WEB OF LIFE ACTIVITY

ALLOTTED TIME: ½ hour plus

SUGGESTED GRADE LEVEL: 4 and up

NUMBER OF STUDENTS NEEDED: up to 20

OBJECTIVES:

To describe the inter-dependence of various marine organisms with other components of a marine environment.

MATERIALS:

1. 1 spool of yarn
2. A set of index cards (enough for each child to have one)

PROCEDURE:

1. Label a set of cards with various marine organisms. Examples: sun, plant, crab, blue fish, mussel, shark, sea star, etc. Use some of the yarn to make a necklace with each card.
2. Pass out one necklace card to each student.
3. Everyone should now stand in a circle. Ask the students to think about which card represents the resource that all life needs to grow (the sun). Hand the end of the yarn to the student with the "sun" card. This student should wrap an end around his/her hand.
4. Now ask, "What would be next in the chain?" or, "What uses the sun directly to grow?" The students should decide that the answer is a plant. The person holding the sun card, while still holding onto one end of the yarn, should then toss the other end to the student with the plant nametag. You may then ask a question such as, "Who eats the plants?" in order to have the students think of where the yarn will go next. Continue through the list in the same manner until all of the labeled cards have been used and each student is holding a piece of string.
5. Ask the group to step back until the string is taught.
6. The student with the original end of string (sun nametag) should now gently begin tugging. If someone feels a tug during this time, he/she should tug in response. This should progress until everyone is tugging, which will also cause the web to shake. You may now note that all things in the ecosystem are connected.
7. At this time, a stressor should be introduced. It can be human-made (i.e. PCBs, oil spill, etc.) or natural (i.e. hurricane, severe climate change, etc.).
   Ask the students how the stressor impacts the entire ecosystem. when one of the links is damaged by stress. Have one or more links drop out of the circle due to the introduction of the stressor. Have students continue their discussion on how

the entire ecosystem is affected if one or more organisms are lost. Repeat this process until enough links have dropped out to illustrate the effect stressors have on the ecosystem.

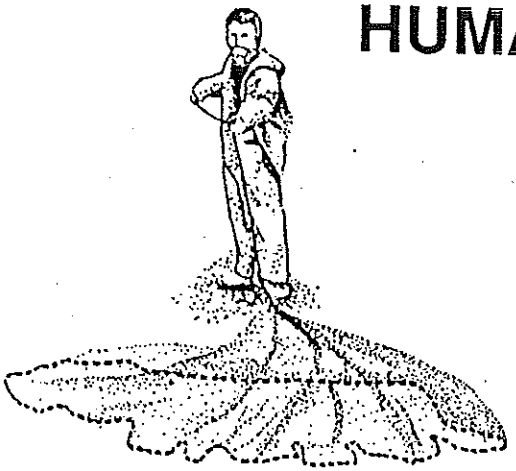
8. The following are questions that should be asked after playing a few rounds of the game:

   Q: What happens when we remove a link in the ecosystem?
   Possible Answer: Organisms that depend on it are affected.

   Q: Were the changes more dramatic when the system was composed of many parts or when it had fewer parts?
   A: Fewer.

   Q: What can we say about the relationship between how many parts the system has (its complexity or diversity) and how stable it is?
   Possible Answer: In general, complexity makes it more stable.

HUMAN



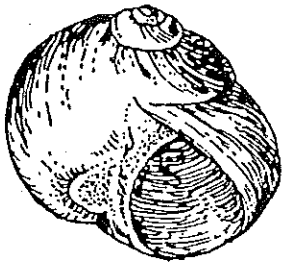
EATS:

OYSTER
FLOUNDER
BLUE CRAB
SEA BASS
SILVERSIDE
BLUEFISH

TAKEN BY:

DETRITUS

MOON SNAIL



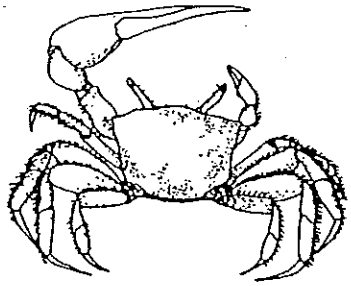
EATS:

OYSTER
MUSSEL

EATEN BY:

BLUE CRAB
DETRITUS

FIDDLER CRAB



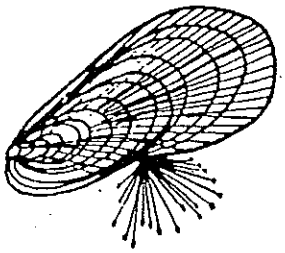
EATS:

DETRITUS

EATEN BY:

SHORE BIRDS
DETRITUS

MUSSEL

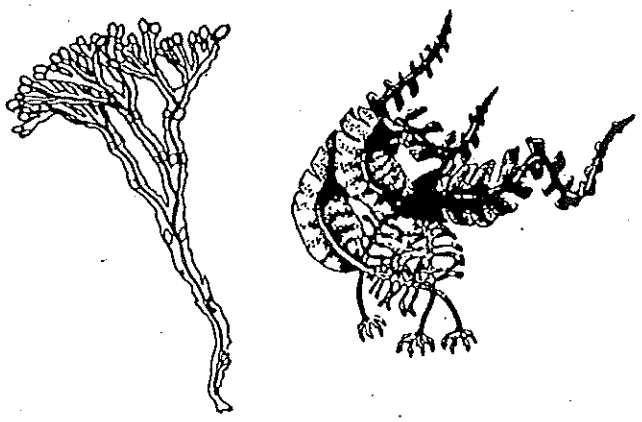


EATS:

PHYTOPLANKTON
ZOOPLANKTON
DETRITUS

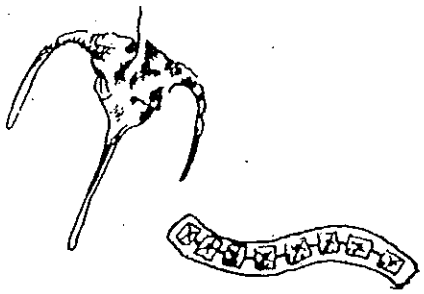
EATEN BY:

BLUE CRAB
MOON SNAIL
DETRITUS
SEA STAR



ALGAE

USES:	TAKEN BY:
SUN	DETRITUS



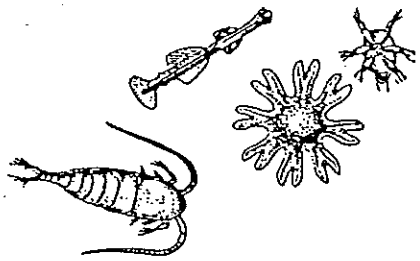
PHYTOPLANKTON

USES:	EATEN BY:
SUN	SEA SQUIRTS OYSTER MUSSEL SILVERSIDE SEA WORMS MENHADEN BARNACLES

MARINE GRASSES

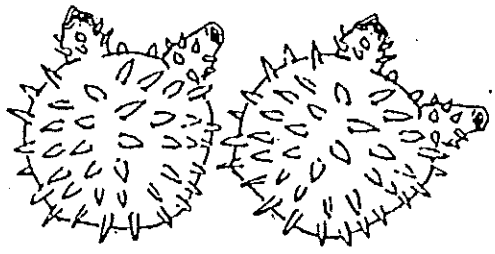
USE:	EATEN BY:
SUN	SILVERSIDE DETRITUS

ZOOPLANKTON



EATS:	EATEN BY:
DETRITUS PHYTOPLANKTON	SEA SQUIRTS SEA WORMS OYSTER MUSSEL BARNACLES SILVERSIDE MENHADEN

SEA SQUIRTS



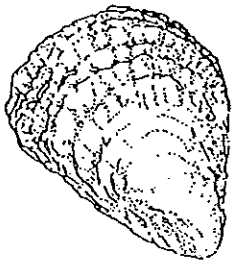
EAT:

PHYTOPLANKTON
ZOOPLANKTON
DETRITUS

EATEN BY:

DETRITUS

OYSTER



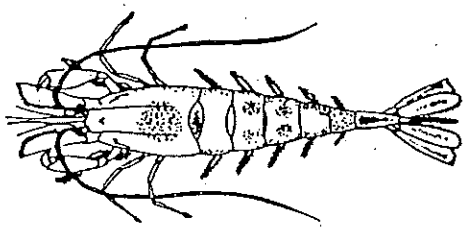
EATS:

PHYTOPLANKTON
ZOOPLANKTON
DETRITUS

EATEN BY:

BLUE CRAB
HUMAN
DETRITUS
MOON SNAIL
SEA STAR

SHORE SHRIMP



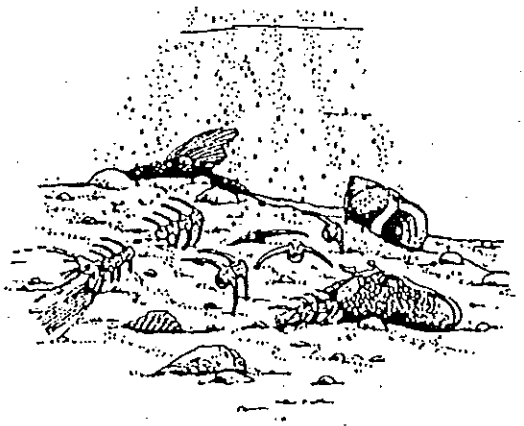
EATS:

DETRITUS

EATEN BY:

FLOUNDER
SEA BASS
DETRITUS

DETRITUS



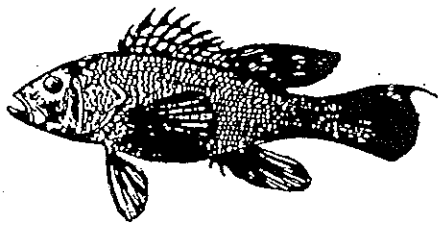
EATS:

ALL LIVING THINGS

USED BY:

PLANTS

SEA BASS



EATS:

SILVERSIDE
SHRIMP
SEA WORMS
BLUE CRAB

EATEN BY:

HUMAN
DETRITUS

SEA WORMS

EAT:

PHYTOPLANKTON
ZOOPLANKTON
DETRITUS

EATEN BY:

SILVERSIDE
FLOUNDER
SEA BASS
DETRITUS
SHOREBIRDS

BARNACLES

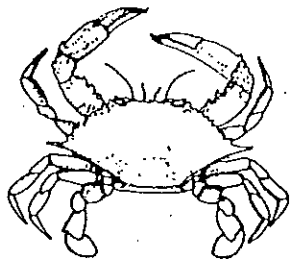
EAT:

PHYTOPLANKTON
ZOOPLANKTON
DETRITUS

EATEN BY:

BLUE CRAB
DETRITUS

BLUE CRAB



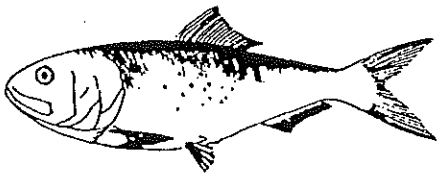
EATS:

MUSSEL
OYSTER
BARNACLES
SILVERSIDE
MOON SNAIL

EATEN BY:

HUMAN
SEA BASS
DETRITUS

MENHADEN



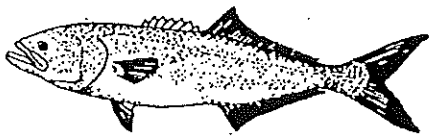
EATS:

DETRITUS
ZOOPLANKTON
PHYTOPLANKTON

EATEN BY:

BLUEFISH
DETRITUS

BLUE FISH



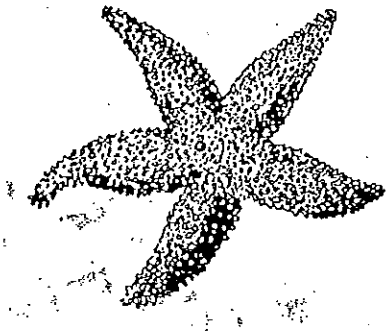
EATS:

MENHADEN
SILVERSIDE

EATEN BY:

HUMAN
DETRITUS

SEA STAR



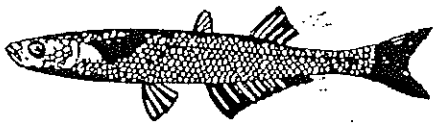
EATS:

OYSTER
MUSSEL

TAKEN BY:

DETRITUS

SILVERSIDE



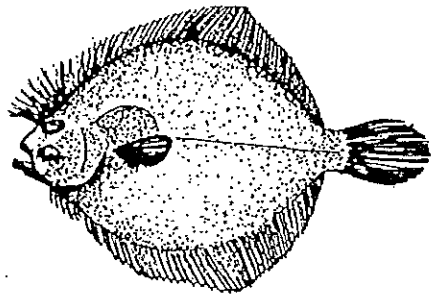
EATS:

DETRITUS
ZOOPLANKTON
PHYTOPLANKTON
MARINE GRASSES

EATEN BY:

BLUE CRAB
FLOUNDER
SEA BASS
BLUEFISH
HUMAN

FLOUNDER

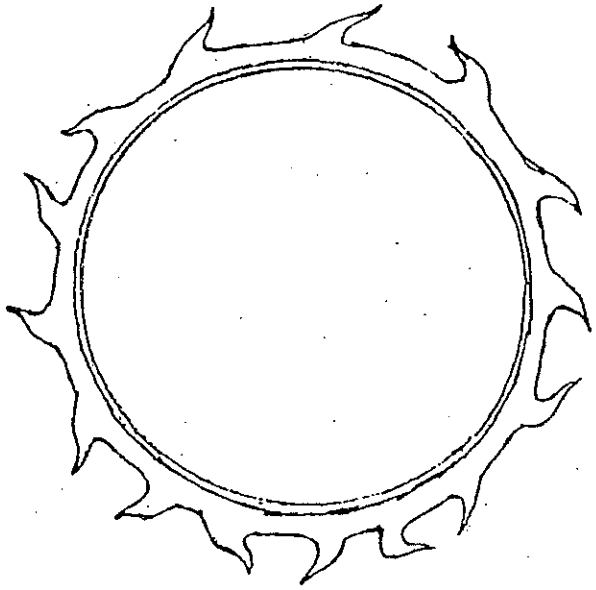


EATS:

SILVERSIDE
SHRIMP
SEA WORMS

EATEN BY:

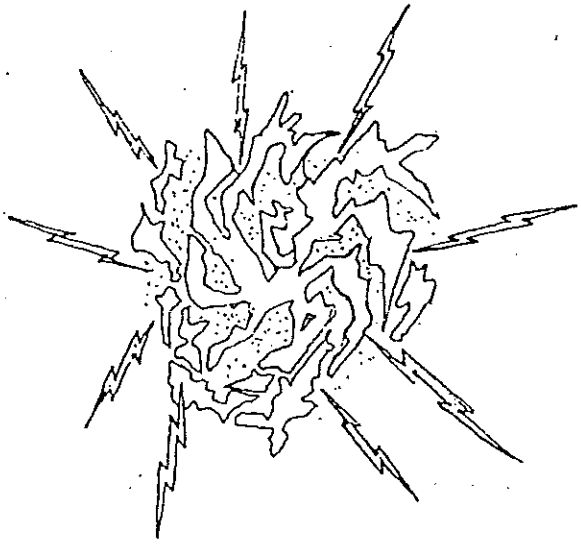
HUMAN
DETRITUS



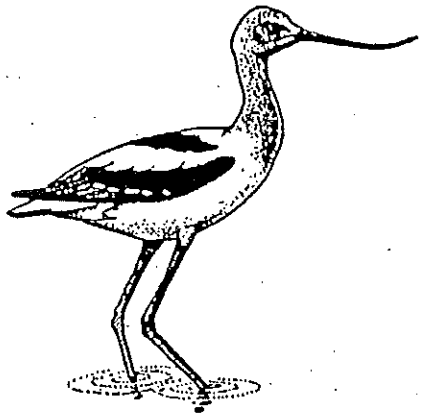
SUN

USED BY:

ALL PLANTS



DISASTER



SHORE BIRDS

EAT:

SILVERSIDE
FIDDLER CRAB
SEA WORMS

TAKEN BY:

DETRITUS

Strand 2: Life Science (Biology)

Grades 3 - 5

Topic	Learning Standard	Example
Characteristics of plants and animals	1. Classify plants and animals according to the physical characteristics that they share.	Through the introduction and background information, students should be introduced to the organisms that are being used in the food web..
Adaptations of living things	7. Give examples of how changes in the environment have caused some plants and animals to die or move to new locations.	Students should understand how human actions and pollution have caused some organisms to die off and the effects this has on the food web.
Energy and living things	11. Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers to consumers to decomposers.	Students will discover how energy is transferred through the food web.

Strand 2: Life Science (Biology)

Grades 6-8

Topic	Learning Standard	Example
Living things and their environment	13. Give examples of ways in which organisms interact and have different functions within an ecosystem that enable the ecosystem to function.	Through this activity students discover the different roles organisms play in the food web and thus the ecosystem..
Energy and living things	14. Explain the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.	Students will discover the roles different plants and animals have in a marine food web.
	15. Explain how dead plants and animals are broken down by other living organisms and how this process contributes to the system as a whole.	Students discover the importance of decomposers in the marine food web and the recycling of minerals and nutrients.
	16. Recognize that producers (plants that contain chlorophyll) use the energy from sunlight to make sugars from carbon dioxide and water through a process called photosynthesis. This food can be used immediately, stored for later use or used by other organisms.	Through this activity students will discover how energy is transferred from the sun to the plants to the consumers in a marine food web.

Web of Life

Connections to the Massachusetts Science and Technology/Engineering Curriculum Framework May 2001

Guiding Principal V: Investigation, experimentation, and problem solving are central to science and technology/engineering education.

Investigations introduce students to the nature of original research, increase students' understanding of scientific and technological concepts, promote skill development, and provide entry points for all learners.

Guiding Principal VI: Students learn best in an environment that conveys high academic expectations for all students.

School districts should also invite role models from business and the community (including professional engineers and scientists to visit classes, work with students, and contribute to instruction.

Guiding Principal X: Implementation of an effective science and technology/engineering program requires collaboration with experts, appropriate materials, support from parents and community, ongoing professional development and quantitative and qualitative assessment.

In addition, local members of the science and engineering community may be able to lend their own expertise to assist with the implementation of a new curriculum. Teachers and administrators should invite scientists, engineers, higher education faculty, and representatives of local businesses and museum personnel to help evaluate the planned curriculum and enrich it with community connections.