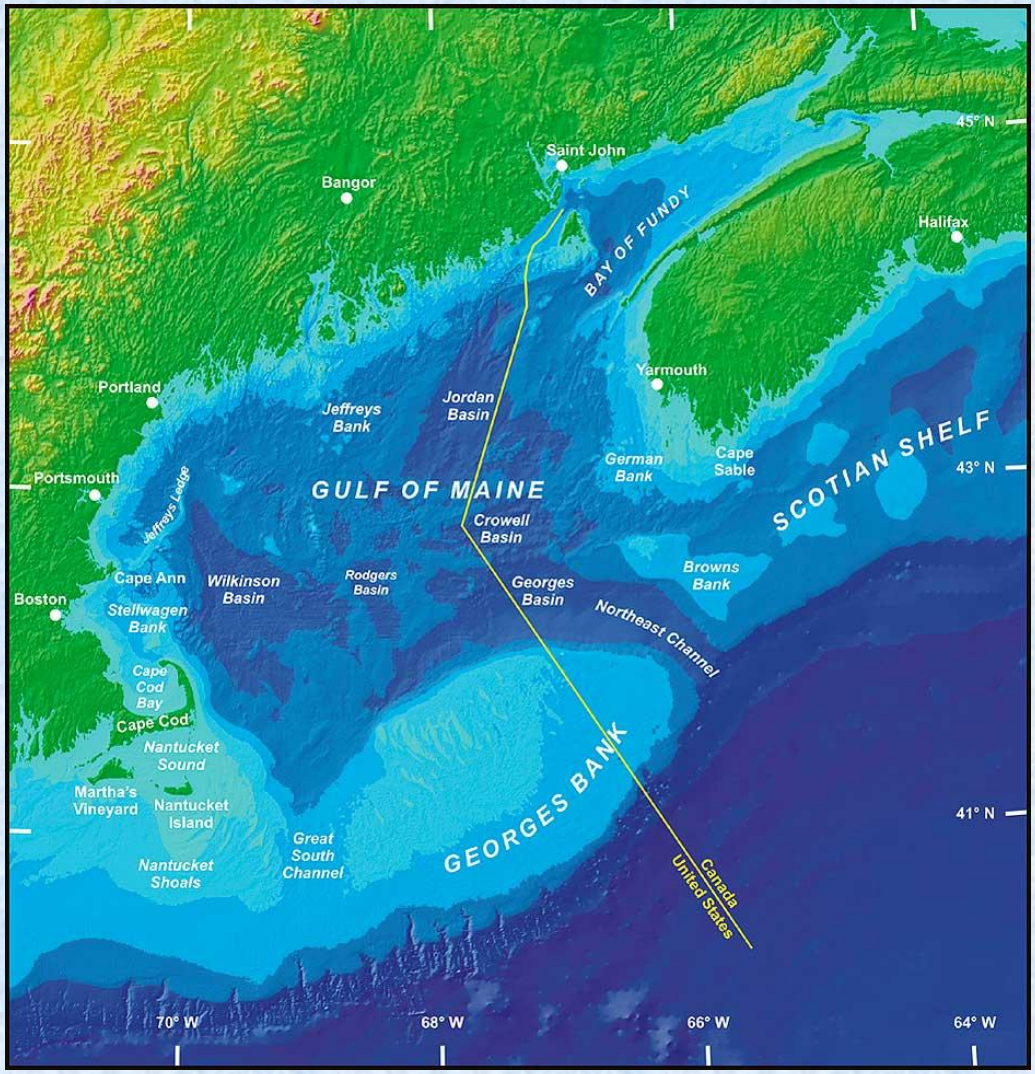
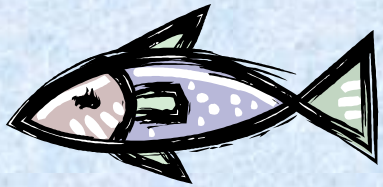
The Gulf of Maine ~ A Research Unit for 5th Grade



This unit was developed by a team of faculty with leadership from Doug Caldwell, 5th grade teacher and Jennifer Stanbro, Library Media Specialist for the South Portland Public School.s

This technology-rich unit uses an Information-Literacy model known as "Big 6" and provides students with a rigorous scientific research experience which integrates technology with library-media skills, literacy and critical thinking.



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Credits

Mission: Gulf of Maine Research

You are a marine biologist learning about the Gulf of Maine food web. You want to understand how the food web works so that you can protect it. You will be working with a team of scientists (your school). Each of you will study one species in the Gulf of Maine. Then you will put your findings together.

The "lead scientist" on the project is your teacher. He or she will be doing some activities to illustrate some of the concepts we will be using in our research.

1. Your charge is to study one creature (species) from the Gulf of Maine to find out how it is adapted to its environment. You will put this information in a database.

2. From the information in the database, you will work together to create a model of the Gulf of Maine food web. You will show the environment where the species live, what they eat, and what eats them.

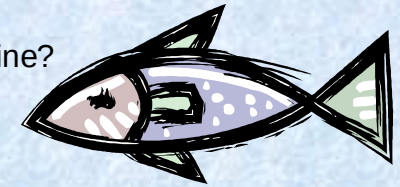
3. Finally, you will write about what you learned in a report to be compiled and published as your school's *Gulf of Maine Journal of Science*.

Here are the big questions we are trying to explore:

• How might changes, such as global warming, pollution, invasive species, and overfishing in the Gulf of Maine habitat influence the survival of an species?

• How do different organisms in the Gulf of Maine depend on each other?

• How can scientists and technology be used to help protect the Gulf of Maine?



• How can we all help protect the Gulf of Maine?

Do you have some ideas about these questions now? Share your thoughts with the class and record your discussion on the smartboard or chart paper. We will check back at the end of this assignment to see what else we have learned.

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Step One: Task Definition

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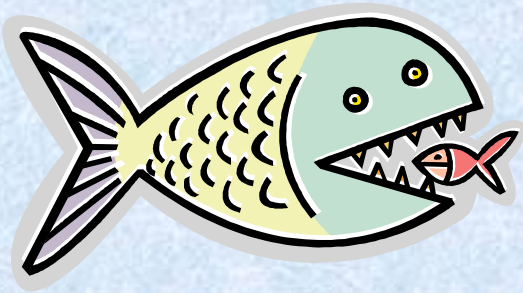
What do I need to do for this project?

1. Research a Gulf of Maine species and its environment
2. Put what I have learned into a database
3. Work with other students to create a model of the Gulf of Maine food web
4. Write a report of my findings for the Gulf of Maine Science Journal

What species do I want to learn about?

See your teacher for a list of possible topics. Since you want to have as many kinds of species in your database as possible, all the scientists will want to study different species. If you have time, however, you may choose to do more than one species.

What information do I need to find out to complete this assignment?



Essential Question: How does my species fit into the Gulf of Maine ecosystem?

1. Where does my species live? What type of aquatic environment (estuary, beach, tide pool, Gulf of Maine)? Does it go between one or more than one aquatic environment? What is that environment like? How does that environment fit into the Gulf of Maine system?

2. How does my species fit into the food web of the Gulf of Maine? What does my species eat? What eats my species?

3. How has my species adapted to its environment? What are some physical or behavioral features that fit with the environment?

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Step Two: Information Seeking Strategies

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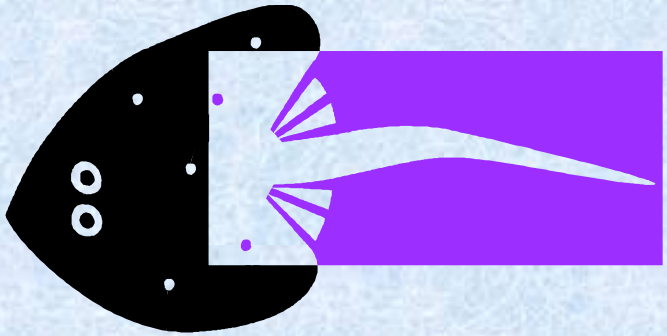
What are the best resources to find my information? Complete this form and print.

- ❑ Library Books
- ❑ Encyclopedia
- ❑ Marvel Online Databases
- ❑ Web Sites
- ❑ Museums
- ❑ Community Experts
- ❑ Maps/Atlas
- ❑ Institutions or Organizations
- ❑ Experiments
- ❑ Other students



Helpful Hint: Remember here that you and your fellow scientists will be creating a web site about your species. You just might find out some information from the scientific community you are creating.

If I am using web sites, how will I know they are good enough for my project?

- ❑ I will only use those evaluated and chosen by my teachers.
- ❑ I will only use sites linked from the South Portland Information Literacy site.
- ❑ I will ask my librarian, teacher, or parent for help in finding good sites.

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Step Three: Location and Access

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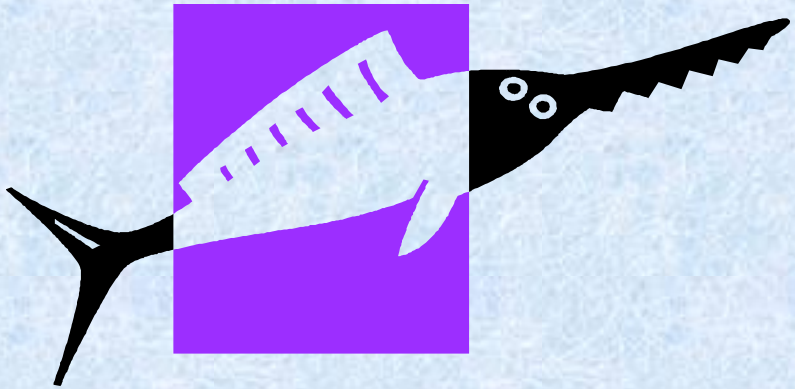
Where will I find my sources? Complete this form and print.

- ❑ School Library
- ❑ Public Library
- ❑ Home computer
- ❑ Classroom Library
- ❑ Gulf of Maine species database created by peers



Who can help me find what I need?

- ❑ I can find the sources myself
- ❑ My librarian
- ❑ My technology specialist
- ❑ My teacher
- ❑ My parent

What are some sites to get me started?

Creatures and Places: Articles on specific species

ME Dept. of Marine Resources: Species Information: **Lots of information about fish.**

Gulf of Maine Research Institute: **Good articles on some sea creatures.**

Katahdin to the Sea: **Use this to find articles about your organisms aquatic environment!**

Yahooligans! Animals

Chesapeake Bay Food Web: **Find some species predator/prey information here.**

Chesapeake Bay Fishes: **Much of your species information will be the same for the Gulf of Maine.**

Fishes of the Gulf of Maine: **Go to the Common Name index to get lots of information on your species.**

Chesapeake Bay Plants & Animals: **Information on plants & animals in Chesapeake Bay (some of these will correlate with the Gulf of Maine.**

EcoKids Underwater Creatures: **More on marine life.**

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Step Four: Use of Information

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How will I record the information I have found?

Graphic Organizer

Notes Checklist

How will I document my sources?

Grade 5 Citation Format

Citations checklist

Here is where you go into the computer lab and work with your technology specialist to put the information you found into the database.

Once the database built, you can search it to see if anyone else found information that will help your research.

Your species may be prey to another species and you don't even know it. Search the database to find out!

Click here to access the database

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Step Five: Synthesis

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Now is the time to pull together everything you have learned about your species and see how it fits into the BIG PICTURE. Here you have two tasks:

First, get together with your fellow scientists and create a model of the Gulf of Maine food web.

Then, write up your findings in a report for your school's Gulf of Maine Science Journal.

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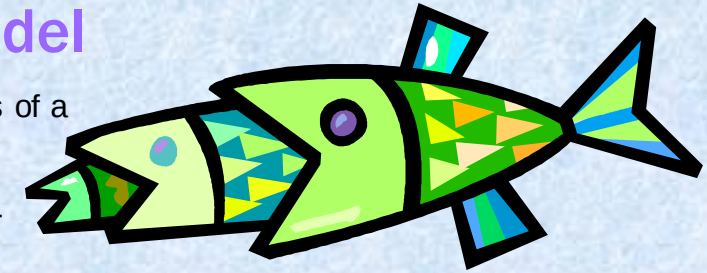
Step Five: Synthesis

Gulf of Maine Food Web Model



Scientists often use models to show how different parts of a system interact.

You and your colleagues will work together to pool your findings and create a Gulf of Maine food web model.

Instructions:

1. Create model of a food web. Using a big wall space, paper, markers and string, work as a class to create a model that contains the following information:

- Gulf of Maine aquatic environments: estuary, beach, tide pool, Gulf of Maine
- Illustrations of organisms and where they are usually found in the Gulf of Maine
- Connections between these organisms in the food web (use string here)

2. Break into pairs and discuss one of the following scenarios:

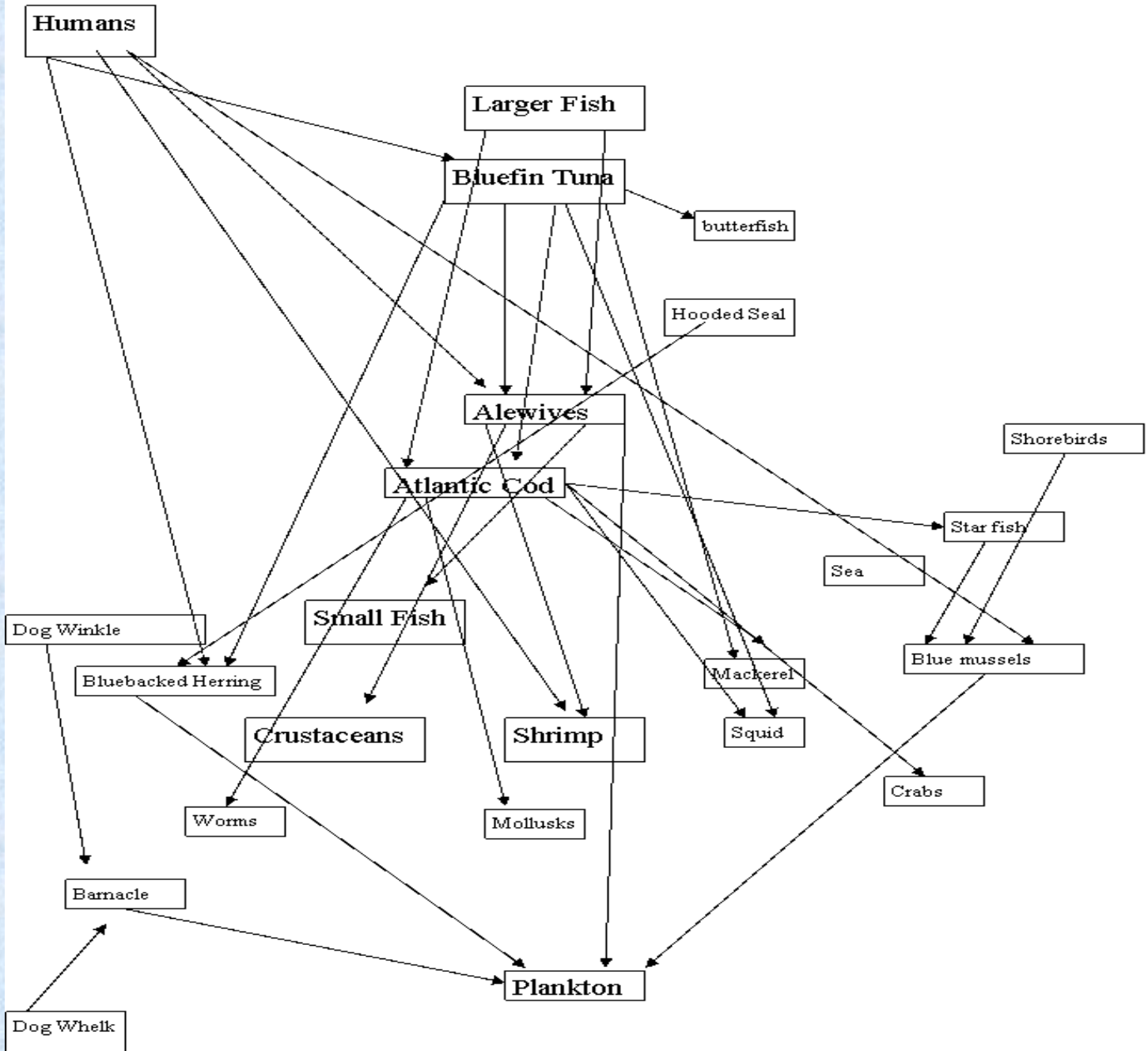
- What species would be affected if a chemical pollutant killed off the plant life in the estuary?
- What species would be affected if overfishing wiped out a species of fish?
- What species would be affected if a predator disappeared from a tide pool?
- What species would be affected if all the phytoplankton were to suddenly disappear?

3. Share your discussion with the class. Then discuss the following questions:

- What have you learned about the Gulf of Maine food web?
- What are some threats that you know about to the Gulf of Maine food web?
- How can scientists protect the Gulf of Maine? How can you protect the Gulf of Maine?

Click here to learn more about how we can protect the Gulf of Maine!

Gulf of Maine Food Web (Sample)



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Step Five: Synthesis

Gulf of Maine Journal of Science Report

When scientists feel that they have learned something of significance, they publish their findings in scientific journals.

After studying your species and creating a model of its interaction with the Gulf of Maine food web, you are ready to publish your findings in the *Gulf of Maine Journal of Science*.

The essential question for this report is: How does your species function in the Gulf of Maine ecosystem?

You can answer this question by addressing the following questions:

1. Where does it live? Describe the aquatic environment of your species. Does it go between one or more than one aquatic environment? How does that environment fit into the Gulf of Maine system?

2. How does your species fit into the food web of the Gulf of Maine? What does your species eat? What eats your species?

3. How has your species adapted to its environment? What are some physical or behavioral features that fit with the environment?

Your report should include:

- Introduction, conclusion, and at least three body paragraphs
- Strong use of organization, ideas, voice, and conventions
- Vocabulary associated with the Gulf of Maine where appropriate

Here is the rubric for your report writing:

Grade 5 Nonfiction Writing Rubric

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Step Six: Evaluation

Remember how we started with those big questions?

•How might changes, such as global warming, pollution, invasive species, and overfishing in the Gulf of Maine habitat influence the survival of an species?

•How do different organisms in the Gulf of Maine depend on each other?

•How can scientists and technology be used to help protect the Gulf of Maine?

•How can we all help protect the Gulf of Maine?

Now is the time to look back over everything you learned and see what you know.

Assignment:

1. For two questions, spend some time writing out short answers. You can even use illustrations or bulleted lists.

2. For two questions, find a creative way to show your answer. You could make a poster, write a poem or song, do a skit, make a Power Point, restaurant placemats, write a letter, make a podcast, or write a nonfiction essay. This will be your homework.

3. Practice presenting your work to the class, or to a small group of peers. Ask peers to give you feedback on your knowledge of the essential question. How does your product show your knowledge of the essential question.

4. Present your work at the Gulf of Maine Celebration!

Mission: Gulf of Maine Research: Credits & Standards

Maine Learning Results

National Teachers of Science

Ocean Literacy

This unit, with its supporting lessons, is consistent with the standards of Ocean Literacy published by the Ocean Literacy Network.
Ocean literacy is an understanding of the oceans influence on you and your influence on the ocean.

An ocean-literate person understands:
- the essential principles and fundamental concepts,
- can communicate about the oceans in a meaningful way,
- is able to make informed and responsible decisions regarding the oceans and its resources.

1. Earth has one big ocean with many features.
2. The ocean and life in the ocean shape the features of Earth.
3. The ocean is a major influence on weather and climate.
4. The ocean makes Earth habitable.
5. The ocean supports a great diversity of life and ecosystems.
6. The ocean and humans are inextricably linked.
7. The ocean is largely unexplored.