



## Floating Colors

### OBJECTIVE

Students will explore the properties of oil, water, and petroleum-derived food coloring through an art project.

### MATERIALS

- Engage Pictures, one set for the instructor
- Petroleum Marble Art Instructions, enough for one-quarter of the class
- Petroleum Marble Art Project Materials, one set per group of four students:
  - Newspaper or tablecloth to cover work area
  - Small bowls, cups, or other small containers, at least four
  - Vegetable oil, about one cup
  - Assorted food coloring (liquid), at least four
  - Spoon, one
  - Fork, one
  - Baking dish, one
  - Water, enough to fill the baking dish about an inch deep
  - Posterboard or cardstock (sized so that it will fit within the baking dish), 4 pieces
- Extra art supplies, to have available if groups finish early:
  - Vegetable oil
  - Posterboard or cardstock

### ENGAGE

- Ask for student volunteers to help you hold up the Engage Pictures or secure them on the board.
- Challenge the class to observe the images and consider what they have in common.
- After hearing students' thoughts, share an additional commonality: Each of the items in these pictures has petroleum as an ingredient.

- Explain that:
  - Petroleum is a fossil fuel.
  - It is called a fossil fuel because it forms deep underground from the remains of ancient marine organisms like algae and plants.
  - Humans can get petroleum by using drilling machines that go deep into the Earth.
  - Once petroleum is removed from the ground, it is sent to a refinery or industrial plant where it is cleaned and separated into different useable parts—including materials that can be used for art supplies!

## EXPLORE

- Tell students that:
  - Today they will be creating art from one of these petroleum products: food coloring!
  - Food coloring contains water, dyes made from petroleum, and propylene glycol which helps the food coloring maintain its color.
  - Their art project's other key ingredients will be vegetable oil, water, and paper.
- Divide students into groups of four, and give each group the Petroleum Marble Art Project Materials plus one set of Art Project Instructions.
- Take a moment to review the Art Project Instructions together, and be sure to bring students' attention to the questions they will answer as they complete their project.
- If groups finish their piece of artwork and there is still time left in the session, encourage them to empty their dish and use new colors to create a second or third design.

## APPLY

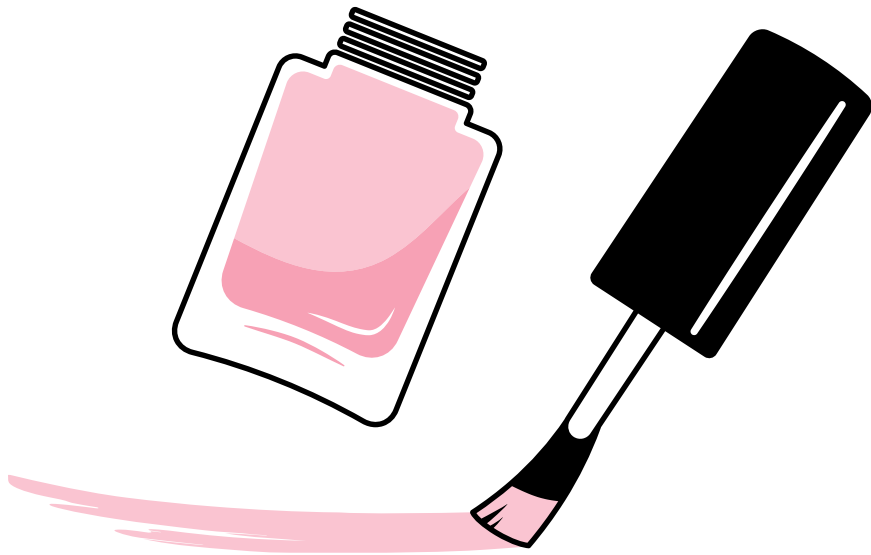
- When there are about 10 minutes left in the session, bring the class back together as their artwork dries.
- Remind the class that they just created art out of three simple ingredients: food coloring, vegetable oil, and water. Ask them to reflect on the properties, or characteristics, of these materials by discussing the following questions:
  1. Did the oil and food coloring mix together easily? Once mixed, did it remain mixed together?
  2. What happened when you dropped the oil and food coloring mixture into the water? Why do you think this happened?
  3. Why is the final piece of artwork marbled (or only dyed in some spots and not others)?
- Wrap up by taking a moment to clarify students' understanding of the art project and the properties of the oil, water, and food coloring. It may be helpful to share some or all of the following:
  - Oil molecules are more attracted to other oil molecules than water molecules, and water molecules are more attracted to other water molecules than to oil molecules. For this reason, oil and water don't remain mixed for long.
  - The food coloring contained water. For this reason, the food coloring and the vegetable oil could only be mixed temporarily.



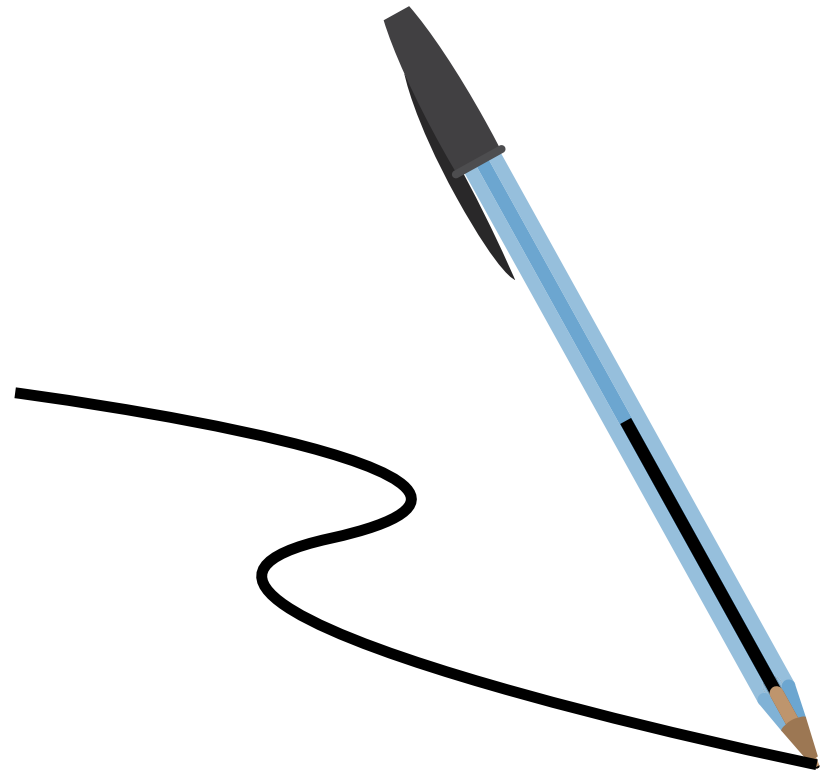
- When the food coloring and the vegetable oil were dropped into the water, the food coloring mixed with the water, while the oil laid on top of the water in different sections. This happened because oil is less dense than water, and it does not like to mix with water.
- The paper absorbed the patterns of the water, food coloring, and oil mixture. The food coloring did not stick to the paper in the sections where there was oil on top of the water. This is why the paper looks marbled!
- Conclude by encouraging students to let their artwork dry over the next day or so. It will feel less oily once it dries and can then be put on display or shared with others!

## ENGAGE IMAGES

Nail Polish



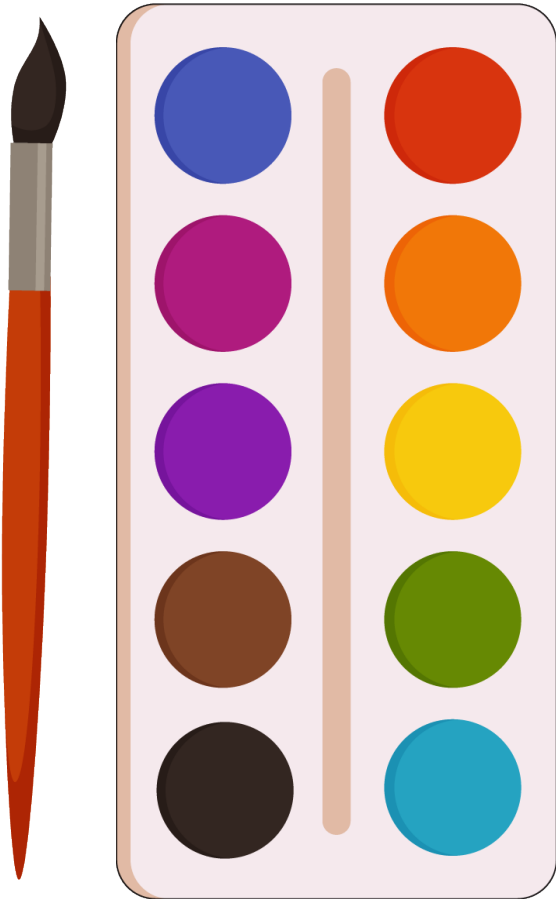
Ballpoint Pen



Crayon



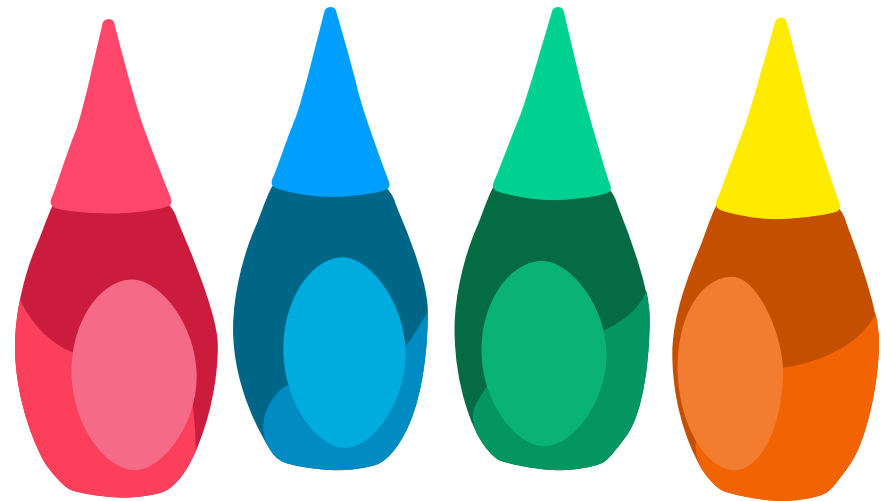
Acrylic Paint



Paint Used for Houses



Food Coloring



1. Prepare your workspace: Use newspaper or a table cloth to cover your work area.
2. Fill the baking dish with about an inch of water.
3. Create your paint:
  - o Place about  $\frac{1}{4}$  cup of vegetable oil into each of the four containers.
  - o Decide which colors your group would like for your artwork, and add drops of these colors to each container. Then stir each one quickly with a fork until they are well mixed.
4. Create your art:
  - o Use a spoon to transfer the different colors into the dish of water, and observe what happens when you do this. Experiment with different colors and different designs.
  - o Then gently lay your paper on top of the water.
  - o Once the paper is wet, carefully lift it up out of the water and place it flat and design-side up on your workspace so it can dry.
5. Observe your final piece of artwork, and discuss with your group: Why does your final artwork have this marbled (or bubbly) design?

## OBSERVE & JOT

What happens when you drop the food coloring into the oil?

## OBSERVE & JOT

What happens when you transfer the food coloring and oil mixture into the water?