



MODULE 04 | TEACHER GUIDE

Baykeepers

Save the Living Bay | English B1–B2 | Ages 15–18 | 60–90 minutes

Students become a coastal conservation team. They build a food web with illustrated organism cards, explore two changes to the bay and create a small exhibition poster. Their goal is to explain why protecting a habitat can help several forms of life.

Learning outcomes

Students can identify producers and consumers, draw food-to-eater arrows and explain one direct and one possible indirect effect. They can use evidence from a model to support a conservation decision. B2 learners compare alternatives and explain the limits of the model.

Lesson sequence

Time	Activity	Result
0–5 min	Ask: Can a tiny organism matter as much as a large animal? Read the mission on p. 2.	Initial ideas
5–13 min	Read the science brief and glossary together. Check the example arrow.	Shared vocabulary
13–28 min	Use p. 3 and the cards on pp. 4–5 to build the food web.	Eight-card network
28–40 min	Work through the two events on p. 6. Reset before Event B.	Cause-and-effect notes
40–55 min	Choose a plan and design the mini-poster on p. 7.	Conservation message
55–60 min	Pair teams. Explain one link and one reason for your plan.	Peer questions

Preparation and support

Print pp. 2–7 for each team of four. Print pp. 4–5 single-sided and cut on the dashed lines. Retain p. 8 for the teacher. Supply two A3 sheets, pens and eight small paper markers. Use the first A3 sheet for the food web and the second for the poster.

Roles: card reader, arrow checker, recorder and speaker. B1: read aloud in pairs and use the sentence frames. B2: explain a second possible effect. The cards represent selected organisms or groups, not eight individual species. Illustrations are not to scale.

Optional extension to 90 minutes

Add 15 minutes for teams to improve their posters after peer feedback. Add 15 minutes to write a 100–140-word message to the council, including one limitation of the model and one way to check the plan's results.

This fictional bay and its event rules are classroom models. They do not predict population numbers or automatic extinction. No live organisms, field collection, online accounts or public posting are required.

Ocean Literacy links: principle 5, the ocean supports diverse life and ecosystems; principle 6, people and the ocean are connected. Scientific background and suggested answers appear on p. 8.



STUDENT SHEET 1 | YOUR MISSION

Small lives matter

A town wants to protect its bay. Some people care most about birds and fish. Others say the underwater plants and tiny animals matter too. Your team is the Baykeepers. Show how the lives in the bay are connected. Then choose a protection plan.

Read before you play

An ecosystem includes living things, their physical surroundings and the links between them. A habitat is a place where an organism lives. Biodiversity is the variety of life. It includes differences within species, between species and between ecosystems.

Producers, such as algae, use sunlight to make food. Consumers get energy by eating other organisms. A food web shows several feeding relationships. An arrow goes from the food to the eater: phytoplankton → zooplankton means that zooplankton eats phytoplankton. [1]

Food is not the only connection. Seagrass is a flowering plant that grows under seawater. Its leaves can provide shelter for small fish and other animals. Seagrass and seaweed are different kinds of organisms. Both can help create habitats. [2]

If a habitat is damaged, animals may lose shelter or feeding places. Some may move, but another place may not offer the same conditions. Losing one food source may also affect other animals. We often say “may” or “could” because real ecosystems are complex.

Our model

Your eight cards show only part of the bay. Some cards represent groups rather than one species. Use the listed diets for the game. Real diets and habitat use are wider and can change with age and season. The S, R and O codes are simplified places in this fictional bay.

Seagrass appears as a habitat, not a food card. Bacteria, fungi and dead material are also missing from the card set. Decomposers break down dead material and help recycle nutrients. A real ecosystem needs these links too. [1]

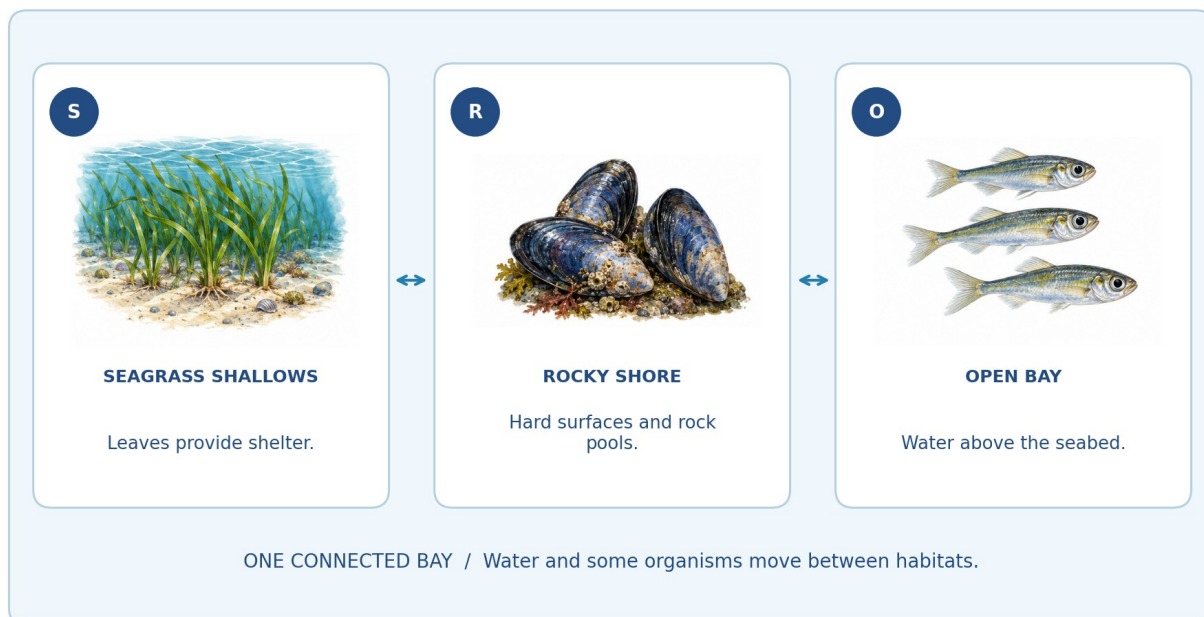
Word bank

Word	Meaning
organism	A living thing.
shelter	A place that gives protection.
producer / consumer	Makes its own food / eats other organisms.
direct / indirect effect	An immediate link / a change through another link.
protect / restore	Prevent damage / help a damaged habitat recover.

Before you start: name one producer and one consumer. Explain why a small organism might matter to a large animal.

STUDENT SHEET 2 | BUILD THE BAY

Connect the living world



A schematic habitat board, not a map to scale. S, R and O are habitat codes on your cards. A card may use more than one habitat.

Round 1 Build your food web

- 1 Give each person two cards. Read them and explain them to the team.
- 2 Put all eight cards beside your A3 sheet. Write their numbers and names on the sheet. Circle the two producers.
- 3 Read each "Eats in our model" line. Draw an arrow from each food card to the animal that eats it. Use every listed link.
- 4 Write the habitat codes beside each name. Keep feeding arrows separate from habitat information.

Example: card 01 → card 03 means "Zooplankton eats phytoplankton." The arrow shows the direction of energy transfer. Water can carry plankton from O towards mussels at R.

Check your network

Find a chain from a producer to the heron. Read it aloud using "is eaten by".
Find an animal with two food sources in the model. Why might that be useful?
Which cards use S? Does using another habitat mean losing S would not matter?

Language help

"Card ... is eaten by card ..."
"The ... needs ... for food / shelter."
"If ... becomes less available, ... may ..."
B2: "Another habitat may help, but ..."

B2 challenge: explain one important relationship that our eight-card food web does not show.

STUDENT SHEET 3 | CUT-OUT ORGANISM CARDS

The start of the food web

01



PHYTOPLANKTON

PRODUCER / HABITAT O

Tiny algae drifting in water. They use sunlight to make food.

Food link: no food card needed.

Tiny does not mean unimportant.

BAYKEEPERS / LIFE IN THE BAY

02



SEAWEEDS

PRODUCER / HABITAT R

Larger algae growing on rocks. They use sunlight to make food.

Food link: no food card needed.

They also give small animals shelter.

BAYKEEPERS / LIFE IN THE BAY

03



ZOOPLANKTON

CONSUMER / HABITAT O

Small animals drifting in water. This card represents plant-eating zooplankton.

Eats in our model: 01.

Many larger animals depend on tiny food.

BAYKEEPERS / LIFE IN THE BAY

04



BLUE MUSSELS

CONSUMER / HABITAT R

Shellfish attached to hard surfaces. They filter tiny food from the water.

Eats in our model: 01.

Water can carry food to an animal.

BAYKEEPERS / LIFE IN THE BAY

Cut along the dashed lines. S = seagrass shallows; R = rocky shore; O = open bay. The artwork shows examples of each group and is not to scale.

STUDENT SHEET 4 | CUT-OUT ORGANISM CARDS

Small animals and their hunters

05



AMPHIPODS

CONSUMER / HABITAT S + R

Small crustaceans living among plants and rocks. Some eat algae and dead material.

Eats in our model: 02.

They are food for fish and crabs.

BAYKEEPERS / LIFE IN THE BAY

06



SHORE CRABS

CONSUMER / HABITAT S + R

Crabs use shallow coastal habitats. They eat different animals and other food.

Eats in our model: 04 and 05.

Losing one food source may change a diet.

BAYKEEPERS / LIFE IN THE BAY

07



SMALL FISH

CONSUMER / HABITAT S + O

This card represents small fish that eat tiny animals. Seagrass can provide shelter.

Eats in our model: 03 and 05.

Open water does not offer the same shelter.

BAYKEEPERS / LIFE IN THE BAY

08



GREY HERON

CONSUMER / HABITAT S + R

A bird that hunts in shallow water. Fish are an important part of its diet.

Eats in our model: 07.

A bird can depend on life below water.

BAYKEEPERS / LIFE IN THE BAY

These cards show selected feeding links. They are not full diets or complete habitat lists. Use the card numbers to build and check your web.



STUDENT SHEET 5 | EVENT ROUNDS

What changes when a habitat is lost

Event A Damaged seagrass

In our fictional bay, repeated boat anchoring damages the seagrass meadow. For this round, treat S as unavailable. Cover S on every card that uses it. Add a small warning marker to those cards. Keep the food arrows for now.

- 1 Which four cards lose a listed habitat?
- 2 Which other habitat does each still have?
- 3 Explain why less shelter or less feeding space may still be a problem. Do not claim that every marked animal dies.

Card number	Other habitat	What may become harder?
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

"The ... can also use ..., but it may have less ..."

Reset your bay

Uncover S and remove all warning markers. Event B is a separate scenario. Do not carry damage from Event A into Event B.

Event B Mussels disappear locally

Construction removes the mussel-covered surface in part of the rocky shore. For this simplified round, take card 04 out of the food web and cross out its food arrows. All other cards stay. This represents local loss, not global extinction.

- 1 Which animal loses one food source? What other food does it still have?
- 2 Follow a possible further effect: if crabs eat more amphipods, what might change for fish? What might then change for the heron?
- 3 Is this the only possible result? Use "may", "could" or "we do not know".

B2 challenge: name one measurement that could help test your explanation. Counting our remaining cards is not a real biodiversity survey: the cards mix species and groups.



STUDENT SHEET 6 | THE PROTECTION CHALLENGE

Make a case for the whole bay

The town has six planning tokens. Choose two or three actions costing no more than six. These are invented classroom costs. Consider both events on p. 6 as possible problems. No plan is guaranteed to solve everything.

Action	Cost	Benefit and limit
A Protect seagrass	3	Create a marked no-anchor zone. Reduces future anchor damage; does not instantly regrow lost plants.
B Protect rocky habitat	3	Change construction plans to avoid living rocky surfaces. Protects habitat; building work may need a different design.
C Survey the bay	2	Count selected organisms and map habitats regularly. Helps check change; does not directly stop damage.
D Inform visitors	1	Create signs and a short guide about wildlife. Helps people understand; results depend on their actions.

Our actions: _____ Total: _____ / 6 tokens.

We chose them because: _____

One problem they do not solve: _____

Create a mini-exhibition poster

Use your second A3 sheet. Make the title "Small lives matter". Include:

- A drawing of one habitat and three connected organisms.
- Two food-to-eater arrows, checked against the cards.
- A 40–60-word message with one possible effect of damage and your plan.
- One way to check whether your plan is helping.

You can choose three organisms from a longer chain. Your poster is a small example, not the whole food web.

Writing frame

"Our bay needs ... The ... is eaten by ... If ... is damaged, ... may ... We propose ... because ... This will not ... We will check ..."

Gallery conversation

Pair up with another team. Explain your poster in one minute. Ask the other team: "Which link shows why this habitat matters?" and "What can your plan not solve?" Improve one sentence after the feedback.

B2 challenge: compare your plan with another affordable plan. Which trade-off matters most to you, and why?



TEACHER SHEET | ANSWERS AND SOURCES

Connections and suggested responses

Food web and habitats

Producers: 01 and 02. Eight feeding arrows: 01 → 03, 01 → 04, 02 → 05, 03 → 07, 05 → 07, 04 → 06, 05 → 06, 07 → 08. Example chains: 01 → 03 → 07 → 08 and 02 → 05 → 07 → 08. Cards 06 and 07 each have two listed foods. Accept only listed links for checking this model; real webs include many more. [1, 3–5]

Habitat S: 05, 06, 07, 08. Their remaining habitats are R, R, O and R respectively. Losing S can reduce shelter or feeding opportunities even when another code remains. The codes describe this activity, not universal species requirements. Seagrass is a habitat-forming plant and producer, although it has no separate food card. [2]

Event reasoning

Event A: mark the four S cards; do not remove any organism automatically. Movement may help, but alternative places may have less space, food or suitable shelter. Event B: remove 04 and arrows 01 → 04 and 04 → 06. Crab 06 still has amphipods 05. If crab feeding on amphipods increases, fish may have less of that food and herons could be affected through fish. This is a hypothesis, not a certain cascade: other prey, movement and population responses could change the outcome.

Useful checks include repeated habitat-area surveys, counts of the same selected organisms at matched sites and times, and observations of feeding. A real biodiversity survey should use consistent species identification and sampling effort. Eight mixed organism cards cannot provide a species-richness score.

Plans and sample poster text

A+B = 6 prioritises preventing physical damage but funds no survey or visitor guide. A+C+D = 6 supports seagrass protection, monitoring and information but does not directly change rocky-shore construction. B+C+D = 6 leaves the anchoring problem untreated. Other two- or three-action plans within budget are valid with reasons. Treat benefits as aims, not measured guarantees.

"Seaweeds are eaten by amphipods, which are eaten by small fish. If rocky habitat is damaged, this food link may become weaker. We propose changing construction plans, surveying the bay and informing visitors. This will not stop anchor damage. We will check habitat area and counts at the same sites over time."

Assessment

Award 0–2 each for correct feeding arrows, habitat reasoning, cautious cause-and-effect language, a justified affordable plan and clear communication. B1: short linked sentences and frames are welcome. B2: expect alternatives and a limitation. Do not reward confident but unsupported extinction claims.

Sources

- [1] NOAA. Aquatic food webs. <https://www.noaa.gov/education/resource-collections/marine-life/aquatic-food-webs>
- [2] NOAA Fisheries. The Importance of Eelgrass. <https://www.fisheries.noaa.gov/feature-story/importance-eelgrass>
- [3] MarLIN. Common shore crab. <https://www.marlin.ac.uk/species/detail/1497>
- [4] MarLIN. A gammarid shrimp. <https://www.marlin.ac.uk/species/detail/1699>
- [5] RSPB. Grey Heron. <https://www.rspb.org.uk/birds-and-wildlife/grey-heron>

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