



Teacher:
Class: 2nd Grade
Duration: 1 class period
Course Unit:
Lesson Title: Sand Casting with Crayon Wax

LESSON OVERVIEW

Students will learn about the different states of matter and about the use of negative space to make artwork as they use melted crayon wax to create sandcast sculptures.

STANDARDS

Tennessee State Standards
Visual Art—Grade 2
1.1 Use tools and media consistently in a safe and responsible manner.
1.2 Demonstrate an understanding of a variety of techniques.
1.3 Explore a variety of processes.
2.1 Identify, understand, and apply the elements of art.
3.1 Select subject matter, symbols, and ideas for the student’s own art.
6.2 Understand connections between visual art and other disciplines in the curriculum.

Science—Grade 2
GLE 0207.Inq.1 Observe the world of familiar objects using the senses and tools.
GLE 0207.Inq.2 Ask questions, make logical predictions, plan investigations, and represent data.
GLE 0207.T/E.2 Apply engineering design and creative thinking to solve practical problems.

Common Core Connections for Integrated Subjects—Language Arts, Speaking & Listening
CCSS.ELA-LITERACY.W.2.8 Recall information from experiences or gather information from provided sources to answer a question.
CCSS.ELA-LITERACY.SL.2.1.B Build on others' talk in conversations by linking their comments to the remarks of others.

OBJECTIVES

1. Students will be able to define the properties of the 3 states of matter.
2. Students will be able to define negative and positive space.
3. Students will be able to understand, apply, and describe the process for making sandcast sculptures.

ASSESSMENT/EVALUATION

1. Teachers will observe how well students follow instructions and maintain a clean workspace.
2. Students will be assessed on their explanation of the sandcasting process. Explanations should mention temperature change and negative space.

MATERIALS

- A PC-to-projector connection
- 1 image of a sand castle
- 1 paper or plastic bowl per student (cereal bowl size)
- 1 pencil per student
- 1 additional bowl per workstation (for collecting loose sand during cleanup)
- 1 bucket of water
- Disposable aluminum baking pans for melting the wax. Calculate the number of tins needed as follows:
 - 1 small muffin well per student
 - 1 mini-loaf pan per 2–3 students
- 4–5 crayon nubs per student, with the paper removed
- 1 paper or plastic bowl per student (cereal bowl size)
- 1 premade example of a sand mold
- 50 lbs. of play sand (the finer the sand the better)
- 1 spray bottle filled with water
- [optional] Classroom objects to use as digging/carving tools
- 1 electric griddle
- 1 journal or sheet of paper per student
- 1 large bowl
- 1 lidded container (gallon-size or larger) for discarded wet sand

ACTIVATING STRATEGY

1. Show students the “[Science and Art](#)” episode of [ArtQuest: Art Is All Around You](#).
2. Ask students what they found interesting about the video. What questions do they have? Reiterate that the artists made the sculpture by pouring the liquid bronze into a mold, and this process is called *sand casting*.
3. [Say:] These artists needed to know a lot about science, especially about the different states of matter.
4. Quiz students on the three common states of matter, and review with them the basic properties of each state:
 - solid—it keeps its shape; it is hard to the touch.
 - liquid—its shape depends on its container.
 - gas—you cannot see it most of the time, like air; it fills the shape of its container.
5. Offer examples for each state of matter, and ask students to offer additional examples. Point out that water can exist as a solid (ice), as a liquid, and as a vapor/gas.
6. [Say:] How can you change matter from one state to another? [Answer: Temperature change.]
7. [Say:] Who can tell us how the artists in the video created their work of art?
8. [Say:] What kind of material did they work with? [Answer: Bronze.] What state of matter was it in when they started? [Answer: solid.] What state of matter was it in when they finished? [Answer: Solid.]
9. [Say:] Did it undergo a change in its state of matter at any point? [Answer: Yes, it was heated to over 2,000 degrees Fahrenheit in order to turn it into a liquid.] What do we call it when matter changes from solid to a liquid? Think about ice turning into water. [Answer: Melting.]
10. [Say:] How did the bronze turn back into a solid? [Answer: The artists let it cool.]
11. [Say:] We can do the same thing, and create our own sandcastings. We don’t have a furnace to heat bronze with, but other solids, like wax, melt at a much lower temperature. Wax, like in a candle or a crayon, starts to melt at only 120 degrees Fahrenheit. You have to create the mold—the container for the liquid wax to fill—so

that when the wax cools, it will solidify into a work of art. This process is called *sandcasting*.

12. [Say:] What material can you use to create a mold for our sand casting? [Answer: Sand!] Have any of you ever built a sand castle, dug in the sand, or made a moat—or seen a picture of someone making this on the beach? [Show the sand castle image.]
13. Explain how they are going to create “negative sand sculptures” to make their mold. Ask if anyone knows what negative space and positive space are. Provide the definitions. [Say:] Positive space is the area in a work of art that is the subject, or area of interest. Negative space is area around the subject in a work of art.
14. Show an illustration of positive and negative space (an excellent example can be found at thevirtualinstructor.com/positive-and-negative-space.html). [Say:] Take a look at this image. Do you see faces or a vase?
15. Tell them they are going to dig a very specific and intentional hole in the sand, and explain how the negative space of their hole will become the positive space of their sandcasting.

INSTRUCTIONS

1. Prior to class, set up this activity as follows:
 - a. Determine the number of workstations needed, with 3–5 students per station.
 - b. At each station, place 1 empty bowl and 1 pencil per student, plus 1 additional bowl for the group.
 - c. Fill a bucket of water and place it near a sink and away from heavy foot traffic. Students will rinse their sculptures in this bucket.
 - d. If using disposable muffin pans, cut them apart to create individual tins for pouring melted wax. Load each tin with 4–5 crayon nubs. If using mini-loaf pans, fill each tin with 10 or more nubs. Set aside one nub for Step 9.
2. After students seat themselves at their stations, explain how they will make their molds: they will pour wax into the space they create in the sand. Show your previously made example and explain how you made it.
3. Explain how they will create a hole, which will be negative space, and that their artwork will take the form of a positive space that is identical to the hole’s negative space. In other words, their artwork will be the opposite of their hole.
4. Tell students to write their name in pencil on the rim of their bowl.
5. Call students up (1 workstation at a time) to receive sand in their bowls.
6. Spray water 4 times into each of their bowls. Explain that the sand will pack better, sticking into the shapes they want, if it is a little wet.
7. Advise them on technique: they can use their finger to dig the shape they want to make, and use their pencil to make details. Making a deeper hole or line with a pencil tip will create a raised dot or ridge on their artwork. Tell them to make sure they don’t dig all the way down to the bottom of the paper bowl.

Recommend some basic shapes:

 - stars or clouds
 - basketballs or footballs
 - rings or coins
 - little figurine heads they can make by digging a hole with their thumb and poking deeper holes for eyes and other facial features. Remind them that they should carve their faces *upside down*!
 - cubes or shapes with a flat surface on which to write their names/initials. (Printing whole names may be difficult/problematic.)
 - animals (if the students are ambitious and dexterous)
8. Show them a crayon nub and tell them that this substance is a solid at room temperature, but when you heat it up to 120 degrees Fahrenheit it melts into a liquid, and that it will turn back into a solid when it cools. Give it to a student to hold and ask them if it is hard and solid.
9. Add the crayon nub to one of the tins, and begin heating all the tins on the griddle. The temperature should stay between 150 and 170 degrees.
10. [Say:] Don’t try this at home without an adult.
11. [Say:] When the wax is melted, I will pour it into your mold.
12. Give them 7 more minutes to form their molds while the crayons melt. Encourage them to experiment:

suggest that they mix the sand up and start over, learn from their mistakes, and ask each other for tips learned through the process. What works and what doesn't work?

13. Call each group up and pour the melted wax into their molds as they watch. Tell them that they have to let it cool at their workstations without touching it for at least 12 minutes. Warn them that it will burn them if they touch it.
14. While they are waiting, have students respond to the following question (in their journals or on a sheet of paper): *What is happening, and what do you think the result will be?* Have them sketch what they think their sculpture will look like.
15. Instruct them to clean up when they are finished, by swiping any loose sand into the additional bowl at the table) and then taking it to your 50 lb. bag of sand. Emphasize the importance of not dumping any sand in the sink or throwing it away.
16. After the students' sandcasts have cooled for at least 12 minutes, call them up by table to a large bowl. Supervise each student as they gently dump their wax artwork out of their bowl. Instruct them to carefully brush most of the sand off of the artwork, and then to rinse it in the bucket of water. Pour the wet sand into the lidded container before calling the next group.
17. Celebrate their artworks. Ask them what they like about their own and others', and then assign the following writing prompts:
 - a. Explain the process: How did you use temperature change and negative space to successfully create a sandcasting?
 - b. What would you do differently the next time?
 - c. What questions do you have about the process?
 - d. Imagine you have access to heavy-duty machines and materials. The sky is the limit. How would you make something even more amazing?

ALTERNATE/EXTRA ACTIVITIES

- Students with special needs can create their castings at their level of dexterity. You can simplify their writing prompts as follows:
 - What happened?
 - Has the artwork always been a solid?
 - What else could you make?
- You can have the students make handprints in a large bowl of sand with their hands, making sure they all touch, and pour the wax into the mold of their interconnected handprints. Depending on class size and bowl size, you can make 1 sandcasting per table, or 2 table groups per bowl, etc.
- Students can use digging or sculpting tools to refine their molds.
- Students can draw pictures with their finished sandcast crayons, but only if they're willing to watch their artwork be worn away.
- The lesson can be done with plaster or candle wax instead of crayon wax.

CLOSURE

1. [Say:] What were some of the techniques that worked the best? What were some of your difficulties?
2. Ask them to share their written responses to their prompt. Ask them what they learned about the states of matter, and about positive and negative space.
3. Ask them if they can think of any other uses besides art-making for the technique they used today.

CROSS-CURRICULAR CONNECTIONS

- Science
- Writing

EXTENDED LEARNING

Books:

- Adrienne Mason, *Change It! Solids, Liquids, Gases and You* (Toronto: Kids Can Press, 2006)
- Inez Snyder, *Wax to Crayons* (New York: Children's Press, 2003)

Videos:

- Frist Center for the Visual Arts, "[Science and Art](#)," [ArtQuest: Art Is All Around You](#) (2014; available at [fristkids.org](#))
- Max Lamb, [Hexagonal Pewter Stool](#) (2010; available at [vimeo.com](#))

For additional lesson plans and activities, visit us at [fristkids.org](#). This lesson plan was created by an art education student in the Frist Center for the Visual Arts' Teaching Assistant Program under the guidance of education department staff and/or a mentor teacher. The Teaching Assistant Program is designed to introduce participants to museum education by providing unique teaching experiences in an informal learning environment. For more information about this program or other educational opportunities offered by the Frist Center, please visit [fristcenter.org](#).

