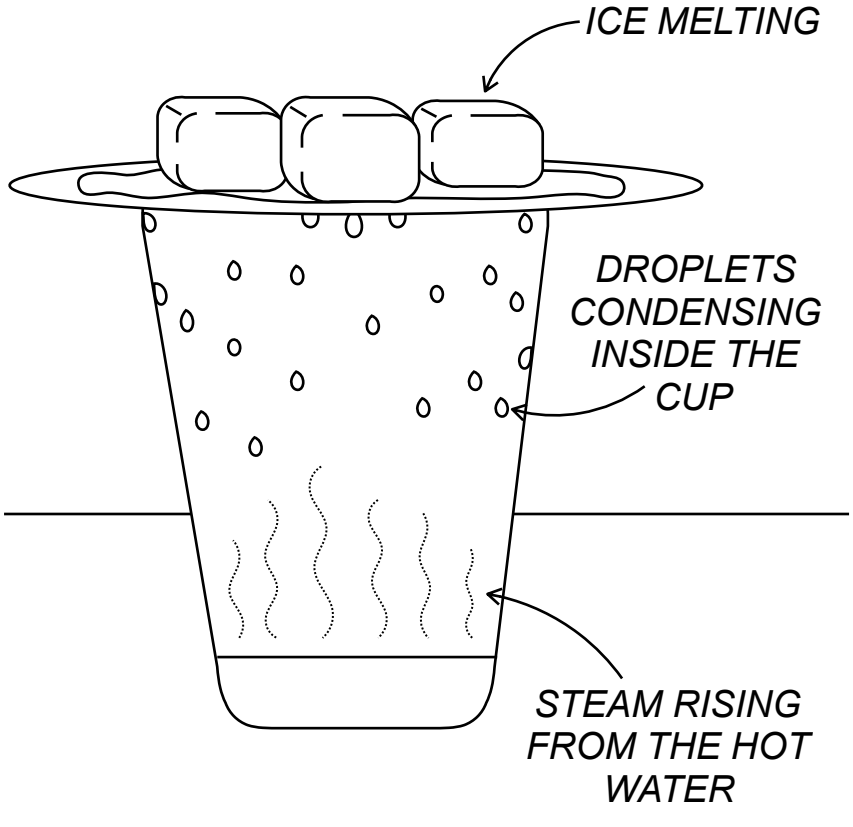
Method:

a) Place a small amount of hot water in the cup or jar.
b) Cover the cup or jar with a plate and place ice on top of the plate.
c) Observe the water droplets condensing on the sides of the cup and underneath the plate.

HAVE YOU EVER SEEN WATER CONDENSE ON THE OUTSIDE OF AN ICE-COLD DRINK? THE MORE HUMID IT IS, THE WETTER THE CUP WILL BE.



ALL THREE STATES OF WATER TOGETHER IN ONE COOL PLACE:



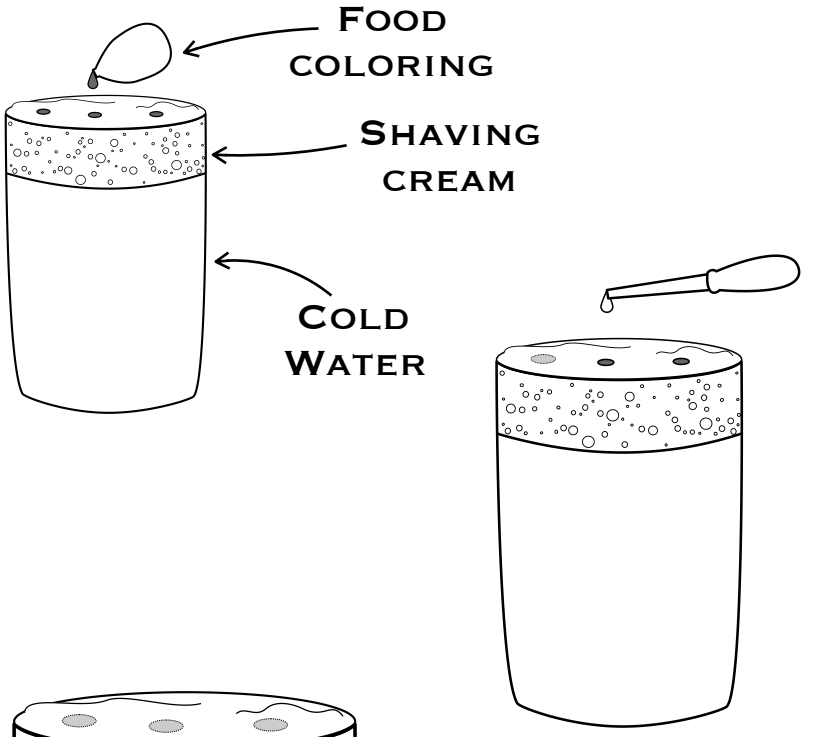
3. Rain in a Jar

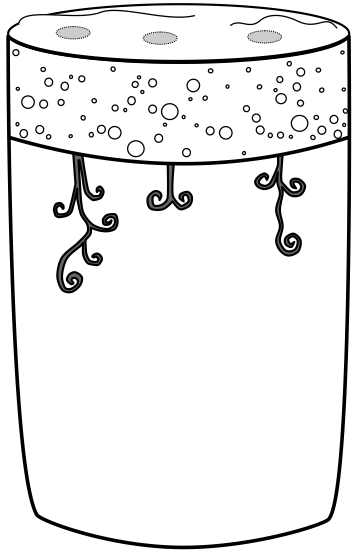
Materials:

- Clear jar or cup
- Shaving cream
- Food coloring
- Dropper

Method:

a) Fill the jar 3/4 full of cold water.
b) Add shaving cream and smooth it out so the shaving cream completely covers the water.
c) Add a few drops of food coloring on top of the shaving cream.
d) Using the dropper, carefully add 3 to 4 drops of water on top of each spot of food coloring.
e) Observe the jar and watch as the food coloring moves down and into the water.





Water travels through the shaving cream because water is more dense. Similarly, rain occurs when droplets get big enough to be more dense than the surrounding air.

4. Pulling water from dirt

Materials:

- Large bowl
- Small cup
- Dirt
- Plastic wrap
- A small pebble or other weight

Method:

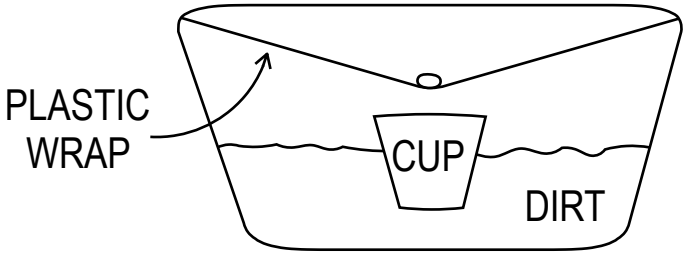
a) Place damp dirt into the large bowl or container.

b) Put the small cup or bowl in the center of the large container.

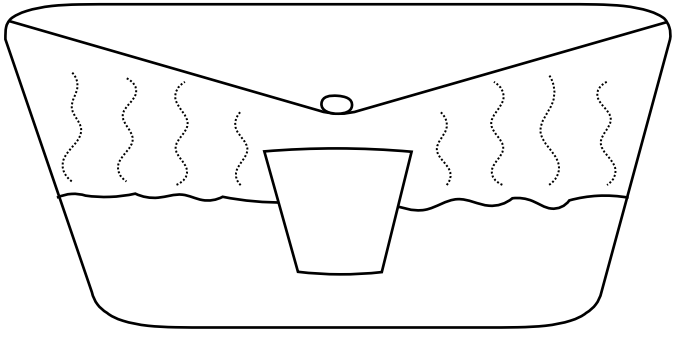
c) Cover the bowl with a lose layer of plastic wrap and place a small rock or other object in the center so the plastic has a low point over the center of the cup.

d) Secure the plastic wrap so that it is airtight. Use tape if needed.

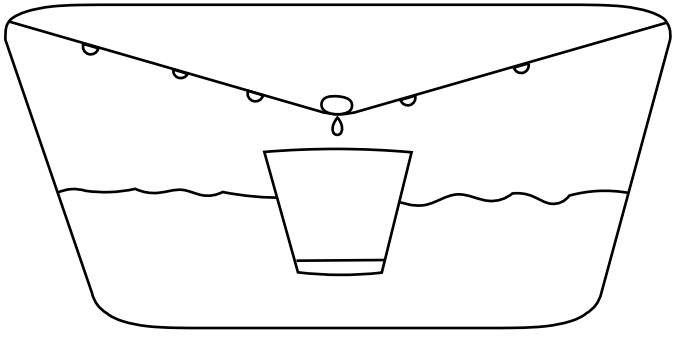
e) Place the container in direct sunlight and leave outside overnight.



SUNLIGHT WARMS THE CONTAINER, CAUSING WATER TO EVAPORATE:



WATER CONDENSES ON THE PLASTIC WRAP AND DRIPS INTO THE CUP:



5. Pop-proof balloon

Materials:

- Balloons
- Water
- Candle
- Matches

Method:

a) Put a few spoonfuls of water into one balloon, and no water into the other balloon.

b) Blow up each balloon and tie a knot at the ends.

c) Light the candle. *NOTE: ALWAYS HAVE ADULT SUPERVISION WHEN USING FIRE. A BIRTHDAY CAKE CANDLE IS NOT THE BEST CHOICE. YOU WANT A CANDLE THAT WILL STAY UPRIGHT.*

d) Hold each balloon over the candle so that it just barely touches the flame.

e) Observe if and when they pop!