Angles in Aboriginal Art

Subject: Mathematics Creators: Ashley Pennington and Harley Weston
Strand: Shape and Space Grade: 6

<table>
<tr><td colspan="2">Content (topic)
Understanding Angles</td></tr>
<tr><td>Outcomes

SS6.1 Demonstrate understanding of angles including:
• Identifying examples classifying angles
• Estimating the measure
• Determining angle measures in degrees
• Drawing angles
• Applying angle relationships in triangles and quadrilaterals</td><td>Indicators

SS 6.1b: Explore and present how First Nations and Métis peoples, past and present, measure, represent, and use angles in their lifestyles and worldviews.

SS 6.1d: Identify referents for angles of 45°, 90°, and 180° and use the referents to approximate the measure of other angles and to classify the angles as acute, obtuse, straight, or reflex.

SS 6.1g: Measure angles in different orientations using a protractor.</td></tr>
<tr><td colspan="2">Lesson Preparation
Equipment/materials:
• A laminated copy of the parfleche box or the parfleche envelope for each group of students.
• An overhead pen for each group of students
• A referent for each student. Referents can be made by cutting 10 cm squares from card stock or Bristol boards and then cutting on a diagonal. Our suggestion is that you give your students the 10 cm squares and have them draw a diagonal and cut along the diagonal to form two triangles. Discuss with the students the measure of the angles in the triangles.</td></tr>
<tr><td colspan="2">Presentation
Development
• Discuss with the students how the plains people of North America used parfleche bags to carry dried food, medicine, and personal items. A single piece of rawhide was folded into a case and tied shut with rawhide laces. The outside of a parfleche was decorated with geometrical shapes.
• Have the students examine the information in the references to learn more about parfleche and discover many examples.
• On an overhead or display show students the Angle Examples (Appendix A) and identify the specified angles as (1) acute, (3) obtuse, (3) reflex, (5) straight or (4) right.
• Ask for volunteer groups of 3 or 4 students to go to the display to</td></tr>
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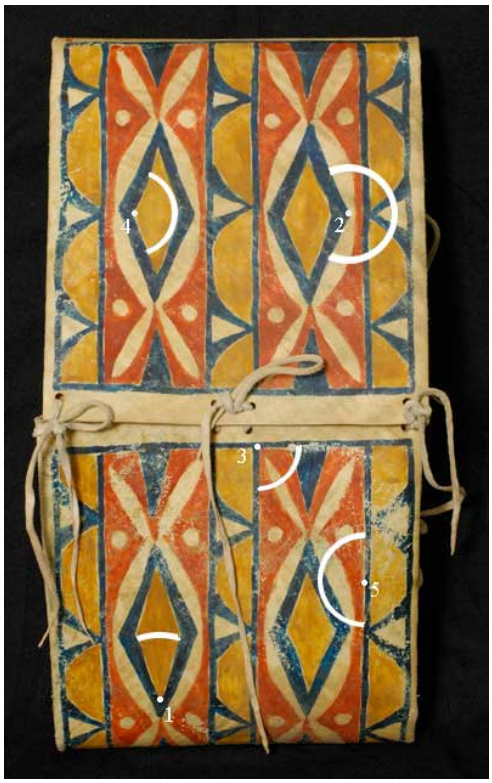
identify other angles and categorize them.

- Divide the students into group of 4 or 5 and give each group a printed laminated copy of the parfleche box or the parfleche envelope (Appendix B) as well as an overhead pen, a referent and a protractor.
- Have one student in each group take the pen and when you say acute, obtuse, reflex, straight or right the student is to find an appropriate angle and mark it. Pass the pen to the next student in the group and repeat the process. Repeat as many times as feasible.
- Have each group wipe the laminated sheets clean.
- Have each student in each group, one at a time, use the referent and identify an angle, if one exists, that measures 45°, 90°, or 180°. The geometric designs on the parfleche are hand drawn so that the students should expect "imperfections" in angle construction.
- Have the groups exchange the parfleche images they have so that each group now has a different image. With the new image repeat number 2. Above.
- Have each student in each group, one at a time, use the protractor to measure an angle on the parfleche image. Have another student in the group measure the same angle from a different orientation and see if the two measures are the same.

References

Parfleche Background PowerPoint
Encyclopedia Britannica online
Images of parfleche in the Smithsonian's collections

Appendix A
Angles Examples



Appendix B

Parfleche Box

Parfleche Envelope