WILDTRUST™

ECOSYSTEMS

SESSION PACK

SESSION PACK CONTENTS PAGE - ECOSYSTEMS

MATERIALS REQUIRED FOR SESSION

- Colouring pens
- Paper
- Screening device

INFORMATION PAGES: ECOSYSTEMS

DESCRIPTION:

An ecosystem is a geographic area where plants, animals, and other organisms, as well as weather and landscapes, work together to form a bubble of life

DEFINITIONS:

- **Living Things**: The term “living things” is broad in its scope. It involves everything living within an ecosystem, from the smallest bacteria to the top predatory animal.
- **Non-living Things**: The non-living things in an ecosystem create and define the ecosystem's environment and include sunlight, temperature, precipitation, weather, landscape, soil chemistry, water chemistry, and nutrient supply.
- **Individual**: An individual is any living organism within an ecosystem.
- **Population**: A group of individuals of the same species that all live within the ecosystem make up the population.

- **Community**: A community is all the various populations of different organisms living within an area.
- **Ecosystem**: A community or group of living organisms that live in and interact with each other in a specific environment.

FACTS:

- In an ecosystem, every plant or animal has a role to play, and each organism's role affects all the others.
- It is a delicate balance, which can be thrown off easily by many sorts of external factors or changes. If a new organism is introduced, or something is removed from the ecosystem - it can cause drastic changes to that ecosystem.
- All different ecosystems share similar traits. This can be broken down into two categories: living things and the environment around them (non-living things).
- Ecosystems come in all kinds of sizes. It can either be gigantic, or very small. These sizes can be broken down into three basic categories:
- ***Micro*** – these are the smallest kinds of ecosystems. An example of a micro-ecosystem would be a tree trunk or under a rotten log.
- ***Messo*** – This is the middle size for ecosystems, such as a kelp forest or pond.
- ***Biome*** – This is the largest type of ecosystem. This would be something like an entire rainforest.
- Ecosystems don't have solid boundaries like countries, provinces, or towns. They are not marked by any rigid manmade lines. Often, different ecosystems begin and end due to some sort of geographic barrier, such as lakes, mountains, rivers, or deserts.
- Ecosystems can be broken down into two different categories:

  Terrestrial Ecosystems – Any ecosystem that exists outside of water are called terrestrial ecosystems.

  Aquatic Ecosystems – If an ecosystem occurs in any type of water, whether it be a puddle, river, dam, lake, or ocean, then it is an aquatic ecosystem. Marine ecosystems are aquatic environments with high levels of dissolved salt.
- Ecosystems are, in their simplest form, a complex system that describes how animals, plants, and organisms interact within their environment.
- Even the slightest change to any of these different factors can greatly change the ecosystem.

SESSION PLAN: ECOSYSTEMS

SESSION OBJECTIVES:

Learners can define what an ecosystem is and understand that an ecosystem is made up of living and non-living components interacting in balance.

INTRODUCTION ACTIVITY:

- *Watch the video explaining ecosystems:* https://tinyurl.com/mtdfm8sz
- Ask the learners if they could name any ecosystems e.g. coral reef, grassland, dune forest, mangrove, etc.

MAIN ACTIVITY:

- Split the learners into five groups and give each group an ecosystem poster *(see RESOURCES provided below).*
- Have the learners identify and list living and non-living components in each of their posters.
- Encourage the learners to discuss how all these elements interact and shape their environment.
- Have the learners feedback to the class five key points about their ecosystem and what makes their ecosystem unique/different from the others.

CLOSING EXERCISE:

- Allow the learners time to discuss factors that could affect the health or balance in their ecosystem and solutions to prevent this from occurring e.g., an increase in ocean temperature causes coral bleaching, how does this affect the ecosystem and how can we mitigate against this?

FOLLOW UP SUGGESTIONS:

- Have the learners observe the beach, nearby park, garden, or even their schoolyard, and have them answer these questions:
- What are the components of that ecosystem?
- How do they interact and depend on each other?

RESOURCES: ECOSYSTEM POSTERS

EZEMVELO KZN WILDLIFE

CORAL REEFS

Vibrate with life and colour

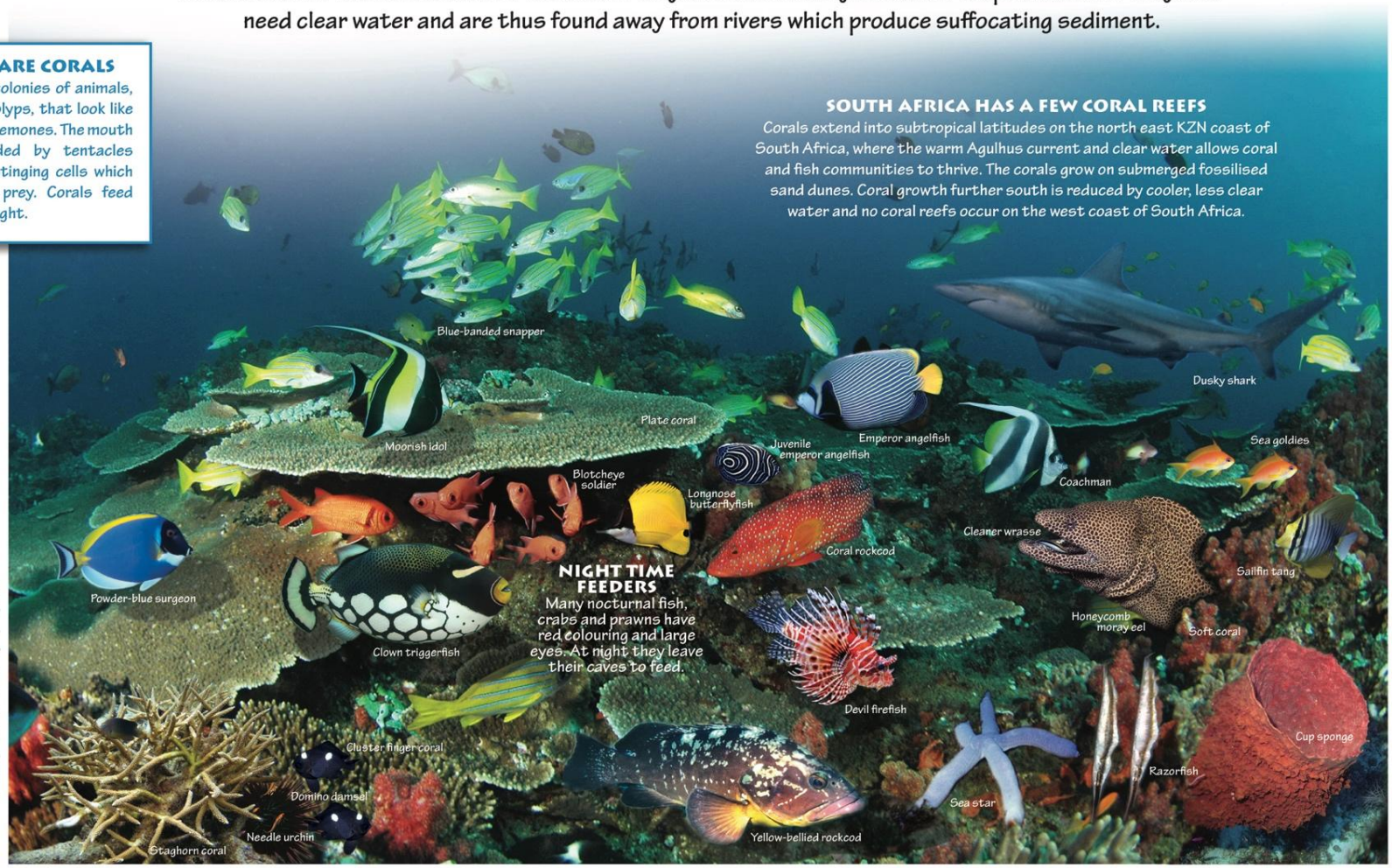
Coral reefs are the rainforests of the ocean. They are found mainly in shallow tropical waters. They also need clear water and are thus found away from rivers which produce suffocating sediment.

WHAT ARE CORALS

Corals are colonies of animals, known as polyps, that look like small sea anemones. The mouth is surrounded by tentacles that have stinging cells which catch tiny prey. Corals feed mostly at night.

SOUTH AFRICA HAS A FEW CORAL REEFS

Corals extend into subtropical latitudes on the north east KZN coast of South Africa, where the warm Agulhus current and clear water allows coral and fish communities to thrive. The corals grow on submerged fossilised sand dunes. Coral growth further south is reduced by cooler, less clear water and no coral reefs occur on the west coast of South Africa.



NIGHT TIME FEEDERS

Many nocturnal fish, crabs and prawns have red colouring and large eyes. At night they leave their caves to feed.

CLOSE RELATIONSHIPS

Some animals live together for mutual benefit: e.g. anemone fish shelter in anemones and domino damsels associate with black urchins.

LIFE ON THE REEF

Animals compete for space, food and mates while avoiding predators. A few eat phytoplankton and algae, but many, including corals are predators. Many fish defend their territories using their bright colours like flags.

CLEANING STATION

The cleaner wrasse, coachman and cleaner shrimp clean large fish without being eaten.

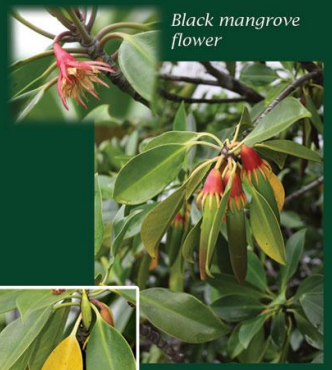
Corals are a natural wonder, swarming with marine life. The first traces of corals date back 500 million years. Today reefs cover 600 000 square kilometres of the ocean floor.

Coral reefs are built by colonies of coral polyps supported by limestone skeletons. Life on the reef depends on the survival of these minute polyps.

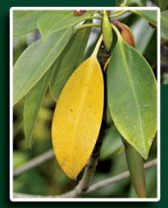
Adapted from Coastcare Fact File
Photographs: Dennis King

MANGROVES

A mangrove community is dominated by plants that have adapted to living in the littoral zone - where land meets the sea. Mangrove trees are plants that have adapted to conditions of high salinity known as halophytes. They grow on shallow, sheltered shores with a muddy substrate with a source of fresh water, rain or rivers to keep salinity moderate.



Black mangrove flower

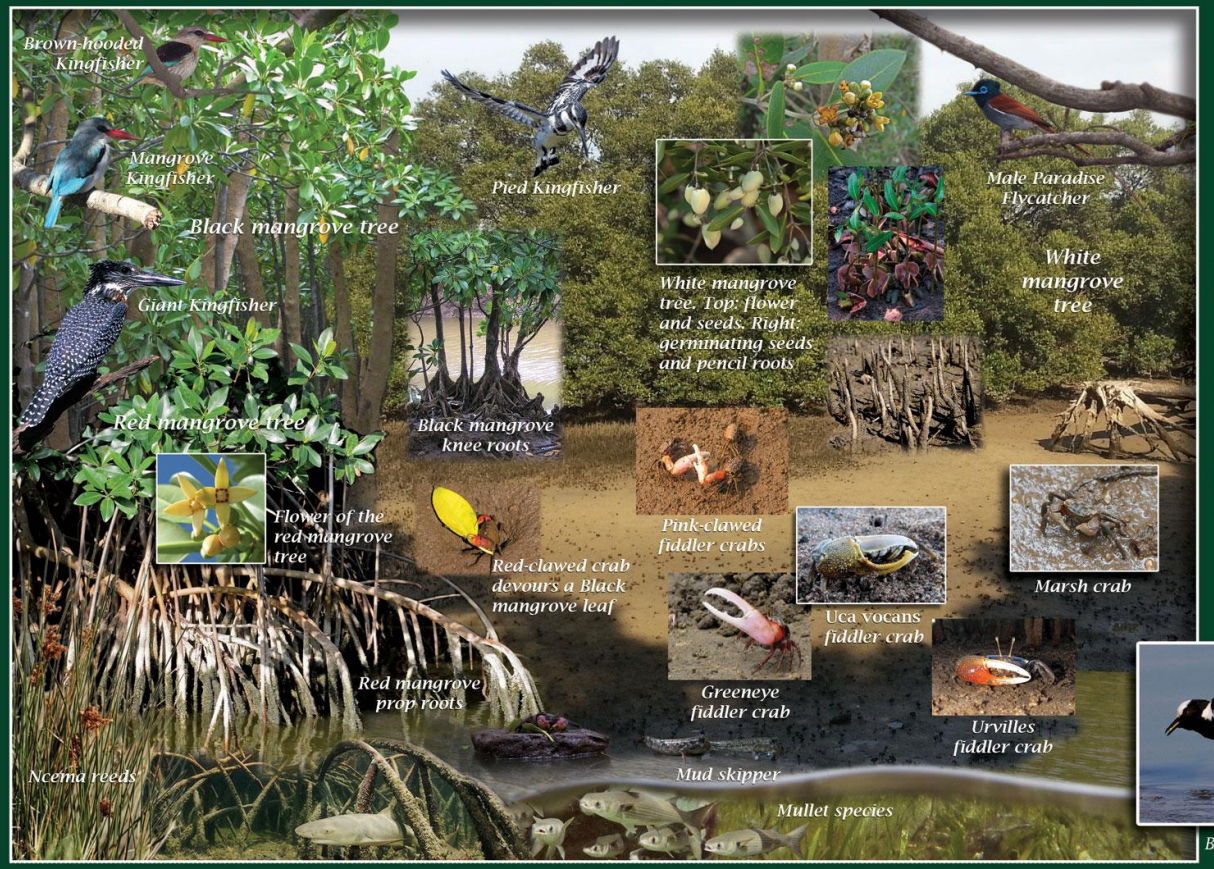


Salt collects in a black mangrove leaf, it turns yellow and drops to the forest floor

Black mangrove seeds partially develop on the tree before dropping into the mud to grow

Climbing whelk

Goliath Heron



Palmnut Vulture

Reed Cormorant

African Fish Eagle

Grey Heron

Blacksmith Lapwing

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Spotted grunter

Natal stumpnose

Cape stumpnose

River bream

Slender glassie

Grey mullet

Mangrove forests are important nursery habitats for certain species of fish. Juvenile fish migrate into estuaries that are rich in food and nutrients. These habitats also provide shelter from open water predators. Fish such as mullet, spotted grunter, Natal, and Cape stumpnose and riverbream juveniles are prolific and migrate back to the sea on reaching sexual maturity.

Photographs courtesy Ezemvelo KZN Wildlife, North Durban Honorary Officers, Di Martin, Ricky Taylor, WESSA, Dennis King and Wikipedia.

SANDY SHORES

Sandy shores on the east coast of KwaZulu-Natal are in perpetual motion.
Waves and wind continually build up or wash away the sand from the beach and reshape the dunes.

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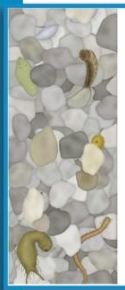
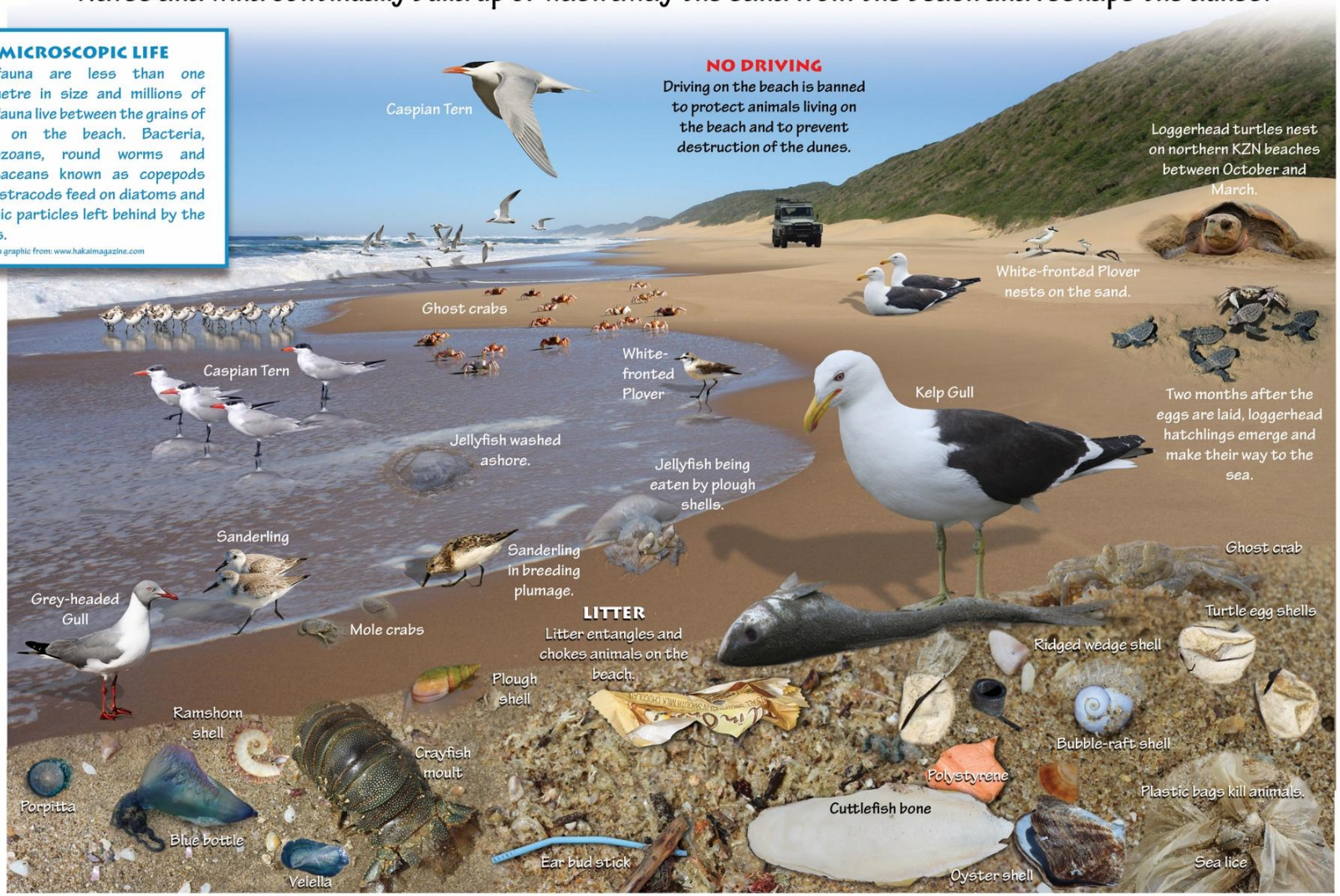
Conservation, Partnerships & Ecotourism



MICROSCOPIC LIFE

Meiofauna are less than one millimetre in size and millions of meiofauna live between the grains of sand on the beach. Bacteria, protozoans, round worms and crustaceans known as copepods and ostracods feed on diatoms and organic particles left behind by the waves.

Meiofauna graphic from: www.hakaimagazine.com



Plough shells ride the waves onto the beach using their large foot. They scavenge for dead animals using their powerful sense of smell. Plough shells have poisonous cadmium in their tissues to prevent predatory birds eating them.

DRIFT LINE DEBRIS

Food for animals on the beach is scarce. They rely on biological matter from the land or washed up by the sea and left along the drift line.

DUNE VEGETATION STABILISES SAND DUNES

Dunes are a sensitive environment. They form a buffer between the sea and inland areas. **PLEASE STAY OFF THE DUNES!**

Ghost crabs scavenge for food above the high tide mark. They also prey on small animals.

Predatory birds mostly scavenge on dead fish, invertebrates and animals washed up along the driftline.

The animals that exist on sandy beaches have adaptated to the tides and rhythms of the waves.

Taken from Coastcare Photographs: Di Martin, E KZN Wildlife and Wikipedia

ROCKY SHORES

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Rocky shores on the east coast of KwaZulu-Natal are a harsh and dynamic ecosystem. There is a huge range of conditions on the rocks and in the pools as they are exposed to crashing waves and hot temperatures twice a day with the tides. Life in this ecosystem has learnt to adapt.

INTERTIDAL ZONES

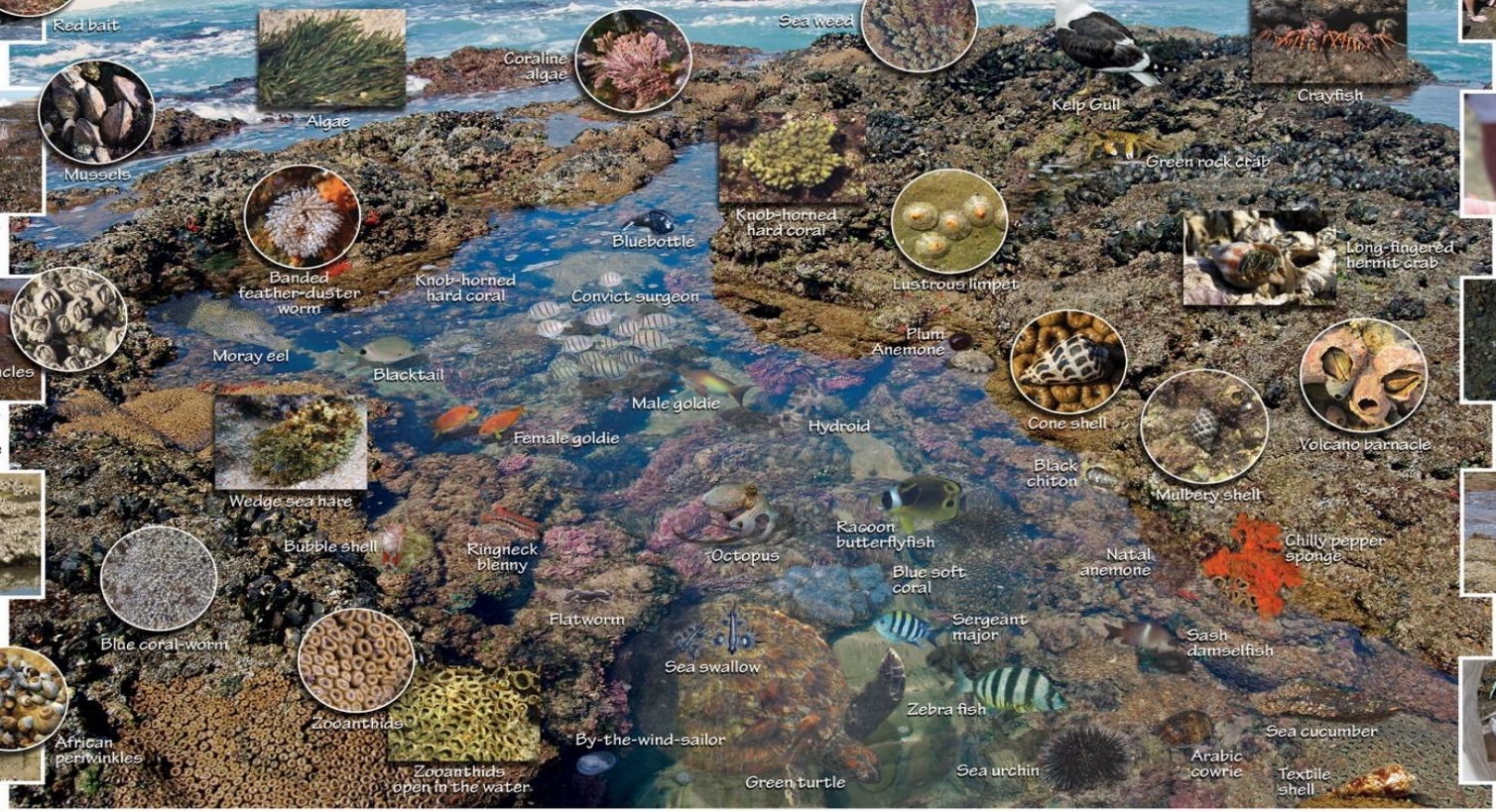
Sub-tidal Zone - always wet

Lower Balanoid Zone - exposed at low spring tide

Upper Balanoid Zone - covered and exposed every high and low tide

Oyster Zone - covered only at high spring tide

Littorinid Zone - hot and dry, only gets splashed at high spring tide



CARING FOR THE ROCKY SHORES

Learn about life in the rock pools.

Be careful - some animals will sting or bite.

Put animals back in the same pool as you found them in.

Watch where you step, you could crush animals on the rocks.

Collect and remove plastic you find - every little bit helps!

Animals and seaweeds on rocky shores spend half their life submerged in cold water at high tide and the other half exposed to air and the hot sun at low tide. They compete for space and food in a restricted area while also trying to escape predators. Many hide in protective shells and have to cling tightly onto rocks and seaweed to prevent being washed away. Some organisms are cemented permanently to rocks and filter food and nutrients brought in by the waves.

Taken from Animals of the Rocky Shores by Bruce and Judy Mann.
Photos: Bruce, Mann, Judy Mann, Dennis King, Annette Gerber, Di Martin, Mary Basson, Dick Daniels, Andrew Shiva (Wikipedia).

DUNE FORESTS

Dune forests grow on the crest of dunes along the KwaZulu-Natal coast. The sands have stabilised allowing trees to flourish in the hot, humid climate. Tall trees provide shelter for many animals to escape the wind and the heat.

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FOREST CANOPY

Tall trees form a canopy on the crest and lee of the dunes. Many of these trees have large compound leaves and bear seeds in pods.

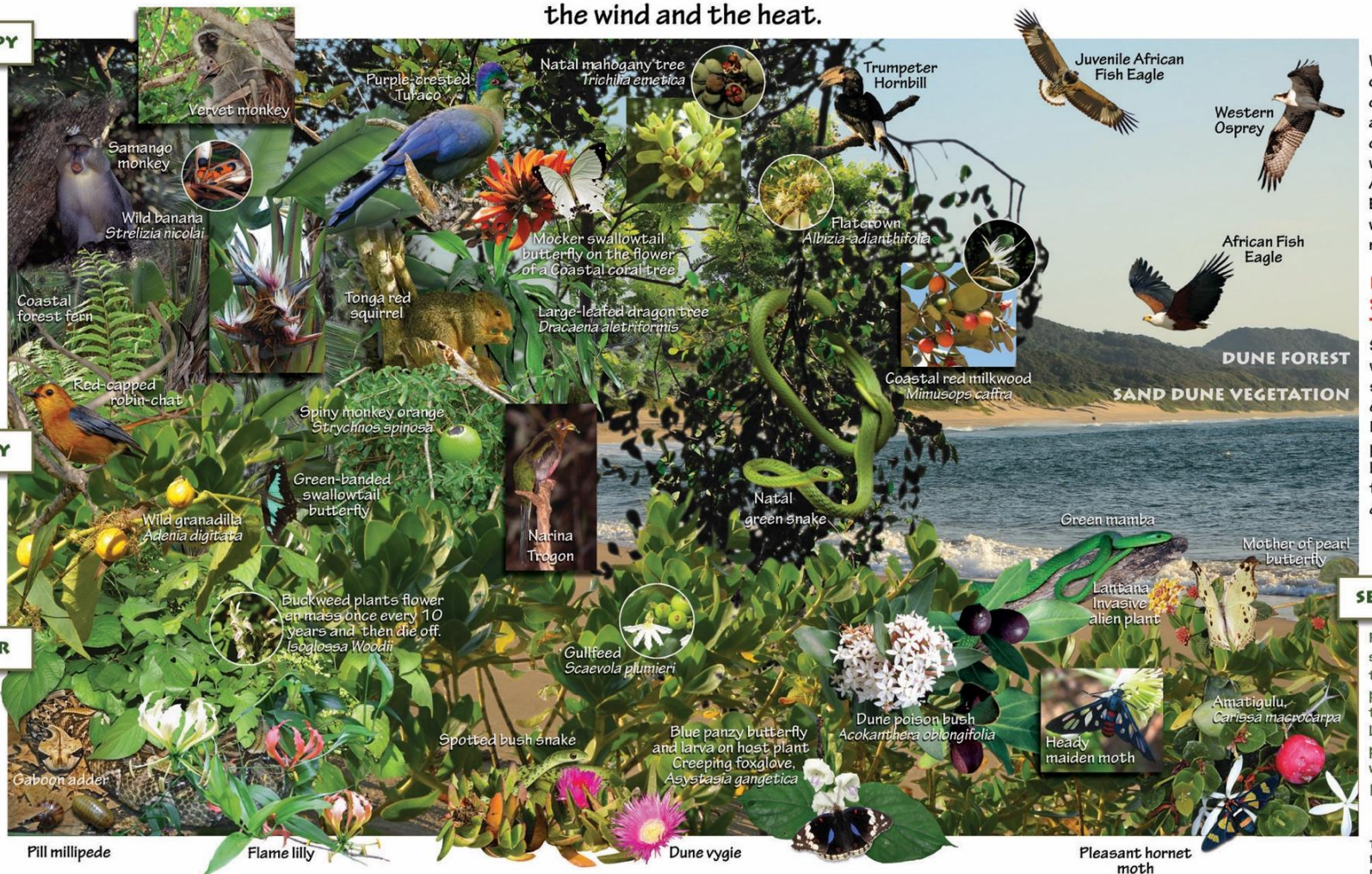
Vervet and Samango monkeys feed on the soft part of Strelizia nicolai flowers as well as on the orange aril of the seeds.

UNDERSTOREY

Small trees, ferns and creepers grow in the shelter of the canopy. They often have broad, soft leaves that wilt easily.

FOREST FLOOR

Fallen leaves form leaf litter and provide food and shelter for ground birds, millipedes, insects and snakes. Dead plant matter provides nutrients in the soil for plant regrowth.



Western Osprey, often seen at coastal lagoons and estuaries, can be confused with a juvenille African Fish Eagle, but the wings are much narrower.

PLEASE STAY OFF THE DUNES!
Sand dune vegetation is a sensitive environment. It forms a protective buffer between the sea and the dune forests.

SEAWARD SLOPE

Plants that are salt tolerant face the sea and are pruned by the wind to a uniform shape. Leaves of these plants are simple, waxy or hairy to prevent water loss.

Threats to dune forests include urban development, slash and burn agriculture, invasive alien plants, harvesting wood, illegal collection of medicinal plants and mining of the dunes for heavy metals, all destroy the forest and the creatures dependant on it.

Taken from Coastcare. Photographs: Alex Miles, Di Martin, Caroline Fox, Ezemvelo KZN Wildlife, Hugh Chittenden, IBC and Wikipedia

ANNEXURE 1

Session plan - Curriculum and Assessment Policy Statement alignment

WILDTRUST Session plan	Additional Topics	Section	Grade	Subject	Strand	Topic	Content & Concepts
Ecosystems session		**Intermediate phase**	**6**	**Natural Science & Technology**	**Live & Living**	**Ecosystems & Food webs**	**Different ecosystems & Living and non living things in ecosystems**
	Costal dune forests	Intermediate phase	6	Natural Science & Technology	Live & Living	Ecosystems & Food webs	Different ecosystems & Living and non living things in ecosystems
	Wetlands	Intermediate phase	6		Natural Science & Technology	Live & Living	Mixtures & Water resources *(Importance of wetlands)*
		Intermediate phase	6		Natural Science & Technology	Live & Living	Ecosystems & Food webs *(Different ecosystems & Living and non living things in ecosystems)*
	Mangroves	Intermediate phase	6		Natural Science & Technology	Live & Living	Ecosystems & Food webs *(Different ecosystems & Living and non living things in ecosystems)*