

GIVE SPARK · HANDS-ON SCIENCE LAB

Candy Color Spread

Does the temperature of water change how fast candy color spreads?

Teacher Guide

Grades 2–5 · A Valentine's Day chemistry lab · 50 minutes

FREE LAB

OVERVIEW

The lab at a glance

One lesson, one driving question and a fair test with a finish point every child can see.

THE DRIVING QUESTION

Does the temperature of water change how fast candy color spreads?

Children predict an answer first, then collect two measurements that let them check it.

What children do

Pairs set up two identical plates. Each plate has a coin in the center and a ring of candies around it. They pour cold water onto one plate and warm water onto the other, and they time how long the first color takes to touch the coin. They graph the two times and use them to answer the driving question.

What children learn

The colored shell of the candy dissolves in water. Children find out from their own results whether warmer water changes how fast that happens. They also learn what makes a test fair. They change the water temperature and keep everything else the same, so a difference in time can be linked to temperature.

Success looks like

1. I changed only the water temperature and kept everything else the same.
2. I poured the same way on both plates and stopped the timer when the first color touched the coin.
3. I used my two times to answer the question and gave a possible reason.

The fair test

WE CHANGE	WE MEASURE	WE KEEP THE SAME
The temperature of the water	The time in seconds for the first color to touch the coin	The plate, the size of the ring, the number of candies, the amount of water and the way we pour

AT A GLANCE

Time: 50 minutes.

Grouping: pairs. One child pours and one runs the timer, then they swap.

Standards link: practices planning a fair test and graphing data, which are NGSS science practices for grades 3–5. It introduces dissolving and does not cover a full performance expectation.

SESSION PLAN

STAGE	MIN
One candy, one question	5
Predict and plan	10
Run the test	15
Graph and explain	15
Back to the question	5
Total	**50**

THE STUDENT RESOURCE

A separate three-page PDF. Page 1 is the plan and the steps. Page 2 is results with a numbered graph. Page 3 is the same results page with a blank scale for older classes or for times over 120 seconds. Print page 2 or page 3.

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PREPARATION

Get ready

What to gather, the setup that keeps the test fair and how to hand out the water.

Materials

For each pair

- 2 identical white plates with a rim, about 7 inches (18 cm) across
- 2 coins, such as pennies
- About 30 candy-coated candies such as Skittles, in a small cup
- 3 identical small cups. One is a guide for the ring and two hold the water.
- A timer, and a thermometer if you have one
- Student page 1, plus page 2 or page 3

For you

- A jug of cold water from the refrigerator
- A jug of warm tap water that feels like a warm bath, about 100°F (38°C)
- A ¼ cup measure
- One clear dish and one spare candy for the opening
- Paper towels and a bucket for used water

The setup that makes it fair

Each plate gets ¼ cup (60 mL) of water. That is enough to reach every candy without covering them. The guide cup makes both rings the same size, so every candy starts the same distance from the coin. Pouring onto the coin sends the water outward to the candies evenly, and the five-second count keeps the pour the same on both plates. The edge of the coin gives one clear finish point.

Setting out the water

Just before the test, measure ¼ cup of cold water into one cup for each pair and ¼ cup of warm water into another. Hand out the cold water first. Hand out the warm water only when a pair is ready for its second plate, so it has no time to cool. If you have thermometers, pairs record each temperature before they pour. Without them, children write “cold” and “warm” in the table.



Two identical plates, each with a coin and a ring of candies. The upturned cup is the guide for the ring.

SAFETY

Use warm tap water only, never water from a kettle. At this temperature children can pour it themselves.

The candies have been handled, so they are for the test and not for eating. Check allergies before you bring candy into the room.

WHICH RESULTS PAGE?

Page 2 has a scale numbered in tens up to 120 seconds. Page 3 has a blank scale, so children choose their own numbers.

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TEACHING SEQUENCE

Run the lesson

A single candy raises the question. Two plates, two coins and a timer answer it.

One candy, one question 5 MINUTES

DO Drop one candy into a clear dish of water where everyone can see it. Wait quietly for the color to start moving.

ASK "Where is the color coming from? What could make it spread faster or slower?" Tell the class that today they test one of those ideas, the temperature of the water.

Predict and plan 10 MINUTES

DO Children circle a prediction on page 1 and write a reason. Build one plate in front of the class as you read the steps aloud. Stand the guide cup upside down in the middle, place candies around its rim a finger-width apart, count them, lift the cup away and put the coin in the center. Then fill in the fair test table together.

SAY *"Pour onto the coin and count slowly to five while you pour. The timer starts when the water first touches the plate. It stops when the first color touches the edge of the coin. Any color counts."*

ASK "If one ring had more candies, or sat closer to the coin, could we trust our result? Why not?"

Run the test 15 MINUTES

DO Pairs build both plates while they are dry and check that they match. Hand out the cold water. One child pours it slowly onto the coin while counting to five, and the other starts the timer the moment the water touches the plate. They record the time, collect the warm water and repeat on the second plate.

Graph and explain 15 MINUTES

DO Children draw one bar for each time. Write every pair's two times on the board in two columns. Each pair tested once, so the class set is the real evidence. Explain the science only after the class has said what the results show.

ASK

- "Which bar is shorter? What does a shorter time tell us about the speed?"
- "Did every pair find the same thing? What could explain a result that is different?"

SAY *"The shell of the candy is made of sugar and coloring, and both dissolve in water. Water is made of particles that are too small to see and are always moving. In warm water they move faster, so they break up the shell more quickly."*

Back to the question 5 MINUTES

DO Children complete the conclusion on the results page and write one new question they could test.

LOOK FOR

Children who can say what they kept the same and why it matters. Listen for conclusions that quote both times.

GRADE 2: AN OBSERVATION VERSION

This is a comparison by eye and not the timed investigation. Partners pour the cold and warm water at the same moment, one plate each, and watch which color touches its coin first. They circle the winner on the results page and leave the table and graph.

IF THE RESULTS SURPRISE YOU

Most pairs should find the warm plate is faster. If a pair finds no difference, or the cold plate wins, treat it as a result to explain.

Ask the pair to check three things. Was the warm water still warm? Did the rings match? Was the pour the same? If there is time, they run that plate again.

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The science behind it

What is happening on the plate, how to adjust the lab and how to see what children learned.

What is happening on the plate

The candy shell is mostly sugar with food coloring. Both dissolve in water, which means they break into pieces too small to see and mix in with the water. Water particles are always moving. Warmer water has more thermal energy, so its particles move faster and hit the shell harder and more often. That is why a shell usually dissolves faster in warm water.

The color does not travel by slow mixing alone. Water with dissolved sugar is denser than plain water, so it sinks and flows outward along the plate and carries the color with it. This is why the lab uses the word “spread” with children. “Dissolve” describes what happens to the shell.

The time children measure is the time for color to travel to the coin. That depends on how fast the shell dissolves and also on how the water moves across the plate. So one pair’s two numbers are weak evidence, and the pattern across the whole class is much stronger. Say “our results suggest” when you sum up.

Support and challenge

Support. Use the observation version from page 4, or give pairs the numbered graph and help them find each time on the scale before they draw.

Challenge. Ask older children why the class tested many plates. They can find the middle value of the cold times and the warm times on the board and compare those.

Ideas children often bring

A CHILD MIGHT SAY	YOU COULD RESPOND
“The color is melting.”	Melting needs heat and turns a solid into a liquid. Here the shell mixes into the water, which is dissolving.
“The warm water has more color.”	Both plates have the same candies. Ask whether the amount of color changed or the time it took.
“Cold water has no energy.”	Its particles are still moving. They move more slowly than the particles in warm water.

ASSESSMENT

Use the results page and the closing discussion.

Fair test: names the one thing changed and at least two things kept the same.

Using data: quotes both times in the conclusion.

Explaining: links the water temperature to how fast the shell dissolved.

TAKE IT FURTHER

A third temperature. Add room temperature water and predict where its bar will fall.

Repeat it. Run each temperature three times and discuss why scientists repeat tests.

A candy heart. For Valentine’s Day, pairs build a heart of candies on a fresh plate, add water and watch the colors meet.

ANY TIME OF YEAR

The test itself has no holiday in it. Use it in any month and leave out the candy heart.

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Candy color spread

Does the temperature of water change how fast candy color spreads?

Name _____ Date _____

1 My prediction

I think the color will reach the coin faster in the **cold water** **warm water**

because _____

2 Our fair test

WE WILL CHANGE	WE WILL MEASURE	WE WILL KEEP THE SAME

3 Build two plates that match

1. Stand the guide cup upside down in the middle of a dry plate.
2. Place candies around the rim of the cup, about a finger-width apart. Count them: _____
3. Lift the cup away. Put a coin in the center of the ring.
4. Build the second plate the same way, with the same number of candies and the same colors in the same order.

4 Run the test

Each cup holds the same amount of water: ¼ cup (60 mL).

1. Start with the cold water. Pour it slowly onto the coin and count to five while you pour.
2. Your partner starts the timer when the water first touches the plate.
3. Stop the timer when the first color touches the edge of the coin. Any color counts.
4. Write the time in seconds on your results page.
5. Collect your warm water and do the same on the second plate.

Science words. When the candy shell mixes into the water, it **dissolves**. The shell is still there, in pieces too small to see.

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Results and conclusion

Use your two times to answer the question. This page has a numbered scale.

Name _____ Date _____

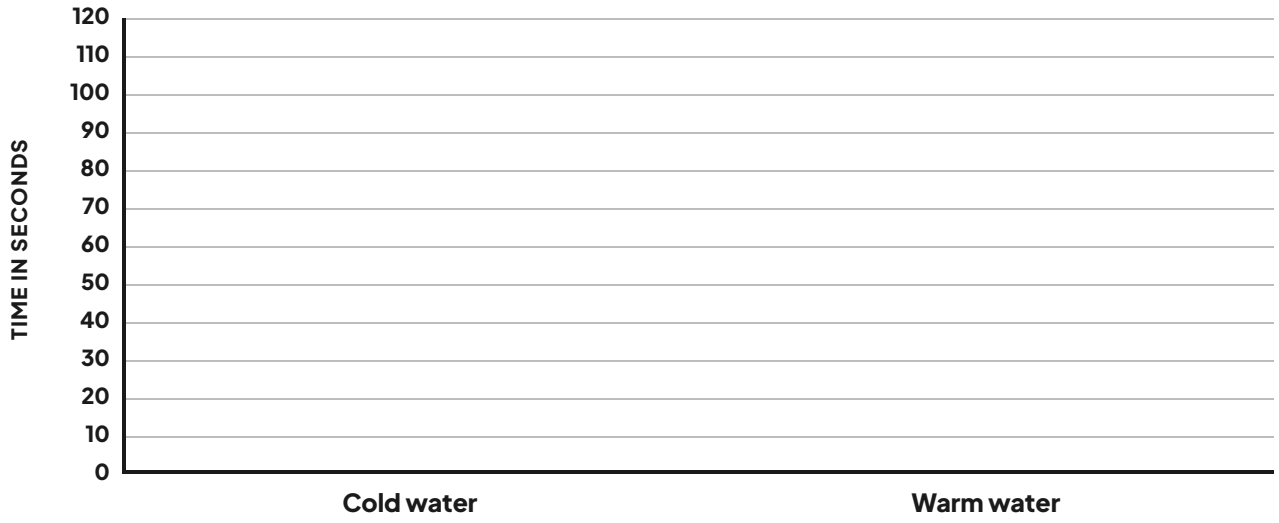
1 Our results

WATER	TEMPERATURE	TIME FOR THE FIRST COLOR TO TOUCH THE COIN
Cold	°F	seconds
Warm	°F	seconds

Which plate finished first? **cold** **warm** **no difference**

2 Graph it

The scale counts in tens. Draw one bar for each time.



3 What we found

The cold plate took _____ seconds and the warm plate took _____ seconds.

So the temperature of the water **did** **did not** change how fast the color spread.

I think this happened because

_____

4 A new question I could test

_____

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Results and conclusion

Use your two times to answer the question. On this page you make your own scale.

Name _____ Date _____

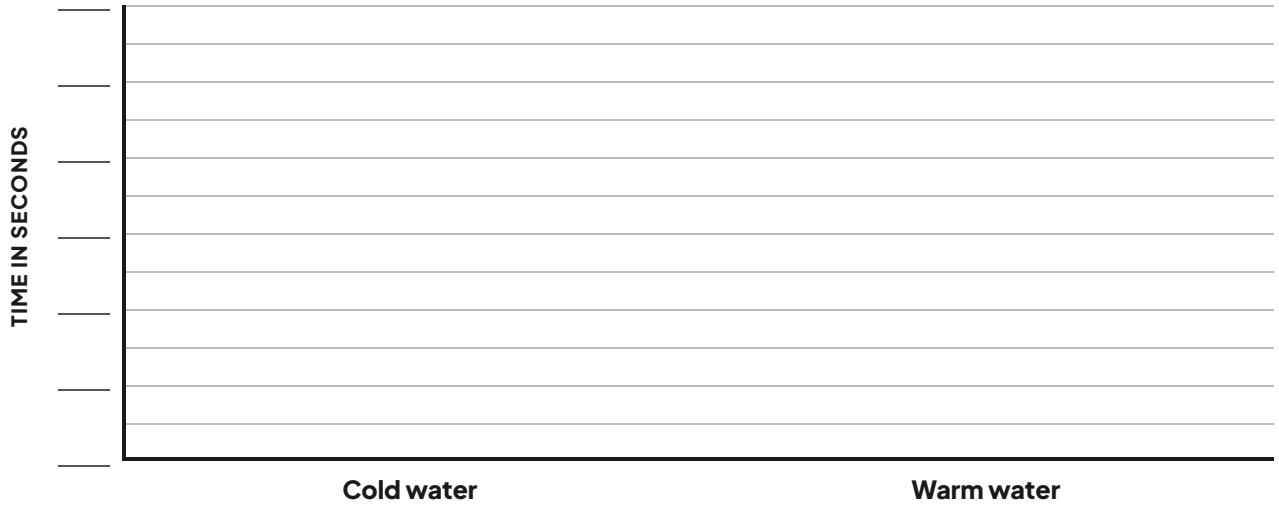
1 Our results

WATER	TEMPERATURE	TIME FOR THE FIRST COLOR TO TOUCH THE COIN
Cold	°F	seconds
Warm	°F	seconds

Which plate finished first? **cold** **warm** **no difference**

2 Graph it

Choose your own scale. Write a number on each line, then draw one bar for each time.



3 What we found

The cold plate took _____ seconds and the warm plate took _____ seconds.

So the temperature of the water **did** **did not** change how fast the color spread.

I think this happened because

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