**Airplane Surveying Activity**

**Goal:** To find the vertical distance and horizontal distance traveled by your airplane, mimicking the process of

 surveying.

**Supplies:** Protractor

 String/yarn – 2 pieces (one short, one long)– attach to hole vertex hole in protractor

 Airplane (Paper or foam)

 Calculator

 2 sticks (if outside) or tape (if inside)

 Yard Sticks/tape measure

**Step 1:** Position protractor on ground. With the shorter piece of string, pull it out of the right and make your initial side of your angle. Use tape or a stick to keep string tight and in place.

**Step 2:** Fly the airplane. **Remember to keep your toe at the center of your protractor.**

**Step 3:** Measure the angle the plane has flown.

 To do so, put the second stick in the ground and wrap the other piece of yarn around the stick –

 try to keep the string tight. Someone will need to hold the protractor in place.

 Read the angle made from the string on the protractor. Angle: \_\_\_\_\_\_\_\_\_\_

 a) Is your angle acute?

 b) If not, what is the supplement of the angle?

**NOTE: You MUST have an acute angle.**

Terminal

Initial

**Step 4**: Measure the distance of your terminal side. Distance: \_\_\_\_\_\_\_

 \*\*Measure string from protractor to stick.

**Step 5:** Draw a picture on the axis below. Label all known quantities

**Step 6:** On your picture in Step 5, draw the **vertical** distance your plane would have traveled.

**Step 7:** Find the vertical and horizontal distances using trigonometry.

 a) What trig function is needed for the vertical distance?

b) What trig function is needed for the horizontal distance?

**Step 8:** Repeat and complete the chart below.

 You will do 2 trials with 3 different airplanes.

 Identify airplanes used.

 Remember to draw the picture for Step 5. You may use the space below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Airplane** | **Trial** | **Angle** | **Acute Angle****(if needed)** | **String Length** | **Horizontal Distance** | **Vertical Distance** |
| Plane 1 | Trial1 |  |  |  |  |  |
|  | Trial 2 |  |  |  |  |  |
| Plane 2 | Trial 1 |  |  |  |  |  |
|  | Trial 2 |  |  |  |  |  |
| Plane 3 | Trial 1 |  |  |  |  |  |
|  | Trial 2 |  |  |  |  |  |