



# A PENNY FOR YOUR DROPS

## MATERIALS

### WHAT YOU'LL NEED

- Coins:
  - a penny, dime, nickel or quarter
- Small container of water
  - Optional: food dye
- Dropper
  - Alternative: straw
- Paper towel

### LEARNING CORNER

**Surface Tension:** Property of the surface of a liquid that creates a "skin" and allows it to resist a limited amount of an external force.

Learn more about surface tension from this YouTube video on the BBC Earth Lab channel [here](#).

**Cohesion:** The force of attraction that holds similar molecules together.

In our case, the force of attraction between the water molecules creates surface tension.

**Adhesion:** Tendency of dissimilar particles and surfaces to cling to one another.

In our case, this looks at the attraction of water molecules to other substances, which keeps the droplet on the coin.

Water molecules like to stick together! Let's explore the attraction between molecules and demonstrate **surface tension** at home using coins and water.



### BIG QUESTION

**How many drops of water can a coin hold?**



Step by step activity instructions on next page.



**Fun fact:** Haven't seen any pennies around? That's because the penny was phased out of Canada's coinage system on February 4, 2013. That's why cash transactions are rounded up or down on a 5¢ scale.



### BONUS QUESTIONS!

Which coin holds the most/least water?  
Try testing other liquids or add soap. Does that change the number of drops the coin can hold?



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## MAKE A HYPOTHESIS

Pick a coin. Make a hypothesis about how many drops of water the coin can hold.

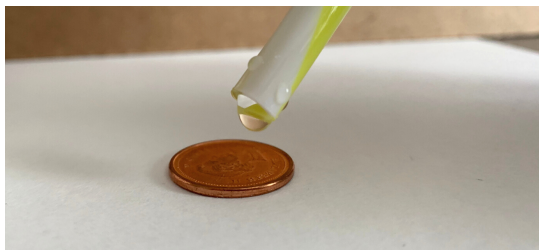
## PLACE YOUR COIN

Place the coin on a flat surface.



## ADD DROPS OF WATER

Using a dropper, carefully squeeze water droplets onto the coin, one at a time. Hold the dropper above the coin (not touching) so it has to fall.



If you don't have a dropper, you can use a straw:

- place the straw in some water
- put your finger over the end
- lift straw up (keep finger on)
- carefully remove finger to release one drop at a time)

## COUNT THE DROPS

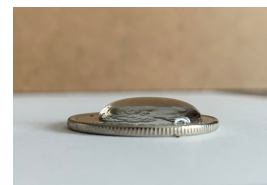
Count your drops. Stop squeezing when the big droplet overflows.



Note the bubble shape of the water drop dome! The bubble shows the **cohesion** between the water molecules!

## EXPERIMENT!

Try testing different liquids (oil, salt water, soda, etc.). Does this change the number of drops the coins can hold? Why might that be?



Try testing surfaces with different shapes or materials. Do other shapes (with approximately the same surface area) hold the same amount of liquid?