



Math + Arts | Symmetry, Reflective Drawing, and Totem Poles

In this lesson, students will create a colored pencil drawing utilizing symmetry and forms characteristic of Northwest Coast art and write a critique of their work.

Lesson Summary

There are three options for this lesson, depending on class needs and time available:

1. Frame, Focus, and Reflection (view and discuss): students will view two videos about Northwest Native American culture. Students will look at images on Wikimedia of a totem poles and discuss symmetry in the artwork.
2. Short hands-on activity: students will plot points and create a geometric reflection.
3. Project: students will create a colored pencil drawing utilizing symmetry and forms characteristic of Northwest Coast art and write a critique of their work.

Time Allotment

1. Frame, Focus, and Reflection (view and discuss): 1 class period
2. Short hands-on activity: 1 class period
3. Project: 2 class periods

Learning Objectives

Math

I can define and identify geometric reflection.

I can find the line of reflection.

I can plot points and create a geometric reflection.

Arts and Humanities

I can discuss the characteristics of the art created by Native peoples of the Northwest Coast.

I can create a symmetrical shape on graph paper.

I can create a pencil drawing with some characteristics of the art created by Native peoples of the Northwest Coast.

I can critique my own art and art that is presented through technology.

Prep for Teachers

The art of the Native peoples of the Northwest coast is characterized by the use of traditional patterns depicting natural creatures (bear, ravens, etc.), legendary creatures (thunderbird, etc.), and abstract patterns using characteristic shapes (ovals, U forms, and S forms). Best known are the immense totem poles carved from cedar trees and painted in primary colors, black, and white. People in these cultures also carve wooden masks and decorate even ordinary household items with characteristic patterns. The same patterns were painted on their traditional plank houses and canoes and replicated in their weaving.

Although students will not be able to replicate the oval on graph paper, they can see the similarities of working with geometric shapes and primary colors in an abstract style.

The elements of art emphasized in this lesson are line, shape, and color (primary, secondary, and black and white). The principles of design emphasized are balance, pattern, repetition, and contrast.

Supplies

Graph paper

Colored pencils

Media Resources

[Oral Traditions](#)

[The Healing Totem](#)

[Cyberchase: Using a Coordinate Grid](#)

[Cyberchase: Graphing Points on a Coordinate Plane: Harry's Feet Compete](#)

Introductory Activity

Students should be able to graph points on a coordinate plane.

Learning Activities

Frame, Focus, and Reflection

When students enter on the first day, have an image of totem pole projected to pique their curiosity. Ask them what they know and what they can observe about the image. Most will know that it is a totem pole, but guide them toward identifying that totem poles are created by the Native American peoples of the Northwest Coast, that they are carved from cedar, and that the abstract patterns representing real or mythical animals are symmetrical. Before showing the video segments "Oral Traditions" and "The Healing Totem," tell students that you want them to pay special attention to any art they observe. After the video, discuss what they learned about the culture and what they observed about the art. Emphasize that, although there have been many changes to the lifestyles of the Northwest

Native peoples, they continue to create their traditional art. Also point out that the purpose of the totem poles is narrative, not ceremonial. Totem poles are not objects of worship but ways of recording clan identity and history.

Project the totem pole image that was on the board when students entered and ask them to identify the line of symmetry. Tell students that they will be exploring symmetrical art using a graph with the y-axis serving as the line of symmetry.

As needed, view and discuss the two segments from *Cyberchase*-- "Using a Coordinate Grid" and "Graphing Points on a Coordinate Plane: Harry's Feet Compete"--from PBS Learning Media to refresh students' understanding of coordinate points.

Short Activity

Distribute the handout "Reflection Drawing Points."

Have students discuss the reflection of a point and the outcome of the shapes.

Have students graph each of the points on a Four Quadrant Coordinate Plane. After students have each of these points graphed, they will then continue by graphing each of the points' reflections across the y-axis. The completion of this assignment will give the students a symmetrical drawing reflected across the y-axis. It is important that students graph these points in order and connect them as labeled. (All original points will be on the left hand side of the y-axis.)

Project

Students will personalize their reflection drawings to make a narrative statement about themselves, their family, community, or school. Because they will need to do some experimenting, provide them with a copy of their graphed picture to use for that process.

Distribute the "Art Terms for Reflection Drawings" handout and review the terms with the students. Project one of the totem pole images and lead students through an oral critique of the artwork. Tell students that they may not be able to replicate the exact style of the totem pole on the graph pictures they create because their lines will be straight and their shapes will not be ovoids, but that you want them to use the idea of reflection to add features to the graphed picture. They should consider the elements to add in terms of making a narrative statement, so they should first experiment on their copies before working on their original pictures. As they add elements, they must record their ordered pairs of coordinates.

After the drawing is complete, distribute colored pencils in red, yellow, blue, green, and black. If colored pencils are not available, crayons could be used, but do not let them use markers. Unless students are highly skilled, markers will blur and distort their lines and shapes. If they do use markers, insist on fine tip. Distribute the Product Rubric so that students will understand expectations. Modify as needed with student input if desired.

They should give their drawings a title reflecting how the artwork makes a narrative statement about themselves, their family, their community, or their school and write a short critique of their work.

Arrange an exhibit of their work in the media center, lobby, or hallway. Invite parents, the site based council and community members to view the exhibit.

Formative Assessment

What are the indicators of student progress toward or achievement of each learning target?

Math Assessment Problems

Teacher review of "Reflection Drawing Points" for accuracy.

Arts and Humanities

1. Frame and Focus and Reflection (view and discuss): I can discuss the characteristics of the art created by Native peoples of the Northwest coast.

Assessment Strategy: teacher observation of discussion.

2. Short hands-on activity: I can create a symmetrical shape on graph paper.

Assessment Strategy: teacher reviews pictures for accurate reflection according to the assigned ordered pairs.

3. Project: I can create a pencil drawing with some characteristics of the art created by Native peoples of the Northwest coast. I can critique my own art and art that is presented through technology.

Assessment Strategy: teacher observation of group oral critique. Teacher assessment of student art and critique. Share the provided rubrics with students before they begin work to ensure they understand the expectations. If desired, modify for your own needs and/or allow student input into creation or modification of a rubric.

Program Review

Where does this fit in? How should you document it?

This activity contributes to your school's overall efforts in art programming in several areas, depending on whether you implement just the Frame, Focus, and Reflection portion or you implement the entire project.

Document with lesson plan and samples of student artwork (copies or photos) and critiques.

Curriculum and Instruction: Aligned and Rigorous Curriculum

a) To what extent does the school ensure that the arts curriculum encompasses creating, performing, and responding and is fully aligned with the Kentucky Core Academic Standards?

b) To what extent does the school ensure that the arts curriculum provides for the development of arts literacy in all four arts discipline and also utilizes the Common Core Standards for English/Language Arts?

c) To what extent does the school ensure that the school's curriculum provides opportunities for integration as natural cross-curricular connections are made between the arts and other content areas?

d) To what extent does the school ensure that the arts curriculum includes the study of representative and exemplary works of dance, music, theater, and visual arts from a variety of artists, cultural traditions, and historical periods?

Curriculum and Instruction: Instructional Strategies

a) To what extent do teachers systematically incorporate all three components of arts study: creating, performing, and responding into the arts?

b) To what extent do teachers provide models of exemplary artistic performances and products to enhance students' understanding of an arts discipline and to develop their performance/production skills?

c) To what extent do arts teachers provide for the development of artistic theory, skills, and techniques through the development of student performances or products that are relevant and developmentally appropriate for students?

Curriculum and Instruction: Student Performance

a) To what extent are students actively engaged in creating, performing, and responding to the arts?

b) To what extent do students identify a purpose and generate original and varied art works or performances that are highly expressive with teacher guidance?

c) To what extent do students, with teacher guidance, routinely use creative, evaluative, analytical, and problem solving skills in developing and/or reflecting in their artistic performances and products?

d) To what extent do students use written and verbal communication to objectively reflect on exemplary exhibits and live or technologically provided performances as classroom assignments?

Formative and Summative Assessment: Assessments

To what extent do teachers utilize formative and summative arts assessments for individual students and performing groups that are clearly aligned with the components of the Kentucky Core Academic Standards; and authentically measure a specific concept, understanding, and/or skill and lead to student growth?

Formative and Summative Assessment: Expectations for Student Learning

a) To what extent do teachers utilize exemplar/models to encourage students to demonstrate characteristics of rigorous work in the appropriate art form in most instructional lessons/units?

b) To what extent do teachers share clearly defined rubrics or scoring guides with students before creating, performing, or responding assignments or other assessments; and students have the opportunity to provide input into the scoring guide?

Formative and Summative Assessment: Assessment for Teaching

To what extent do students regularly reflect on, critique and evaluate the artistic products and performances of others and themselves as is grade level and age appropriate?

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<https://www.pbslearningmedia.org/resource/b25d1df3-44fb-44ae-b12d-f80cb7d2ba68/symmetry-reflective-drawing-and-totem-poles/>

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