Gulf Stream Voyage Fishing Lesson -
A CIESE Realtime Data Project
http://ciese.org/curriculum/gulfstream/teacherfishing

Objectives
Students will be able to:
- analyze real time data and images
- interpret data to make business decisions

Materials
Computers with Internet access
Student Worksheet
Blank Northern Atlantic Coastal Map
Hurricane Tracking Chart

Background
Fishers regularly use a variety of electronics and technology to keep track of migrating fish. Information about weather patterns, moon phases, water temperature, and the Gulf Stream collected via sensors, satellites and sent to fishing vessels while underway. Interpreting all of the data streams, while incorporating a working knowledge of the fish is virtually an art form, an extremely lucrative art when done well.

Procedure
Problem Statement
You and your partner are the owners of an east coast fishing fleet. Among the many gamefish your boats pursue is the Yellowfin Tuna, a highly prized fish, found in warm open ocean waters, near the surface. Currently you have boats in the following areas, Cape Hatteras, NC, Boston, MA, and Halifax, Nova Scotia. Unfortunately at this time, your company only has enough money to support one boat to fish, the others will remain at port.
Using several sources of real time data, you and your partner must determine which boat would have the greatest opportunity to catch fish. To make the decision, you will study information about the fish, about the waters, and determine what other factors may have an influence over your decision of which boat to send fishing.

1) Create small student working groups.

2) Locate and label Cape Hatteras, NC, Boston, MA, and Halifax, Nova Scotia, Canada, on the map.

3) Use the resources listed to determine the following information about Yellowfin Tuna and record the information on the Student Worksheet:
- Normal geographic range
- Normal temperature range
- Optimal temperature range

Fishbase - Yellowfin Tuna
Comfort Temperatures
Monterey Bay - Yellowfin Tuna
Seafood Species Guide - Yellowfin Tuna
Atuna- Yellowfin Tuna

4) Study the four seasonal satellite images of the Gulf Stream path. Although it will not be possible for you to exactly predict where the warm water is currently, it is important to have a sense of how the current fluctuates during the seasons.

Seasonal Data:
Winter Spring
Summer Autumn

Did you note any major differences in flow patterns over the seasons?
Why would it be important to know where the Gulf Stream is flowing? What does that have to do with locating fish?

5) Study the Near Real Time satellite image of the Gulf Stream current. Based on the Yellowfin profile information gathered, can you identify possible areas of the ocean where Yellowfin Tuna may be? **Note:** It may be helpful to use a blank Northern Atlantic Coastal Map or a Hurricane Tracking Chart.
Current Gulf Stream Image

6) It is important to verify the satellite image. To verify that the satellite is accurately reporting data, collect the sea surface temperature data from a buoy and compare the temperature to the color on the satellite image.
Cape Hatteras - Station 41001
Cape Cod - Station 44018
Nova Scotia - Station 44137

7) Utilizing all of the data collected, identify which area of the ocean you think the fish might be and which boat should leave port to fish. Be prepared to defend your selection in a group discussion.

Assessment
1. What other type of information do you think would be helpful to obtain prior to making the decision of which boat to send fishing? List.
2. Access any information listed above and explain if the information supported your answer of which vessel to send fishing.
3. Which boat did you select? Why?
4. Why do you think the Gulf Stream information used in the lesson is Near Real Time? Why do you think you could not obtain the most current information?

Extensions
Create a “Critter Corner” in the classroom. Have students research other fish found in your geographic area. Have students obtain the basic information about the fish and have the students make predictions based on real time data, where those fish might currently be found in the coastal waters. Have students create posters, or fish, or any other display method and post information/projects in a “Critter Corner” in the classroom or hallway.

Critter Worksheet #5	**Fishing Lesson**

1) Yellowfin Tuna Profile

Normal geographic range	
Normal temperature range	
Optimal temperature range	

2) Seasonal Satellite Images
Did you note any major differences in flow patterns over the seasons?

Why would it be important to know where the Gulf Stream is flowing? What does that have to do with locating fish?

3) Buoy Data

Buoy Location (Lat. And Long.)	**Temp. of Water**

4) Identify which areas of the ocean you think the fish might be and which boat should leave port to fish. Be prepared to defend your selection in a group discussion.

5) What other type of information data do you think would be helpful to obtain prior to making the decision of which boat to send fishing? List.

6) Access any information listed above and explain if the information supported your decision of which vessel to send fishing.

7) Which boat did you select? Why?

North Atlantic Coastal Map