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CODE: STEM223



Problem: The local dairy farmer is claiming that his cow makes Magic Rainbow Milk! He claims that when you pour his cow's milk into a bowl, it magically makes a rainbow! He wants to sell his magic rainbow milk for \$20 dollars a container! Is it really magical?

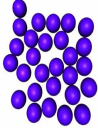
Task: Figure out how the farmer's milk makes magical rainbows. Determine if the milk is magical or something else is creating the rainbow.

## Materials:

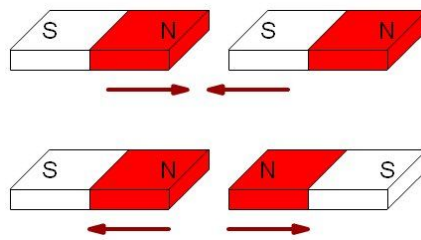
- Chart
- Whole milk ( $\frac{1}{2}$  cup)
- (optional) 2%, 1%, non-fat
- Liquid dish soap (2 tbsps)
- Food coloring (few drops per color)
- Small bowl (2)
- Q-tips (4)
- (optional) popsicle sticks
- Elmer's glue or hot glue gun
- Print outs

## STEAM Connections:

This experiment shows children that the

molecules (small particles ) in liquids are just like magnets. They

attract and repel.



The hydrophilic (attracted to water) part of the soap wants to connect to the water in the milk. The hydrophobic (not attracted to water) part of the soap wants to connect to the fat in the milk. When the Q-Tip is soaked in soap and touches the milk, it separates the fat in the milk. This is pushing the food coloring around the milk.

Science:

Force (pushing and pulling), Surface tension,  
reversible/irreversible chemical changes

Technology:

Completing the chart or Using a computer to create a  
graph

Engineering:

Designing the farm, and the creation of the experiment

Art:

Creativity and drawing

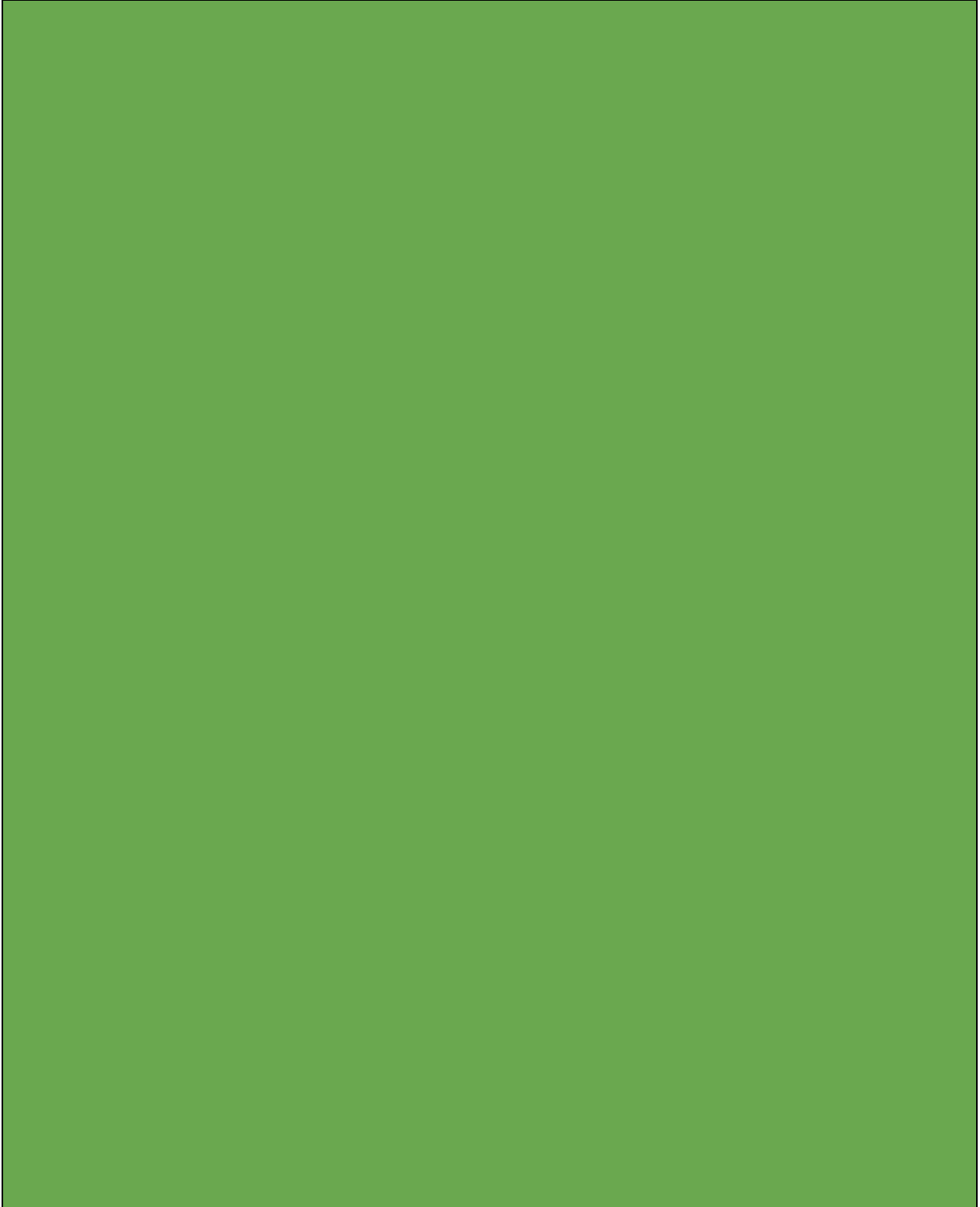
Math:

Predicting, Non Standard Units of Measurement

# Farm Creation:



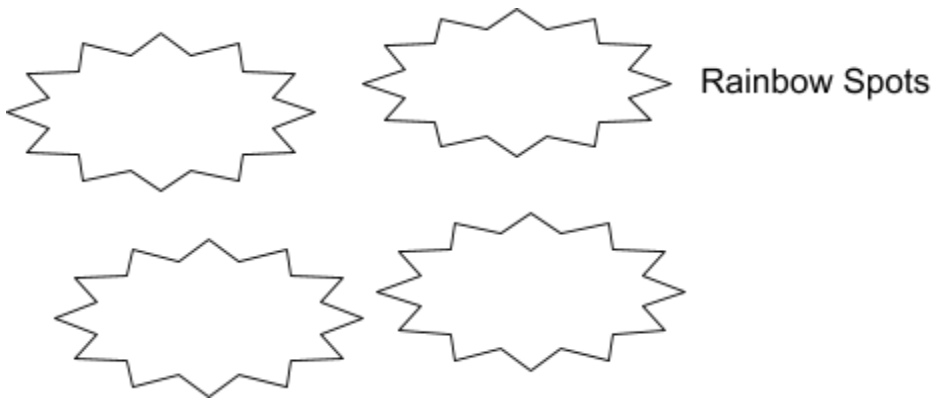
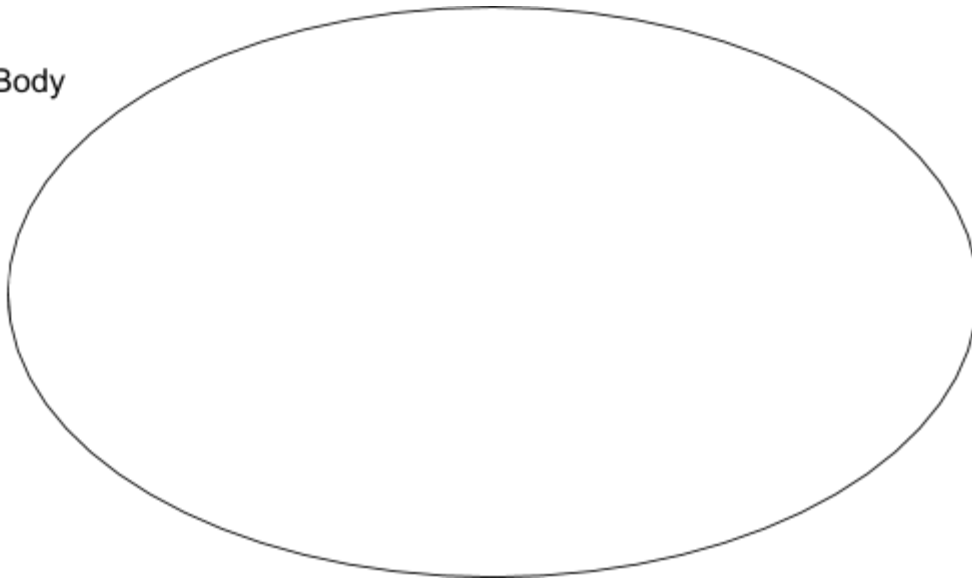
# Farmer's Grass



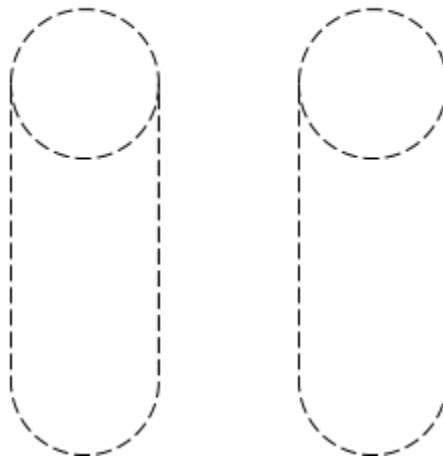
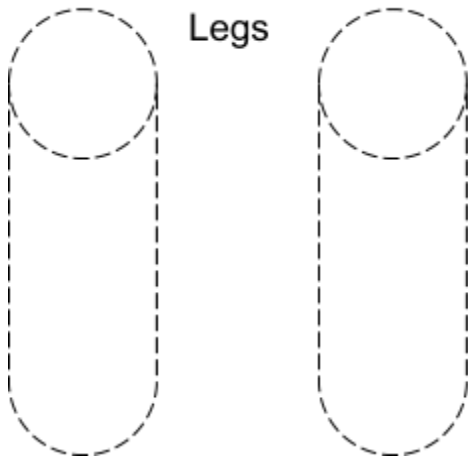
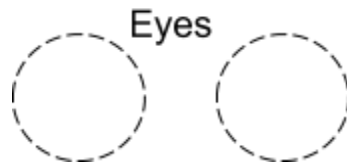
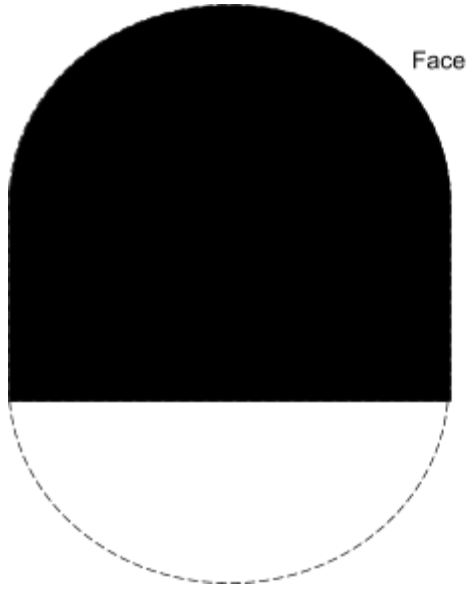
# Cow template

Step 1: Use the pieces below to create the Farmer's Magical Rainbow Cow. Color his spots like a rainbow.

Body







Farmer

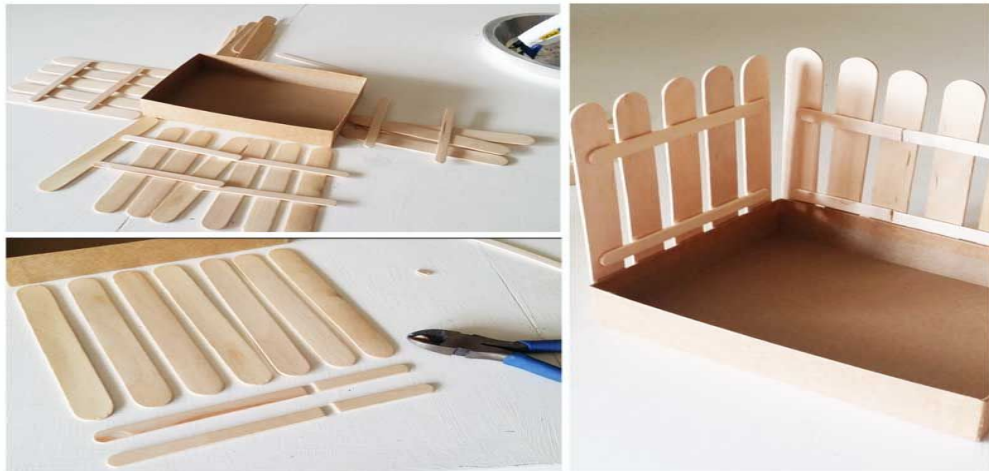


smile

**Step 2:** How many sticks do you think it will take go around the fence? Put that amount in the first box.

How many did I predict?	How many did I actually use?

**Step 3:** Get the cow to stand up on the green grass. Fold the corners of your grass so that you have something to glue the sticks to. Create a fence around your farm using popsicle sticks(optional)



**Step 4:** How many sticks did it actually take to go around your farm? Put that amount in the second box.

IF you don't have popsicle sticks handy, allow your child to color the sticks below, cut them out and glue them around the green grass. (print multiples of this page)

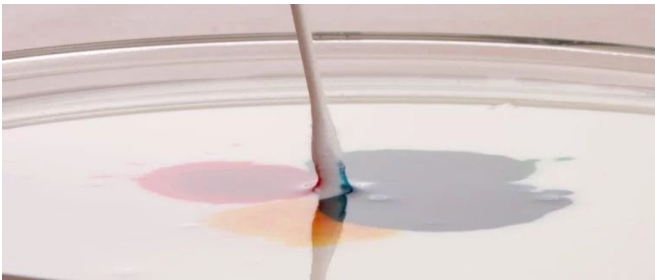


## STEM Project:

- Pour the milk into the container.
- Dip 2 Q-Tips in the soap and leave 2 Q-Tips untouched.
- Put drops of food coloring into the milk.



- Dip the Q-Tips with NO soap into the food coloring



- Dip the Q-Tips with soap into the food coloring.



- Complete the chart below

Write to tell what you see. Draw what you see.

Q-Tips	Write what you see when it touches the food coloring	Picture of what you see when it touches the food coloring
No Soap on Q-Tip in magic milk	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	
Soap on Q-Tip in magic milk	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	

Was the milk magical or was it something else? Write your thoughts below.

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