Lesson Plan

Unit 3 Lesson: Investigating Angles

CURRICULUM EXPECTATIONS:

* classify and construct polygons and angles;

SPECIFIC EXPECTATIONS:  
The students will:

1. measure and construct angles up to 180 degrees using a protractor, and classify them as acute, right, obtuse, or straight angles;
2. identify, perform, and describe, through investigation using a variety of tools (e.g., grid paper, tissue paper, protractor, computer technology), rotations of 180 degrees and clockwise and counter clockwise rotations of 90 degrees, with the centre of rotations inside or outside the shape;

RESOURCES

* textbook
* paper
* pencil
* protractor (180/360 degree)
* handouts

INTRODUCTORY ACTIVITY: (hook)

* Use the pictures at the top of page 82 to review the type of angles.
* To extend the review, ask students to identify examples of each type of angles in objects in the room. Identify angles with a sticking note with a description.
* Introduce *Explore*. Distribute copies of Master 3.6 to students. Have 360 degree or 180 degree protractors available for student use.

DEVELOPMENT STRATEGIES: (focus lesson)

* How did you estimate the measures of angle A and angle B?
  + *(I know the angle at the corner of a piece of paper is 90 degrees. If I fold one side onto the other, the fold line divides the 90 degree angle into two 45 degree angles. Angle A is about 45 degrees. I know angle B is greater than 180 degrees, because I compare it to a protractor that measures 180 degrees. Two 180 degree protractors together make 360 degrees. So, I estimate angle B is greater than 180 degrees and less than 360 degrees, but closer two 360 degrees.)*
* How did you estimate the measure of angle C and angle D?
  + *(I used the right angle on a piece of paper to estimate that angle C is greater than 90 degrees and less than 180 degrees. I estimate it is halfway between 90 degrees and 180 degrees, which is 135 degrees. Angle D is greater than 180 degrees and less than 360 degrees, but closer to 180 degrees.)*
* How are the angles in each pair the same? How are they different?
  + *(In each pair of angles, one angle is less than 180 degrees and the other angle is greater than 180 degrees. It does not matter is the angle with the lesser measure is acute, right, or obtuse, the other angle in the pair is always greater than 180 degrees.)*
* How can you use a 180 degree protractor to measure the greater angle?
  + *(I can extend one of the arms to make a straight line. I measure the angle on the straight line; it is 180 degrees. Now I can measure the angle formed by the extension I drew and the other arm of the original angle. I add the measure of this angle to 180 degrees.)*
* What is the sum of the angles in each pair?
  + *(The sum of the angels in each pair is 360 degrees.)*
* Alternative
  + Students work in pairs. One Student draws an acute angle. The other students estimates, then measures, the angle formed. Students take turns to draw and measure acute, obtuse and reflect angles. Have students explain how the measures of the angles in the first pair can be used to estimate the measures of the angles in the second pair.
* Early Finishers
  + Have students draw different angles on cards, then record the angle measures on the backs of the cards. They trade cards with a partner to measure and check.
* Common Misconceptions
  + Students do not know whether to use the inner or outer scale when they measure an angle.
    - How to help: Have students estimate the measure first and identify the angle as acute, right, obtuse, straight, or reflex. After they place the protractor correctly,, they can read the measure that is closest to their estimate.
* ESL Strategies
  + ESL students benefit from hearing vocabulary and instructions repeatedly with visual cues and demonstrations. Use key words frequently in dialogue and point to the word and illustrations from the text as often as possible.

CONCLUDING ACTIVITY: (reflection)

* Invite students to share the strategies they used to estimate and to measure the angles.
* Ask:
  + Why is it important to estimate when measuring angles?
    - *(There are two scales on a protractor. If I estimate the measure of the angle, I am less likely to make an error in measure the angle.)*
  + How can you use what you know about one angle to dins the measure of the other angle?
    - *(I can measure the smaller angle in each pair and subtract its measure from 360 degrees.)*
* Review the types of angles at the top of page 83.
* Ask students to identify other examples of those angles from objects in the room.
* Have students sketch a variety of each type of angle.
* Demonstrate the steps to measure and to draw a reflect angle.
* If time permits, have students draw different angles and use protractors to measure them.
* Remind students that the measure of a angle does not change if the angle is rotated or moved to a different location.

METHOD OF EVALUATION: (assessment)

* Practice. Questions 1 to 6 require protractors and rulers. It may be helpful for students to trace the angles and extend the arms to allow more accurate measurements.
* Encourage students to discuss their work and compare their results. This feedback helps to correct errors as they occur while students practice estimating, measuring, and constructing.
* knowledge and understanding: students can use a protractor to measure and to draw angles less than 360 degrees
* communication: students can explain how to draw or to measure an angle

FOLLOW UP IDEAS:

* Have students bring a picture of an example of angles outside the classroom; can be a magazine cut out, Internet print off, or actual picture.
* Next lesson: classifying figures using previous knowledge on angles.

SELF REFLECTION:

* Successes I experienced...
* Challenges I encountered...
* Areas to work on...
* Action plan...
* What I learned from this experience...