

Title of Lesson Plan	The Case of the Slumping Pot
Objective	Students will learn about the challenges conservators face with heat and water-sensitive materials such as wax and clay. They will compare these properties to a more stable material used by ancient Egyptians, stone.
Standards	<i>National: 2-PSI-4 Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.</i> <i>Georgia: S2P1. Obtain, evaluate, and communicate information about the properties of matter and changes that occur in objects.</i>
Grade Level	2 nd Grade
Pacing	3 sessions, can be shortened to 2 sessions without supplemental mummy mask-making activity.
Guiding Questions	What display conditions affected the Egyptian vessel? Are these conditions harmful for other objects? How can conservators use wax to protect objects?
Collection Connection	Calcite cylinder vase (2013.035.001); Cuneiform tablet (XXX?); Brick (2010.049.058); ceramic beer jar (2005.063.002); ceramic Shabti figure (2018.010.354); limestone statue of Intef (2004.062.002); calcite strap handled amphora (2010.048.001); corn Osiris wax mummy mask with gold (2018.010.001D); Mummy Portrait of Sarapon (2004.048.001); "Corn" Osiris Figure and Coffin (2011.043.003A/B).
Content (About the Artwork and/or connection to the topic)	The Case of the Slumping Pot One day at the Carlos Museum, conservators noticed something very odd while walking through the Egyptian Gallery. An Egyptian vessel had slumped over in its display case! Looking around the gallery, they tried to figure out what happened to the vessel. One part of a conservator's job is to make sure the display environment is safe for objects. Look around this image of the Egyptian Gallery at the Museum. What do you see that could affect the objects on display? Since Egypt has a very dry climate, water can affect objects made in Egypt. In the gallery, this water can appear in the form of humidity or flooding. Objects on display can also be affected by hot

display lights, heating during the winter, or air conditioning during the summer. What would happen to these objects if the humidity was high or if there was a flood in the Museum? What if the heat was too high or the air conditioning was too cold?

Ancient Egyptian Materials

This slumping vessel was made in ancient Egypt, which is located in Northern Africa. Egypt has a desert climate, which means it is very dry and hot in the summer and cooler (but not cold!) in the winter. The areas near the ocean also get some rain in the wintertime. In ancient Egypt, many materials were used to make vessels for ceremonial and daily use. Among those materials were unfired clay, ceramic, stone, and wax. As you can see from these objects in the Near East and Egyptian collection at the Carlos Museum, unfired clay, ceramic, stone, and wax were also used to make sculptures, paintings, buildings, and tablets.

Pop-out: [Did you know? Some of the main natural resources of Egypt are petroleum, natural gas, iron, limestone, gypsum, lead, zinc, and rare earth elements.]

Second pop-out? [There are approximately 104 million people in Egypt with 95% of the population living near the Nile River.]

The Uses of Wax in Conservation

Wax can also be used by conservators to protect objects, like metals, or restore objects, like this stone vessel from Egypt. Wax can be mixed with resins or pigments to fill areas of loss in an object. Once a year, conservation staff from the Museum apply wax to outdoor metal sculptures around campus. This protects the metal surfaces from pollution, rain, and human interaction. Wax can also be used by conservators to restore gaps in certain materials. Wax is a great material for some stones, like calcite or alabaster, because it is translucent just like these minerals. This is what we see in the slumping pot. Part of the bottom has been restored with wax, which started to melt under the hot display lights. Supports were added later to the wax fill to make it sturdy and the lightbulbs inside the case were changed to LEDs, which don't get as hot.

Egyptian Wax Masks

Have you ever heard of a chia pet? The concept of a chia pet is to grow seeds from a fun decorative planter. Way before chia pets existed, Egyptians were doing almost the same thing! During the New Kingdom era (ca. 1550-1070 BCE), Egyptians began burying Osiris figures filled with mud and grain in tombs and sacred sites.

	<p>These would then sprout from the ground, representing Osiris’s role in bringing life from the earth. This was done on feast days as an offering to the gods. An example of one of these figures can be found on display in the Egyptian Galleries at the Carlos Museum. In order to make these figures, sand, soil, and grains were wrapped in linen and shaped into an Osiris figure. A wax mask was then made to place on the face of the figure. Wax was thought to have magical properties of transformation. These masks were gilded with gold, to represent the god’s skin, and painted. These figures were then placed inside of a wooden coffin to be buried.</p>
Project Title	<i>The Case of the Slumping Pot: Physical Changes</i>
Materials	<p>Beeswax (1” diameter disk, 0.25” thick; can also use other low-melting point wax depending on availability) Clip lamps Incandescent bulb Hair dryer (must have cold setting) Ball of wet clay (1” diameter) Unglazed ceramic saucer (ex. Pot saucer from any hardware store) Plastic bowl (1 per group or 1 per student) Water Silicone face molds (a variety of styles can be found on Amazon or similar retailers. Silicone candy molds would work well for this) Sheet wax</p>
Instructions	<p>Week 1: The teacher will introduce “The Case of the Slumping Pot” using Classroom Presentation. Include geography, cultural context, the museum environment, and related objects in the Museum collection. Students will be divided into groups of 3 and each group given a set of raw materials (wax, clay, ceramic, stone). They will record the observable physical properties of each material in their worksheet. The teacher will have set up 4 clip lamps with incandescent bulbs, one for each material type. At the beginning of class, the lamps should be turned on in order to start heating the materials. Half of the student groups will start by observing the materials under hot lights and recording their observations. The other groups will be investigating the effects of hot and cold air on their materials using the hair dryer and recording observations in their worksheet. After 7 minutes, these groups will switch.</p> <p>Week 2: The teacher will reintroduce “The Case of the Slumping Pot” using a PowerPoint presentation. In groups of three, students will place each material in a bowl of water and record their observations.</p>

	<p>They will make a compare and contrast double bubble thinking map to compare the properties of the different materials. They will then answer critical thinking questions synthesizing the activity on their worksheet.</p> <p>Week 3: Students will use what they learned about the physical properties of wax to make their own mummy masks. They will need to warm up the sheet wax with either a hair dryer or lamp, press the wax into silicone molds, and then release the mask from the mold by submerging them in cold water.</p>
Assessment	See attached worksheet
Additional Resources (Bibliography, other artwork in the collection, FAQs, books/websites for the classroom, etc.)	<p>Changing Matter: Understanding Physical and Chemical Changes (My Science Library)</p> <p>Physical Change: Reshaping Matter (Exploring Science: Physical Science) by Darlene Ruth Stille, 2005</p>
Handouts/Worksheets	One worksheet attached
Vocabulary	Matter, reversible change, properties, texture, structure, color