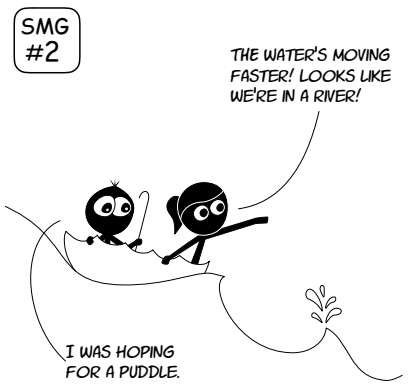
SMG #2



SCIENCE MOM
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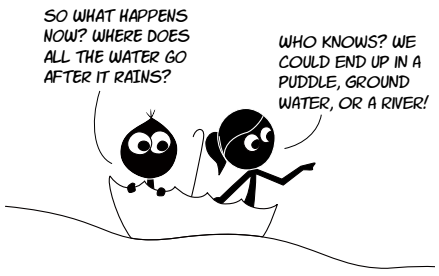
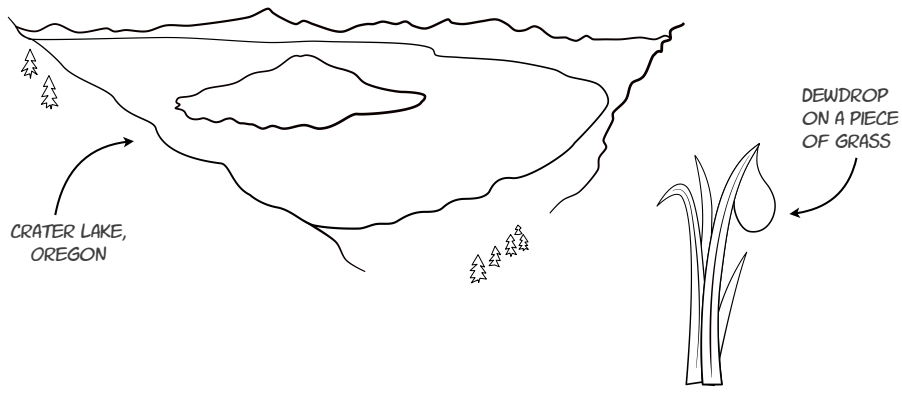
SCIENCE MOM'S
Guide to WATER, Part 2



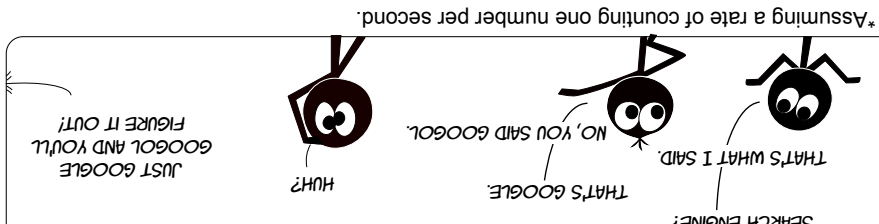
Think of a big lake versus a dewdrop. Pretty big difference in size, right?



The dewdrop is SUPER small compared to the lake. But a water molecule (the smallest bit of water you can have) is MUCH smaller than a dewdrop.

A single drop of water has more than 1,000,000,000,000,000,000,000 water molecules! That huge number with 21 zeros is called a sextillion, and it is a *TRILLION TIMES BIGGER* than one billion.

*Assuming a rate of counting one number per second.

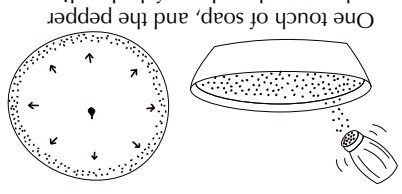


LET'S TALK ABOUT BIG NUMBERS

Name	How many zeros	How long to count that high*
Million	6 (1,000,000)	11 days
Billion	9 (1,000,000,000)	31 years
Trillion	12	31,704 years
Quadrillion	15	31 million years
Quintillion	18	31 billion years
Sextillion	21	31 trillion years
Septillion	24	317 trillion centuries
Googol	100	Don't be ridiculous!

A googol is bigger than the number of PARTICLES in the UNIVERSE.

One touch of soap, and the pepper shoots to the edges of the bowl!



c) Watch the pepper scatter!

b) Add a touch of soap to the surface of the water.

a) Place water in bowl and sprinkle with pepper.

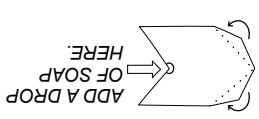
Method:

- Bowl or plate
- Ground black pepper
- Concentrated dish soap
- Water

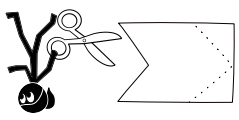
Materials:

1. Pepper Scatter

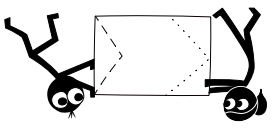
THEN SET THE BOAT IN WATER AND WATCH IT GO!



THEN FOLD THE FRONT LIKE THIS:



CUT THE PAPER LIKE THIS FOR THE BACK OF THE BOAT:



GET A SQUARE OF PAPER, PREFERABLY CARDSTOCK.

2. Soap Boat

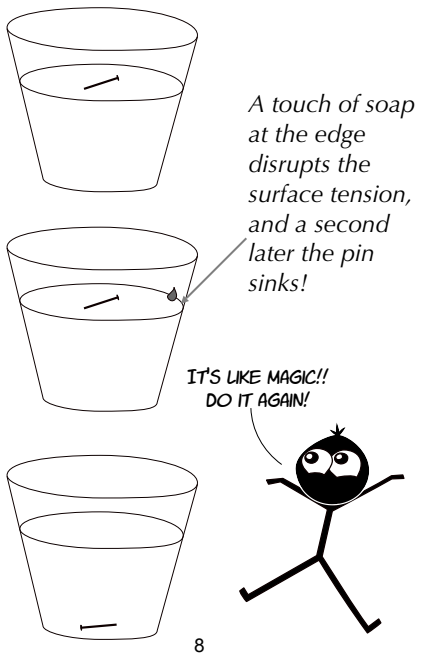
3. Floating Pin

Materials:

- A small pin or needle
- Bowl or cup
- Concentrated dish soap
- Water

Method:

a) Fill bowl or cup with water and carefully place pin on surface. *Hint: tweezers may help. The pin must be flat with the surface of the water. It will sink if it comes in at an angle.*
b) Add a touch of soap.
c) Watch the pin sink!



4. Floating Paperclip

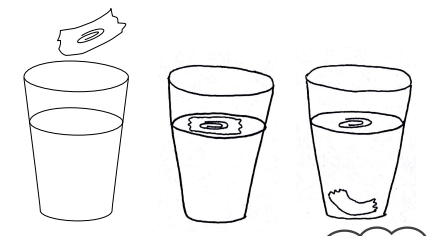
Materials:

- Paper clip
- Tissue paper or paper towel
- Cup or bowl
- Water

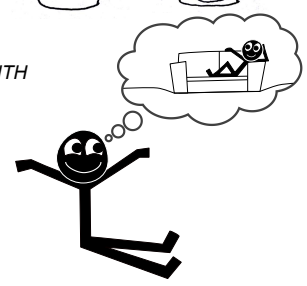
Method:

a) Fill the cup with water and gently place a piece of tissue paper on the surface.
b) Carefully place a dry paperclip on the tissue.
c) The tissue should sink. If it doesn't, give it a gentle push downward.

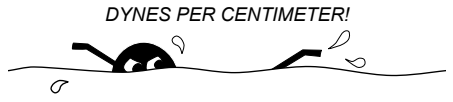
Tip: be sure that the cup and water are not soapy.



Idea:
IF IT WORKS WITH A PAPERCLIP, HOW ABOUT SOMETHING BIGGER, LIKE A FLOATING COUCH!

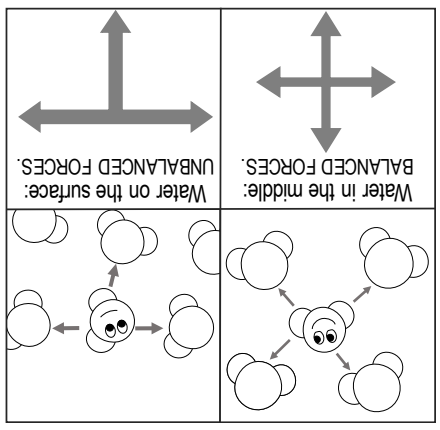


Reality:
THE SURFACE TENSION OF WATER IS ONLY 72 DYNES PER CENTIMETER!

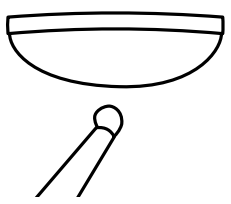


HOW DOES IT WORK? Surface Tension.

Water molecules like each other more than they like air, so the molecules on the surface bond more tightly to their neighbors. This creates surface tension, which helps raindrops stay together and allows us to fill cups above the brim, or make a dome of water on a coin.

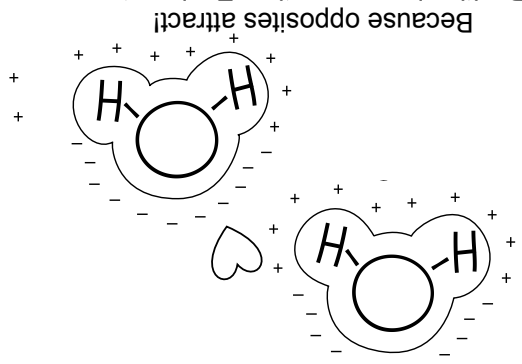


Question:
How many drops of water can you fit on a coin before the water spills off the side?



Answer:
A lot! The molecules on the surface pull in, creating a dome of water on the coin. Wow!

Because opposites attract!
Positive loves negative. Each water molecule is part positive (+) and part negative (-). Hydrogen bonds (♡) form between the positive and negative sides.



But **WHY** do water molecules want to be by each other?

X

C

G

F

D

E

F

F

D

C

C

B

X

A

A

B