Task

Angle of Elevation/Depression

What is the purpose of trigonometry?
Collect journals and check completion of bookwork while students are working on a warm-up. Go over answers to book work and discuss responses to journals. Make a list on chart paper of the responses to the first essential question. Post this is the room so that students have a constant reminder of those concepts. Some key ideas that the students should arrive at are: that the mathematicians used patterns to develop trigonometry, they organized an classified given information to notice relationships between the sides and angles of right triangles, and that the sine, cosine, and tan of a specific angle measure is the same no matter what size the triangle is.
Direct the students' attention to the second essential question, "What is the purpose of right triangle trigonometry?" Then begin a lesson on how to solve application problems. Start by defining the term **angle of elevation** as the angle looking up between the horizontal and the line of sight. Also, draw a diagram of this angle. Then introduce the five steps the students will use to solve application problems involving **angle of elevation**.

- ✓ Step 1: Draw and label a diagram to represent the information in the problem.
- ✓ Step 2: Organize the given information.
- ✓ Step 3: Classify the triangle as one that involves sine, cosine, or tan and set up equation.
- ✓ Step 4: Solve equation.
- ✓ Step 5: Check to see if answer makes sense and label units.

Go through an example with the class like the following word problem: **The angle of elevation from a sailboat to the top of a 121 ft. lighthouse on the shore measures 16°. To the nearest foot, how far is the sailboat from shore?**

Walk the students through the five-step process.
Pass worksheet #1 on right triangle applications for homework.

The following day, check homework while students are working on a warm-up. Ask students to go up to the board and put up answers to the homework problems.
Teach the skill of summarizing out loud so that the students can explain their work to the class. Go over the fact that students need to explain their diagram, how they organized the given information, how they classified the triangle, and how they solved the equation. Go through each problem on the board by asking students to summarize their work for the class. Ask students to answer the essential question "What is the purpose of trigonometry?" based on yesterday's lesson. Write responses down on chart paper and post. Explain that today they are going to learn how to solve similar problems involving **angle of depression**. Define **angle of depression** as the angle looking down from the horizontal to the line of sight and provide a diagram.