“Activity: How Difficult Is It to Predict Hurricane Path and Intensity Forecasts? 
Case Study: “Hurricane “Sandy”

Images used with permission from Prof. Clark Evans
University of Wisconsin-Milwaukee
http://derecho.math.uwm.edu/models/
These images show the set of track paths and intensities for “Hurricane Sandy” (2012) predicted by computer models used by the forecasters and researchers. Click on the link for more information.

• **Tracks**
  These show the path that the models predict the storm will follow for the time periods shown. Pay attention to the locations where they predict the storm will come ashore (make landfall).

• **Intensities**
  These show the predicted maximum winds during the time period. Shading also indicates when the storm is a hurricane, tropical storm, or weaker.
Where do most models predict the storm will go over its lifetime?
How many predict landfall somewhere in the US?
How many models predict this storm will develop into a hurricane? What are the maximum wind speeds predicted?
Six hours later, what is the strength of the storm now?
How many models predict landfall in the US?
In what states is this landfall predicted to occur?
Where do most models predict the storm will go?
How many models now predict the storm will become a hurricane? How many predict it might develop into a category 2 storm? What ocean conditions may have provided the increased energy to the storm?
6 hours later, what is the classification of the storm?
How many models think there will be landfall?
In which States/Provinces do these models predict landfall will occur?
24 hours later, where do most models predict the storm will go?

Describe the range of potential landfall locations by State and Province

What factors might create such a wide spread between the models?
What is the category of the storm now?
Looking at the locations of possible landfalls, in which State would you predict it to come ashore?
How fast are the maximum winds?
How many models predict it will develop into a Category 3 storm?
How many models predict it will diminish back to a tropical storm?
What is an important difference now from the models 24 hours earlier? Based on these, where would you predict landfall will occur?
What is the storm’s strength now?
Why might most models predict the storm will begin to weaken 96 hours later?
Where do most models now predict the storm will come ashore?
How does this compare with the predictions you first made (Q19)?
Off what State is the center of the storm at this time?
Where do most models predict landfall?
Is there still a wide difference among the predicted paths?
Off which State is the center of the storm now?

What might you guess is different about the sea surface temperatures here from those feeding the storm energy when it was farther south?
What do these models predict will happen to the storm in the next 48 hours? Why might the winds become so much weaker in this time period?
What does it mean that the storm is now described as a “Post-Tropical Cyclone”? Why might there be so much variation in where the storm will eventually end?
Where is the center of the storm now?
What factors that affect its path and strength are different from when it was over the ocean?
Examine these final intensity predictions, and then compare their range with the differences shown at the beginning of the storm on 22 Oct (slide 4).
Here is the actual path of “Sandy” during its lifetime. Based on looking again at the predicted paths, did any of the models prove to be significantly more accurate than the others? Explain your answer.