NCEA Math Lesson Plan

Grade: 4   **Subject:** Mathematics

Domain:
Geometry

Standard Number(s) and Description:
4.G.2 Classify two-dimensional figures based upon the presence or absence of parallel lines or perpendicular lines.

Vocabulary to be Highlighted:
Perpendicular, parallel, intersecting lines

Mathematical Practices (#):
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
6. Attend to precision.

Essential Questions:
What is the difference between a point, ray, angle, and line segment? How are these terms related?
What new math words did you learn or use today?
How can you convince me that your answer makes sense?
Based on these examples, what conclusions can you draw?

Materials/Tools (include technology):
Photographs of several different crosses

Connections to Other Math Domains:
4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
4.MD.5.A An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.
4.MD.5.B An angle that turns through n one-degree angles is said to have an angle measure of n degrees.
4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
4.MD.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

Connections to Other Subject Areas:
Religion- Discuss the difference in types of crosses. Are they always perpendicular?

Catholic Identity Component:
Students will examine examples of crosses to analyze parallel and perpendicular lines.

Resources (attachments):

Activities/Timeline:
1. Activation: To begin, the teacher shows several examples of crosses, ensuring that the crosses are perpendicular.

Grouping: This lesson includes a whole-group setting, with many opportunities for students to collaboratively discuss with small groups or pairs.

2. After showing the crosses, the teacher facilitates an open-ended discussion about what students notice about the crosses. Students should draw upon knowledge regarding angles and angle measurement. How are the crosses similar?

3. Have students heard of the word "intersection" in the real world? What is an intersection, and why do you believe that it is called an intersection? The teacher introduces the idea that some types of lines have a special relationship: parallel and perpendicular. Elicit student responses regarding real world examples of parallel and perpendicular lines. What are the properties of each type of line (i.e. parallel lines will never intersect, and perpendicular lines intersect at a right angle.)

4. Closure: In partners, one student explains the meaning of parallel, and the other explains the meaning of perpendicular.

Extension: Angles are additive. What happens when we add two of the right angles together? Three? Four? Introduce the ideas of complementary and supplementary angles. Reflex angles may also be introduced at this time.

Formative Assessment (what to look for, how/when to look):
Student answers as they discuss and analyze the crosses and discuss parallel and perpendicular lines.

Fist of Five to demonstrate relative level of confidence with this topic.

Summative Assessment:
Ticket out the door: List an example in our classroom of parallel and perpendicular lines.