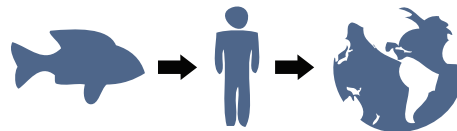




# Connections

*What have we got to lose? In order for students to understand the real problem of marine debris, they need to learn about what lives in the ocean and why it is important. Art, drama and games help students to communicate complex scientific relationships and foster a sense of stewardship towards their local ecosystem.*

## Orientation: What is an ecosystem?



Do as a whole class or prepare Ss for group work. Ask Ss to make a list of five things that live in the ocean. Elicit quickly from Ss – you can go through the letters of the alphabet and ask if anyone has written down something beginning with that letter. Make a list on the whiteboard. Alternatively, Ss in small groups list the letters A-Z and write the name of living and non-living things found in oceans next to each letter.

T then picks one of those animals and asks Ss what does this animal need to survive? Elicit answers from Ss and write on the whiteboard. T can then start building on the concept of an ecosystem with Ss making a drawing on the whiteboard. See the end of the lesson for an example of the type of drawing you could make. Ask questions such as: 'What does a shark eat?', 'Why is seaweed important?', 'What would happen to the marine life if the water got really cold?', 'Do any of these animals breath oxygen?', 'Is rubbish part of our natural environment?', 'What happens if an animal disappears?' and 'Who is affected?'. The idea is to make Ss aware that all species are somehow linked and rely on each other to exist.

## Class ecosystem: create a marine display

It could be a shoreline that meets the sea or an under-the-ocean display. Ss could start off drawing their own idea of a marine ecosystem on paper (similar to what was demonstrated on the whiteboard). Have a class discussion about what will be included in the class display and then decide who will make what items to put in the display, what materials will be used and how much time will be spent making it.

## Rubbish in our ecosystem:

For a really good video clip about plastic in the ocean and food web watch: <http://www.oneworlddoneocean.com/video/entry/ocean-heroes-5-gyres-ep.-1>

## YEAR LEVEL

Years 4 – 6

## MATERIALS

PowerPoint presentation  
4-6 Lesson 2.ppt

Equipment for students to view  
PowerPoint presentation on

Art materials for making a  
class marine habitat

Blank Food Pyramid Diagram

Example ecosystem picture

Coloured armbands or sports  
shirts

Different coloured tokens  
(to represent food in the  
ecosystem game)

## KEY WORDS

- Ecosystem
- Survive
- Marine life
- Producers
- Consumers
- Decomposers
- Source
- Energy
- Food chain
- Carnivores
- Omnivores
- Herbivores
- Trophic levels





# Connections

## The roles of living things:

Use the Food Pyramid Diagram for Ss in this activity – see the end of this lesson, or use the Lesson 2 Connections PowerPoint presentation if you want to show the whole class on the whiteboard. In this activity, Ss explore that different living things in their marine ecosystem have different roles: top predator, carnivores, herbivores and producers. Use one of the food webs that have been created in the class, or use the one at the end of this lesson. Ask Ss where the main source of energy comes from for their marine ecosystem (sunlight). Producers are plants that take the energy from the sunlight to produce their own food. Spend some time getting Ss to give some examples of producers from the marine ecosystem. Then proceed to go through the other roles. Use the blank Food Pyramid Diagram for Ss to draw pictures and write some examples of marine life in each category.

## Ecosystem game: Plastic in our food

**Equipment:** food tokens, use different coloured ice-cream sticks or other tokens. Put some stickers on a few of the tokens to represent pollution. Don't tell Ss what the stickers on the tokens mean because the idea is for Ss to reflect and realise that animals can't tell the difference of what they are choosing to eat.

## Set the game up:

Take students to your playing area. Give each student a coloured armband. When distributing armbands, about 2/3 of the class should receive one colour to represent herbivores; most of the remaining students should be 1st and 2nd level carnivores; leaving two or three top carnivores. It helps to assign the fastest runners in the class to the top carnivore roles! Ask students to name a specific animal from your ecosystem with that role in the food pyramid.

Show students the food tokens. These tokens will represent food energy in our game. Scatter the tokens throughout the playing area and define specific boundaries within which students can run.

## Establish the rules:

The object of this game is to collect energy in the form of food tokens (first trophic level), following these rules:

Herbivorous consumers represent the second trophic level. Herbivorous consumers can collect tokens directly from the ground (in this case, the tokens would be plants growing on the ground). Herbivorous consumers will be given a 30-second head start; count down from 10 until the entry of the carnivorous consumers

Carnivorous consumers represent the next trophic level and they eat herbivorous consumers. This means that they must tag a herbivorous consumers in order to collect a food token. Carnivorous consumers cannot collect tokens directly from the ground and will need some time to collect tokens from herbivorous consumers. Count down from 10 until the entry of the top carnivores.

Top carnivores represent the top trophic level in this ecosystem. They eat carnivorous consumers and therefore they must tag a carnivorous consumers in order to collect a food token. Top carnivores cannot collect tokens directly from the ground nor collect tokens by tagging herbivorous consumers. Players must stay within designated boundaries. Players cannot be tagged twice in a row. Ss may tag someone else and then come back.





# Connections

## Monitor the game:

Allow the game to run for a few minutes, gauging when the students begin to get tired. This will happen relatively quickly as this game burns a lot of energy.

## Review the game:

Gather the group back into a circle. If they haven't already begun to count their food tokens, invite students to do so. What do the food tokens represent?

If students collected seven or less tokens, they did not get enough food to survive. If students collected eight or more tokens, they did get enough food to survive.

Ask students to sit down if they did not get enough food. Of those who remain standing, have students examine their food tokens for stickers. The stickers represent pollution in the food chain. Any student with three or more stickers has been poisoned by pollution.

## Consider the implications:

What three things did organisms need to do in this game to survive? (Escape predators, get food and avoid pollution.)

Questions could be: 'When getting food, what were the survival strategies you used?', 'When avoiding predators, did you stay still or run faster?', 'Are these the same strategies animals might use in an ecosystem?', 'Why weren't you told about the stickers on the food tokens?', 'Do animals have any way of knowing whether the food they are eating is polluted?'

Of the survivors: 'Which type of organism had the best chance of survival?'

Note how the polluted food tokens worked their way up through the trophic levels of the food pyramid. In what ways has this game demonstrated the interconnectedness of the food pyramid?

How many more students would have survived this game if the class had done a 'beach/river clean-up' and removed the stickers from the food tokens? In real life, how do you think a beach clean-up can change the outlook for an individual organism's survival?

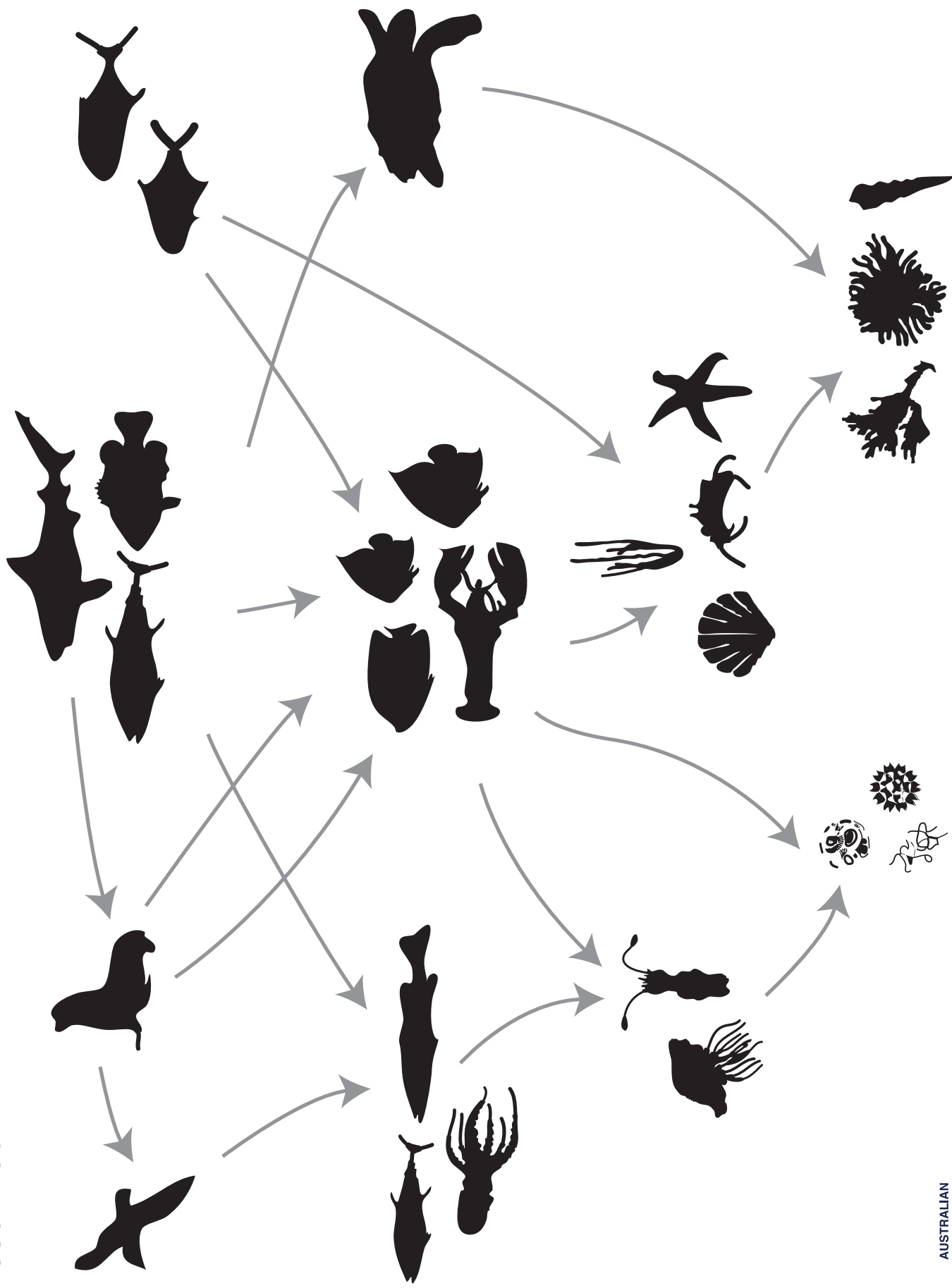
## Game variations:

Older and wiser – play the game again with students knowing about the polluted food tokens. How does this change the game strategy? Is it harder to get enough food to eat?

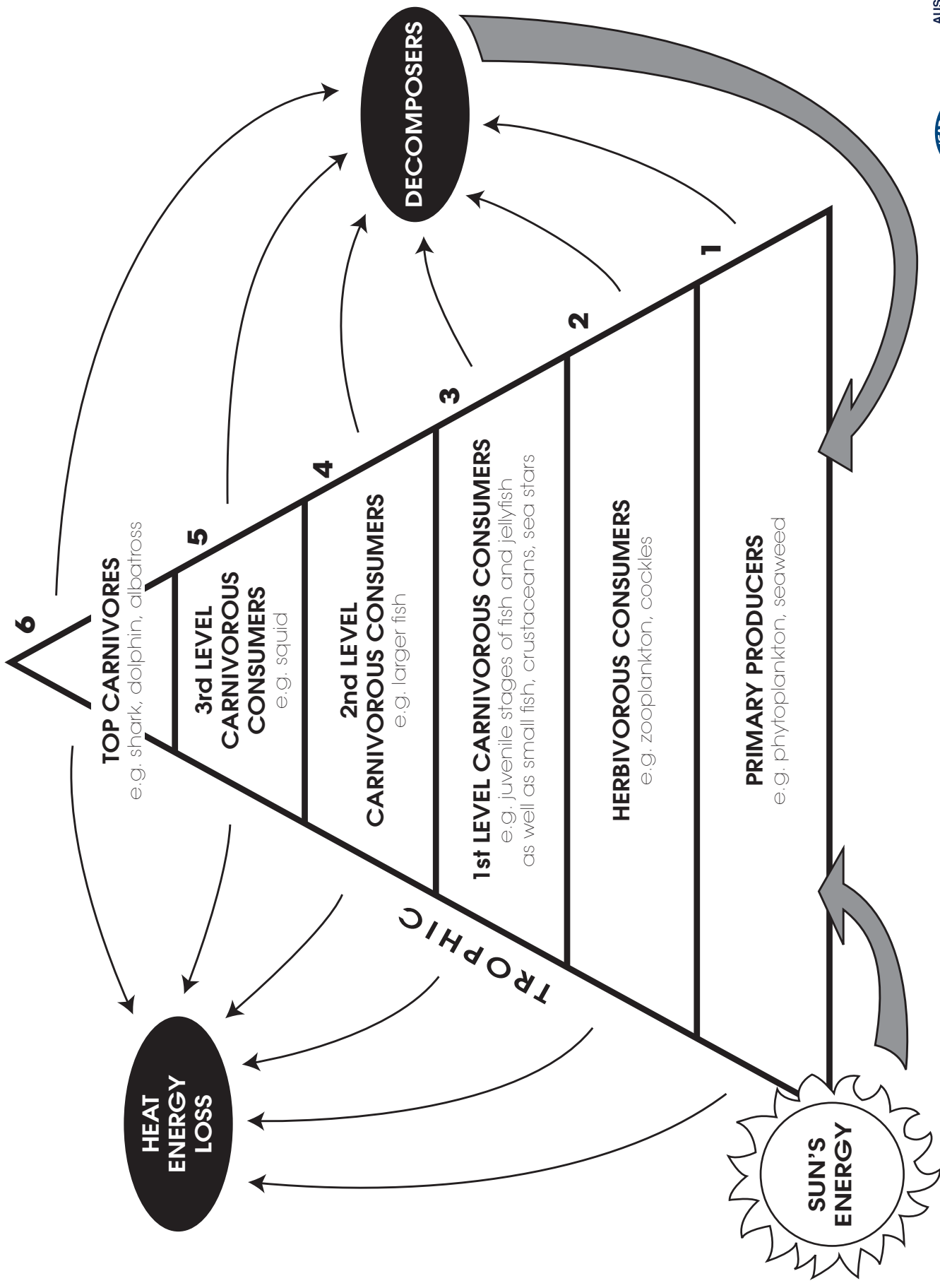
A new element – add in a 'decomposer' student: if you are tagged by this student, you have to hand over all your food tokens, which the decomposer then redistributes in the environment (i.e. scatters the food tokens on the ground again for others to use).



# Marine Food Web



# Food Pyramid Diagram



# Food Pyramid Diagram

