

LESSON 1:

COLORFUL CARNATIONS

SUPPLIES

TEACHER BRINGS

- Water (if no sink in classroom)

PENCIL BOX

- Markers
- Scissors (optional)

MAIN BIN

- Plates (20)
- Aluminum Foil
- Spoons (20)
- Spray Bottle
- Cups (20)
- Pipe cleaners (60)
- Coffee filters (80)

OBJECTIVES

- Name all primary & secondary colors
- Understand the meaning of "diffusion"

HOOK



1 min

Ask students: have you ever accidentally spilled water on something you were drawing with markers? What happened?

Tell the students that today, we are going to be turning something that is normally an accident into art!



INTRODUCTION



3-5 min

What happens when colors mix together? Have you ever colored a picture and mixed different color markers or crayons together? What happened?

In today's iSTEAM class, we will be letting colors mix together while we create some colorful flowers!

First, we will explore primary colors, and make a colorful carnation that uses **Red**, **Yellow**, and **Blue**. Then we will explore secondary colors and make a flower that is **Orange**, **Green**, and **Purple**. At the end of the class, everyone will have a bouquet of colorful flowers to bring home.


COLOR FACTOR

This experiment explores primary & secondary colors.

We will use the science of diffusion (the movement of particles around a space) to blend primary colors together and create secondary colors.

Then, we use the scientific process of chromatography to separate secondary colors into primary colors!

DISCUSSION

 5-7 min

Discuss the concepts of primary and secondary colors with students.

First, ask students if anyone can name the three primary colors (Yellow, Red, Blue.) Ask if they know why these are called primary colors. Then, ask the same questions about secondary colors.

Have the students guess which primary colors mix to make:

- Orange (answer: Red & Yellow)
- Green (answer: Blue & Yellow)
- Purple (answer: Red & Blue)

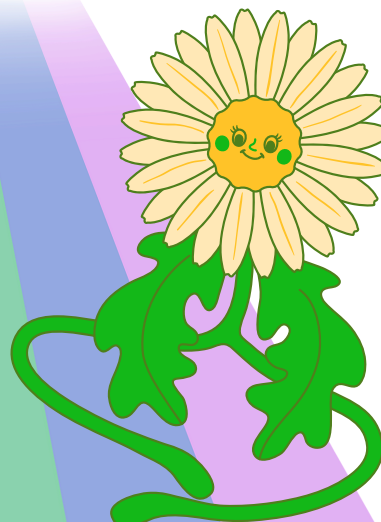
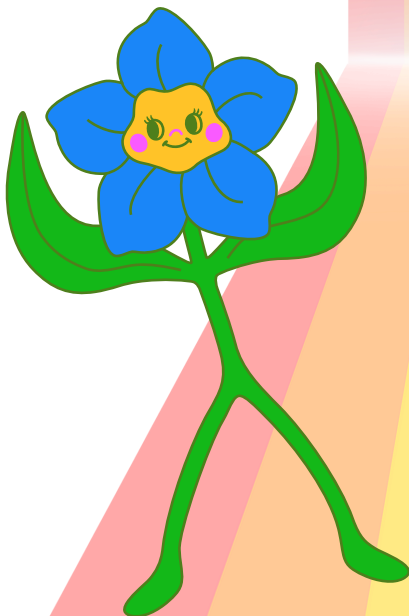
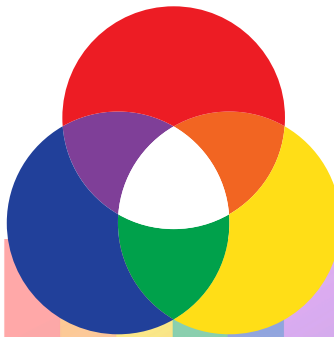
Explain that every color we see can be made by mixing different amounts of the three primary colors and making the shade darker or lighter.

PRIMARY COLORS

The three primary colors are Red, Yellow, and Blue. They are called primary colors because they cannot be made from mixtures of other colors.

SECONDARY COLORS

The three secondary colors are Orange, Green, and Purple. They are called secondary colors because they can be made by mixing the three primary colors.



ACTIVITY Part 1 (Primary Colors)

🕒 7-10 min

1. Pass out a white piece of paper and a coffee filter to each student. Also, pass out red, yellow, and blue markers (the kids will share).
2. Have students flatten their coffee filters on top of the paper so that the markers don't bleed onto the desks.
3. Give students time to color using primary colors.
4. Pass out a plate with a sheet of aluminum foil on top to every student. Have students place their coffee filters on top of the foil, and secure with masking tape.
5. Explain the process of diffusion to students.
6. Use the spray bottle to mist each student's design.
7. Bring student creations to the drying station.
8. Collect the markers from this experiment. Students can keep their printer paper, paper plate, and tin foil for the next experiment. Have them wipe any water off of their tin foil with a paper towel.



DIFFUSION

Diffusion is the movement of particles throughout space.

On a molecular level, everything is constantly moving & vibrating. As things move, they naturally go from places that are more crowded to places that are less crowded.

When we spray water onto our coffee filter, the water molecules spread around the filter so they're not crowded in one spot. On the way, they pick up the ink from the markers and move that around, too!



DRYING STATION

Find a spot for students to dry their filters—on top of a vent or near a window is best. Write student names on pieces of masking tape or paper to keep track of their art.




DISCUSSION

🕒 1-2 min

Ask students what happened when they sprayed their filters with water. Did the primary colors blend together? What colors did they create?

The students may have also noticed that, even when it didn't blend with another color, some of the spots of ink may have separated into multiple colors. This is a great introduction to the next part of our experiment!

ACTIVITY Part 2 (Secondary Colors)

 7-10 min

During this part of the experiment, we will explore the process of chromatography using secondary colors.

1. Pass out new coffee filters and green, orange, & purple markers.
2. Explain the process of chromatography.

Hypothesis: Ask students to guess which colors each secondary color will separate into.

3. Have students flatten the filter on their paper and draw a circle with three different sections (purple, green, and orange)



4. Have students tape their coffee filters on top of their foil-covered plate.



5. Pass out a few spoons and 1-2 cups of water to each table.

6. Have students use a spoon to add a few drops of water in the center of their circle.

7. Watch chromatography in action! Remind the students to be patient and not add more water– it will take a few minutes for the water to spread.


8. Move student creations to the drying section.

CHROMATOGRAPHY

Chromatography is a process for separating parts of a mixture. The mixture (ink) is dissolved in a substance (water), which carries it through a second substance (the coffee filter).

Marker ink is made up of different pigments (dry, colored powders) mixed with liquid. When we add water, the ink starts to spread throughout the coffee filter. Chromatography was first used in the 1800s by artists, who used it to dye textiles.

DISCUSSION

 1-2 min

Ask students to reflect on what they observed. What colors did the different inks separate into? Did this result match their hypothesis?



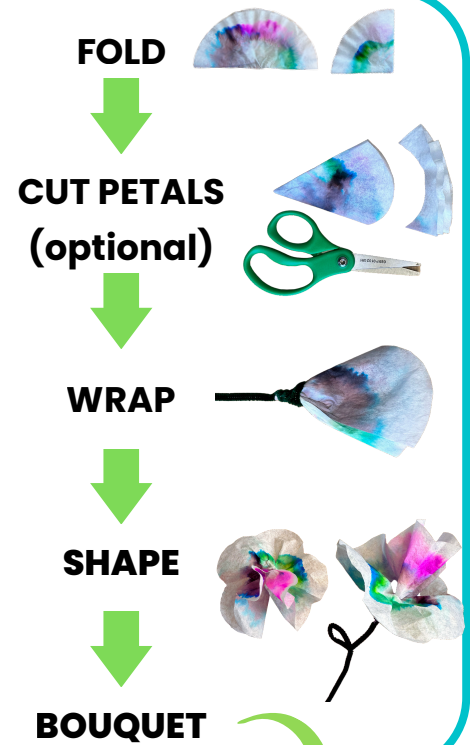
MAKING CARNATIONS



15 min

For the remainder of class, students will use what they just learned to make their own unique art pieces.

1. Pass out a pipe cleaner to all students. Starting with the first coffee filter they made, show students how to make a carnation (steps below).
2. If there is time, pass out all colors of markers and another coffee filter. Allow students to repeat experiments 1 or 2 using whatever colors they want.
3. Have students dry their creations in the drying station. While waiting for their carnations to dry, the students can repeat the experiment using new colors and designs.
4. Once each filter dries, students can create their carnations. They can bunch their carnations together in a cup to make a bouquet!



OBSERVE & EXPLAIN



2 min

Today, we have used diffusion to blend primary colors together to create secondary colors. We have also used chromatography to separate secondary colors into primary colors.

Now, ask students:

- How could chromatography and diffusion be used in other types of art?
- How does the process of diffusion and the method of chromatography show that art can influence science? Can you think of other times art has influenced science?



Exit Ticket



Ask each student the following questions as they walk out the door.

- Q: Name a primary color!
 - A. Red, Yellow, Blue.
- Q: Name a secondary color!
 - A. Orange, Green, Purple
- Q: What is "diffusion?"
 - A: The movement of particles through space. Today, the water diffused across the coffee filter.