**Teacher Activity**

**Lesson One: How long before the tsunami wave hits?: Two different applications of math to calculate the travel time of a tsunami wave**

1. **Seaside Video Model**

This animation is a prediction of what might happen during an imminent tsunami alert and evacuation if a near shore tsunami struck today.   It is a predictive model of possible casualty risk when we have less than 30 minutes lead-time to evacuate the City of Seaside, after a devastating near-shore earthquake and subsequent tsunami.  This animation is based on a Japanese model, applied to the Seaside topography and estimated severe 500 year tsunami event.

* + - 1. Have students discuss what models are and how they are used.
      2. What can we learn from the Seaside model and animation?
      3. Discuss how science can’t model the "infinite complexities" of nature and human actions.

***Scientists and engineers have to make assumptions in their models about how nature works and how people will respond to events by understanding the assumptions, we can understand the results.***

* + - 1. Have students list what they think the assumptions are in the model and how that might affect the final casualty’ results.

1. **Estimating tsunami travel time with isolines (contours) on a map**

Each color band on the map represents an estimated one-hour increment of travel time. Students can estimate tsunami wave travel time by counting the isolines on the map.

Activity C below allows students to calculate the actual travel times and travel distance of tsunami waves. The values from these calculations are used to make maps like the example used in activity B.

1. **NOAA Lesson 9: Waves – “Can you outrun a tsunami?”**

*The lesson defines tsunamis and describes ways that scientists predict and prepare for tsunamis. In the activity, students apply the equations they have learned to predict when tsunami waves triggered by earthquakes at given depths will arrive at specified locations.* (See lesson plan for complete activity)

* 1. Teacher Extension: Can a teacher adapt the NOAA lesson for their local area?
  2. Reflection: How does this lesson work? Not work? What would you change?
  3. For advanced classes, student teams can use the values from equations to map their own “isoline” maps like the one used in Activity B.