

Activity 1.4

Investigating the line

Is the “line” that forms when two colors meet a special property of M&M’s?

Students are often intrigued by the apparent “line” that forms where colors from M&M coatings meet but do not mix. Perhaps the most surprising aspect of this non-mixing is that it is actually quite common anytime similar liquids come together. For example, when mixing yellow and blue paint together to make green, you wouldn’t place the yellow and blue next to each other and expect them to mix on their own. You would physically stir the paints together to speed up the mixing process. In this activity, students will discover that this non-mixing of colored solutions is not unique to M&M’s.

Materials needed for each group

2 Different colors of M&M’s	Bucket or large bowl
Room-temperature water	Paper towels
Clear plastic container	Dropper with red corn syrup
Crayons or colored pencils	Dropper with blue corn syrup

Notes about the materials

- Be sure you and the students wear properly fitting goggles.

Preparing materials

- The following procedure will make enough colored corn syrup to supply all groups with the amount needed for the activity.
- Place 2 tablespoons of corn syrup into each of two small cups.
- Add 3 drops of red food coloring to one cup and 3 drops of blue food coloring to another.
- Use a separate spoon or popsicle stick to mix the corn syrup and coloring well.
- Distribute the corn syrup in the droppers that the students will use. You will need two droppers for each group—one with red syrup and the other one with blue syrup.

Activity sheet



Copy *Activity sheet 1.4—Investigating the line*, pp. 40–43, and distribute one per student when specified in the activity.

Assessment

An assessment rubric for evaluating student progress during this activity is on pp. 52–53. For this formative assessment, check a box beside each aspect of the activity to indicate the level of student progress. Evaluate overall progress for the activity by circling either “Good”, “Satisfactory”, or “Needs Improvement”.

Activity 1.4

Investigating the line

Question to investigate

Is the “line” that forms when two colors meet a special property of M&M’s?

1. Have students observe the M&M’s in a clear plastic container.

Suggest to students that it might be interesting to take a better look at the “line” that forms between M&M colors. Instead of using a plate, tell students that they will use a clear plastic container with slightly deeper water than they used in the plate.



Distribute *Activity sheet 1.4—Investigating the line*. Students will follow the procedures on this activity sheet, record their observations, and hypothesize whether this property of non-mixing is unique to M&M’s.

Procedure

1. Place a clear plastic container with a flat bottom on a white sheet of paper. Then pour water into the container to a depth that would cover the M&M’s.
2. Once the water settles, place 2 different-colored M&M’s in the water about 2 centimeters apart.
3. Observe for about 1 minute. Look from the side and describe what you see.
4. Empty the water and M&M’s into a bucket or sink and dry the clear plastic container with a paper towel.
5. Record your observations on the activity sheet.



Expected results: The color will be along the bottom of the container only. The two colors will spread along the bottom in a circular pattern. The two colors will not mix, but instead will remain separate. A “line” will form where the colors meet.

2. Have students share their observations.

Remind students that the colored coating on M&M's also contains sugar. Ask students whether they think that M&M coatings are special or that any sugar and color mixture would form a line when colors meet. Students may think of placing different types of colored candies, like Skittles® or gumballs, in water to see whether their colors collide or combine. They can try this experiment in the *Science in Action* activity, pp. 57–58.


3. Have students test two different-colored sugar solutions in water.

The following procedure investigates whether colored sugar solutions, in general, will collide or combine. Based on the results, students can reason that the “line” is a property of any two colored sugar solutions coming together. Have students conduct the procedure on *Activity sheet 1.4*, p. 41.

Distribute the colored corn syrup in the droppers that students will use. You will need two droppers for each group—one with red syrup and the other one with blue syrup.

Follow a procedure similar to the one you used with two M&M's.

Procedure

1. Place a clear plastic container with a flat bottom on a white sheet of paper. Then pour water into the container until it is about as deep as the water in which you tested the M&M's.
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2. Once the water settles, hold the droppers with the red and blue sugar solutions upright in the container of water about 2 centimeters apart. Then gently add about 5 drops of each solution directly beneath each dropper. When you are done, carefully remove the droppers from the water.
 3. Observe for about 1 minute. Look from the side and describe what you see.
 4. Empty the clear plastic test container and dry it with a paper towel.

4. Have students share their observations.

Expected results: Like the M&M's, the color will spread along the bottom of the container and form a distinct “line” where the colors meet.

Ask students: Is the “line” that forms where two colors meet a specific property of M&M's? Students should conclude that it is not but that it appears to be a characteristic property of colored sugar solutions, no matter where they come from.