

WORCESTER ART MUSEUM



Earth Science Getting Muddy



Have you ever used **clay** at home or in an art class? Did you know that there is clay in the ground almost everywhere?

The dirt we see around us is called **soil**, which is an essential part of a happy ecosystem*, and soil has many things in it, like rocks, sand, silt, clay, bugs, and other organisms. It is very important that soil has at least a little bit of all of these things to be healthy, and healthy soil is one of the most important parts of keeping the entire Earth healthy--because we need good soil for plants to grow!

Rocks, sand, silt, and clay are made out of tiny particles called **minerals**. The minerals that make up clay are not the same ones that make up rock, sand, or silt, though.

Here's another way to think about it: A cake and a loaf of bread have similar **ingredients**, but there are differences, like how much sugar, and how many eggs you use. The same goes for different rocks, clay, and other parts of soil. As the ingredients of a cake are specific to cake, the minerals (or ingredients) of clay are specific to clay.

Clay is an important part of soil. So what is clay? Clay is a soil material found in nature, made of tiny particles that are hexagonal (six-sided) and concave (bowl-like) on both sides. When the clay particles become wet, they bond to each other. Water is added to make clay workable so the particles slip by each other more easily. To the right is a **magnified** size comparison of some of the soil parts we've talked about. One clay particle is very tiny... we would not be able to see it without a microscope!



[Duck Vessel](#)
[clay, 1300 CE to 1500 CE](#)
[1985.81](#)



Sand

0.05mm-2mm



Silt

0.002-0.05mm



Clay

<0.002mm

Vocabulary

Ceramics - Using clay and other materials (like glazes) to make pots, cups, vases, etc., and artistic forms which are baked (or fired) in a kiln to be hardened.

Clay - A soil material found in nature made of tiny mineral particles.

Ingredients - Items or materials that are combined to make or build something.

Kiln - A special oven for ceramics and pottery that gets very hot.

Magnified - Made to appear larger, so we can more easily see the object.

Minerals - Tiny pieces of matter that make up rocks, clay, and more.

Pottery - Pots, cups, vases, etc. and artistic forms made of clay (only clay) that are baked (or fired) to harden them.

Soil - The dirt all around us.

To help get a better understanding of this lesson... get muddy! Digging around in the dirt is a great way to take a closer look at what makes up the soil near you.

*Learn more about ecosystems in WAM's Art & Science lesson titled "We're All Homebodies!"

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Place and Time Match



We've learned that clay is an important part of soil. How else is clay important to humans, besides keeping our Earth healthy?

Well, for art! Below are examples of how humans have used clay to create beautiful, useful pieces throughout history. When we shape something out of clay and bake it, we're creating **pottery**. When we shape something from clay and use other materials like glazes, we make **ceramics**. Baking clay in a hot oven, or a special oven called a **kiln**, makes it strong and hard, which is why pottery lasts so long.

Take a look at the ceramics and pottery below. These pieces range from being over 5,000 years old to, more recently, 8 years ago. How have pottery styles changed over time? Are there things that are the same? What might have people used pottery for long ago? Do we still use it the same way? Look around your home. Do you see any ceramics or pottery? What does it look like, and what do you use it for?

Draw a line from each artwork to where you think it was made and when you think it was made!

Place — Artwork — Time

China
unknown
artist

America
American
Terracotta and
Ceramic
Company

Mexico
unknown
artist
Colima,
Mexico

Britian
Royal Crown
Derby

Japan
Suzuki, Miki

Denmark
Richard Manz



Pot (with Blue Stripe)



Vase



Blue Bizen vessel with white patterns 01



Storage Jar



Sauce Boat with Cover



Snake Vessel.

**19th
century**
Between 120
and 220
years old

**3500 BCE-
3000 BCE**
Between 5,020
and 5,520
years old

**1900 CE-
1903 CE**
About 120
years old.

2012 CE
8 years old

**1958 CE-
1999 CE**
Between 21
and 62
years old

**200 BCE-
500 CE**
Between 1,500
and 2,200
years old

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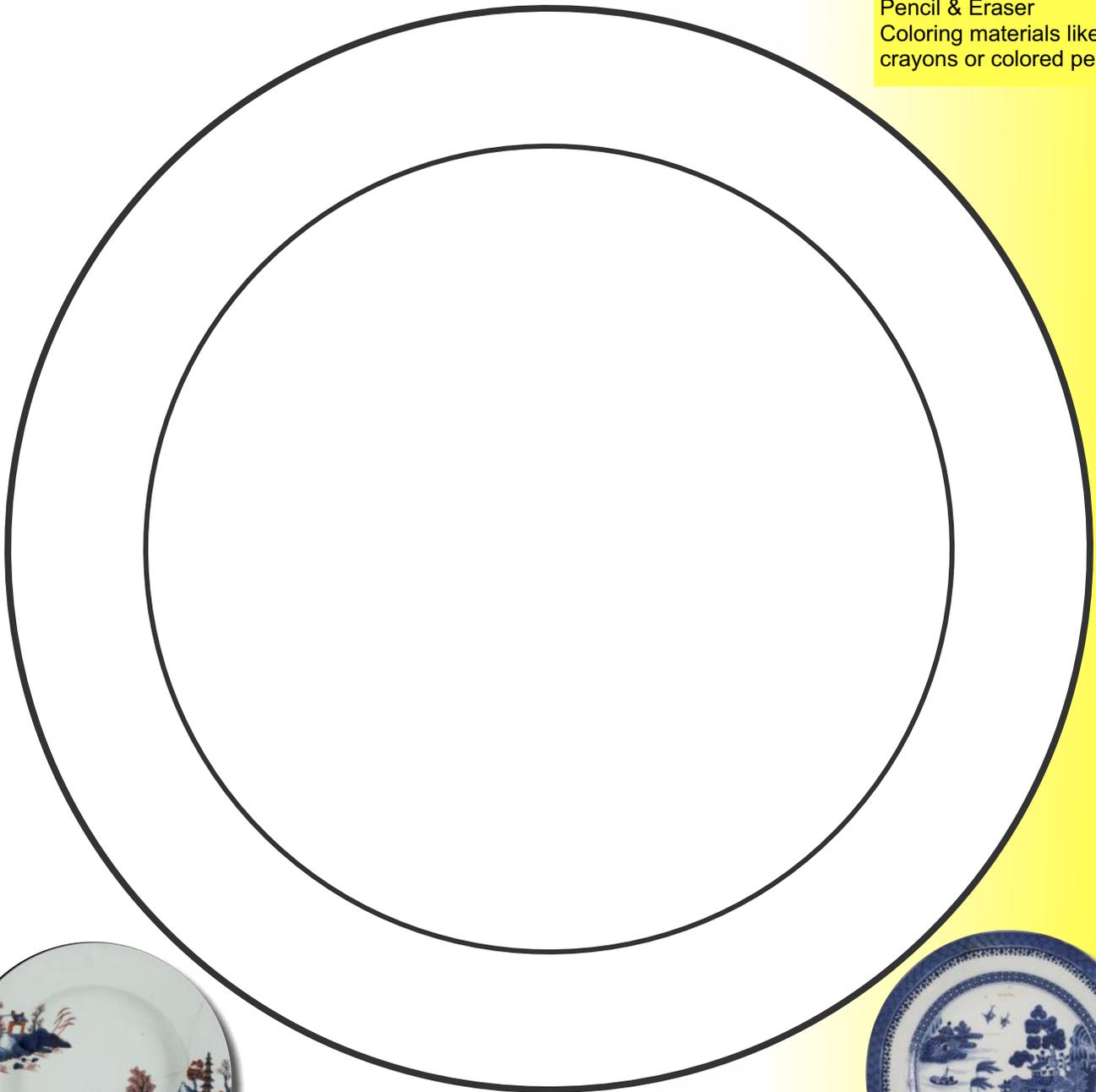
Design a Plate : Drawing

Ceramic plates, pots and sculptures may have awesome designs that can be carved in, drawn or painted in glaze, or painted on afterwards. What would your favorite plate look like if you could design it? Use the template below to design and color in your own plate. If you want inspiration, below are two plates from the Worcester Art Museum's collection. Click on the images for more information!



Supplies

This page, printed
Pencil & Eraser
Coloring materials like
crayons or colored pencils



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Create : Pottery



Sometimes the best way to learn about something is to try it yourself! Here we have two clay pot project options--a pinch pot and a coil pot. You can use clay you bought or you can try to make your own clay with the recipe on the next page.



Supplies for both

Bakeable or air-dry clay
Water
Pencil or Paper clip
Washable surface



Pinch Pot

Directions

1. Use a piece of clay about the size of an orange. Save any extra in case you'd like to add anything at the end.
2. Roll the clay around in your palms until it becomes round like a ball. Smacking the sides of it might help to round it out too!
3. Gently poke a thumb-sized hole half-way into the ball. This will be the top, or the opening, of your pot.
4. Gently begin to pinch out the edges, turning the pot as you go. Start to work downward as well, to create a deeper pot. Sides about half an inch thick are ideal. If you get too thin they might collapse. Also, make sure not to put your thumb through the bottom!
5. When your pot is as deep as you want, lightly press the bottom down onto a flat surface to get a flat bottom.
6. If desired, you can draw designs into the clay with the tip of a pencil or the end of a paper clip.

Directions

1. Use a piece of clay the size of an orange. Save any extra in case you'd like to add anything at the end.
2. Pinch off about $\frac{1}{3}$ of the your clay piece. You will use this part to create the bottom of your pot.
3. Set the larger chunk aside.
4. Gently roll out the smaller chunk into a thin rope. The rope should be about half an inch in diameter to remain sturdy.
5. Start to coil this rope into a spiral--make sure all the edges are touching and there are no gaps.
6. Roll out the second, larger part into a similar rope. If it gets too long, you can break it into sections that are easier to handle.
7. Begin to wrap the second rope on top of the base, around the edge, and stacking the rope as you coil it.
8. If you've broken the rope into sections, you can stick them together
9. Coil until the rope runs out, and you will have walls of your pot.
10. If desired, you can draw designs into the clay with the tip of a pencil or the end of a paper clip.

Connecting Clay: Score & Slip

Every time you attach clay to clay you should put little scratches into the two places that touch--this is called *scoring*. Then you should wet the area with some water or clay water--this is called *slip*. Then press the pieces together firmly. This will help them stick!

Try out different pot heights, widths, and shapes. Add ears, faces...you can make the coil pot easily look like a worm or snake! Of course, feel free to use clay for other projects, too!

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Make My Own Clay: Clay Recipe



This clay is polymer-like in that it has plastic qualities of being bendable and a bit elastic before baking, and hard after. It is best to keep sculptures on the smaller side, or at least not too thick - about a half-inch thick at most. Not for making eating or drinking ware. Remember-- this is not the same clay you'd find in the ground, but it feels similar!

Ingredients

- 1 cup (8 oz) Corn Starch
- 1 cup (8 oz) White Glue
- 2 teaspoons vinegar or lemon juice
- Oil or hand lotion

Tools

- Cooking Pan
- Spatula (silicon works best)
- Container with lid to store clay in (A large yogurt or medium take-out container will work well.)

Directions

1. Prepare a clean countertop space for clay kneading by skim-coating it with a layer of oil or hand lotion.
2. Add the cornstarch, glue, and vinegar (or lemon juice) to a saucepan that is on the range top with the heat on low. (It might need to be on very low if you have a gas range due to the constant heat).
3. Stir continuously as the mixture thickens - this takes about 10 minutes.
4. Once the mixture starts to stick to itself and pieces from the bottom of the pan begin to be a bit crusty/crispy, take the pan off the heat and turn the stove off.
5. Transfer the clay mixture to the prepared countertop. Coat your hands in lotion or oil.
6. It will be hot to touch, but start kneading as soon as you can touch the clay.
7. To knead, lift the furthest part of the clay lump up and squish it in to the center-top of the clay using the heel of your hand. Repeat.
8. Every few kneads, turn your lump of clay over and rotate it 90 degrees.
9. If your clay is sticky, you can sprinkle it with a teaspoon of cornstarch and knead it in. Repeat as needed. If your clay is too dry and cracking, add a couple drops of oil.
10. Once the clay has cooled and is elastic (a little stretchy) and smooth, you are good to start creating!
11. Store in an air-tight container.

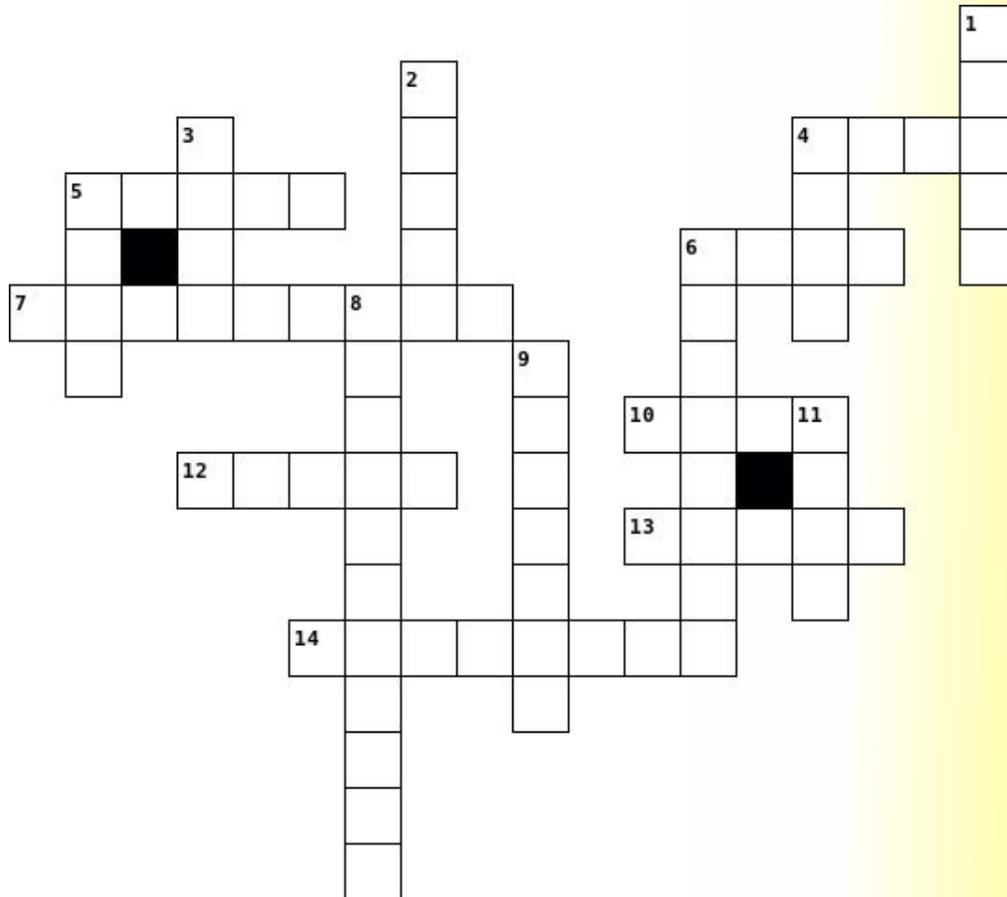
Baking:

Bake finished sculptures on a baking sheet in a 225F oven for 20-30 minutes

Match Answers	Artwork	Time
China	Storage Jar	3500 BCE - 3000 BCE
Denmark	Pot (with Blue Stripe)	1958-1999
Britain	Sauce Boat with Cover	19th century
American	Vase	1900-1903
Mexico	Sankle Vessel	200 BCE - 500 BCE
Japan	Blue Bizen vessel...	2012

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Getting Muddy : Crossword



Across

4. The second step in connecting one piece of clay to another
5. Where the oldest piece of ceramic pottery came from on the matching page
6. Type of pot made by rolling out long pieces of clay
7. Made to appear larger, so we can more easily see the object
10. A part of soil that can be found at the beach
12. The first thing you need to do when connecting one clay piece to another
13. Another type of handmade pot where the first step is making your clay into a ball
14. What makes up rocks, clay, sand, and silt

Down

1. Where the most recently made piece of ceramic pottery on the matching page was made
2. The featured legless reptile is the shape of one of the pots on the matching sheet
3. A special oven for ceramics and pottery that gets very hot.
4. The dirt all around us
5. A soil material found in nature made of tiny mineral particles
6. Using clay and other materials (like glazes) to make pots, cups vases, etc., and artistic forms which are baked (or fired) in a kiln to be hardened
8. Items or materials that are needed to be combined make or build something
9. Pots, cups, vases, etc. and artistic forms made of clay (only clay) that are baked (or fired) to harden them
11. Shape of the pot on the first page