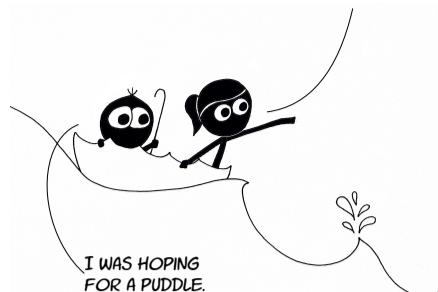


THE WATER'S MOVING  
FASTER! LOOKS LIKE  
WE'RE IN A RIVER!



# **SCIENCE MOM'S**

*Guide to WATER, Part 2*

**SCIENCE MOM**  
— JENNYBALLIF.COM —  
[www.youtube.com/ScienceMom](http://www.youtube.com/ScienceMom)

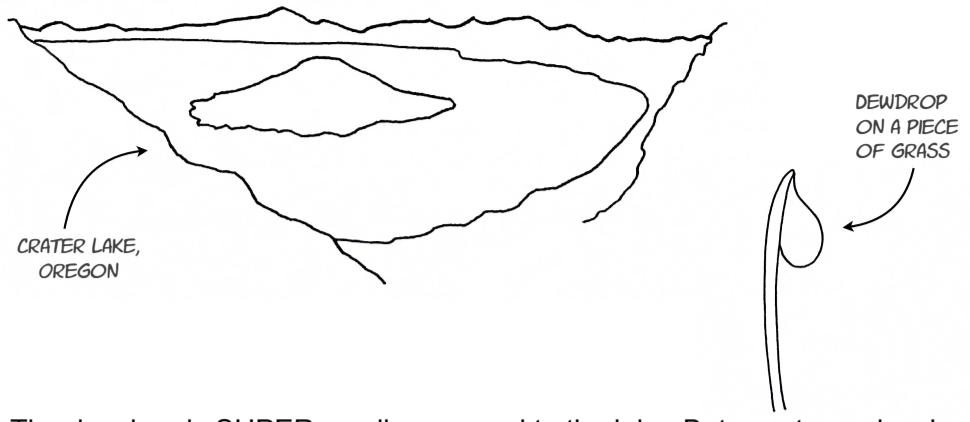
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SO WHAT HAPPENS  
NOW? WHERE DOES  
ALL THE WATER GO  
AFTER IT RAINS?

WHO KNOWS? WE  
COULD END UP IN A  
PUDDLE, GROUND  
WATER, OR A RIVER!

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 water molecules! That huge number with 21 zeros is called a sextillion, and it is a *TRILLION TIMES BIGGER* than one billion.

1

2

3

6

YAHOO!

WATER AND WATCH IT GO!

THEN SET THE BOAT IN

FRONT LIKE THIS:

THEN FOLD THE

ADD A DROP OF SOAP HERE.

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

GET A SQUARE OF PAPER, PREFERABLY CARDBSTOCK

2. Soap Boat

**Materials:**

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

**Method:**

- a) Place water in bowl and sprinkle with pepper.
- b) Add a touch of soap to the surface of the water.
- c) Watch the pepper scatter!

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

5

Name	How many zeros	How long to count that high*
Billion	9 (1,000,000,000)	31 days
Million	6 (1,000,000)	11 days
Tillion	12	31 years
Quadrillion	15	31,704 years
Quintillion	18	31 million years
Sextillion	21	31 billion years
Septillion	24	31 trillion years
Googol	100	Don't be ridiculous!
NAME OF AN INTERNET SEARCH ENGINE?	GOOGOL? ISN'T THAT THE NAME OF A PARTICLE IN THE UNIVERSE?	A googol is bigger than the number of particles in the universe.
THAT'S GOOGLE.	HUH?	JUST GOOGLE IT OUT!
THAT'S WHAT I SAD.	NO, YOU SAID GOOGOL.	GOOGOL AND YOU'LL FIGURE IT OUT!
		

### 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!

A touch of soap  
at the edge  
disrupts the  
surface tension,  
and a second  
later the pin  
sinks!

IT'S LIKE MAGIC!!  
DO IT AGAIN!

## 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.

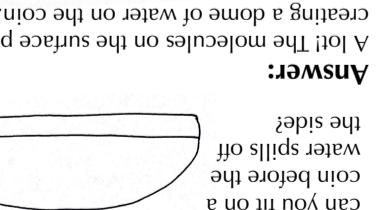
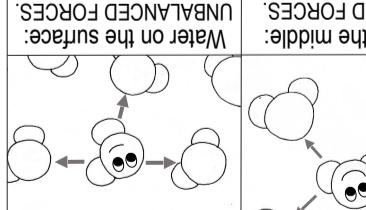
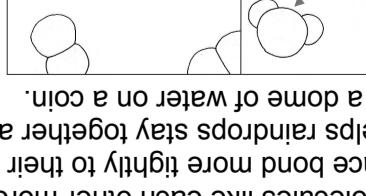
**Tip:** be sure that the cup and water are not soapy.

10

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

Because opposite charges attract!

Positive loves negative. Each water molecule is part positive (+) and part negative (-). Hydrogen bonds ( $\text{H}\cdots\text{O}$ ) form between the positive and negative sides.

<p><b>Surface Tension</b></p> <p>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.</p> <p><b>Question:</b> How many drops of water can you fit on a coin?</p> 
<p><b>Answer:</b></p> <p>How many drops of water can you fit on a coin before it spills off the side?</p> <p>A lot! The molecules on the surface pull in, creating a dome of water on the coin.</p> <p>Wow!</p> 
<p><b>HOW DOES IT WORK?</b></p> <p>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.</p> <p><b>Question:</b> How many drops of water can you fit on a coin?</p> 

Surface Tension.

HOW DOES IT WORK?

B

A

A

X

B

C

C

D

F

E

E

D

E

G

G

X