**Hurricane Alert! Pre-mission math practice**Teacher pages

**Overview**This lesson reviews the math skills your students will need for their Hurricane Alert! simulation. Decide if your class needs the extra math practice included in this lesson. This will depend on the grade level, ability level, and math proficiency of your students. If they do not need the extra practice, the explanations of the calculations in the mission instructions may be sufficient preparation for the mission. (In any case, be sure to review the instructions with your students well before the mission as they will need to make the calculations quickly and accurately in order to keep pace with hurricane advisories.)

Students should practice all the math skills because they may be called upon to help a team member during the mission. If you have already assigned specialty roles, they should pay particular attention to the role they will have during the mission.

Calculator use is an option.

**Materials**Hurricane Tracking practice data sheet
pencils
calculator (optional)

**Procedure**Finish the practice problems below for each type of calculation needed in your Hurricane Alert! mission.

**1. Converting wind speeds from knots to miles per hour.**

Knots x 1.15 = miles per hour.

Example:

27 knots (kts) = ? miles per hour (mph)
27 x 1.15 = 40.25 miles per hour

For your mission, you can round to the ones place. Example: 40.25 would round to 40 miles/hr.

**Practice problems**
a. 45 knots = \_\_\_*52*\_\_\_ miles per hour

b. 67 kts = \_\_\_*77*\_\_\_\_\_mph

c. 100 kts =\_\_\_*115*\_\_\_\_mph

d. 135 kts = \_\_*155*\_\_mph

Check your answers with the rest of the class.

**2. Finding the directional speed of the hurricane.**

Speed = Distance ÷ Time

Speed = number of miles (from one point to another—provided on your practice data worksheet) ÷ number of hours from one advisory to the next (from your worksheet).

Round your answer to the nearest tenth place.

Example:

If the hurricane traveled 100 miles in 4 hours (from 8 am to 12 pm), then

 100 ÷ 4 = 25 miles per hour

 **Practice problems** a. A hurricane traveled 200 miles in 6 hours. Speed = \_*33.3* \_\_\_ miles per hour (mph)

 b. A hurricane traveled 158 miles in 4 hours. Speed = \_ *39.5*\_\_\_mph

 c. A hurricane traveled 105 miles in 3 hours. Speed =\_\_*35*\_\_\_\_mph

 d. A hurricane traveled 120 miles in 2.5 hours. Speed =\_\_*48*\_\_\_\_ mph

Check your answers with the rest of the class.

**3. Calculate the Estimated Time of Arrival (ETA) to breakpoint cities.**

A breakpoint city is an official location identified by the National Weather Service to be used when predicting hurricane impacts. (For your Hurricane Alert! mission, breakpoint cities are identified on your Hurricane Tracking Map.)

To find a hurricane’s ETA to a location, divide the number of miles from the hurricane to the location by how fast the hurricane is moving.

Example:

If a hurricane is 300 miles away from Miami and is traveling 60 miles an hour, it will reach Miami in (300 ÷ 60) 5 hours.

If it was traveling 100 miles an hour, it would reach Miami in (300 ÷ 100) 3 hours.

**Practice Problems**a. A breakpoint city is 555 miles away from Hurricane Lucille traveling 68 miles per hour (mph). ETA = \_\_\_*8.2 hours*\_.

**b.** A breakpoint city is 124 miles away from Hurricane Bob traveling 54 miles per hour (mph). ETA = \_\_*2.3 hours*\_\_.

c. A breakpoint city is 379 miles away from Hurricane Edna traveling 75 miles per hour (mph). ETA = \_ *5 hours*\_.

d. A breakpoint city is 283 miles away from Hurricane Frank traveling 78 miles per hour (mph). ETA = \_*3.6 hours*\_.

**Now, practice the calculations to track hurricane conditions.**1. Use the data provided on the Hurricane Tracking data sheet to calculate the missing values for advisories #1—4.
2. Enter the values into the data sheet.