

NOAA Teacher at Sea – Sargassum Unit

Unit Title: Sargassum Hide-n-Seek

Subject (Focus/Topic): Exploring sargassum as a marine habitat.

Grade Level: 3-5 grade

Average Learning Time: Six, one-hour sessions

Lesson Summary (Overview/Purpose):

Students will learn the important role sargassum plays in supporting marine life.

Overall Concept (Big Idea/Essential Question):

Why is sargassum an important habitat for marine life?

Specific Concept (Key Concepts):

Sargassum as a habitat

Marine life that rely on sargassum

Focus Questions (Specific Questions):

What is sargassum?

How does sargassum support marine life?

What types of marine life rely on sargassum?

Objectives/Learning Goals:

Through hands-on exploration, students will participate in a simulated research survey of surface dwelling marine organisms that rely on sargassum as a habitat.

Using the Super Lotus model, students will research one marine species that relies on sargassum as a habitat and write a 1-2 page informational article.

Background Information:

Sargassum is a type of brown algae that is common in temperate and tropical waters. This seaweed is usually very widespread. Sargassum comes from the Portuguese word for little grapes (sargaço) because of the tiny, air-filled bladders that sprout from its branches to keep it afloat. Sargassum typically clumps together to form mats or clusters that float on the surface of the water.

Sargassum provides habitat, safety, and breeding grounds for many types of marine life. Organisms within the sargassum produce waste (nitrates and phosphates) that provide nutrition for the sargassum. Both rely on each other for survival.

The Sargasso Sea is located in the Northern Atlantic Subtropical Gyre and is created by the North Atlantic Current, the Canary Current, the North Atlantic



Image from bermuda-triangle.org

Equatorial Current, and the Gulf Stream. The clockwise currents create this slowly rotating area known as the Sargasso Sea. The Sargasso Sea has no coastline. It is very calm with little wind, and is also very warm. Because of this the evaporation rate is high, while the precipitation about is low. This causes the water to have high salinity. The lack of nutrients in this area results in the inability to support larger fish. However, sargassum is abundant and provides a habitat for many diverse smaller organisms that directly depend of it for survival.

Common Misconceptions/Preconceptions:

Sargassum is an invasive seaweed.

Materials:

- A Sea Within A Sea by Ruth Heller
- 5 medium buckets (5 gallon buckets work great)
- 10-20 bags of green paper basket grass, or dried moss (depending on size of buckets being filled)
- Color images of sargassum marine life, printed on white cardstock, labeled and laminated
- 5 pint-sized jars
- Sample jar labels (see attached)
- 9 sheets of 8 ½ x 11 paper each in different colors, one set for each student
- Lined paper
- Pencils
- Markers
- Copies of rubrics, one for each student (see attached)

Technical Requirements:

Student access to internet for research

Teacher Preparation:

Images of juvenile sargassum fish/filefish, pinfish, pipefish, jacks, jellyfish, triggerfish, sargassum crab, sargassum shrimp, frogfish, flying fish, freshwater eel, nudibranch, dolphin fish, bryozoan, and sea turtles need to be printed on white cardstock, individually cut out, and laminated. Jellyfish images should also be included. There should be enough images to distribute between five sargassum samples. Note: Jellyfish images may not be present in all samples.

* ALL IMAGES SHOULD INCLUDE NAME OF ORGANISM ON BACK.

Fill buckets with grass/moss and hide an assortment of sargassum organism images throughout it. Label the buckets with a “station number” (for example B113 or E126) and a latitude/longitude of the station (any latitude/longitude located along the western coast of Florida will work).

(“B” stands for bongo station where a bongo sample and a Neuston sample are collected. “E” stands for combo station where a bongo sample, Neuston sample, and a trawl sample are collected.)

Create a list of sargassum organisms and include pictures with each organism.

Keywords:

Sargassum

Habitat

Sample

Camouflage

Organism

*Names of organisms

Pre-assessment Strategy/Anticipatory Set:

Day 1, Part 1 (15-20 minutes)

Students will watch “The Ocean We Want to Know” to learn about our one world ocean and about various important aspects of it.

<http://www.youtube.com/watch?v=z1pxmcE3S8k>

Students will read the book, A Sea Within A Sea by Ruth Heller, to build background knowledge of sargassum, the Sargasso Sea, and organisms that live there.

Students will view the National Geographic video “Fish vs. Sargassum” to learn about one species that relies on sargassum for its livelihood.

<http://www.youtube.com/watch?v=JFhxhlyJ3U4Q&feature=related>

Lesson Procedure:

Day 1, Part 2 (20-25 minutes)

1. Group students into groups of five or less students.
2. Give each group a sargassum sample bucket, a pint-sized jar, and one of each type of jar label.
3. Inform students about how their “sample” was collected using a Neuston net. Provide images of a Neuston net from “Sargassum, Sargassum, Sargassum” blog located under the Additional Resources section.
“Neuston nets have wide rectangular openings. When they are deployed from ships, they are pulled across the surface of the water to collect surface dwelling organisms. At the bottom of the net is a “cod end”. A cod end is a cylinder that has many holes that are covered by screens. The screens allow the water to flow through the holes, but not the organisms. Neuston nets are usually deployed for 10 minutes. After 10 minutes have passed, the net is hauled back onto the ship. The sargassum collected in the net is placed into buckets. Once in the buckets, the scientists must rinse off the sargassum to collect any organisms hiding in it. The organisms collected are placed into a jar and labeled. The jars are later studied by scientists back at the lab.”
4. Allow students to begin to sift through the sample to collect the sargassum organisms. Students should place the organisms they find into their group’s pint-sized jar.
5. Once the entire sample has been sorted through, students will label the jars with their collected sample. One label will be folded in half (information side out) and

placed inside the jar. The other label will be taped to the lid on the outside of the jar. If students find jellyfish in their sample, they should note this on their label under “Comments”. Also, “1 of 1” refers to the number of jars for the collected sample. Note: In this simulation, it will always be “1 of 1” as all organisms collected should fit in one jar.

Inside Label Example:

NOAA NATIONAL MARINE FISHERIES SERVICE MISSISSIPPI LABS	SAMPLE # 1
	LATITUDE 29.764377
STATION # B113	LONGITUDE -83.968506
VESSEL Oregon II	DATE <i>(date students collect)</i>
CRUISE SEAMAP	TIME <i>(time students collect)</i>
COMMENTS Jellyfish present	GEAR Neuston

Outside Label Example:

SAMPLE NO. 1
VESSEL Oregon II
STATION B113
1 OF 1
GEAR Neuston

Day 1, Part 3 (10-15 minutes)

1. Students will analyze their group’s sample by categorizing all of the specimens collected in their sample.
2. Once specimens are categorized, students will record the number of each specimen they collected in their sample using the table below:

Specimen Type	Number of Specimen Found in Sample
Filefish	
Pinfish	
Pipefish	
Jack	
Triggerfish	
Frogfish	
Flying Fish	
Sargassum Crab	
Sargassum Shrimp	
Nudibranch	
Dolphin Fish	
Bryozoan	
Sea Turtle	
Freshwater Eel	
Jellyfish	

3. Students will identify which species was the most abundant in their sample and which species was the least abundant and label this on their charts.

4. Students will complete the self-evaluation on the simulation rubric to evaluate their level of participation. (See attached)
5. The teacher will complete the teacher section of the simulation rubric following the students' completion of the self-evaluation rubric. (See attached)

Day 2, Part 1 (10-15 minutes)

1. Students will examine the various types of sargassum organisms and pick one to research. Have a list prepared of organisms that include pictures so students can more easily choose one to research.
2. Pass out 9 different colored sheets of paper to each student. Papers must be divided into 9 equal squares. This can be done by folding, using a ruler to draw lines, or preprinted with lines, depending on teacher preference.
3. Students will create a lotus chart. (see example below). In the lotus chart, students will place their chosen organism in the center box. In the surrounding boxes they will place topic areas they want to learn more about in relation to their organism. Provide students with examples of topics they can choose to include. (Some examples are included in the attached chart.)

Day 2, Part 2 (45-50 minutes)

1. Once students have created their lotus chart, they will begin research to create their Super Lotus chart.
2. For each topic placed in students' original lotus charts, separate lotus charts will be completed. Each topic should be placed in the center of a separate, different colored chart. The surrounding boxes will be filled with eight different pieces of information regarding the center topic. (See attached: Super Lotus Layout Example)
3. Students can use the internet, books, videos, etc. to collect the information about their organism.

Day 3 & 4 (60 minutes)

1. Students will continue researching their organism to fill out each topic lotus chart.
2. Once all eight topics have been made into lotuses, tape the nine charts together. Make sure to include the original lotus in the center. The location of each topic lotus should correspond to the location on the original lotus.

Day 5 & 6 (60 minutes)

1. Students will use their super lotuses to create an informational article about their organism. Students will need to write an introductory paragraph and a concluding paragraph. The body of their article will come from the information in their topic lotuses. Each topic should be a new paragraph in their article. Articles should be handwritten.
2. Once the students have completed their articles and are finished editing and revising their writing, they will need type up their articles and format them to include a picture of their organism. Pictures can come from the internet or scanned images from books.

3. Once all articles are typed and formatted, print them off and create a bulletin board showcasing students' articles.
4. The teacher will complete the research article rubric following student completion of the research article.

Assessment and Evaluation:

Simulation:

See Attached Simulation Rubrics.

Article:

See Attached Research Article Rubric.

Standards:

National Science Education Standard(s) Addressed:

Unifying Concepts and Processes

E.U.1 Systems, order, and organization

E.U.4 Evolution and equilibrium

Science as Inquiry

E.A.1 Abilities necessary to do scientific inquiry

E.A.2 Understandings about scientific inquiry

Life Science

E.C.1 Characteristics of Organisms

E.C.2 Life cycles of organisms

E.C.3 Organisms and environments

Science and Technology

E.E.2 Understandings about science and technology

Ocean Literacy Principles Addressed:

Essential Principle 1:

The Earth has one big ocean with many features.

Essential Principle 5:

The ocean supports a great diversity of life and ecosystems.

State Science Standard(s) Addressed: Iowa Core Curriculum, 3-5 grade

Science as Inquiry:

- Recognize that scientists perform different types of investigations
- Plan and conduct scientific investigations
- Use appropriate tools and techniques to gather, process, and analyze data.

Life Science

- Understand and apply knowledge of organisms and their environments

Other National or State Standards Addressed:

Iowa Core Curriculum – Writing

Text Types and Purposes

W.3.2. Write informative/explanatory texts to examine topic and convey ideas and information correctly

W.4.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly

W.5.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly

Production and Distribution of Writing

W.3.4. With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose

W.4.4 Provide clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience

W.5.4. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience

W.3.5. With guidance and support from adults, develop and strengthen writing as needed by planning, revising, and editing.

W.4.5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing

W.5.5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach

W.3.6. With guidance and support from adults, use technology to produce and publish writing (using keyboard skills) as well as to interact and collaborate with others

W.4.6. With guidance and support from adults, use technology, including the internet, to produce and publish writing as well as interact and collaborate with others

W.5.6. With guidance and support from peers and adults, use technology, including the internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of two pages in a single setting

Research to Build and Present Knowledge

W.3.7. Conduct short research projects that build knowledge about a topic

W.4.7. Conduct short research projects that build knowledge through investigation of different aspects of a topic

W.5.7. Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic

W.3.8. Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories

W.4.8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes, categorize information, and provide a list of sources

W.5.8. Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources

Iowa Common Core – 21st Century Skills

Employability

Practice leadership skills, and demonstrate integrity, ethical behavior, and social responsibility in all activities.

- Use interpersonal skills to influence and guide others toward a goal.
- Leverage the strengths of others to accomplish a common goal.

Demonstrate productivity and accountability by producing quality work.

- Demonstrate accountability for individual performance.

Technology Literacy

Use technology resources to create original products, identify patterns and problems, make predictions, and propose solutions.

- Work individually and collaboratively to create, display, publish, or perform media-rich products.

Utilize digital tools and resources to investigate real-world issues, answer questions, or solve problems.

- Locate, organize, and ethically use information from a variety of sources and media.
- Access information for specific purposes, and assess the validity of the information source.

Understand technology hardware and software system operations and their application.

- Use everyday technology processes, hardware, and software

Additional Resources:

“What is the Sargasso Sea?”

(for short animation of global ocean currents in relation to the Sargasso Sea)

<http://oceanservice.noaa.gov/facts/sargassosea.html>

“Sargassum, Sargassum, Sargassum!” – NOAA Teacher at Sea Blog

<http://teacheratsea.wordpress.com/2012/07/15/stacey-jambura-sargassum-sargassum-sargassum-july-15-2012/>

Sargassum Weed

<http://www.crystalbeach.com/weed.htm>

Super Lotus Chart

Amy Humphreys, World of Thinking

www.worldofthinking.com

Animal Planet Fish Guide

<http://animal.discovery.com/guides/fish/fish.html>

Marine Species Identification Portal

<http://species-identification.org/search.php>

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NOAA NATIONAL MARINE FISHERIES SERVICE MISSISSIPPI LABS	SAMPLE #
	LATITUDE
STATION #	LONGITUDE
VESSEL	DATE
CRUISE	TIME
COMMENTS	GEAR

NOAA NATIONAL MARINE FISHERIES SERVICE MISSISSIPPI LABS	SAMPLE #
	LATITUDE
STATION #	LONGITUDE
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(Inside sample jar labels)

NOAA NATIONAL MARINE FISHERIES SERVICE MISSISSIPPI LABS	SAMPLE #
	LATITUDE
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CRUISE	TIME
COMMENTS	GEAR

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	LATITUDE
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VESSEL	DATE
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COMMENTS	GEAR

(Outside sample jar labels)

NOAA NATIONAL MARINE FISHERIES SERVICE MISSISSIPPI LABS	SAMPLE #
	LATITUDE
STATION #	LONGITUDE
VESSEL	DATE
CRUISE	TIME
COMMENTS	GEAR

SAMPLE NO.
VESSEL
STATION
_____ OF _____
GEAR

SAMPLE NO.
VESSEL
STATION
_____ OF _____
GEAR

SAMPLE NO.
VESSEL
STATION
_____ OF _____
GEAR

SAMPLE NO.
VESSEL
STATION
_____ OF _____
GEAR

SAMPLE NO.
VESSEL
STATION
_____ OF _____
GEAR

Habitat

Characteristics

Adaptations

Feeding
Habits/ Diet

Filefish

Reproduction/
Life Cycle

Predators

Geographical
Location/
Distribution

Classification/
Taxonomy

Super Lotus - Layout Example

	1			2			3	
			1	2	3			
	8		8	Topic	4		4	
			7	6	5			
	7			6			5	

Name: _____

Simulation Rubric – Student Self Evaluation:

	4	3	2	1
I participated in the simulation.	Tried to always participate	Usually participated	Participated about half the time	Did not participate much
I listened well and stayed focused	Well focused and listened well in class	Sometimes needed reminders to listen and focus	Sometimes listened but at times unfocused	Often did not listen well and was difficult to work with
I helped others to solve problems and issues	Very helpful	Was helpful with reminders	Sometimes troublesome	Troublesome most of the time. Difficult to work with.
I shared materials	Always happy to share	Usually shared materials	Sometimes did not share	Would not share and was difficult in groups
			TOTAL	

Student Comments:

Simulation Rubric – Teacher:

	4	3	2	1
Participation	Participated Thoroughly. Worked cooperatively with others.	Participated most of the time and fairly well focused.	Participated with reminders, but was difficult at times.	Troublesome in class and with group. Unfocused and uncooperative.

Teacher Comments:

Research Article Rubric:

Student Name: _____

Organism Researched: _____

	Excellent 3 pts	Satisfactory 2 pts	Needs Improvement 1 pt
Important Information	The article contains all 8 topics of the Super Lotus. Facts are complete and correct.	The article contains most of the 8 topics of the Super Lotus. The facts are primarily correct.	The article contains only a few of the 8 topics of the Super Lotus. The facts are incomplete or wrong.
Writing Mechanics	The article is clear and concise. The article contains only 1 or 2 spelling errors. The article contains only 1 or 2 grammatical errors.	The article contains few sentences that are unclear to the reader. The article contains few spelling errors. The article contains few grammatical errors.	The article is vague and unclear. The article contains many spelling errors. The article contains many grammatical errors.
Editing and Improving	The article was completely edited and improvements were made.	The article shows some improvements and edits.	The article was neither edited nor improved.
TOTAL Points	/10		

*** Include 1 pt for completion of assignment.**

Teacher Comments: