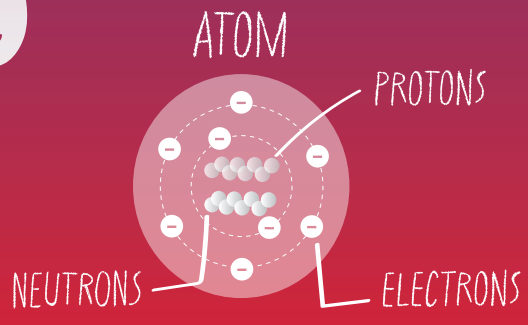
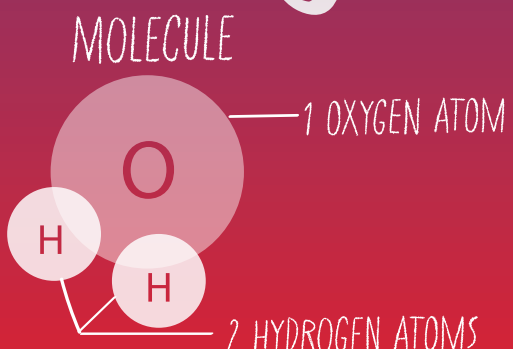
DREAM. BUILD. BECOME.

ACE METAL FOUNDATIONS

By IACMI

Color Changing Slime





Color-Changing Slime

Prior Knowledge

This activity requires some prior knowledge to ensure success. Students should possess a basic understanding of simple fractions to assist them in recognizing necessary measuring spoons. Students must also: be able to follow multi-step instructions, possess a basic understanding of heat and temperature, and possess cause-and-effect reasoning skills.

Color-Changing Slime

Lesson Overview

In this lesson, students investigate how materials can be designed to respond to energy in predictable ways. Using color-changing slime, students explore how changes in temperature cause a visible response, and how that response can be observed, compared, and explained.

As students make and interact with the slime, they focus on how thermal energy—specifically warmth from their hands or the surrounding environment—affects the material. Rather than treating the color change as a surprise, students are guided to think about where the energy comes from, how it enters the material, and why the material responds the way it does. Students observe that the color change is reversible, meaning the material can return to its original state when conditions change again.

The lesson emphasizes that this behavior is intentional and designed, not accidental. The slime contains a special material that responds to temperature, allowing it to act as a visual indicator of environmental change. Students learn that engineers and material scientists design materials like this on purpose so they can signal information, show changes that might otherwise be invisible, or help people understand what's happening around them.

Vocabulary

Material: What something is made of

Energy: Something that causes change, like heat or movement

Temperature: A measure of how warm or cool something is

Response: How something changes when something happens to it

Figure 1: Solar panels, used to convert energy from sunlight.

Figure 2: A thermometer, used to find temperature.

Color-Changing Slime

The Foundations of Responsive Materials

Have you ever noticed that some materials change when their surroundings change? A sidewalk feels warmer in the sun, a metal spoon may feel colder than a plastic or wooden one. Materials are always interacting with the world around them.

Some materials are designed to respond when they receive energy. Energy can come from light, movement, or heat. When energy enters a material, it can cause the material to behave differently.

Today, you will work with a material that responds to temperature. When the slime warms up, it changes color. When it cools down, it changes back. The material itself isn't becoming something new; it is responding to energy.

This kind of response doesn't happen by accident. Engineers and scientists design materials to behave this way on purpose. A visible change, like a color shift, can tell us something we can't see, such as when something is getting warmer or cooler. As you explore, you will be practicing the foundations of working with responsive materials by observing how energy affects material behavior.

Figure 3: Thermochromic pigments become transparent when heated, revealing the design underneath.

Figure 4: A thermal camera converts heat energy into a visible image

Color-Changing Slime

Materials

Materials Supplied in Kit	
Per Student	**Shared**
• 2 tablespoons of Elmer's glue • 1 spoon of thermochromic powder • [3] 1/8 teaspoons of baking soda • ¾ teaspoon of contact solution • 1 Ziploc bag • 1 craft stick (to assist with removing glue from measuring spoon)	• Elmer's glue • Thermochromic powder (one of the provided spoon's worth per student) • Baking soda • Eye contact solution • [5] 1 Tablespoon scoops • [5] 1 teaspoon scoops • [5] 1/8 teaspoon scoops

Activity Directions

Step 1: Start with the Base

- Place 2 tablespoons of glue into your plastic bag
- Add 1 spoonful of color-changing powder to the bag
- Seal the bag tightly
- Use your hands to gently mush and squish the bag until the glue and powder are mixed

Color-Changing Slime

Activity Directions Continued

Step 2: Add the Activator

- Open the bag and add three 1/8 teaspoons of baking soda
- Seal the bag again
- Use your hands to mush and mix the ingredients through the bag until everything is combined

Step 3: Watch the Slime Form

- Open the bag and carefully add ¾ teaspoon of contact solution
- Seal the bag one last time
- Mush, squeeze, and press the bag with your hands
- Keep mixing until the slime starts to pull together and looks stretchy instead of runny

Step 4: Observe your slime

- Hold the bag in your hands
- Stretch and squish the slime through the bag
- Watch closely and note the color change as your hands warm up the slime

Safety Note

- *While this activity uses skin-friendly materials, every child's skin is different. In very rare cases, students with particularly sensitive skin have experienced minor, but adverse reactions. For this reason, the slime is made and interacted with in the plastic bag. Students with known skin sensitivities should not be encouraged to play with the slime using their bare hands.*

Color-Changing Slime

Discussion Prompts or Reflection

- Where do you think the energy will come from in this activity?
- How can you be sure that energy from your hands is moving into the material?
- What evidence do you see that heat is affecting the slime?
- What characteristics of the slime remain the same, even though the color changes?

Variations and Enrichment

- Encourage small groups to make their slime with slightly different ingredients amounts, such as more glue, less glue, more contact solution, etc. Then have students compare the outcomes of the different formulations.
- Invite students to test how temperature affects the slime. Allow the students to let their slime rest near a window allowing natural light in to add to the notion that the slime is reacting to its environment (the heat) not necessarily their hands.
- Have the students design a use for the slime. Examples may include: a toy, a temperature warning, use in a mood-changing object, etc.

Foundation Exploration

- Materials Scientists study how materials respond to heat, light, and other forms of energy. They test materials to see how they change and help design new materials with specific responses
- Quality Control Technicians test materials to make sure they behave the same way every time. They may look for changes in color, texture, or strength to decide whether a product meets standards
- Packaging Engineers design containers that protect products and sometimes include materials that respond to temperature changes to warn is food or medicine gets too hot or too cold
- Medical Device Designers create medical tools that use materials that change color to show temperature changes or signal when something needs attention. These materials help doctors and nurses notice important changes quickly