Oregon State University Extension Service Washington County

4-H Investigators
Water World Kit

March 16th our 4-H Investigators Zoom meeting 6:30-7:30 PM
Each month we will have a "middle of the month" Zoom gathering to share more information about 4-H Investigators and talk about the Spark Kit activity that month. (A Zoom link will be sent out)

March 2021 Spark Kit Preview
Water World!!

The "Water World" kit contains:
Very cool activities focused all on Water

- Cartesian Divers
- Water on a penny and things that float
- Water Lenses
- Moving water with a string
- Salt and Ice

Questions about 4-H Investigators?
Contact Darsy or Pat:

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4-H Investigators
Outdoor Explorers Kit

This packet contains information about your Water World Spark Kit. Have a great month exploring!

Activity #1: Cartesian Diver

This kit contains:
- Glass eyedropper
- Water
- Clear plastic pop bottle and cap

What to do:

1) Fill a plastic pop bottle with water to the VERY top.
2) Fill the glass eyedropper about half full with water. You may need to experiment with the amount of water in the eyedropper so it barely floats.
3) Place the eyedropper into the soda bottle. The eyedropper should float and the water in the bottle should be overflowing. Seal the bottle with the cap.

4) Squeeze the sides of the bottle and notice how the eyedropper (called a diver) sinks.
5) Release your squeeze and it floats back up to the top.
6) Squeeze it again. Does the water level in the eyedropper change?
7) Practice making the diver go up and down without making it look like you're squeezing the bottle. Amaze your friends with your ability to make the eyedropper obey your commands!

What is causing the eyedropper (Cartesian Diver) to sink or float?

Squeezing the bottle causes the diver to sink because the increased pressure forces water up into the diver, compressing the air at the top of the eyedropper. This increases the mass, and density, of the diver causing it to sink. Releasing the squeeze decreases the pressure on the air at the top of the eyedropper, and the water is forced back out of the diver.

(This is the same technology submarines use!!!)

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Activity #2 : Water on a Penny

This kit contains:

Eyedropper, clear plastic cup
Penny and paper clip
Water and one or two drops of dish soap

What to do:

1) Predict how many drops of water you think will fit on a penny?
2) Use the eyedropper to pick up and carefully drip one drop of water at a time onto the penny.
3) Count how many drops you can fit onto one penny until the water overflows.
4) Record your data in your journal. Repeat the experiment. Is the number the same each time? Is the number the same on the head side and tails side?

Why do so many drops of water fit on a penny?

Were you surprised to discover that a lot more drops of water fit on a penny than you thought? ***Surface Tension*** and ***Cohesion*** is the reason you can get so many drops of water on a penny. Cohesion is the "stickiness" of water molecules to one another. Water molecules love to stick together. Surface Tension is the result of the water molecules sticking together. Once the water has reached the edge of the penny, a dome shape begins to form. This is due to the surface tension forming a shape that has the least amount of surface area possible (like bubbles)!

Try this!!

See if other objects will sit on top of the water or float. Fill your cup about ¾ full with clean water. Using the paper clip included with the kit, very gently lay it flat on top of the water. Does the surface tension keep it from sinking? Now try laying the paper clip on its end on top of the water. What happens?

Now try this.

Add one or two drops of dish soap to the water and try these tests. What happens?

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Activity #3: Water Lenses

This kit contains:

- Quart size Zip Lock bag
- Hand lens (magnifier)
- Water

What to do:

1) Fill a zip lock bag with water and seal it tight.
2) Hold it over this picture and see if the images appears larger. Does it maginify the image?
3) Now look at the same picture with the hand lens in the kit. The large lens increases the image 5 times, the small lens increases images 10 times. Estimate how much your Zip Lock Water Lens increases the magnification of the image.

What is happening.

Water can actually bend light. Your hand lens also bends light to magnify images. Another experiment you can do is put a pencil in a cup of water. It looks like the pencil is bent, but that is just the water bending the light.

Activity #4: Moving water with a string

This activity needs:
- Two plastic cups
- A piece of string, about 6 inches long
- Water

What to do: Try to move water from one cup to another using a piece of string.

1) Fill one cup about ¾ full with water
2) Place the two cups as shown in the picture
3) Wet the string then place one end in the cup with water, and the other in the empty cup.

What is causing the water to move up, then down the string? Does it take longer if the water is cold or warm?

Activity #5: Get that last drop of water

This activity needs:
- Plastic water bottle
- Toothpick

What to do: Use a toothpick to get the last drops of water out of a bottle.

1) Fill a water bottle with water, then pout out as much as you can.
2) Place a toothpick in the bottle as shown in the picture.

How many extra drops of water can you get out of the bottle?

(Both of these activities are related to Surface Tension and Cohesion. The "stickiness" of water helps move water down a string or the tooth pick. What happens if you add a drop of soap to the water? Does the water still act the same?)

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Activity #6: Salt and Ice

Cup # 1 without ice

This activity needs:
- Two plastic cups
- Thermometer
- Water, Ice and Salt
- Journal

(Caution: Do not drink the salt water from this activity)
Please pour it down the sink when finished

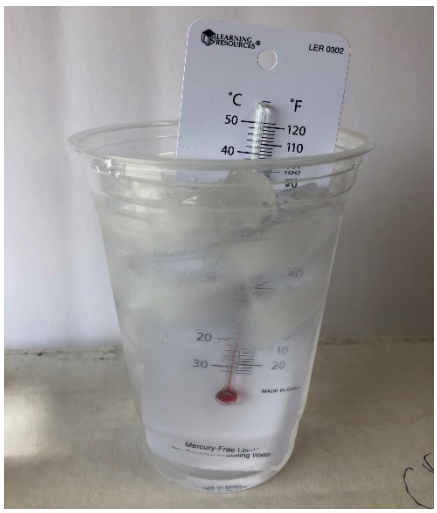
What to do: See if water temperature changes when salt is added.

1) Fill both cups about ½ full with tap water

2) Take the water temperature of both cups. Gently stir the water and record the temperature in your journal. Keep the thermometer in the water for 5 minutes before recording temperatures to get the most accurate readings possible.

3) Fill one of the cups half full with ice and half with water until the cup is full. Take the temperature of that and record that in you journal. Gently stir.

3) Add the salt to the ice and water cup. Gently stir. Take the temperature again. Record that temperature reading.



Things to ask and do:
- ❑ Did adding salt in the ice-water mix change the water temperature?
- ❑ If you add salt to the cup of water without ice, does that change the water temperature?
- ❑ Does the amount of salt make a difference in the ice water temperature?
- ❑ If you add sugar to the water, does that have the same effect of salt on the temperature?

Bonus question: Why do we put salt on roads or side walks when it gets icy? Would sugar do the same?