

Exploration 2: Decomposition, Part 1

GRADE LEVEL 4 - 6th

DURATION Prep time: 20 minutes; Activity time: 40 minutes

SETTING Classroom

In this activity, students will discuss the role of conservators in protecting objects in museums. Students will set up an investigation to find out how effective different materials are at blocking sunlight and protecting a piece of construction paper from fading. The results of the investigation will be revealed in the final exploration.

MATERIALS

- Colored construction paper (the cheaper the better, for faster fading)
- Scissors
- Tape
- Miscellaneous materials for testing light blockage, such as foil, plastic wrap, waxed paper, tissue paper, and card stock. It is ideal to cut the materials into two-inch squares to save time during the activity.

BACKGROUND FOR EDUCATORS

Decomposition is the process of a substance breaking down into simpler substances or elements and can be caused by heat, light, chemical processes, or biological activity. In ecosystems, breaking down organic material (such as dead plant or animal tissue) into smaller molecules makes important elements such as nitrogen available for other organisms to use. Bacteria, fungi, insects, and other organisms carry out this type of decomposition.

Heat, light, and moisture also can contribute to decomposition. For example, chemical changes can occur when an object is subjected to light and heat energy, causing atoms and molecules to break their bonds and sometimes form different substances.

While decomposition is a beneficial process in nature, it can

be problematic for those who aim to preserve specimens in a natural history museum or artworks in an art museum. Conservators go to great lengths to protect museum objects from light, heat, moisture, and living things such as fungi, bacteria, and insects.

PROCESS

1. Begin by having students look back at their reflection from the previous session and respond to the prompt, Since last time I . . .
2. Introduce the theme, vocabulary word, skill, and career of the day as follows:
 - » **Theme: Decomposition**
 - » **Vocabulary: Decomposition.** The breakdown of materials, either by living organisms such as bacteria, insects, and fungus, or by non-living means such as heat or light
 - » **Skill: Investigation.** An active and systematic process to discover the answer to a question or the solution to a problem
 - » **Career: Conservator.** A person whose job is to preserve objects within a museum. At natural history museums, conservators work with dead specimens. At fine arts museums, conservators work with paintings, three-dimensional objects, arts on paper, and textiles. Give students time to record these concepts in their notebooks using their own words and/or drawings. Ask students to predict if the skill of investigation is used by artists, scientists, or both.
3. Introduce the concept of decomposition and ask students for examples of things they have noticed breaking down, fading, or otherwise changing over time. Talk about processes that can cause materials to break down. Explain that organisms such as fungus, bacteria, and insects are often involved. However, non-living things such as light and heat can also cause decomposition by breaking down



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- chemicals in the material.
4. Show images of artworks that have been damaged over time (there are examples available in the attached pdf). Discuss the role of conservators in maintaining and protecting art and specimens from damage. Explain how, among other threats to materials, conservators must protect them against light, which can cause or accelerate fading and other damage.
 5. Tell students that they will be doing an investigation to find out how well different materials block light. They will conduct tests on construction paper and attempt to prevent the paper from fading. Introduce the materials that will be tested. Ask students: Which ones do they think will be best at blocking light, and why? Which materials will allow light through and fade the paper? Have students record their predictions in their notebooks.
 6. Give students time to set up the investigation. Each student should place pieces of each testing material on their sheet of construction paper. Have them trace outlines around each piece of testing material and, most importantly, label each one. We recommend attaching the pieces to the construction paper by using loops of tape underneath the materials. Using glue will make it difficult to remove the materials later, and putting the tape around the edges of the materials could interfere with the natural fading process.
 7. Hang the construction paper in the window, facing out, or somewhere else with plenty of sun exposure. You might ask your students to figure out the best place to hang the sheets based on what they've noticed about sunny spots in the classroom or hall. Let the sheets remain in their spots for at least one week before uncovering the results. [See Exploration 4: Decomposition, Part 2.]
 8. Reflect on the skill of the day and ask students how they used this skill in today's activity. Ask students how the skill might be useful for artists and for scientists. Revisit the predictions they made at the beginning about who might use the skill and discuss how their thinking about this might have changed.
 9. Give students time to respond to a final reflection question: What might a conservator do at an art museum? At a science museum?

