

Mapping and Countermapping Lesson Plans for Elementary Art

Rationale

As long as people have existed, maps have served an important purpose as a teaching tool, helping us organize knowledge and understand our world.

In this six-lesson cartography unit, students view and engage with maps from the American Geographic Society Library's collection. They are introduced to cartography, explore a variety of artistic media and techniques, and investigate what maps can tell us about the people who made them.

Unit Outline

This six-lesson unit consists of a series of art projects that allow students to process maps from large to small, from real to imaginary, from sculpted to drawn (following educator S. Kay Gandy's suggested sequence for map skills).

In **lesson one**, students are introduced to cartography through an exploration of early maps, then create clay-slab maps to represent the relative locations of a few familiar places. This lesson also serves as an introduction to clay.

In **lesson two**, students explore absolute location as they use physical grid lines to create a model of the art room in clay. This lesson also allows students to refine their clay-modeling skills and introduces the slip-and-score technique. Finally, students explore perspective as they create aerial-view maps of their completed clay dioramas.

In **lesson three**, students are introduced to map language through an exploration of orientation and scale. Working in groups, students create simple magnetized compasses, then orient maps of their playground, add the cardinal directions to a compass rose, and use pacing to complete an accurate scale bar for their map.

In **lesson four**, students reinforce their cartographic knowledge as they create imaginary-place maps that feature a map legend and a variety of landforms. They also consider how three principles of design - contrast, balance, and emphasis - can help create visually appealing maps.

In **lesson five**, students zoom out to a global perspective and are introduced to lines of latitude and longitude as they create papier-mâché globes. After completing their globes, students are given scissors and challenged to convert the three-dimensional

world into a two-dimensional map, thereby discovering that distortion is inevitable in any attempt to represent the world on a flat piece of paper.

In **lesson six**, the culminating lesson, students apply what they have learned about the art of cartography to create their own world maps. Students use cartographic content and the principles of design to create an artwork that tells a compelling story about their future world.

Notes

These lessons were created for upper elementary students (grades 3-5) but may be adapted for use with younger or older students.

This unit consists of six sequenced lessons, but any individual lesson may be used as a stand-alone activity. Most of these lessons span multiple class periods; timing is noted in each lesson plan.

A corresponding slideshow for classroom use is available for download at the American Geographical Society's website. Find it in the K-12 Resources tab.

Lesson four was adapted from a from a lesson by [Zach Stoller](#) for Thomas Elementary. Lesson five was adapted from lesson by [Ashley Vice](#) for Manchester University and from a lesson by Williams College's [Center for Learning in Action](#).

Lesson six borrows the theme "My Future World" from the 2023 edition of the [Barbara Petchenik Children's World Map Competition](#). This biennial map-drawing competition promotes the creative representation of the world in graphic form. If you wish to submit student work to the contest, verify the deadline and substitute the current contest theme in your lesson. See the link above for contest information.

References

- Mapping Is Elementary, My Dear: 100 Activities for Teaching Map Skills to K-6 Students*, S. Kay Gandy (Rowman & Littlefield, 2020)
- Children Map the World: Selections from the Barbara Petchenik Children's World Map Competition*, Jacqueline M. Anderson, Jeet Atwal, Patrick Wiegand, and Alberta Auringer Wood (ESRI Press, 2005)
- Ultimate Mapping Guide for Kids*, Justin Miles (Firefly Books, 2016)
- Maps: Getting From Here to There*, Harvey Weiss (Houghton Mifflin, 1991)
- Maps & Globes*, Jack Knowlton (Thomas Y. Crowell, 1985)
- Let's Look at Maps & Mapmaking*, Rowland W. Purton (Frederick Muller, 1971)

Lesson One

Early Cartography: Making a Clay-Slab Map

TIMING: 1 session of 45 minutes (with optional extra time for glazing or painting)

MATERIALS:

- ¼ to ½ lb clay per student
- clay tools
- rolling pins (optional)
- containers of water
- glaze or tempera/watercolor paint, optional

OBJECTIVES: While creating clay-slab maps, students will:

- Understand that maps are a way to **record and share information**.
- Describe and depict the **relative location** of familiar places.
- Learn to **wedge** clay, create a **slab**, and use simple **clay tools**.
- Integrate a variety of **line, shape, and design elements** to express ideas.

LAUNCH LESSON:

-Thousands of years ago, our ancestors invented **maps**. The very first maps were just scratches in dirt, sand, or mud – but they were very useful tools. They helped people find food and water, and find their way home without getting lost. Today, we'll be learning about **cartography**, or the art of making maps.

-Early **cartographers**, or mapmakers, created maps by etching pictures on **slabs** of clay. Today, we will learn how to create a clay-slab map using some simple clay tools.

EXPLORE:

- Focus on **Image A** [the Gasur Tablet]: Explain that the photograph shows a map made in clay over 4,000 years ago. The drawing on the right shows the **symbols** from the map more clearly. Ask students to guess what the symbols represent. Ask: *Can you find a mountain range?* [the pattern of semicircles, like fish scales, toward the top and bottom of the map] *The river?* [the long parallel lines that run through the center of the map]. Ask students to describe the location of various map features relative to each other [*near, across from, next to, above*]. Explain to students that this map shows a plot of land that had been sold to a new owner. Ask: *Why might the new owner have wanted a map of the land?* [to know where the land is located, to know the size of the land, to show proof that he or she owned that land]

- Focus on **Images B-D** [three early maps]: Explain that maps have long been used to record and share information. Ask students to guess what each map shows, then share some information about the maps.
 - **B:** Yu Ji Tu (1136 CE) - a Chinese map etched on a stone block and showing the coastline and two major rivers - used to help prevent flooding on agricultural fields
 - **C:** Nebra Sky Disk (1800-1600 BCE) - a bronze disk found in Germany showing the sun, moon, and stars - believed to have been used as an astronomical clock to help synchronize lunar and solar calendars
 - **D:** Marshall Islands stick chart, or *rebbelib* (1920s) - a chart of ocean currents used to help navigate the Pacific Ocean by canoe

CREATE:

*Students will create clay-slab maps showing two or three familiar locations. They should show these locations in relation to each other - this is called **relative location**.*

- **Demonstrate wedging clay and creating a slab**, either by pounding with fists or by rolling with a rolling pin and optional guide slats. Review proper use and care of clay tools.
- Encourage students to begin by deciding on the two or three places they will show and **choosing appropriate symbols** to represent these places.
- Students **make slabs**, then scratch their initials on the back of the slab, turn them back over, and create their maps.

CLEAN UP:

Students put away clay tools, place their clay-slab maps in the designated location, clean table tops, wash hands, and line up.

OPTIONAL: After the slabs have dried, students may either glaze them (if they will be fired) or use watercolor or tempera paint (if using air-dry clay) to add color.

REVIEW:

- True or false: Maps were invented thousands of years ago. (true)
- Raise your hand when I say a reason why people make maps: **To show the location or size of a plot of land**, to show what a person looks like, **to show the currents and waves in the ocean**.

ASSESSMENT:

- Clay slab is relatively even and an appropriate size and thickness.
- Map uses simple symbols to show two the relative locations of two familiar places.

Lesson Two

Using Gridlines: Modeling Our Classroom

TIMING: 2 sessions of 45 minutes each (+ optional 45-minute session for painting)

MATERIALS:

- ¼ to ½ lb air-dry clay per pair of students
- clay tools
- pre-made slip or containers of water
- pre-gridded cardboard bases
- pre-gridded drawing paper
- pencils, colored pencils, and erasers
- tempera or watercolor paint, optional

PREPARE physical grid lines in the classroom. Create labels by stapling loops of paper to the strings: letters for vertical lines and numbers for horizontal lines. If possible, arrange the grid lines to cross over or intersect at major classroom features.

OBJECTIVES: While creating models and aerial-view classroom maps, students will:

- Understand that maps use **grids** to identify the exact location of places.
- Identify the **absolute location** of various classroom features.
- Use **scoring and slipping** to create a clay classroom model that uses grid lines to determine the location of classroom features.
- Use **aerial perspective** to draw a simple map of their classroom models.

DAY ONE: Exploring classroom grid and creating clay dioramas

LAUNCH LESSON:

-Thousands of years ago, our ancestors made simple maps by scratching lines and symbols into slabs of clay. These maps showed important information, like where to find food or how to get back home. As civilizations grew, more and more places were added to the map. To help people find what they were looking for on the map, cartographers invented a system of imaginary lines, called a **grid**, to divide space on maps. People could quickly find the exact location of any place on the map by searching the area where the horizontal and vertical lines met.

-Today we will be making **models**, or miniature versions, of our classroom using clay. You may have noticed the grid lines in our classroom. These grid lines will help us identify the **absolute locations** of the objects in our classroom. We'll use that information to make sure everything goes in the right place as we make our models.

EXPLORE:

- Focus on **Image A** [Wisconsin Apple Growers Association map]: Ask students what this map shows [the state of Wisconsin, the apple orchards in Wisconsin]. Point out that the Wisconsin Apple Growers Association made this map. Ask: *Why might the apple growers have wanted to make this map?* [so people can find out where to buy apples] Point out that the apples along the edges of the map are labelled with numbers or letters. Explain that these numbers and letters identify imaginary lines that create a **grid**. Ask students to point out the imaginary lines at A and 3. Ask: *What is located at A3?* (a river and bridge). Ask volunteers to find the grid coordinates for a few orchards.
- Focus on **Image B** [Portrait Chicago map]: Ask students what this map shows [a map of Chicago showing the skyscrapers downtown]. Elicit that there are very many skyscrapers. Explain that using words like *near* or *above* might not be enough to help us identify a specific building. To solve this problem, this map uses a **grid**. Grid coordinates identify a place's **absolute location**.
- Explore the **classroom grid**: Have students work with a partner to identify the features found at a series of pre-selected grid coordinates. It may be helpful to provide students with a handout listing the grid coordinates.

CREATE:

*Working with a partner, students will create clay models of the classroom on gridded cardboard bases. They will choose a few major features (tables, smartboard, etc.) to show in their **absolute locations**.*

- Demonstrate using **scoring and slipping** to join two pieces of clay to create a table or other classroom feature. Then point out the grid lines on the pre-gridded base and elicit student input on where to locate the feature you created. Demonstrate using a bit of slip to attach the clay item to the base.
- Have students write their names on the bottom of the base.
- Students begin by choosing 4-6 major classroom features to model.
- Encourage students to consider **size** as they work - how can they make sure all the features fit on the base?

CLEAN UP:

-Students put away clay tools, place their classroom dioramas in the designated location, clean table tops, wash hands, and line up.

REVIEW:

- True or false: Cartographers use grids to divide space on maps. (true)
- To join clay parts, do we use **scoring and slipping** or coiling?

***OPTIONAL WORK DAY:** If time allows, give students a work day to paint their classroom models. Liquid tempera paint works well. Once dry, a glossy finish can be achieved by applying a thin coat of PVA glue.

DAY TWO: Drawing aerial-view maps

LAUNCH LESSON:

-When we made our classroom models, we were careful to put things in their proper places. We could use these models like maps, but it wouldn't be very practical: They are fragile and take up a lot of room. Wouldn't it be handy to have a map we could fold up and put in a pocket? That's what we're going to make today.

-Today, we will draw maps of our classroom using **aerial perspective**. We'll do this by looking at our models from above, as if we were birds flying above our school.

EXPLORE:

- Focus on **Image A** [a perspective illustration]: Explain that maps often use a special **perspective**, or point of view, to show the world from above. **Aerial perspective** is sometimes referred to as **bird's-eye view** because it shows something the way a bird flying high might see it. Ask: *What is this a picture of?* Elicit that the flower is shown from above using **aerial perspective** (or *bird's-eye view*) in the first image and from below (*worm's-eye view*) in the second image.
- Focus on **Image B** [an aerial-view map of a living room]: Explain that things don't always look how we expect them to when we look at them from above. Ask: *What things can you see in this bird's-eye view map?*
- Focus on **Image C** [a hand-drawn map by Frida Kahlo]: Remind students that maps show where things are located. Explain that sometimes cartographers simplify their maps by using **symbols** to represent objects instead of drawing detailed pictures of each object. Tell students that this map shows the artist Frida Kahlo's home from above. Ask: *Did Frida Kahlo use bird's-eye view or worm's-eye view in this map?* Ask volunteers to identify the symbols used to represent various household objects, such as a bed or a table.

CREATE:

Observing their classroom models from above, students will use pre-gridded paper to draw simple classroom maps using **aerial perspective**.

- **Demonstrate transposing classroom features** from the model onto the map using the grid lines, being sure the pre-gridded paper is correctly oriented.

- Students begin by **observing their model** from above using **aerial perspective**. There will be one model per two students, but each student should create their own hand-drawn map.
- Remind students to **use the grid lines** to help locate the objects on their map.
- Students can finish their maps by **coloring** them in using colored pencils.

CLEAN UP:

-Students will put away their drawing materials, place their classroom models and paper maps in the designated location, clean table tops, and line up.

REVIEW:

- True or false: Cartographers use grids to divide space on maps. (true)
- True or false: Aerial perspective, or bird's-eye view, shows objects from above. (true)
- Which view do maps usually use, **bird's-eye view** or worm's-eye view?

ASSESSMENT:

- Clay models include major classroom features.
- Classroom features are located on the gridded base with reasonable accuracy.
- The parts of the clay model are solidly joined and appropriately sized.
- The paper map uses aerial perspective to show major classroom features.

Lesson Three

Orientation and Scale: Charting Our Playground

TIMING: 1 session of 45 minutes

MATERIALS:

- one compass (for demonstration)
- blunt-tipped metal tapestry needles or straightened paper clips (1 per group)
- leaves or sliced corks (1 per group)
- non-metallic dishes filled with water (1 per group)
- magnets (1 per group)
- clipboards (1 per group)
- pencils
- clipboards (1 per group)
- playground map (1 per group; see Teacher Resources for information)
- classroom map from previous lesson (for demonstration)

PREPARE playground maps based on the guidelines in the Teacher Resources appendix. Alternatively, if this lesson will be taught during inclement weather, consider creating a map of an interior space, such as the gymnasium.

OBJECTIVES: While completing playground maps, students will:

- Understand that **orientation** indicates direction and is often shown on maps with a **compass rose**.
- Create a simple magnetic **compass** and locate the four **cardinal directions**.
- **Orient** a map and accurately add directions to a **compass rose**.
- Understand that maps use **scale** to show relationships between the distance on the map and the distance on the ground.
- Pace a distance and record it on a **scale bar** to show a map's scale.

LAUNCH LESSON:

-Maps have a special language of their own. By learning this language, you will be able to read maps. Maps can take you places and show you things when you know how to read them!

-Today, we will learn about two important parts of map language: direction and scale. We will use what we learn to turn an unfinished playground map into a finished map that other people can easily read and understand.

EXPLORE:

- Focus on **Image A** [one map in four different orientations]: *Maps can help us find our way if we know how to read them. Let's imagine we're visiting a friend in a new city and we want to go to the art museum by ourselves. We'll need a map!* Ask volunteers to explain how to get from the house (the small black rectangle) to the museum (the larger white rectangle), then point out that the illustrations all show the same map. Explain that just like when we make sure the book we are going to read is right-side up, we need to **orient** our maps to make sure they are right-side up, too. To orient a map, we find which way is north on the map. We can do this by looking at a map's **compass rose**.
- Focus on **Image B** [a map with compass rose]: Point out the compass rose, then ask: *Which way do we need to walk to get from the house to the museum?* [east] Ask: *But standing next to our friend's house, how do we tell which way is east?* Explain that a **compass** is a special tool that tells directions. Show students a compass and explain that the needle of a compass always points north. By looking at the face of the compass, we can notice which way is east, then head that way.
- Focus on **Image C** [a map with compass rose and scale bar]: Ask: *Now that we've oriented our map and started heading east, we're bound to reach the art museum sooner or later. But how can we tell how far we have to go?* Explain that when we talk about how far apart places are, we're talking about **distance**. Maps shrink down the actual distances between places to make them fit on a piece of paper. Cartographers use a system called **scale** to shrink everything the same amount. A special symbol, called a **scale bar**, shows us how much smaller the distances on the map are than the real distances on earth. Point out the scale bar on the map and explain that it tells us that one inch on the map equals five miles on earth. Demonstrate finding distances on the map by measuring the inches and multiplying by five.
- Focus on **Image D** [shipwreck chart of the Great Lakes]: Ask: *What does this map show? Which way is north? How can you tell? Where is the scale bar?* Elicit from the students that the scale bar shows that 1 inch on the map equals 25 miles on earth.

CREATE:

Students will work in pairs or small groups as they orient a playground map and complete a **compass rose** and a **scale bar**.

- **Explain the students' mapmaker challenge:** Someone made a map of the playground, but they forgot to finish two very important things: the compass

rose and the scale bar! Challenge the students to use their knowledge of map language to make these maps more readable.

- **Demonstrate creating a simple magnetic compass:** Stroke a blunt-tipped metal tapestry needle (or straightened paper clip) along a strong magnet 25 times, moving it in the same direction each time, being sure to lift the needle from the magnet at the end of each stroke. Then place the needle on a slice of cork or a small leaf and place it in a non-metallic bowl of water. Show students that the needle will spin until it is facing north. (This works because the compass needle the compass needle has become magnetized; the needle is now a small magnet. The Earth is a magnet, too. The compass needle is attracted to the Earth's north magnetic pole, so as long as it remains magnetized, it will always point north.) *Sometimes the blunt end of the needle will point north; this is because of the way the needle was magnetized.*
- **Demonstrate orienting a classroom** map from the previous lesson and adding a compass rose with the help of the compass.
- **Point out the scale bar** on the playground map. To understand the real distances shown in the map, we will need to know how far one inch on the map equals on the ground. Demonstrate choosing something that is one-inch long on the map and pacing its distance, then record their paces on the scale bar.
- Students collect their materials and **head to the playground** to create their compasses, orient the maps, and complete their compass roses and scale bars.

CLEAN UP:

-After returning to the art room, ask volunteers to collect the compass needles and leaves or cork pieces and to empty the water dishes. Students should place their completed maps in the designated place before lining up.

REVIEW:

-True or false: Maps use a symbol called a compass rose to show where north, south, east, and west are on the map. (true)

-Raise your hand when I say one of the cardinal directions: **north**, above, left, **west**, **south**, diagonal, **east**.

-True or false: Cartographers use a system called scale to fit millions of miles on a small piece of paper. (true)

ASSESSMENT:

-Compass needle accurately indicates north.

-The compass rose correctly orients the map.

-The scale bar is completed with a reasonably accurate pace count.

Lesson Four
Building Worlds: Mapping an Imaginary Place

TIMING: 4 sessions of 45 minutes each

MATERIALS:

- 90 lb. drawing paper (12" x 18")
- rulers
- pencils
- colored pencils and/or fine-tipped markers
- optional: extra-fine permanent markers and watercolor paint
- cartography guide (available in the Teacher Resources appendix)

PREPARE copies of the cartography guide to hand out.

OBJECTIVES: While creating imaginary-place maps, students will:

- Understand that cartography is the **art** of making maps.
- Reinforce their knowledge and understanding of cartographic elements, including **compass roses** and **scale bars**, and expand upon it with the introduction of **map legends** and **map symbols** (line, point, and area).
- Demonstrate an awareness of the **principles of design** - in particular contrast, balance, and emphasis - to create visually appealing maps.

LAUNCH LESSON:

-Maps can show information about new or familiar places, like the size or shape of a country. Maps can also help us find our way when we're somewhere new. But maps don't always show real places.

-Over the next few weeks, you will become cartographers as you create maps of **imaginary places**. Today, we will look at some examples of maps of real places and imaginary places, too, and we will consider how cartographers use the **principles of design** to create beautiful maps.

EXPLORE:

- Focus on **Image A** [snowfall map and boundary map]: Explain that cartographers are artists. As artists, they use the **principles of design** when they make maps. **Contrast** is one of the principles of design. When we use contrast, we are putting opposite things next to each other - like light and dark colors in a painting or smooth and bumpy textures in a sculpture. Ask: *What do these maps show?* [the Great Lakes; the first map shows snowfall amounts; the

second map shows the border between the U.S.A. and Canada] *Which map uses color to create greater contrast?* Elicit from students that the second map is easier to read at first glance because of its greater contrast.

- Focus on **Image B** [three maps of the Great Lakes; two of which are unbalanced, one of which is balanced]: Explain that **balance** is a principle of design. A balanced artwork is one in which the visual weight is distributed equally. Explain the difference between “real” weight and visual weight. Elicit from students that their eyes go straight to the blue lakes, not the surrounding white negative space. Ask: *Which map is the most balanced?*
- Focus on **Image C** [a map of the movement of barley on the Great Lakes and a photograph of the Great Lakes as seen from space]: Explain that **emphasis** is a principle of design. Emphasis means one thing is more important than everything else; it is the center of attention. Ask students what they notice first when they look at the first map [the dark squiggle in the center of the map]. Ask: *What do you think the dark squiggly line shows?* [the squiggly line shows the path barley is shipped along]. Elicit that the emphasis on the squiggly line helps the cartographer tell a story about the movement of barley on the Great Lakes. Ask the students to identify the most important thing in the second map [It is very hard to do; everything seems equally important]. Ask: *Which map shows the most emphasis? What is emphasized?*
- Focus on **Images D-G**: Tell students they will be looking at three maps. Ask them to find an elbow partner and discuss the following questions:
 - Does this map show a real place or an imaginary place?
 - Does this map use **contrast, balance, or emphasis**? How?
 - Does this map tell a story? What story does it tell?
 - What details make this map interesting?

After students have discussed the maps, call on a couple volunteers to share.

CREATE:

*Students will create maps of imaginary places. They will have four class periods in total to complete their work. Their maps must show both **land** and **water** and must include a **title**, a **compass rose**, a **legend**, and at least three **landforms**.*

DAY ONE:

- Students have studio time to **brainstorm and sketch** their ideas. Some students may wish to brainstorm with a partner or small group, but each student will create his or her own map and should have his or her own sketch by the end of the studio time.

- Remind students that they will have several weeks to work on their maps. Their maps should **show an imaginary place** and should include both land and water.

DAY TWO:

- **Begin with a brief review** of prior learning, then share the examples of maps in the slideshow and ask students to discuss them with a partner. While engaging with the maps, point out the following features: **title, compass rose, scale bar, and map legend**. Explain that map legends are a very important part of a map - they explain what the symbols used in the map mean.
- **Ask volunteers to share** their ideas for their imaginary-place maps, then go over the project guidelines:
 - The map shows an imaginary place.
 - The map shows *both* land and water.
 - The map includes a title, a compass rose, a legend, and at least three landforms.
- **Present the cartography guide**, highlighting the first three steps (Define Your World; Add Mountains, Forests, Rivers, and Water; Define Shores).
- Students have **studio time** to begin their maps. Their goal for today is to complete the first three steps.

DAY THREE:

- **Begin with a brief review** of the project guidelines, then share the examples of maps in the slideshow and ask students to discuss them with a partner.
- **Present the cartography guide**, highlighting the final three steps (Add Cities and Towns; Add Labels; Add a Compass Rose and Map Legend).
- Students have **studio time** to work on their maps. Their goal for today is to complete the final three steps.

DAY FOUR:

- **Begin with a brief review** of the project guidelines, then share the examples of maps in the slideshow and ask students to discuss them with a partner.
- Tell students that today is the final workday for this project, then **introduce colored pencils and/or fine-tipped markers**. (Optionally, you may wish to offer students extra-fine-tipped permanent markers to trace over their pencil lines, then watercolor paint to add washes of color after tracing over the lines).
- Students have **studio time** to complete their maps. Early finishers can write an artist statement using a provided template.

CLEAN UP:

-Students put away their materials (table folders can be used to store the in-progress maps) and line up.

REVIEW:

-True or false: A person who makes maps is called a cartographer. (true)

-Raise your hand when I say something that should be included on any map: **title**, sea monsters, **compass rose**, **map legend**, mountains, **scale bar**.

-True or false: Some maps show imaginary places, like the setting of a story or the world of a video game. (true)

ASSESSMENT:

-Map includes a title, compass rose, and a map legend with at least four items.

-Map shows both land and water, as well as at least three landforms.

-Map demonstrates effective use of contrast, balance, and emphasis in its use of color, labels, and symbols.

*Adapted from a [lesson](#) by Zach Stoller for Thomas Elementary.

Lesson Five

Global Distortion: Making a Papier-Mâché Globe

TIMING: 4 sessions of 45 minutes each

MATERIALS:

- newspaper or newsprint (optionally pre-torn into strips about 1" wide)
- prepared papier-mâché paste (or an alternative: watered-down school glue, etc.)
- inflated balloons (1 per student, plus a few extras)
- containers of water
- blue tempera paint
- paintbrushes (1 per student)
- continent template (1 per student)
- lengths of string (1 per student, for measuring)
- safety pins (1 per student) and name tags (optional)
- sandwich bags or paper clips (1 per student, optional, for storing cut-out continents)
- an unpeeled orange (optional, for demonstration)
- drawing paper (12" x 18")
- glue
- scissors

PREPARE the papier-mâché paste before class. If possible, inflate the balloons before class; if not possible, be sure to have extras on hand for students who need help with this step (this way, you will have a clean balloon to inflate for them).

OBJECTIVES: While creating papier-mâché globes, students will:

- Understand that a **globe** is a scale representation of our Earth.
- Understand that lines of **latitude** and **longitude** help us locate places on the surface of the Earth.
- Identify and locate the **Equator** and **Prime Meridian**.
- Explore map **distortion** and consider the advantages and disadvantages of various **map projections**.

DAY ONE: Making papier-mâché spheres

LAUNCH LESSON:

-Until about 500 years ago, most people believed the Earth was flat. They believed everything would fall off the bottom side of the Earth if it were round. Sailors worried

they would fall right off the edge of the Earth if they sailed past the end of the Earth. Eventually, people realized that the Earth is actually round.

-Today we'll be learning about **globes**. Unlike the flat maps we've been drawing, globes are shaped like the Earth is – like a ball or **sphere**. To make our globes, we will use a technique called **papier-mâché**.

EXPLORE:

- Focus on **Image A** [a GIF of a spinning globe]: Explain that globes are **scale models** of our Earth – they are miniature versions of the Earth. The Earth is actually about 40 million times bigger than the average globe! Ask students to identify the continents on the spinning globe and to point out our continent.
- Focus on **Image B** [a globe with prominent latitude and longitude lines]: Explain that just like cartographers use imaginary lines to divide the space on maps, they also use imaginary lines to divide the space on globes. The lines that divide the globe have special names: the horizontal lines that wrap all the way around the globe are called **lines of latitude**. The vertical lines that stretch from the North Pole to the South Pole are called **lines of longitude**. Point out the **Equator** and explain that it divides the Earth into two halves: the Northern Hemisphere and the Southern Hemisphere. Ask: *Is the Equator a line of latitude or a line of longitude?* [latitude] Point out the **Prime Meridian** and explain that it, too, divides the Earth into two halves: the Western Hemisphere and the Eastern Hemisphere. Ask: *Is the Prime Meridian a line of latitude or a line of longitude?* [longitude]. Point out that each line of latitude and longitude is labelled with a number; this system of imaginary lines allows us to identify the exact location of every place on earth!

CREATE:

*In the first phase of this lesson, students will create **papier-mâché spheres** using newspaper strips and pre-mixed papier-mâché paste.*

- **Demonstrate** tearing strips of newspaper, dipping the strips into the papier-mâché paste, skimming off the excess paste, and sticking the strip onto the balloon. Emphasize using plenty of paste so the strips stick well and overlapping the strips so the sphere is strong.
- Students begin by **tearing their newspaper** into strips about 1" wide.
- After 5-7 minutes, have students stop tearing and inflate their balloons, then **make their papier-mâché spheres**. Remind students to use plenty of paste and to go around their balloons about four times to completely cover it, leaving the area around the knotted part uncovered.

- As students finish, check that they have used enough newspaper strips and enough paste. If they have, use a safety pin to **attach the student's name tag** to the lip of the balloon (being careful not to pop the balloon!).

CLEAN UP:

-Students will place their papier-mâché globes in the designated drying area, wipe their tables, and wash their hands before lining up.

REVIEW:

- True or false: A globe is a scale model of the Earth. (true)
- What are the imaginary lines that run horizontally across the globe called, **latitude lines** or grid lines?
- True or false: The Equator is a latitude line that divides the Earth in half. (true)

DAY TWO: Painting the oceans and preparing the continents

PREPARE palettes with blue paint and copies of the continent template. To help avoid messes, you may wish to create two separate stations: one for painting and one for coloring the continents and cutting them out.

LAUNCH LESSON:

- Last week we learned that a **globe** is a miniature version of the Earth, then we used a technique called **papier-mâché** to create the sphere that will become our globes.
- To turn our papier-mâché spheres into globes, we will paint the oceans blue, find the **Equator** and the **Prime Meridian** and then add the seven **continents**.

EXPLORE:

- Focus on **Image A** [an image of a globe]: Last week we learned that cartographers use a network of imaginary lines, called **lines of latitude** and **lines of longitude**, to divide the space on the globe. These lines can help us identify the exact location of every place on earth. Ask: *Which of these lines show the **Equator**? Is the Equator a line of latitude or longitude?* Remind students that the Northern Hemisphere is above, or north of, the Equator - about 90 percent of the world's population lives in the Northern Hemisphere! Ask: *Which continents are located in the Northern Hemisphere? The Southern Hemisphere is below, or south of, the Equator. Which continents are located in the Southern Hemisphere?* Ask students to identify the **Prime Meridian**. Ask: *Is the Prime Meridian a line of latitude or longitude?* Explain that the Prime

Meridian divides the Earth into the Western Hemisphere and the Eastern Hemisphere; ask students to identify some continents in each hemisphere.

CREATE:

Students paint their globes blue, then color their continents and cut them out.

- **Demonstrate** carefully removing the (now-fairly-deflated) balloon from the papier-mâché sphere, then painting it blue. Remind students of proper paintbrush technique.
- **Point out the continent template** and explain that students should choose a different color for each continent, write their names on the back of each continent, and carefully cut them out. Demonstrate cutting by turning the scissors and by turning the paper.
- Students **paint their spheres** blue. As students finish, use the safety pin to attach their name tags to the sphere.
- After students have cleaned up their paint area, they should begin **coloring and cutting out their continents**. Remind students to use a pencil to write their names on the back of each of their continents.

CLEAN UP:

-Students will put their painted globes in the designated drying area and either paper-clip their continents together or place them in a sandwich bag.

REVIEW:

-True or false: The imaginary lines that run vertically from the North Pole to the South Pole are lines of latitude. (false)

-Raise your hand when I say a continent that is located in the Western Hemisphere:
North America, Asia, South America.

-What is the line of latitude that divides the earth into the Northern and Southern Hemispheres called, the International Date Line or the **Equator**?

DAY THREE: Locating and adding the Equator, Prime Meridian, and continents

PREPARE lengths of string to be used for measuring.

LAUNCH LESSON:

-We've learned that cartographers use lines of **latitude** and **longitude** to identify the exact location of every place on earth. Today, we will use two of those lines to help us locate all seven **continents** on our **globes**.

-Globes are miniature models of the Earth, and it matters where we put the continents. We'll pay attention to where each continent goes to make our globes as accurate as possible.

EXPLORE:

- Focus on **Image A** [an Azimuthal projection map]: Ask volunteers to point out the **Equator** and the **Prime Meridian**, then have students identify the relative location of the continents (in relation to the Equator and the Prime Meridian and in relation to each other). Ask: *Where is the Northern Hemisphere? Which continents are found in the Northern Hemisphere? How about the Southern Hemisphere? The Western Hemisphere? The Eastern Hemisphere?*

CREATE:

*Students will complete their globes by adding the **Equator**, the **Prime Meridian**, and all seven **continents**.*

- **Demonstrate locating the Equator and the Prime Meridian** on an orange or other spherical object. If using an orange, point out the stem, which can represent the North Pole, and the blossom, which can represent the South Pole. Then use a string to measure the distance from the poles and find the center by folding the string in half. Mark the center point on the orange (or other object) in four or five places, then carefully connect the dots to draw on the Equator. If using an orange, peel it and point out the section "lines" running from the "North Pole" to the "South Pole" and pick one to represent the Prime Meridian. If not using an orange, simply wrap the string vertically around the widest part of the sphere and draw in the Prime Meridian. Finally, demonstrate locating the continents relative to the Equator, Prime Meridian, and each other.
- Students begin by **measuring and marking the Equator and the Prime Meridian** with the help of a partner.
- Next, students **locate their continents** on the globe and glue them.
- Students who finish early can **label the continents and oceans**.

CLEAN UP:

-Students will put away their materials and wait to be called to line up.

REVIEW:

-True or false: The Equator divides the Earth into the Western and Eastern Hemispheres. (false)

-Raise your hand when I say a continent that is located in the Southern Hemisphere:
Africa, Europe, **South America**.

-What are the lines that run vertically across the globe from the North Pole to the South Pole, lines of latitude or **lines of longitude**?

DAY FOUR: Turning globes into maps

LAUNCH LESSON:

-The **globes** we made are round, like the Earth. Because they are round, they give the truest possible view of the whole Earth. But as useful as they are, it's not very practical to carry one around with you on a hike or car ride - they take up too much room!

-Like a globe, a world map can show the entire world, but because it is flat it can be rolled up or folded very easily. But how do cartographers turn the round surface of the Earth into a flat **map**? That is what we are going to discover today!

EXPLORE:

- Focus on **Images A-B** [Martin Behaim's Erdapfel gores] Explain that it is complicated to show a round surface like the Earth's on flat paper. Ask: *If you tried to peel the "skin" of the Earth and glue it down on a piece of paper, what would happen? Would it lay flat or would you have to make some changes?* [There would be big gaps at the top and bottom because the Earth is narrower at the top than around the middle.] Ask: *What would happen if you stretched the top and bottom edges so they came together?*
- Focus on **Image B** [a Mercator projection map]: Explain that if you stretched the top and bottom of the Earth's "skin" so the edges met, you would get a map that looks like this one. The gaps are filled in, but the top and bottom are stretched, so some areas are **distorted**. These areas appear much bigger than they actually are. Ask students to find Greenland and compare its size in the Mercator projection to its size on the globe gores in Image A. Briefly explain that a **map projection** is a way of showing the curved surface of the Earth on a flat surface and point out how Mercator projections are made.
- Focus on **Images C-D** [two interrupted projections]: Explain that cartographers have come up with many different map projections, or ways of turning the globe into a flat map. These are two examples. Maps that have gaps like these are called **interrupted projections**.
- Focus on **Image E** [a comparison of the Peter's and Mercator projections]: Every projection has limitations and advantages: Some distort land sizes, others distort distances or leave gaps in the oceans. There is no one best world

map, but there are certain maps that are most useful for certain purposes (for example, sailing around the world, comparing the size of the continents, etc.).

CREATE:

*Working in pairs, students will **experiment** with different ways of turning their papier-mâché globes into **flat maps**. Instead of demonstrating this process, allow students to explore on their own.*

- Students use scissors to **cut their globes** into pieces and glue to affix the pieces to a flat piece of paper to create a world map.

CLEAN UP:

-Students will put the world maps in the designated place, then put away their materials and line up.

REVIEW:

- True or false: Globes are round but maps are flat. (true)
- When cartographers turn a round globe into a flat map, the top and bottom gets stretched. What is this stretching called, **distortion** or projection?
- True or false: The most accurate world map is called the Mercator Projection. (false; All map projections have certain limitations and certain advantages)

ASSESSMENT:

- The papier-mâché globe is solidly constructed with overlapping paper strips.
- The oceans are painted blue and the continents are located with reasonable accuracy.
- The Equator and Prime Meridian are clearly visible and located with reasonable accuracy.
- Students worked collaboratively to try out two different ways of cutting their globe into pieces.
- The pieces of the globe are reassembled and glued down to create a world map.

*Adapted from lessons by [Ashley Vice](#) for Manchester University and by Williams College's [Center for Learning in Action](#).

Lesson Six: Telling Stories With Maps: Mapping the World

TIMING: 4 sessions of 45 minutes each

MATERIALS:

- 12" x 18" heavyweight drawing paper (trimmed to 11" x 17" if the completed maps will be entered in the Barbara Petchenik Children's World Map Competition)
- a variety of drawing materials such as pencils, colored pencils, fine-tipped markers, permanent markers, oil pastels, etc.
- a variety of painting materials such as watercolors, watercolor pencils, and tempera
- a variety of paintbrushes
- magazines and assorted printed images or decorative paper (optional, for collaging)
- scissors (optional, for collaging)
- glue or glue sticks (optional, for collaging)
- water dishes
- palettes
- paper towels
- rulers
- world map examples
- cartography guide (from Lesson Four)

PREPARE copies of the cartography guide as a reference for students and ensure that students have access to a variety of world maps for reference as they work.

N.B. This lesson borrows the theme "My Future World" from the 2023 edition of the [Barbara Petchenik Children's World Map Competition](#). This biennial map-drawing competition promotes the creative representation of the world in graphic form. If you wish to submit student work to the contest, verify the deadline and substitute the current contest theme in your lesson. See the link above for contest information.

OBJECTIVES: While creating maps of the world, students will:

- Understand that maps can tell **stories**.
- Consolidate their **cartographic knowledge**.
- Determine the **system of projection** that will most effectively tell their story.
- Explore a variety of **materials** and make decisions about which materials and techniques can best convey their message.

LAUNCH LESSON:

-We've learned a lot about maps: Maps use a **special language** to record and share information about our world. Maps can tell us the size and shape of a place, where it is located, and what is found there. But maps can also **tell stories** about our world.

-Over the next few weeks, we'll be creating maps that tell a story about our world. You will get to **choose your materials** - colored pencils, markers, pens, watercolors, or tempera paint - and whether you'd like to work by yourself, with a partner, or in a group of three. Today, you will get started by brainstorming and planning your map.

DAY ONE: Introduction to the project

EXPLORE:

- Focus on **Image A** [Fani Nomidou-Kouloutsi map]: Ask: *Can you find a map?* [Yes - There is globe in the ice-cream dish.] *What story does this artwork tell?* Encourage students to come up with possible titles for this artwork.
- Focus on **Images B** [Candice Winterboer]: Ask students to identify the story being told in this artwork and to point out some details that help tell that story.
- Focus on **Image C** [Dimitris Michos map]: Ask: *Can you find a map? Can you find the seven continents?* Ask the students to identify the story being told in this artwork. Elicit from students that the birds shown are doves. Doves are a symbol of peace. Encourage students to consider how this artist uses symbolism to tell a story. [Consider sharing **Image D**, a painting by Henri Matisse, which may have inspired this artist's work.]

CREATE:

Students will work alone, with a partner, or in a group of three (their choice) to create world maps based on the theme "My Future World." [The current Barbara Petchenik Children's World Map Competition theme and guidelines are available [here](#).]

- **Discuss the theme** as a group and share examples of student work [found in Images C-I]. Encourage the students to identify the story being told and the cartographic elements and artistic decisions that help tell the story.
- **Review the guidelines** for the maps. The student's maps should:
 - Creatively show what their future world might be like.
 - Show all or a large portion of the world.
 - Represent the size, shape, and location of landmasses and oceans with reasonable accuracy.
 - Use appropriate cartographic elements, including symbols, colors, names, and labels to help tell their story.
 - Use contrast, balance, and emphasis to help tell their story.

- Students have studio time to begin **brainstorming and planning** the story they will tell about our world. Encourage students to choose their favorite idea and come up with a title to represent it. Then, students should consider the materials they will use and create a sketch (or, if preferred, a written description) of their map.

DAYS TWO THROUGH FOUR: Studio time

EXPLORE:

- Focus on the slideshow **Images** [maps made by students around the globe], using the text boxes on each slide to guide a brief discussion of each map.

CREATE:

*Students will work alone, with a partner, or in a group of three (their choice) to create world maps based on the theme “**My Future World.**” [The current Barbara Petchenik Children’s World Map Competition theme and guidelines are available [here.](#)]*

- **Review the project guidelines.** The student’s maps should:
 - Creatively show what their future world might be like.
 - Show all or a large portion of the world.
 - Represent the size, shape, and location of landmasses and oceans with reasonable accuracy.
 - Use appropriate cartographic elements, including symbols, colors, names, and labels to help tell their story.
 - Use contrast, balance, and emphasis to help tell their story.
- Students have **studio time** to work on their maps.
- Circulate as students work, answering questions, providing assistance, and replenishing supplies. Remind students to refer to the cartography guide from Lesson Four as needed.

CLEAN UP:

-Students will clean up their areas, put their materials away, and line up.

REVIEW:

-True or false: Some way of showing the curved surface of the globe on flat paper are more accurate than others. [false: All map projections have limitations and advantages.]

-Raise your hand when I say something that should be included on all maps: **title**, sea monsters, **map legend**, **compass rose**.

-When an artist puts two opposite things together – like light and dark colors or smooth and bumpy textures – the artist is using which principle of design: balance or **emphasis**.

ASSESSMENT:

- The map shows a recognizable image of all or a large portion of the world in which the shapes and relative locations of land masses and oceans are reasonably accurate.
- The map demonstrates a clear connection between the form, shape, and use of cartographic elements to creatively address the theme “My Future World.”
- The map includes appropriate cartographic elements such as symbols, colors, names and labels, as well as a map legend and compass rose.
- The map uses contrast, balance, and emphasis to create a visually appealing map and to help tell a story about the world.

TEACHER RESOURCES

- Lesson One
 - Rolling a Clay Slab - Video Tutorial
 - Pounding a Clay Slab - Video Tutorial

- Lesson Two
 - Scoring and Slipping - Video Tutorial
 - Perspective: Bird's-Eye View and Worm's-Eye View - Anchor Chart

- Lesson Three
 - Creating a Homemade Compass - Video Tutorial
 - Playground Map - Guidelines

- Lesson Four
 - Cartographer's Guide
 - Principles of Design: Contrast, Balance, Emphasis - Video Tutorials

- Lesson Five
 - Papier-Mâché Technique - Video Tutorial
 - Continents Template - Monkey Puzzle Printable

- Lesson Six
 - Barbara Petchenik Children's World Map Competition Guidelines

LESSON ONE RESOURCES

- Still Life Ceramics Video: [Rolling Out the Perfect Slab - Process, Tips, and Tricks](#) (4:38)



Rolling out the perfect slab: process, tips, and tricks

 **Still Life Ceramics**
7.39K subscribers [Subscribe](#)  60  [Share](#) 

- Josey Owens: [Pounding a Clay Slab](#) (4:05)

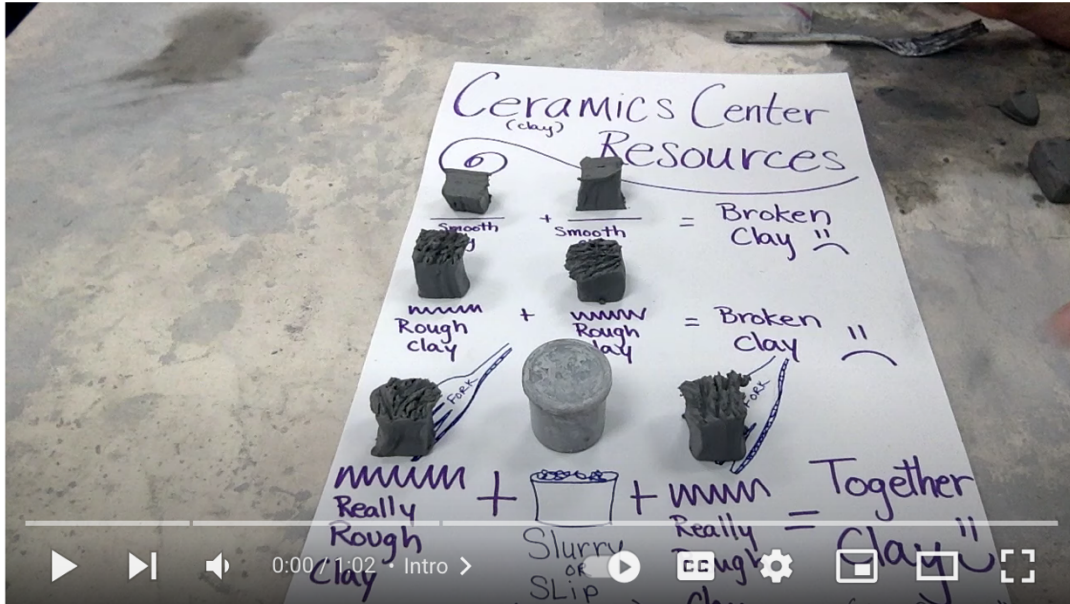


Pounding a Clay Slab

 **Josey Owens**
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LESSON TWO

- Miss Russ: [How to Get Clay to Stick Together: Slip and Score](#) (1:02)



How to get clay to stick together slip and score



Miss Russ: Eleme...
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INTRODUCING

PERSPECTIVE

worm's-eye view



bird's-eye view



LESSON FOUR

- World of Engineering: [How to Make a Homemade Compass - DIY Compass](#) (3:26)



How to Make a Homemade Compass - DIY Compass



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PLAYGROUND MAP GUIDE



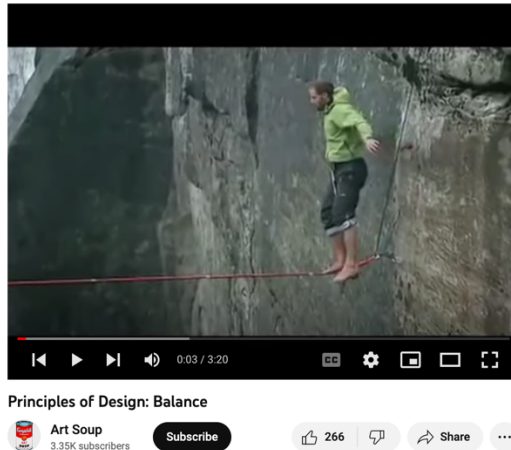
1. Search your school on Google Maps.
2. Select the satellite view and capture an aerial-view image of your playground.
3. Print the image and overlay it with a one-inch grid.
4. Add an unmarked compass rose and a one-inch scale bar. Leave the map scale blank.
5. Select a playground feature that measures approximately one inch on your printed map. Use this feature as your pacing guide.

LESSON FOUR

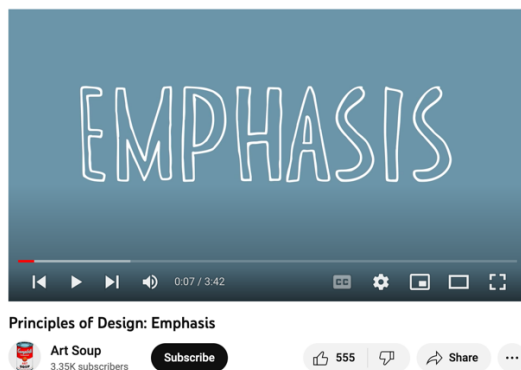
- Art Soup: [Principles of Design - Contrast](#) (2:58)



- Art Soup: [Principles of Design - Balance](#) (3:20)



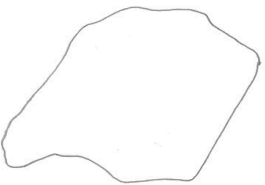
- Art Soup: [Principles of Design - Emphasis](#) (3:42)



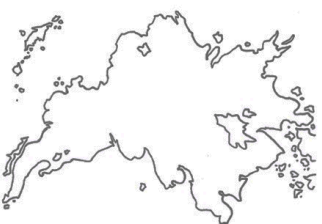
MAPMAKING GUIDE

Step One: Define Your World

1. Using a light pencil line, draw the outline of a very simple continent shape.
2. Next, refine the shape to make your coastline more interesting.



3. Then, add islands, lakes, inlets, or bays.
4. Finally, trace over your lines in dark pencil.



Islands are often grouped together in bunches of irregular shapes.
Lakes are often long and fingerlike. Inlets and bays go into the outline.

MAPMAKING GUIDE

Step Two: Add Mountains, Forests, Rivers, and Water

1. To create mountains, sketch a light line to show where they will go. Then, draw the mountains one by one, making an upside-down V or W.



Erase your guideline after drawing in the mountains.

Add thin lines on the side of each mountain to create definition.

3. To create forests, mark where they will go. Then, draw a triangular shape with a flattened bottom to show each tree.



Define your trees by shading in the bottom corner portions of each tree with a few pencil lines, then adding tree trunks. You can also add shade lines around the bottom of the trunks and along the sides of the forest.

2. To create hills, draw small upside-down U-shapes along the edge of your mountain range.



You can define your hills with lines, just like you did for your mountains.

4. To create rivers, decide where it will start. Then, draw a twisty line toward the coast. Finally, add a second line, adding twists and turns to make it interesting.



Rivers usually begin between two mountain or hill ranges and end in the sea. Rivers often widen as they approach the coast.

MAPMAKING GUIDE

Step Three: Define Shores and Water Lines

1. Emphasize your shores by drawing a light line around your original coastlines.



2. Include shorelines on your lakes, too!



3. Add a second shoreline outside your first one.



4. Finally, add ocean lines that look like small waves that extend horizontally from the shorelines.



MAPMAKING GUIDE

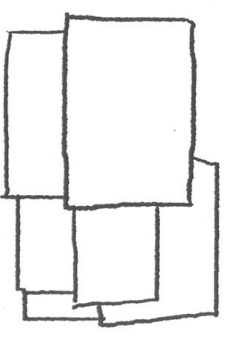
Step Four: Add Cities and Towns

1. Decide where your cities and towns will be. Draw a light dot where each city will be.

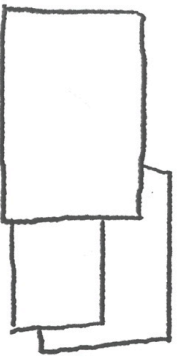


Many cities or towns are located near rivers, coasts, or natural resources, like pastures for cattle or farmlands.

3. Fill in the buildings by drawing rectangles right under the roofs – these are the house bases for your roofs to sit on. Each roof should have a box underneath it.

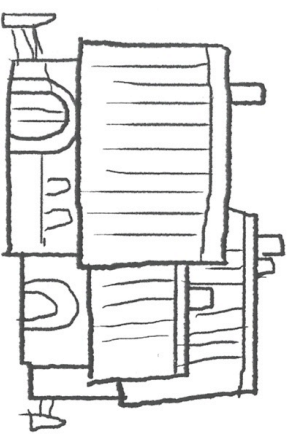


2. Choose one of your dots and draw a small rectangle to show the roof of a house. Then, draw more rectangles next to the first, depending on how big your city will be.



Two or three rooftops is a good starting point.

4. Finally, add details like doors, windows, and chimneys.

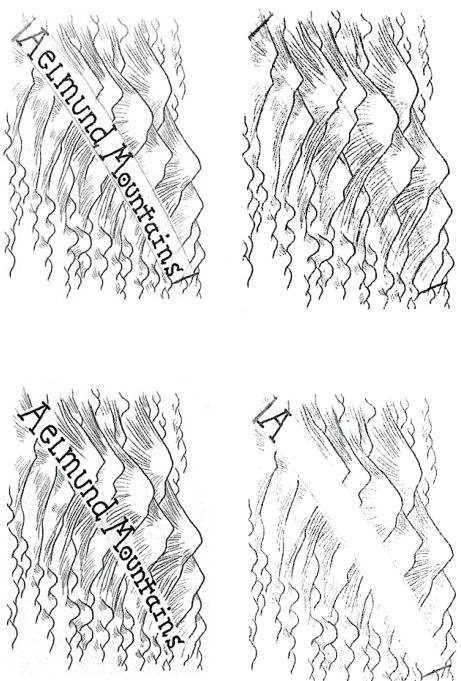


Adapted from *How to Draw Fantasy Art and RPG Maps: Step-by-Step Cartography for Gamers and Fans* by Jared Blando

MAPMAKING GUIDE

Step Five: Add Labels

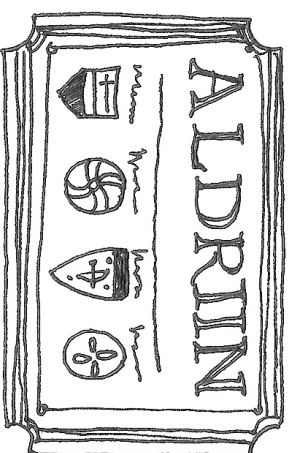
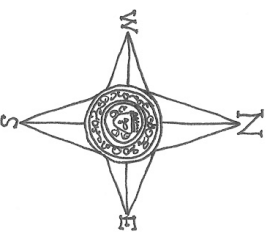
1. Label towns and cities.
 - Use a ruler to lightly draw a straight line next to your town or city symbol.
 - Draw a second line right above the first one. The distance between the two lines will determine how large your label's letters will be.
 - Carefully write the name of the town or city between the two guidelines.
 - Erase the guidelines.
2. Label areas, such as mountain ranges and forests.
 - Decide where you will add your label. Labels for areas are curved.
 - Lightly draw curving guidelines on top of the mountains or trees.
 - Erase the space between the guidelines.
 - Carefully write the name of the area between the two guidelines.
 - Erase the guidelines.



MAPMAKING GUIDE

Step Six: Add a Compass Rose and Map Legend

1. Show your map's orientation by adding a compass rose.
 - Draw the center shape: a circle about the size of a quarter.
 - Add another smaller circle inside the first circle.
 - Add the points.
 - Starting with the north point, draw two long triangles on the top and bottom of the circle.
 - Then, add two shorter triangles on the sides.
 - Divide the points by drawing a line down the center of each triangle.
 - Add a design to the central circle.
 - Mark the south, east, and west points with the first letter of each direction. For north, add a larger N to give it more emphasis.
2. Explain and define your map's symbols and scale by adding a legend.
 - Decide where you will place your legend.
 - A good place is usually in one of the four corners or at the center bottom of your map.
 - Lightly draw a rectangle where the legend will go.
 - Add your map's title to the legend.
 - Add the symbols you used on your map.
 - Add your map's scale.
 - Decorate the border of your legend.



LESSON FIVE

- Hacks and Crafts: [How to Make a Paper Mache Globe](#) (5:28)



How to make a paper mache (papier-mâché) globe - Earth Day craft



Hacks and Crafts
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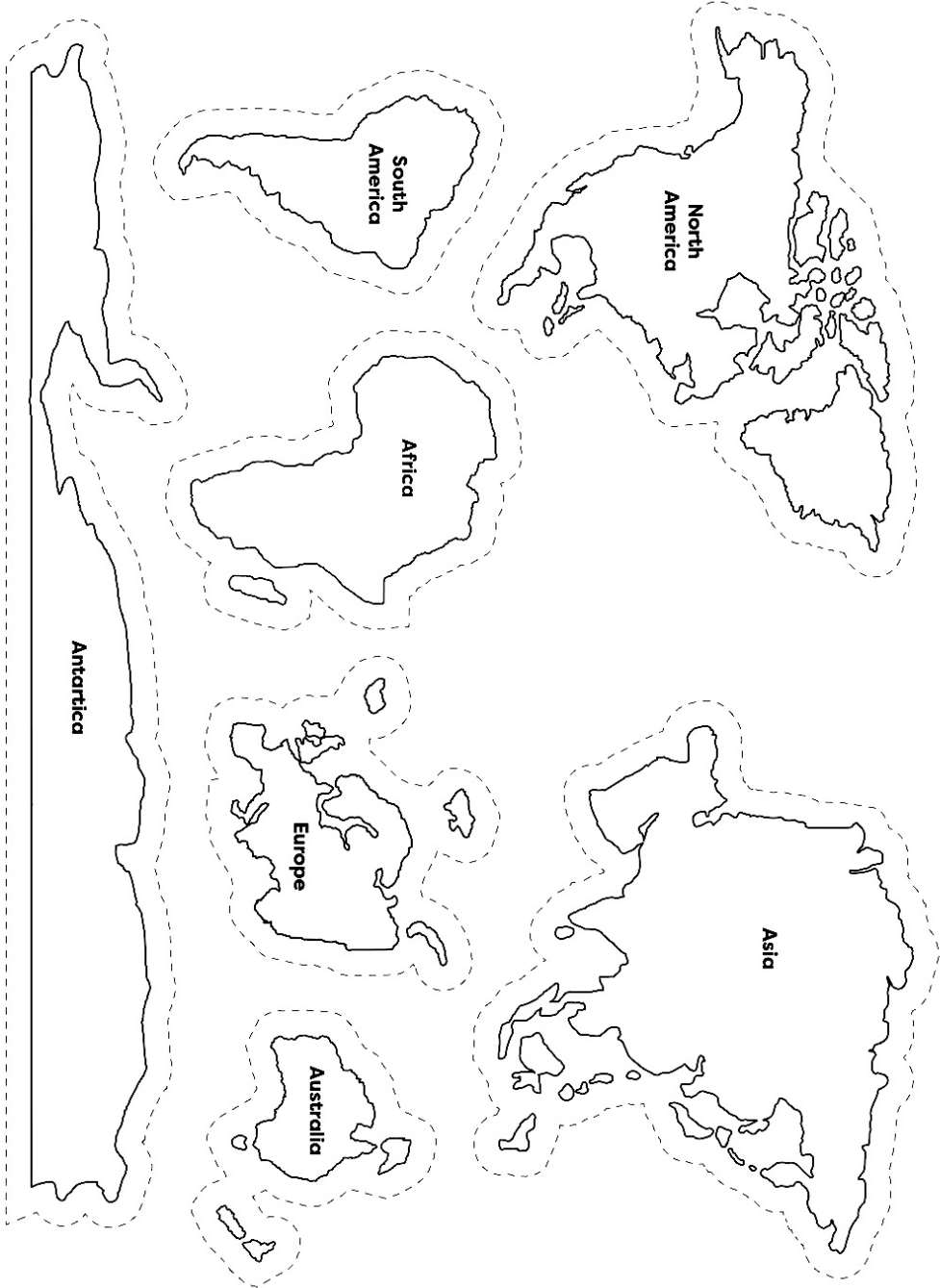
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Find more activities on our website at monkeypuzzledaynurseries.com/learning-at-home

LESSON SIX

The Barbara Petchenik Competition is a biennial map drawing competition for children. It was created by the International Cartographic Association [ICA] in 1993 as a memorial for Barbara Petchenik, a past vice president of the ICA and cartographer who had a lifelong interest in maps for children. The aim of the contest is to promote the creative representation of the world in graphic form by children.

The competition is organized every two years. In a national round in all participating ICA member countries, the national winners are selected, which are exhibited during the [International Cartographic Conference](#), where the international winners are selected. The international winners can be seen below. To also see the national winners, please visit the [Winner Map Collection](#) at the Carleton University Library.

For the most up-to-date contest information, please see the ICA's [website](#).