

Activity Instructions

Swirly Whirly Milk

The following items will be needed for this activity:

- shallow dish (a clear dish will allow students to observe below the surface of the liquid)
- 500 mL carton of whole milk (3.25%) at room temperature
- food colouring (four different colours for the most stunning results)
- 2-3 cotton swabs per demonstration
- liquid dish soap (3-4 drops per demonstration)
- flat and stable desk
- cup of water

The carton of milk must be removed from the refrigerator and brought to room temperature before performing the *Swirly Whirly Milk* demonstration. It should take approximately two hours to bring the milk to room temperature.

Step 1

Carefully pour the room temperature milk into the shallow dish, forming a layer about 1/2" (1 cm) deep, enough to completely cover the bottom of the dish (**Figure 1**).



Figure 1



Figure 2

Step 2

Add one drop of each of the four food colours onto the surface of the milk in the centre of the dish (**Figure 2**).

Step 3

Wet the tip of a cotton swab with water and gently touch it to the milk, holding it for 10 to 15 seconds and taking care not to mix or disrupt the food colouring too much (**Figure 3**).



Figure 3

Step 4

Place a drop of liquid dish soap onto the tip of another cotton swab. Put the soapy end of the cotton swab into the centre of the milk and hold it there for 10-15 seconds. Observe the burst of colour (**Figure 4**).



Figure 4

Step 5

Add another drop of soap to the tip of the cotton swab and put it into the milk again. Experiment with coloured patterns by putting the cotton swab into different places in the milk (**Figure 5**).



Figure 5

Soap Crayons

The following items will be needed for this activity:

- lab gloves
- parchment paper or aluminium foil (enough to cover work desk)
- measuring spoons and cups
- Ivory soap flakes (see *Prep Instructions*)
- 2 mixing bowls
- white powder tempera paint
- 1 mixing spoon for each coloured mixture
- 3 large, clear cups
- hot water
- red, blue and green food colouring
- moulds (optional)

The materials listed will make soap crayons for one group of students (see *Lesson Logistics* for organizational details). Quantities should be adjusted depending upon the number of groups in the class.

Step 1

This activity can get messy. To avoid stains, cover the work desk with aluminium foil or parchment paper. Have all students handling the soap crayons wear lab gloves.

Step 2

Using the measuring cups, transfer 1 cup of the Ivory soap flakes into a mixing bowl (**Figure 6**). Set bowl aside until needed.



Figure 6



Figure 7

Step 3

Using the measuring spoons, add three teaspoons of powdered tempera paint to the other mixing bowl. Add two tablespoons of hot water and stir with one of the mixing spoons (**Figure 7**).

Step 4

Divide the Ivory soap flakes evenly into the three cups (approximately 1/3 cup of Ivory soap flakes in each cup). Slowly divide the tempera powdered paint solution into the three cups (**Figure 8**). The Ivory soap flakes will begin to dissolve.



Figure 8



Figure 9

Step 5

Add as much of one colour of food colouring as desired to one of the cups and stir the mixture with a mixing spoon to evenly distribute the colour throughout the mixture (**Figure 9**). The amount of food colouring added to the mixture will determine the saturation of the hue. Continue to stir, until crayon mixture begins to thicken and hold its shape. Add more water or soap as needed. Repeat this step for the remaining two cups and food colouring, using different mixing spoons to avoid colour contamination.

Step 6

Once the mixtures become stiff and difficult to stir, remove them from the cups and knead them by hand on the desk covered with aluminium foil to achieve a uniform consistency. The soap crayons can be moulded into shapes once the mixtures begin to harden. Round soap crayons can be achieved by rolling the mixture into golf or tennis ball-sized shapes (**Figure 10**). Be sure to wear gloves to prevent staining hands with the dye.

Step 7

If desired, moulds can be used to create unique crayons. Ice cube trays, empty film canisters, cookie cutters and paper cups are some examples of readily available items which can be used to mould the homemade crayons.



Figure 10

Step 8

Once the crayons have been shaped by hand or pressed into a mould, lay them out on the aluminium foil-covered desk and let them dry for at least two days before removing from moulds. The soap crayons are now ready to be used.

Puff Paint

The following items will be needed for this activity:

- squeeze bottle
- white glue (PVA)
- men's shaving cream
- food colouring
- 3 marbles (per paint colour)
- newspaper (to cover desks)

The materials listed will make one bottle of Puff Paint. Quantities may need to be adjusted depending upon the number of paint colours which will be prepared.

Step 1



Figure 12

Place all materials on a desk covered with newspaper. Fill the squeeze bottle with 30 mL (1 fluid ounce) of white glue. This is easy to do if the squeeze bottle is labelled with volume markers (**Figure 11**). Add the food colouring of choice to the squeeze bottle, bearing in mind that the more food colouring added, the more saturated the resulting paint colour.



Figure 11

Step 2

Very slowly, fill the squeeze bottle to the top with shaving cream. Gently tap the bottom of the bottle against a table or desk to help the shaving cream settle. Keep adding shaving cream, tapping the bottom of the bottle after each addition, until the bottle is full (**Figure 12**).



Figure 13

Step 3

To assist in mixing, add three marbles to the squeeze bottle (**Figure 13**). Cap the bottle and ensure that it is tightly sealed. Shake the bottle vigorously until the glue, shaving cream and food colouring are evenly mixed (**Figure 14**), which may take several minutes. The bottle may be passed around to the students for shaking while another colour of paint is prepared using a different food colouring.

Note: Depending on the brand of glue, it might get stuck at the bottom. You may change the order of the ingredients to: shaving cream, food colouring, then glue.



Figure 14

Step 4

By using different colours and quantities of food colouring, it is possible to prepare many different hues of puff paint (**Figure 15**). To apply the paint, remove the cap and angle the squeeze bottle downward, applying gentle pressure to dispense the paint from the nozzle. The puff paint can now be used to create fun 3-D pictures (**Figure 16**).

Leave pictures overnight to dry. It is important not to touch the paint until it has dried completely, otherwise the puffy effect will collapse.



Figure 15



Figure 16

Icy Colours

The following items will be needed for this activity:

- red, yellow and blue ice cubes (see *Prep Instructions*)
- hot water
- 3 clear plastic cups
- 3 pieces of masking tape
- pen or marker

Step 1

Using a pen or marker, write “red + blue” on one piece of masking tape, “red + yellow” on a second piece of masking tape and “yellow + blue” on a third piece of masking tape.

Step 2

Place the tape labels onto the three cups and fill the cups about halfway with hot water (**Figure 17**).



Figure 17

Step 3

Remove the coloured ice cubes from the freezer. Remove the red and blue ice cubes from the ice cube tray and transfer them, one at a time, into the cup labelled “red + blue” (**Figure 18**). Repeat with the remaining two combinations of coloured ice cubes (“blue + yellow” and “red + yellow”). As the ice cubes melt, they will combine to form a new colour (primary coloured ice cubes are combined to create secondary colours).



Figure 18

Colour Changing Markers

The following items will be needed for this activity:

- 2 coffee filters
- 2 pipe cleaners
- tape
- 2 tall plastic containers
- 8-10 different coloured felt tip, non-washable pens or markers
- 2 sticky labels or paper
- cup of water
- flat desk

The materials listed are sufficient for one *Colour Changing Markers* activity. Quantities may need to be adjusted depending upon whether a single demonstration will be done for the entire class or whether the students will work together in groups (see *Lesson Logistics* for details).

Step 1

Cut two large rectangles out of the coffee filters.

Step 2

Roll one edge of the filter around the pipe cleaner and secure in place with tape (**Figure 19**). Place each filter into a plastic container by resting the pipe cleaner against the lip of the container to test that the filter paper is the appropriate length. If necessary, trim the bottom edge of the filters to ensure that they do not touch the bottom of the plastic containers.

Step 3

Divide the markers into two sets. Each set will have a label, a coffee filter-pipe cleaner assembly and a tall plastic container.



Figure 19

Step 4

Approximately 1/2 in. from the bottom of the coffee filter, create a row of coloured dots by gently pressing the tip of each of the first set of markers onto the filter paper. Create a dotted label in the same way, using the same order of colours as on the coffee filter. This dotted label will facilitate colour identification after separation (**Figure 20**). Repeat for the other filter and set of markers.



Figure 20

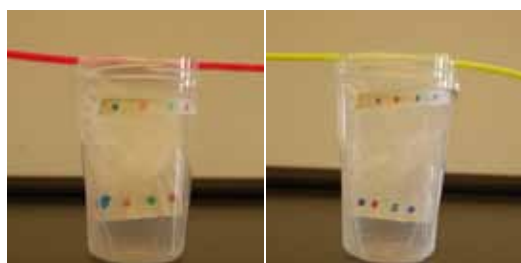


Figure 21

Step 5

Place each of the dotted coffee filters into a separate plastic container by resting the pipe cleaners on the lip of the container. Attach the matching labels to the containers (**Figure 21**).

Step 6

Carefully transfer some water from the cup to the containers, until the water level just reaches the bottom of the coffee filter, taking care not to wet the coloured markings in the process (**Figure 22**).

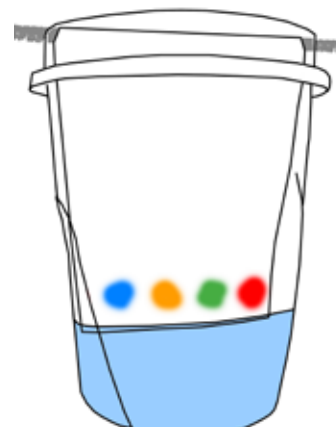


Figure 22



Figure 23

Step 7

Watch the coloured dots separate into pure colours as the water is absorbed by the coffee filters.

Step 8

Wait until the water has risen to within 1 cm of the pipe cleaner before removing the coffee filters and allowing them to dry on a desk or counter top. **Figure 23** shows a coffee filter which was marked with blue, orange, green and red pens. The pure colours (blue and red) do not separate on the filter, but the other colours (orange and green) separate into the pure colours from which they are composed.