WILDTRUST™

SMALL SCALE FISHERS

MODULE 01

SESSION PACK

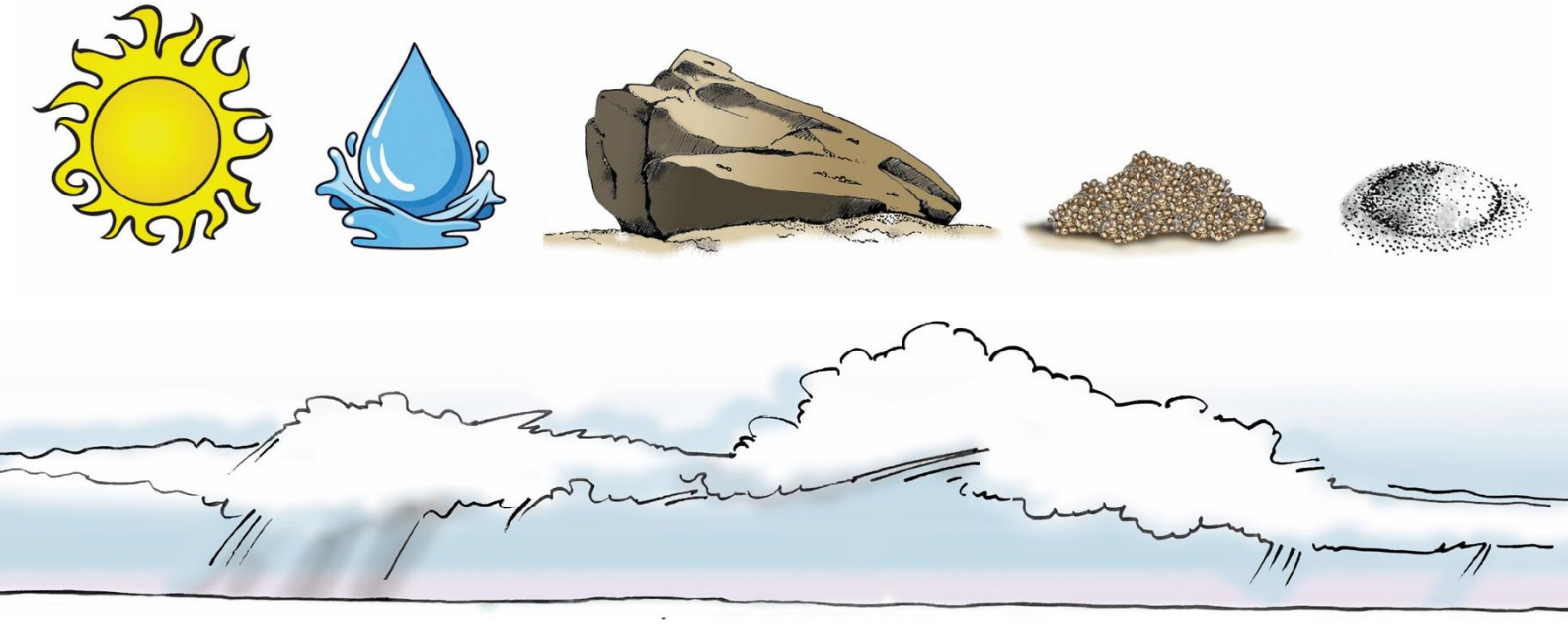
SESSION PLAN: ROCKY SHORE ECOSYSTEM INTERACTIONS

SESSION OBJECTIVES:

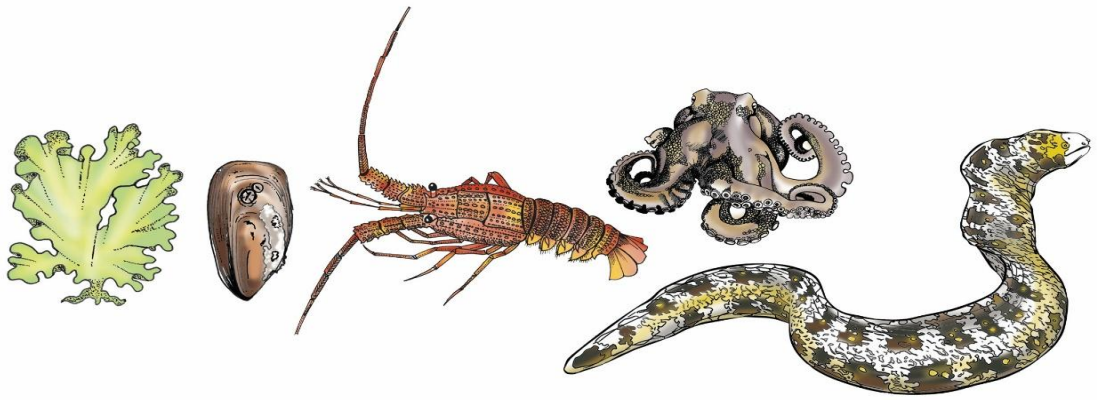
The aim of this session is to demonstrate the relationship between living and non-living organisms in the rocky shore ecosystem as well as a basic food web and the relationship between harvesters and the ecosystem.

NOTES FOR FACILITATOR:

Some examples of non-living components: Rocks, Water, Salt, Sun, Air, Sand



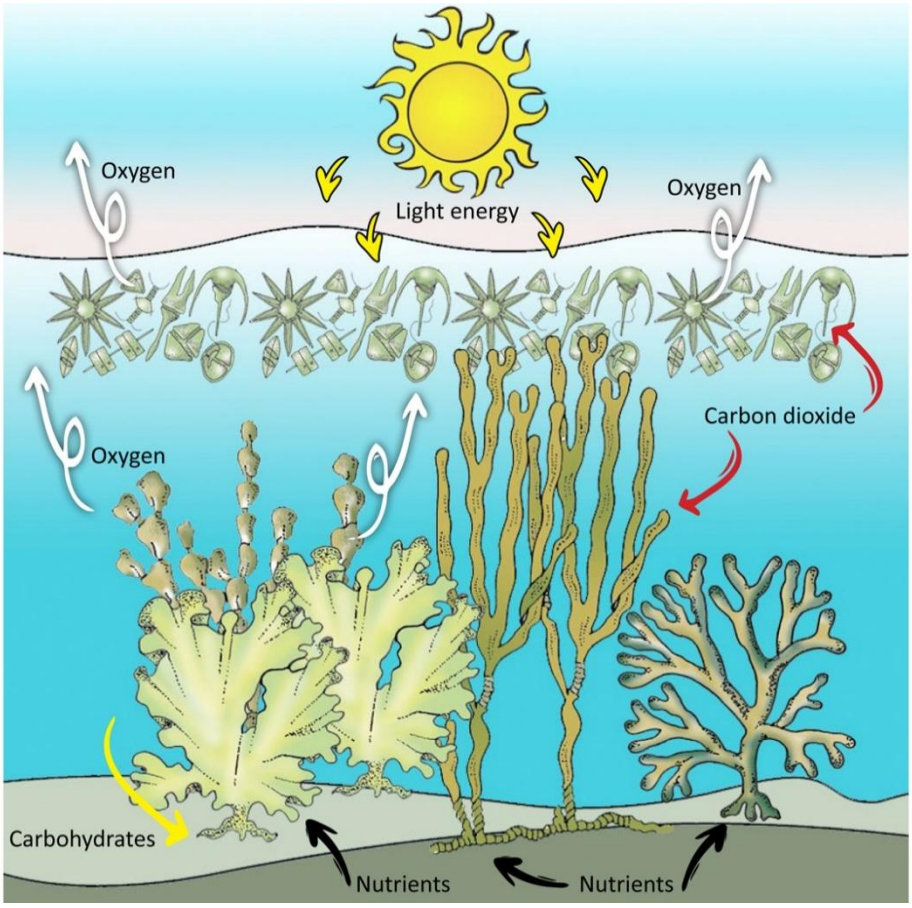
Some examples of living organisms found in rock pools: Plankton, seagrass, algae, sponges, mussels, tube worms, shrimps, hermit crabs, anemones, barnacles, limpets, whelks, mussels, starfish, urchins, oysters, sea cucumbers, red bait, eels, octopus, rock lobster, fish, kelp gull.



Examples of interactions between living organisms and their non-living environment:
These examples illustrate the intricate balance between living and non-living components, emphasizing their importance in maintaining the health and stability of the ecosystem.

1. **Photosynthesis in Plants and Algae:**

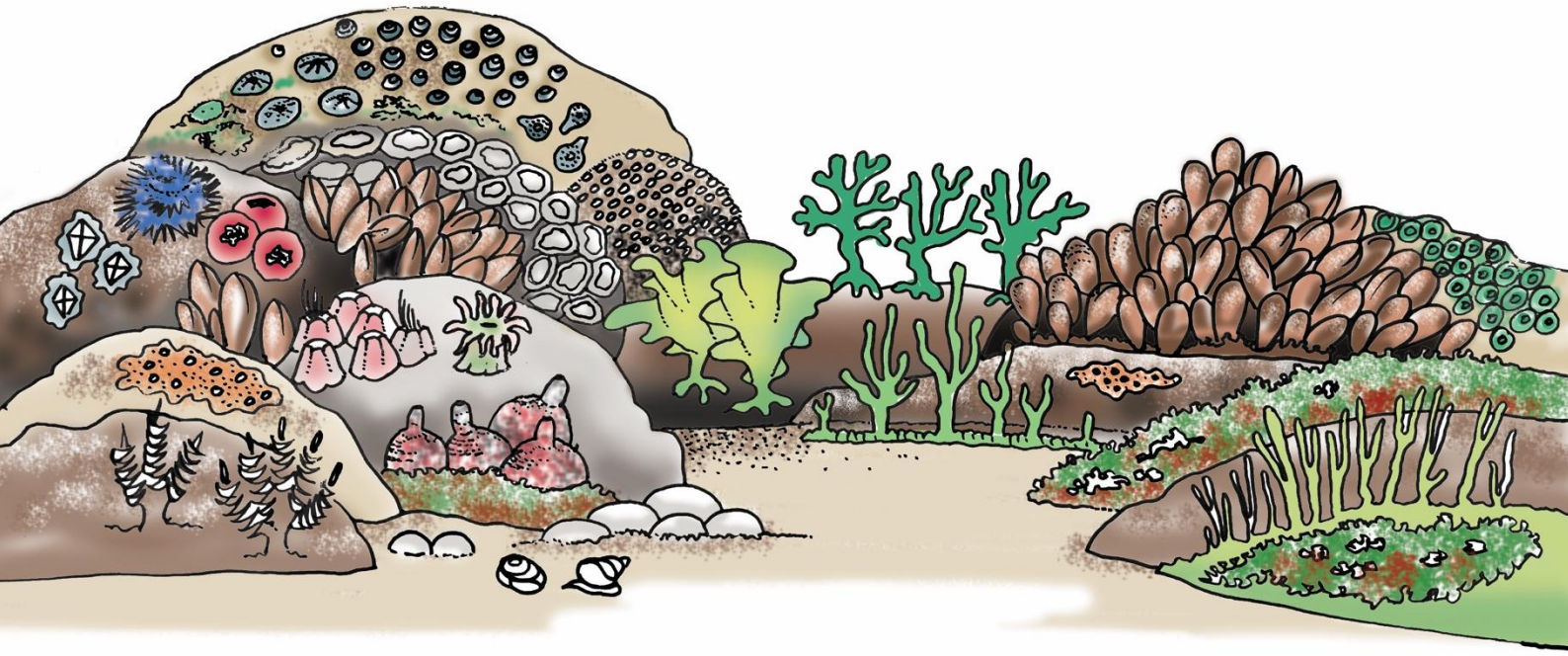
   Plants and Seaweeds: These organisms use sunlight to perform photosynthesis, converting water and carbon dioxide into glucose (food) and oxygen. This process provides essential nutrients for themselves and contributes oxygen to the surrounding water, crucial for the respiration of aquatic animals.



2. **Rocks as Habitat and Protection:**

   Protection from Waves: Rocks buffer the impact of waves, creating calmer zones where organisms can survive despite the harsh conditions of the open shore. This protection is essential for species that need a stable environment for feeding or reproduction.

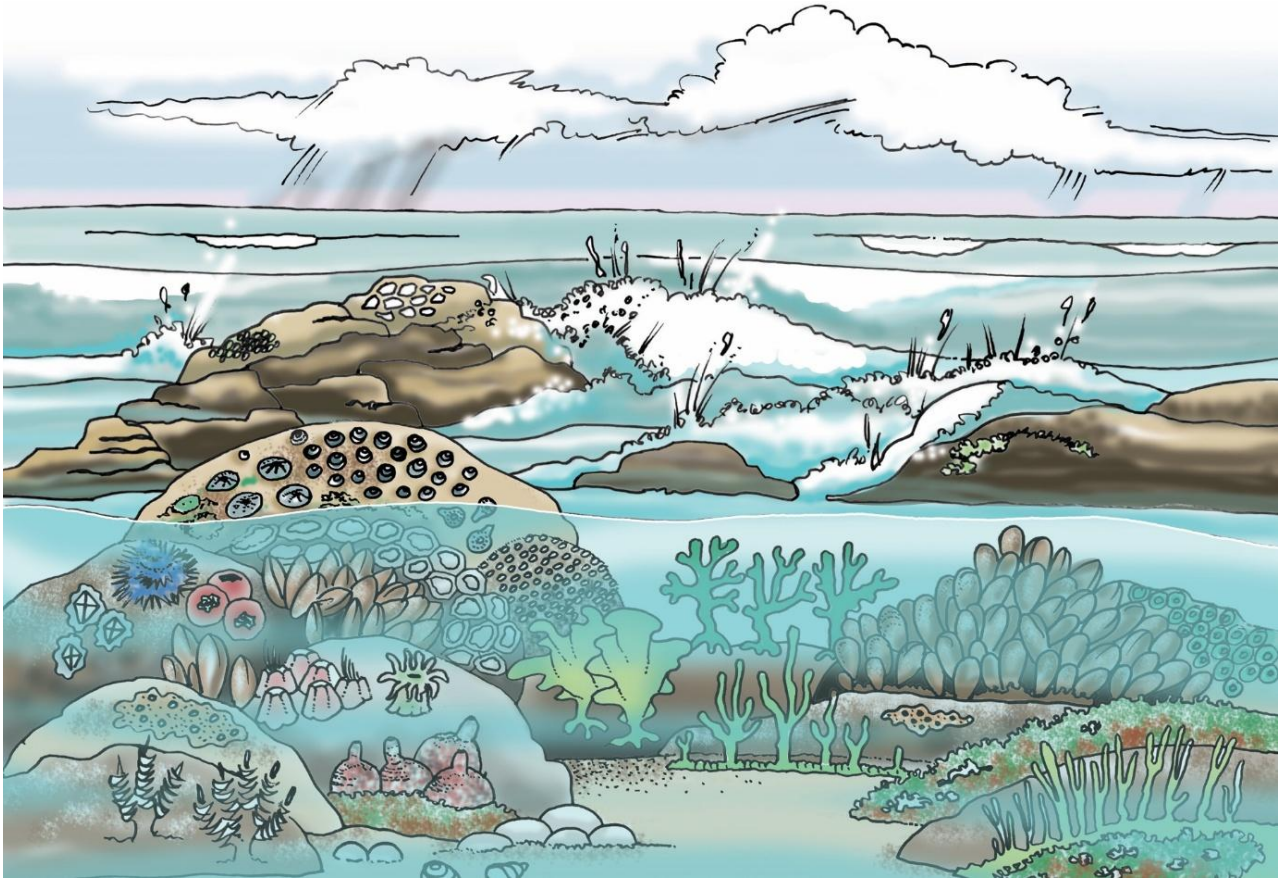
Substrate for Attachment: Many organisms, like mussels, barnacles, and sea anemones, rely on rocks for stability. The rough, uneven surface offers an ideal environment for them to cling to and thrive.



3. **Nutrient and Food Transport:**

Water Flow: The movement of water plays a crucial role in distributing nutrients and food particles. Sessile (non-moving) organisms, like mussels, rely on water currents to bring in plankton and other food sources, ensuring their survival.

4. **Rocky shore ecosystem illustrating interactions between living organisms and their non-living environment**



INTRODUCTION ACTIVITY:

Ask the learners to name some living and non-living organisms found in the rocky shores. List what they say on the board.

Ask the learners if they could describe/explain any interactions between the living organisms and the non-living environment in the rocky shores i.e. the rocks provide shelter from waves and a place for the mussels to attach.

MAIN ACTIVITY: Rock pool activity

1. *Print out* (A3 size or bigger if possible) and *show* the learners the Rock pools diagram (see below).
2. *Print out* on A4 paper the rock pools non-living and living organisms' pictures as well as the arrows (see below) then *cut them out* individually.
3. *Hand out* the pictures to the learners (there should be enough for each learner to have at least one. (5 x non-living, 23 x mussels, 15 x plankton & sea plants, 6 x octopus, 4 x rock lobster, 2 x eels).
4. Ask each learner to identify their organism and to team up with other learners that have the same organism as them.
5. Address one team at a time and ask each team if they know where in the rock pools their organism lives then have them place their organism on the diagram.
6. Also ask them if they know what their organism might eat and what might eat it. Start with the primary producers (plankton and seagrass) and work your way up the food chain (mussels, then rock lobster, then octopus then eel) until all the organisms are on the diagram. Use the arrows to make these connections.
7. Now ask the learners what would happen if all the plankton was harvested (plankton harvesting happens in the polar regions of the planet). The answer is that the mussels would not have food and eventually die, to demonstrate this *remove all the plankton and the mussels from the diagram.*
8. Next, ask the leaners what will happen now that the mussels have all died? The answer is that the rock lobster and octopuses would run out of food and die – *remove them from the diagram. Then remove the moray eel* as it too will have nothing to eat! You should be left with only sea grass on the diagram.
9. Now ask the learners if they eat seagrass …. most will say: No
10. Now ask them if they eat mussels. Yes – can they see what would happen to the ecosystem if they were to harvest all the mussels?

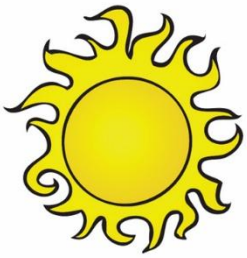
CLOSING ACTIVITY:

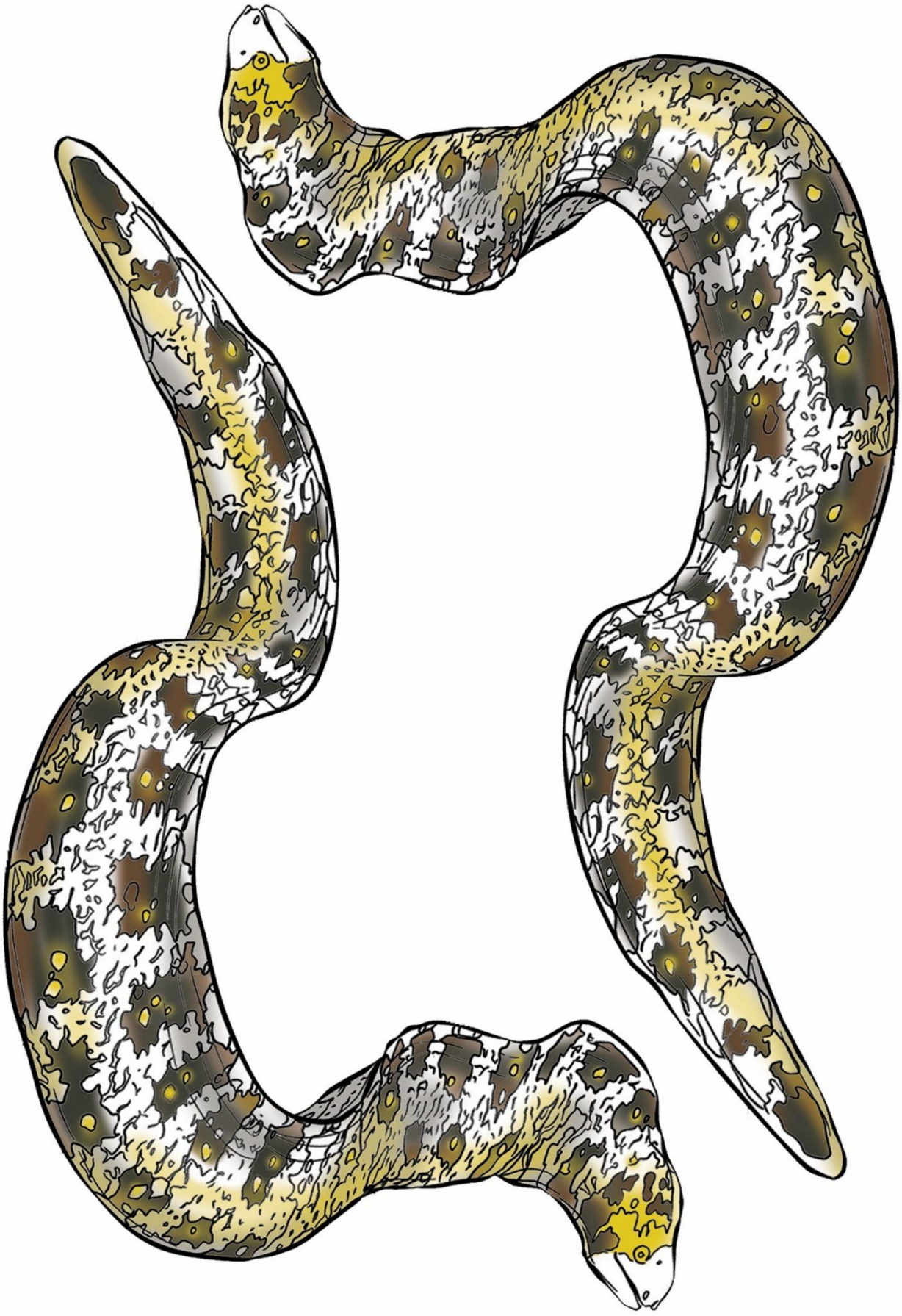
Learners colour the rocky shores food web worksheet (see below) and draw arrows to show living and non-living interactions and a food web.

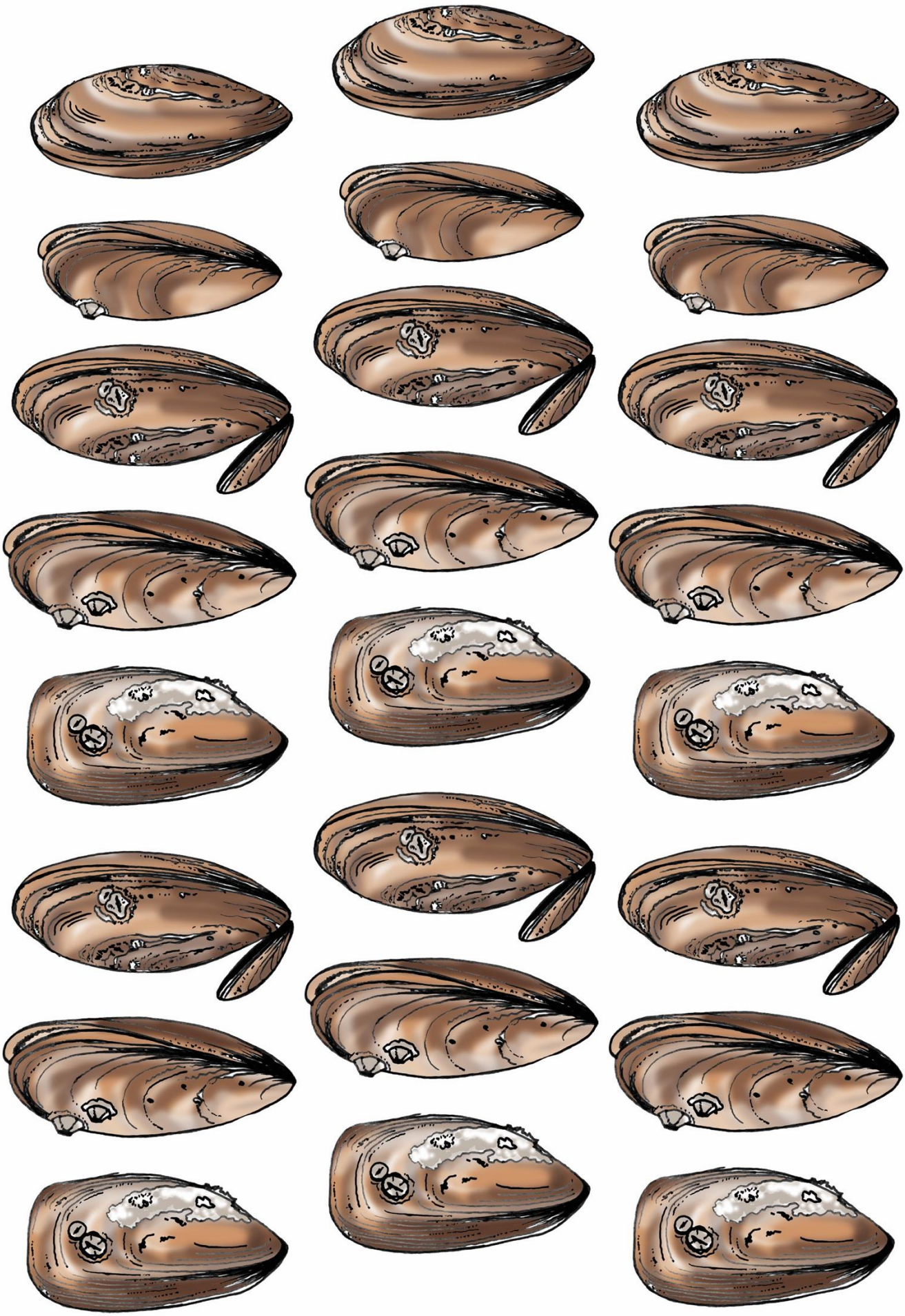
Rock pool diagram:

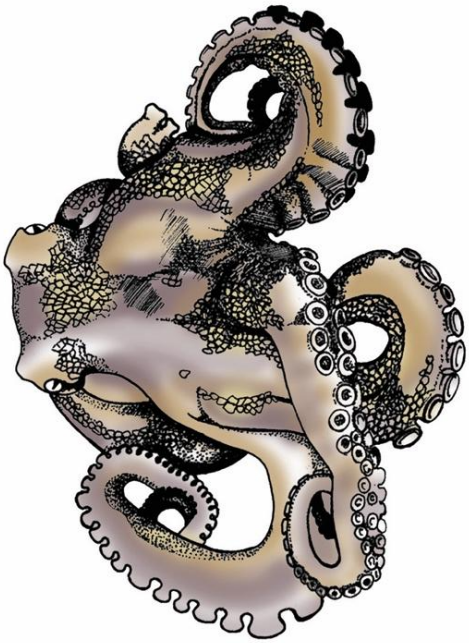
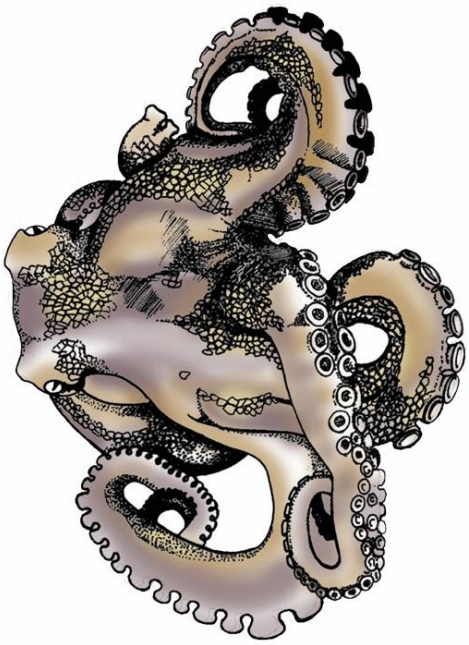
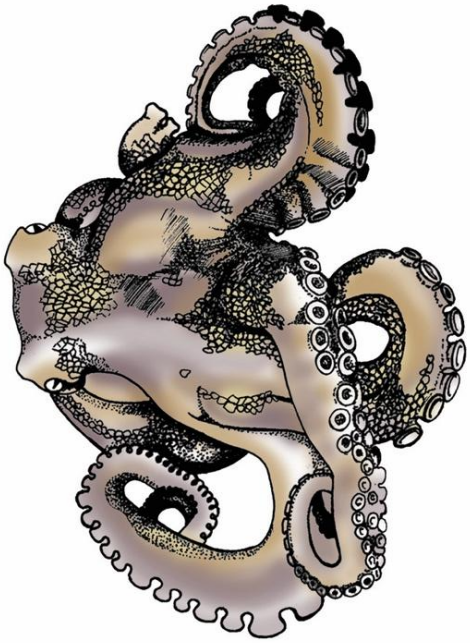
East Coast Rock Pools

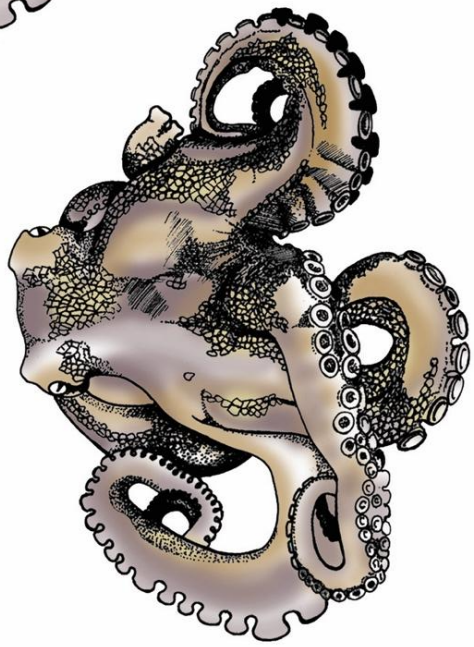
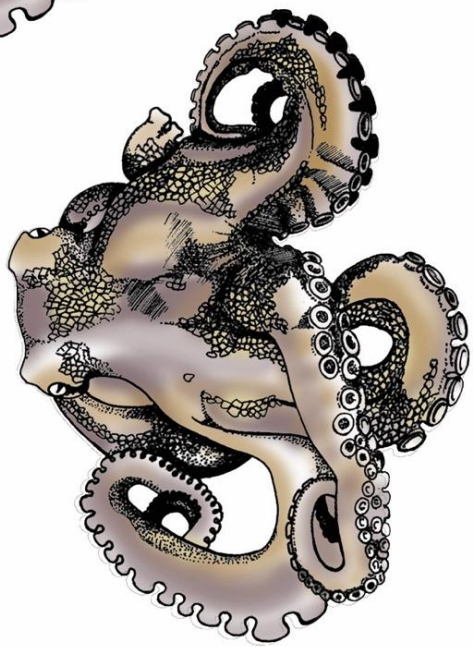
Cut out non-living and living organisms for rock pools activity:

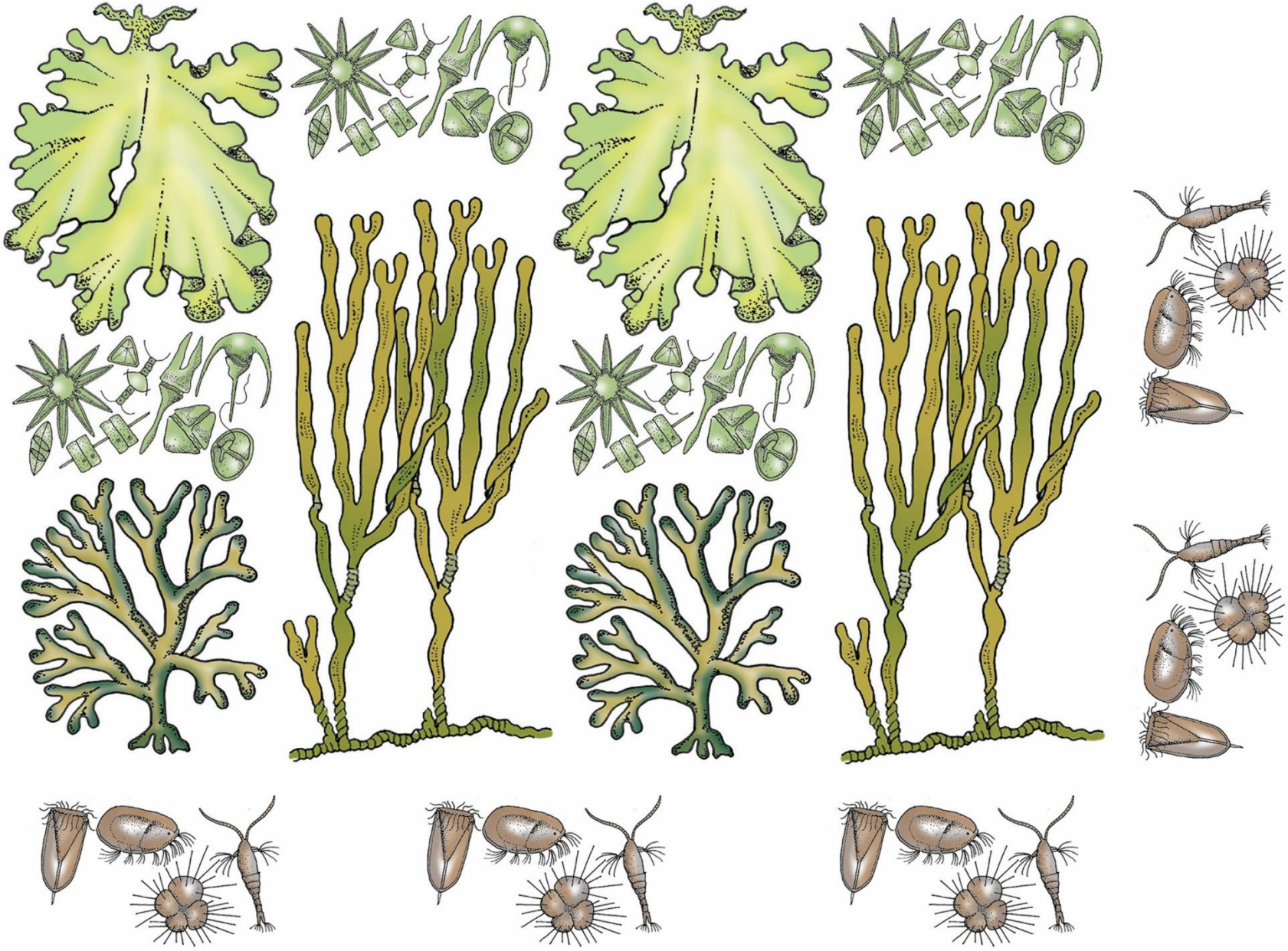




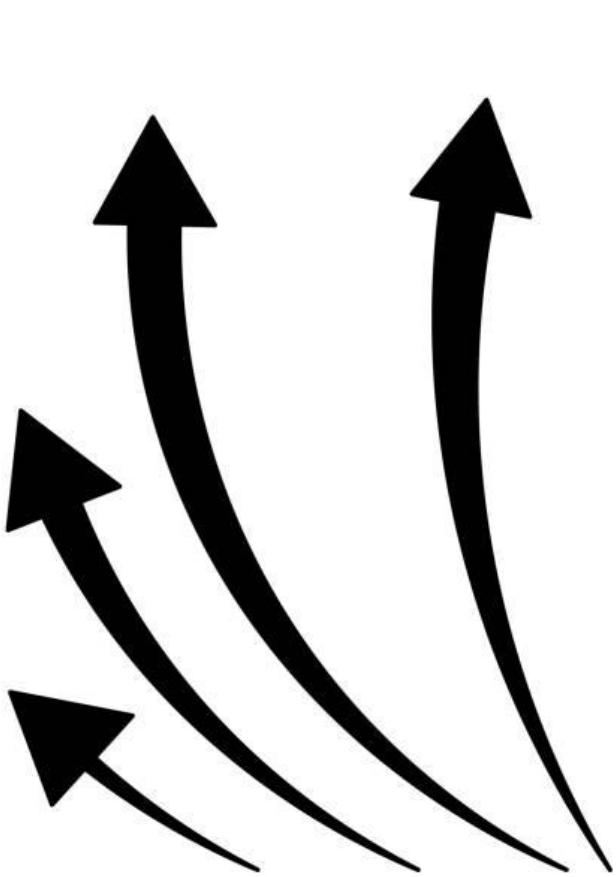


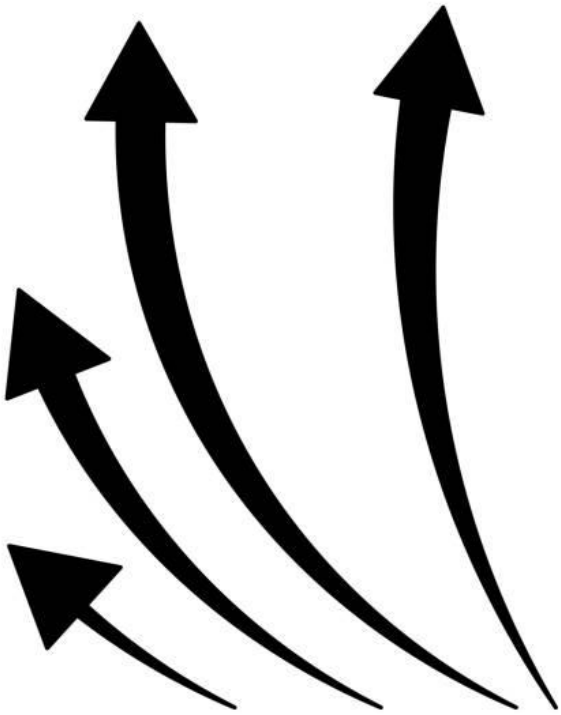




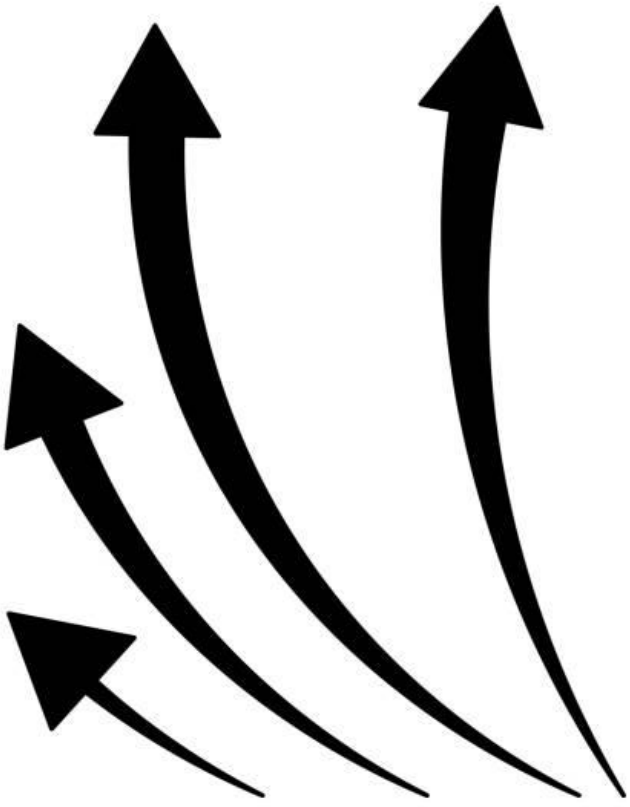



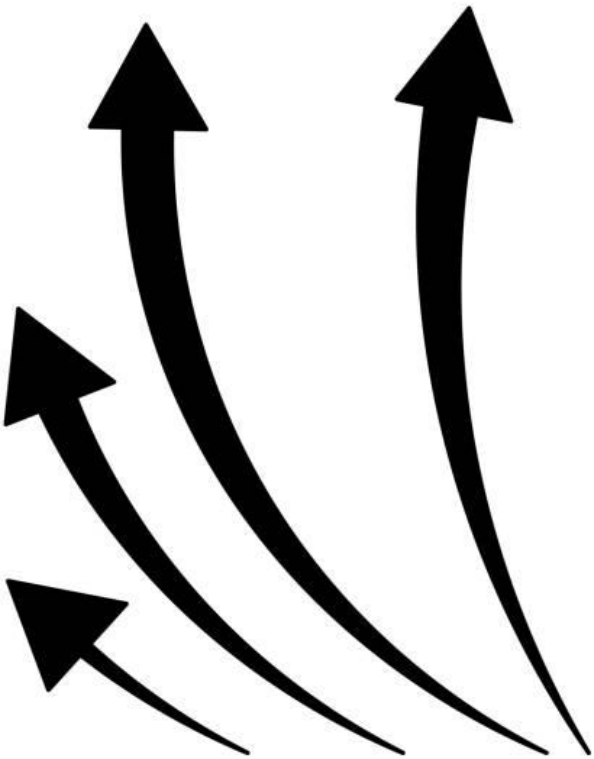


Cut out arrows for rock pools activity



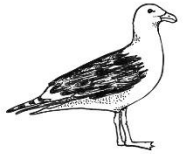




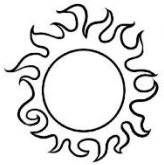


A Rocky Shore Food Web

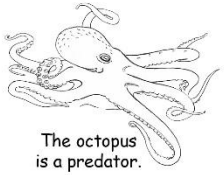
The rocky shore is a harsh environment and the animals that live there have adapted in various ways to survive the stresses of being covered with water, then exposed to the heat and the air, twice a day with the tides.



The Kelp Gull is a scavenger and a predator.



Sunlight provides the energy needed for plants to photosynthesize.



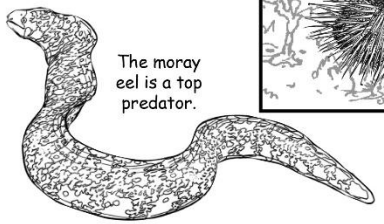
The octopus is a predator.

Whelks are carnivorous and are eaten by seastars and fish.

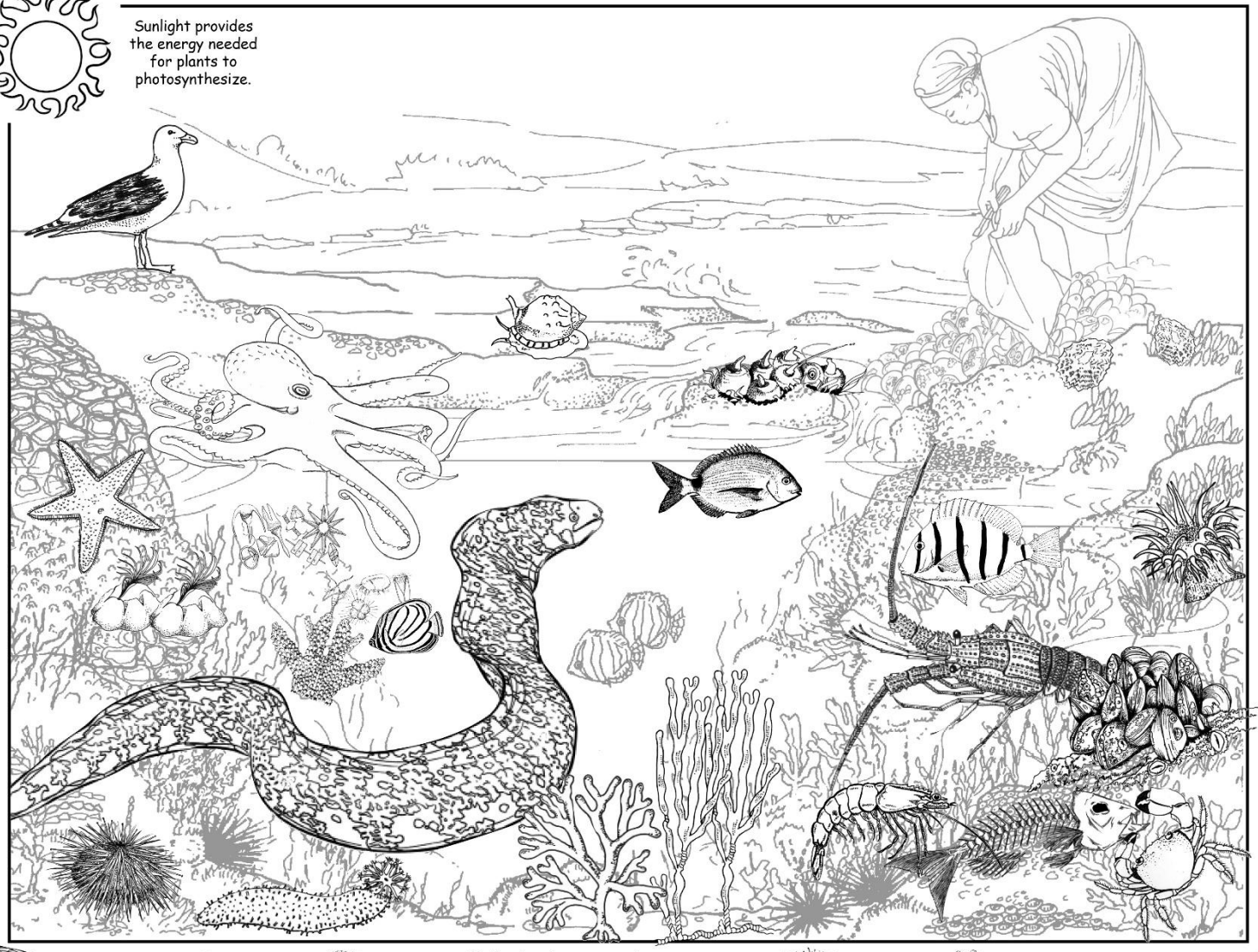
Seastars are carnivores or herbivores.

Red bait, or sea squirts are filter feeders.

Barnacles are filter feeders.



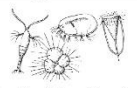
The moray eel is a top predator.



Adult blacktail are omnivorous.

The convict surgeon is a grazer.

Phytoplankton are producers.



Zooplankton feed on phytoplankton.

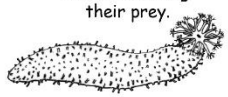
Sea urchins are herbivorous.

Corals use stinging cells to catch zooplankton.

Shrimps are detrivores.

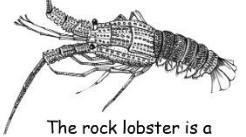
Butterflyfish are carnivores.

Anemones sting their prey.



Sea cucumbers are filter feeders.

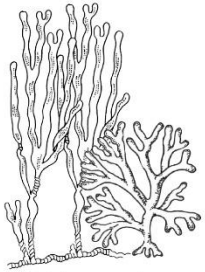
Limpits graze algae on the rocks.



The rock lobster is a predator.

Mussels are filter feeders.

Crabs are scavengers.



Red, brown and green seaweeds photosynthesize.

Curriculum and Assessment Policy Statement Alignment

SSF Modules				Module - CAPS Alignments							
Module	**Topic**	**Objective**	**Activity**	**Section**	**Grade**	**Subject**	**Strand**	**Topic**	**Content & Concepts**	**Tasks**	**Term**
1	Rocky shores ecosystem interactions	The aim of this session is to demonstrate the relationship between living and non-living organisms in the rocky shore ecosystem as well as a basic food web and the relationship between harvesters and the ecosystem.	Rock pool activity	Senior Phase	Grade 7	Social Sciences	Geography	Natural resources and conservation in South Africa	Natural resources: on earth – including water, air, forests, soil, animal and marine life- Use and abuse of selected examples	Matching, Making connections bettwen causes and effects	4
2	Sustainable utilization (harvesting)	The aim of this session is to illustrate the concept of sustainable utilization (harvesting) by using the worm model.	Worm model	Senior Phase	Grade 7	Social Sciences	Geography	Natural resources and conservation in South Africa	Natural resources: Use and abuse of selected examples	Writing, short answers Making connections bettwen causes and effects	4
3	Stock limits	Learners are exposed to what stock control is and how and why bag limits are determined as well as an appreciation for the fact that some elements cannot be controlled in the process.	Bean game	Senior Phase	Grade 7	Social Sciences	Geography	Natural resources and conservation in South Africa	Management of resources: Concept of conservation – including reasons for conservation as well as Conservation areas (including marine reserves)	Answering questions, Working with data (graphs and tables)	4
4	Mussel biology	The aim of this session is for the learners to understand the mussels biology and life cycle and to appreciate that they are slow growing and require time and resources to reproduce in order to replenish stocks.	Mussel story and game	Senior Phase	Grade 7	Natural Science	Live & Living	Biodiversity	Basic differences in processes such as movement, nutrition and reproduction, distinguishes plants from animals		1
				Senior Phase	Grade 7	Natural Science	Live & Living	Variation	individuals of the same species can reproduce to make more individuals of the same species		1
				Senior Phase	Grade 7	Natural Science	Live & Living	The biosphere	*Living things need energy, gases, water, soil (rocks) and favourable tempratures. *Living things are suited to the environment in which they live		1
5	Cooperative resources use and stewardship	The aim of this session is for the learners to understand the need for cooperative use and stewardship over finite resources	Commons dilemma lake fishing game	Senior Phase	Grade 7	Social Sciences	Geography	Natural resources and conservation in South Africa	Management of resources: Concept of conservation – including reasons for conservation as well as Conservation areas (including marine reserves)	Itentifying and discussing issues, evaluating ideas and actions writing paragraphs	4