



Animals: Ecosystems, Interdependence and the Environment handling resource

GROUP LEADER INFORMATION

(PRIMARY CLASSES)

ANIMALS: ECOSYSTEMS, INTERDEPENDENCE AND THE ENVIRONMENT

This pack outlines the **contents of the self-led handling box** and how the box will be laid out during your session. It contains additional information on the **objects, suggested discussion points, and the Curriculum for Excellence's Experience and Outcomes**. Notes for pupils can also be found in this pack.

CONTENTS OF THE BOX

The objects in this box are split into four categories. **Each category represents a different ecosystem from around the world**. The objects represent different animals who live within that ecosystem and who link up to each other within a food web. We have provided suggested **activities and discussion points**, but you may want to develop your own activities based on the work you are doing in class around this topic.

PRACTICALITIES

On the day, you should ensure pupils are in up to four groups, with an adult helping each group or moving between them. The room you are using will be set out with the objects at four sets of tables.

Seat each group at a table, it is up to you whether you wish them to stay at the one table throughout the session or rotate to all of the tables. **On each table, you will find the objects, plus notes for pupils.**

THE OBJECTS ON THE TABLE ARE REAL

Please ensure pupils and adults are sensible and **handle these objects with care** keeping them over the tables with protective plastazote foam. If pupils or adults think they might be allergic to an object there are sinks at the back of the room to wash hands and gloves which can be used. **Contact information for a first aider is also written on the wall above the phone.**

Distribution maps are an approximation as animal populations can move and fluctuate.

The vulnerability status on the specimen notes is based on the **IUCN Red List**. The IUCN Red List of Threatened Species TM is widely accepted as the most comprehensive and objective approach to monitoring the conservation status of animals and plants across the world. **The status reflects world populations, not those of individual ecosystems.**

ACTIVITIES AND DISCUSSION

We suggest you work through these activities together as a class. There is additional information that you may wish to share with your group in the coloured boxes.

IDENTIFICATION OF OBJECTS

Recall knowledge to identify.

Is the specimen what they expected?
How/Why?

Start your session with pupils **exploring the objects on the table** in front of them. The objects can be referred to as **specimens**. Each specimen is from an animal which has a **fact file on the table**. Specimens are not labelled.

Ask the pupils to look carefully at each specimen and read the fact files in the centre of the table. Can they use the information in the fact file and recalled knowledge to identify each of the specimens? Is the specimen what they expected that animal or part of animal to look like? In what ways?

FOOD WEBS

SCOTTISH WOODLAND ECOSYSTEM

Wolves were hunted to extinction in Scotland over **300 years ago**. How has this changed our ecosystem and what benefits or problems might there be if they were to be reintroduced? (Reduction in deer populations leading to an increasing in plant life which would in turn benefit birdlife and insects/ threat to livestock).

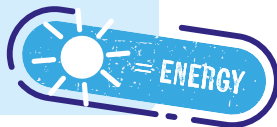


Each table has a food web for that particular ecosystem with some species missing. Arrows point in the direction of energy travel (prey → predator).

- Ask pupils to study the food webs and decide where the species represented on their table would fit.
- How would the food web be affected if a species was missing?
- How would the food web be affected if a new species was introduced or an old, missing one introduced? For this question, you can show the **Scottish Woodland group** the wolf skull and talk to the **Tropical Reef group** about plankton.
- Ecosystems are extremely complex and these food webs show only a select few species for the area. As a result some primary or secondary consumers may appear to have no predators. You can ask pupils what they think these predators may be, as an extension activity.
- Even apex predators can find themselves as prey if injured or very young.

TROPICAL CORAL REEF ECOSYSTEM

Plankton: There are two types of plankton: zooplankton and phytoplankton. Zooplankton are microscopic animals that feed on phytoplankton. Phytoplankton are microscopic plants that get their energy from the sun.



EVOLUTION AND ADAPTATION

AFRICAN SAVANNAH ECOSYSTEM

Broad-banded Green Swallowtail Butterfly
Ask pupils why this butterfly is so colourful. Would its bright colours help it to camouflage or are they more likely to be a warning or to attract a mate? Red and orange are usually warning markers.



- What **adaptations** does each species have to help it survive and thrive in its ecosystem? (Teeth, camouflage, horns/antlers etc). For an example of how to talk to the pupils about this see the information in the box.
- In what way might species **evolve or adapt** in the future if the ecosystems change? To stretch pupils, ask about slow change such as climate change and more rapid change such as deforestation.

CONTENTS



- Red Squirrel pelt
- Red Deer antler
- European Badger skull
- European Hedgehog skeleton
- Red Fox skull
- Two Banded Longhorn Beetle
- Grey Wolf skull
- Scots Pine
- Rowan



- Leopard pelt
- Skink skeleton
- Long Tailed Macaque skull (replica)
- Giant Centipede
- Jungle Nymph
- Klugia
- Wild Ginger



- African Elephant tooth
- Lion skull (replica)
- Ostrich feather
- Roan Antelope horn
- Broad-banded Green Swallowtail Butterfly
- Umbrella Thorn Acacia (image only)



- Bull Shark jaw
- Sawfish snout
- Triton shell
- Hawksbill Turtle shell
- Porcupinefish
- Staghorn Coral

CURRICULUM LINKS

Below are the curriculum links for the suggested activities within this box.



LITERACY

FIRST

When I engage with others, I know when and how to listen, when to talk, how much to say, when to ask questions and how to respond with respect. **LIT 1-02a**

To help me develop an informed view, I am learning to recognise the difference between fact and opinion. **LIT 1-08a**

SECOND

When I engage with others, I can respond in ways appropriate to my role, show that I value others' contributions and use these to build on thinking. **LIT 2-02a**

To help me develop an informed view, I can distinguish fact from opinion, and I am learning to recognise when my sources try to influence me and how useful these are. **LIT 2-08a**

Using what I know about the features of different types of texts, I can find, select and sort information from a variety of sources and use this for different purposes. **LIT 2-14a**



MATHEMATICS

FIRST

SECOND

Having investigated where, why and how scale is used and expressed, I can apply my understanding to interpret simple models, maps and plans. **MTH 2-17d**



SCIENCES

FIRST

SECOND

I can explore examples of food chains and show an appreciation of how animals and plants depend on each other for food. **SCN 1-02a**

I can identify and classify examples of living things, past and present, to help me appreciate their diversity. I can relate physical and behavioural characteristics to their survival or extinction. **SCN 2-01a**

I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area. **SCN 2-02a**

TWO-BANDED LONGHORN BEETLE

Rhagium bifasciatum



"Two-banded Longhorn Beetle *Rhagium bifasciatum*" by gailhampshire is licensed under CC BY 2.0.



LOCATION



HABITAT:

- Two-banded longhorn beetles are found throughout Europe. They are widespread in Scotland.
- They are often found in woodland.



DIET: The adults lay their eggs in dead trees and the young larvae eat the wood making small holes.



FOOD CHAIN: Insects are at risk from predators such as birds or small mammals.



SIZE: They grow up to 2cm long.



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RED SQUIRREL

Sciurus vulgaris



"Red Squirrel in the rain... - Eekhoorn in de regen (*Sciurus vulgaris*)..."
by Martha de Jong-Lantink is licensed under CC BY-NC-ND 2.0.



LOCATION



HABITAT:

- These squirrels are found in Europe and Asia, including Scotland.
- Red squirrels live in nests called 'dreys' that they build in trees.



DIET: They eat seeds, flowers, leaves and roots.



FOOD CHAIN: Their main predators are pine martins although grey squirrels are a threat to them as they compete for food sources.



FACTS: Red squirrels have brown fur with cream underbelly, they are known for their bushy tails and fluffy ears.



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RED FOX

Vulpes vulpes



"European Red Fox (*Vulpes vulpes*)" by Harlz_ is licensed under CC BY 2.0.



LOCATION



HABITAT: Red foxes can be found across the Northern Hemisphere. They are also found in Australia where they have been introduced.



DIET: They eat mainly small mammals and birds as well as insects.

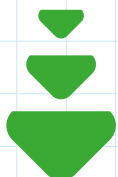


FOOD CHAIN: Large birds of prey or wolves may attack foxes but generally they have few predators.



FACTS:

- They can use their bushy tail as a cover to keep warm in winter.
- Foxes are crepuscular meaning they come out at dawn and dusk.



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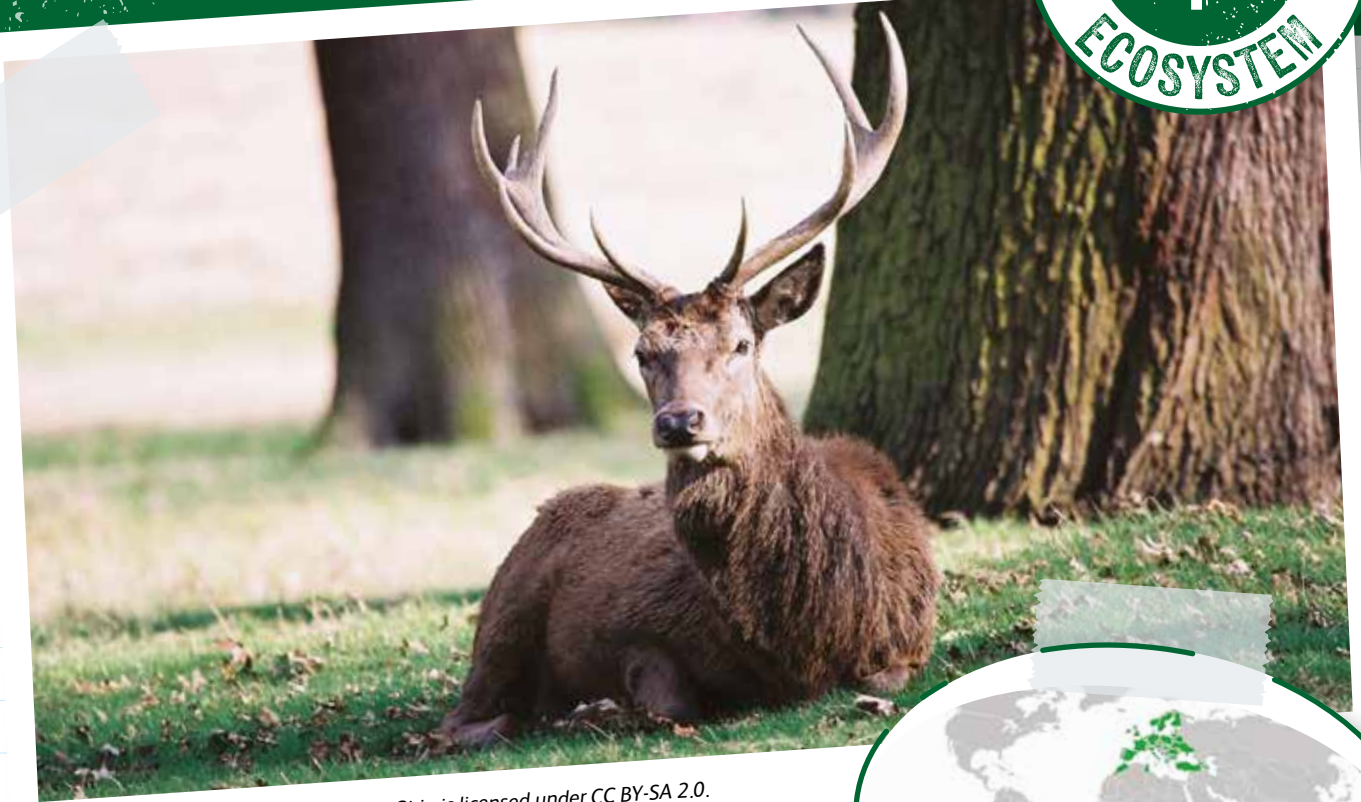
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RED DEER

Cervus elaphus



"Red Deer in Richmond Park" by Bruno Girin is licensed under CC BY-SA 2.0.



LOCATION



HABITAT: Red deer can be found across Europe.



DIET: They eat shrubs, trees, grass and heather.



FOOD CHAIN: Young deer are at risk from eagles. Adults are prey for wolves but there are none in Scotland.



FACTS:

- Male red deer have large antlers which they use to compete with other males.
- Red deer are active throughout the day and the night.



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EUROPEAN HEDGEHOG

Erinaceus europaeus



"Hedgehog at Dusk" by Mark Wheadon is licensed under CC BY-SA 2.0.



LOCATION



HABITAT: Hedgehogs live in Western Europe, including the UK.



DIET: Hedgehogs eat insects, berries, frogs and even snakes.

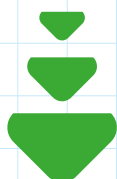


FOOD CHAIN: Hedgehogs are prey for badgers.



FACTS:

- Hedgehogs have sharp spines and can curl into a ball to help protect them from predators.
- Hedgehogs hibernate in winter.



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GREY WOLF

Canis lupus



"Gray Wolf" by U.S. Fish and Wildlife Service - Midwest Region is licensed under CC BY 2.0.



LOCATION



HABITAT: The grey wolf was hunted to extinction in Scotland in 1680, they can still be found in many other countries.

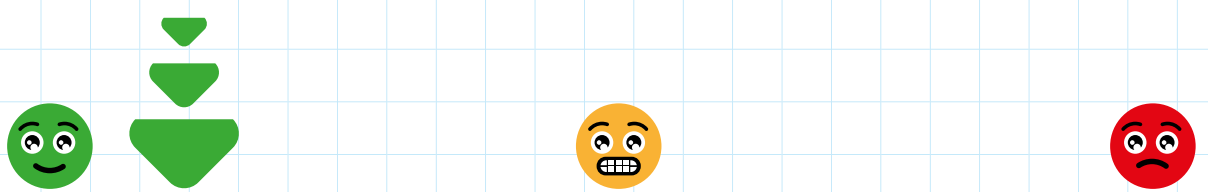


DIET: Grey wolves mostly hunt large prey such as deer.



FACTS:

- Grey wolf fur can be white, grey, red, brown or black.
- They have sensitive ears and noses to help them find prey.
- Grey wolves live and hunt in packs of between 5-12 wolves.



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EUROPEAN BADGER

Meles meles



"Badger" by hehaden is licensed under CC BY-NC 2.0.



LOCATION



HABITAT: Badgers can be found living in both the countryside and cities. The best habitat for them is the woods.



DIET: Badgers mostly eat earthworms. They will also eat small animals like hedgehogs as well as fruit, nuts and insects.



FOOD CHAIN: Badgers have no natural predators in Scotland, although young cubs can be at risk from golden eagles.



FACTS:

- Badgers are nocturnal which means they are most active at night. They do not hibernate but will spend more time in their setts (made up of tunnels and nests) in the winter.
- Badgers live in social groups and will have between one and five cubs.



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ROWAN

Sorbus aucuparia



"Sorbus aucuparia" by douneika is licensed under CC BY-NC-SA 2.0.



HABITAT: Rowans are native throughout Britain and Ireland.



FOOD CHAIN: It grows bright red berries in the late summer which are eaten by birds such as chaffinches, siskins and blackbirds.



SIZE: It can grow between 10-15m.



FACTS:

- Birds scatter the Rowan seeds in their droppings.
- Rowan is a deciduous tree meaning it loses its leaves in the winter and grows new ones in the spring.

SCOTS PINE

Pinus sylvestris



"Pine forest: *Pinus sylvestris* + *Pinus nigra* (+ *Fagus sylvatica* + *Picea abies*) (47°37' N 16°06' E)" by HermannFalkner/sokol is licensed under CC BY-NC-SA 2.0. To view a copy of this license, visit <https://creativecommons.org/licenses/by-nc-sa/2.0/?ref=openverse>.



HABITAT: Scots Pine used to be found throughout Britain but warmer temperatures in the last few thousand years mean that it is now mostly found in Scotland and not further South.



SIZE: It can grow up to 40m tall.



FACTS:

- Scots Pine is an evergreen conifer meaning it has needles for leaves, the seeds are cones, and it does not lose its leaves in winter.
- The tree seals damage to its trunk, often caused by insects, with a sticky sap.

SCOTTISH WOODLAND FOOD WEB



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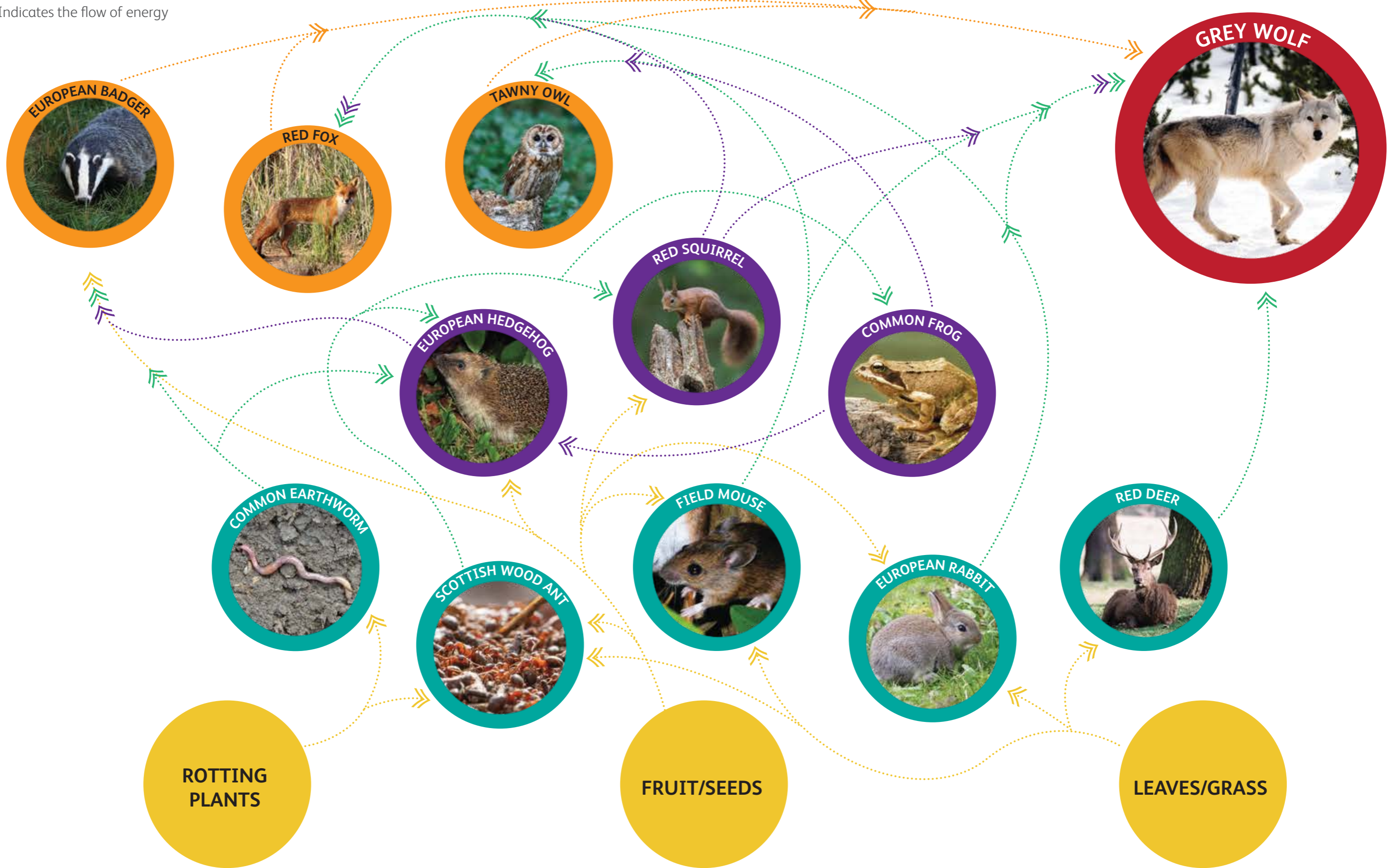
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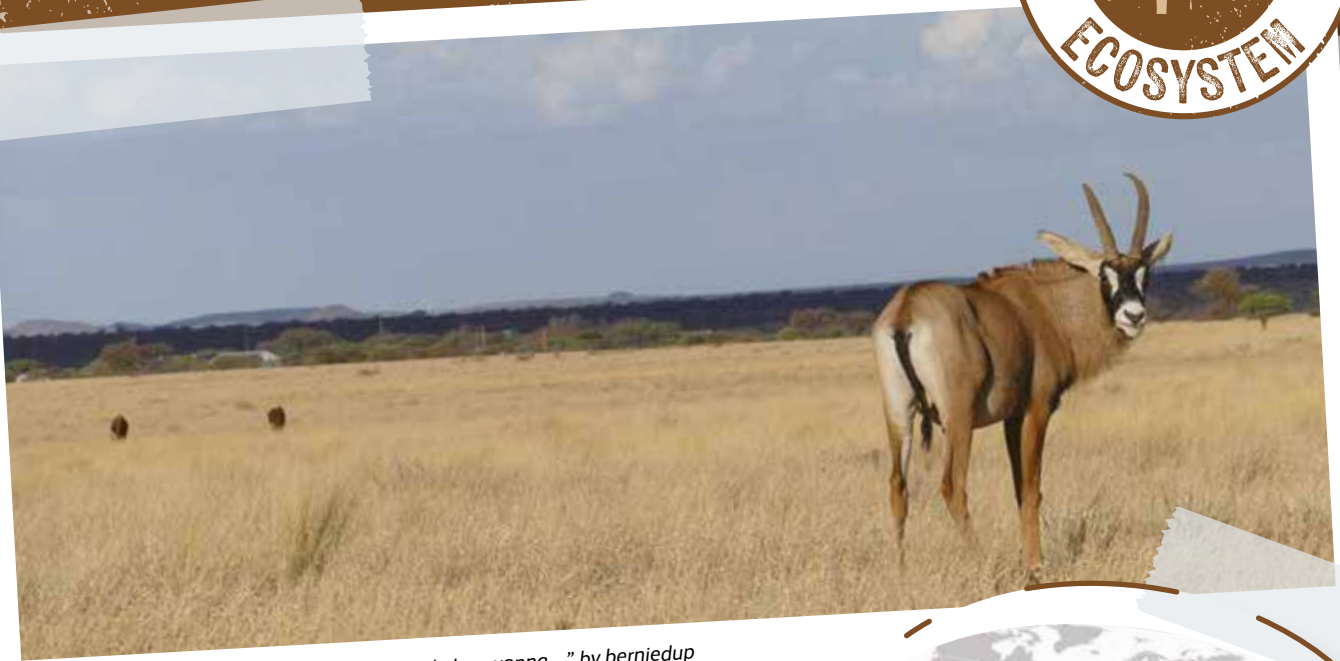
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ROAN ANTELOPE

Hippotragus equinus



"Roan Antelope (*Hippotragus equinus*) in Mokala savanna ..." by berniedup is licensed under CC BY-SA 2.0.



LOCATION



HABITAT: These antelope live across the savannas of Africa.



DIET: Antelope eat long grass and occasionally shrubs and seeds.



FOOD CHAIN: Roan antelope are prey for lions, leopards, cheetahs and painted wolves.



FACTS:

- Antelope have large curved horns.
- Roan antelope usually live in herds of between 5–35.



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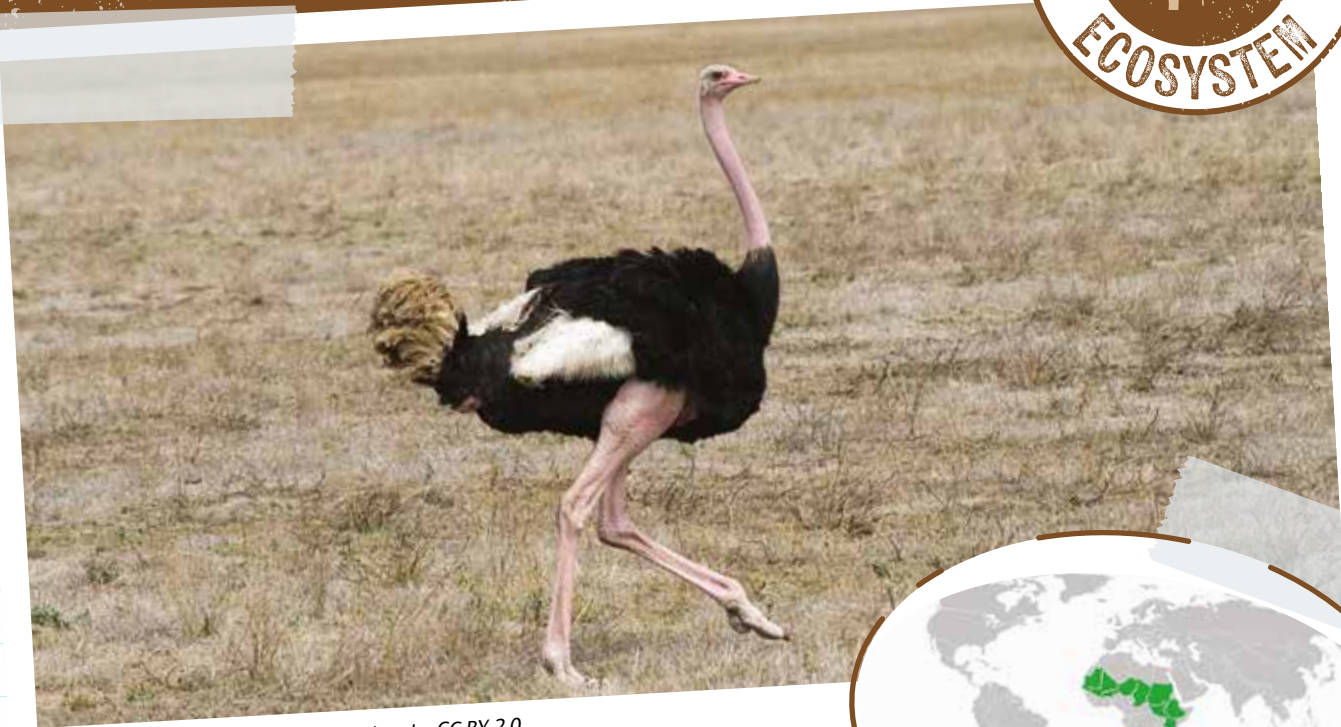
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OSTRICH

Struthio camelus



"Ostrich" by Stig Nygaard is licensed under CC BY 2.0.



LOCATION



HABITAT: Ostriches are found across Africa and have also been introduced in Southern Australia.



DIET: They eat grass, seeds and leaves as well as some insects.



FOOD CHAIN: Ostriches can be hunted by lions, leopards, painted wolves, cheetah and hyena.



FACTS:

- Ostriches have long legs with two sharp toes which they use for running and kicking.
- Ostriches are the biggest and heaviest living bird. They do not fly.



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AFRICAN LION

Panthera leo



"African Lion - Western Kruger, South Africa" by whl.travel is licensed under CC BY-NC-SA 2.0.



LOCATION



HABITAT: These lions are now only found in Sub-Saharan Africa.



DIET: They eat large animals such as zebra, wildebeest and antelope.



FOOD CHAIN: Lions have no natural predators.



FACTS:

- Lions have powerful jaws with sharp teeth.
- Lions usually live in groups of 10-15 individuals, called a pride.



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BROAD-BANDED GREEN SWALLOWTAIL BUTTERFLY

Papilio bromius



Broad-banded Green Swallowtail Butterfly



LOCATION



HABITAT:

- These butterflies live across Sub-Saharan Africa.
- The best places for them to live are areas with some trees so they can get small amounts of water from the trees.



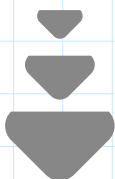
DIET: The caterpillars eat citrus and other plants.



FOOD CHAIN: Butterflies can be eaten by ants, snakes, birds and even monkeys!



FACTS: Butterflies can be colourful for all sorts of reasons including camouflage, warning other animals away and attracting other butterflies.



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AFRICAN ELEPHANT

Loxodonta africana



"African Elephants-Africa" by flickrfavorites is licensed under CC BY 2.0.



LOCATION



HABITAT: African elephants live in Eastern, Southern and Western Africa



DIET: They eat grass and shrubs.

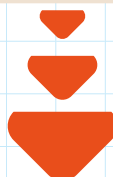


FOOD CHAIN: Elephants have no natural predators.



FACTS:

- Elephants have wrinkles in their skin to help keep them cool in the hot sun.
- Elephants live in large groups called herds.
- Elephants only have four teeth (not including their tusks), but they are very large. They will have six sets of these throughout their lives. Tusks are actually large incisor teeth.



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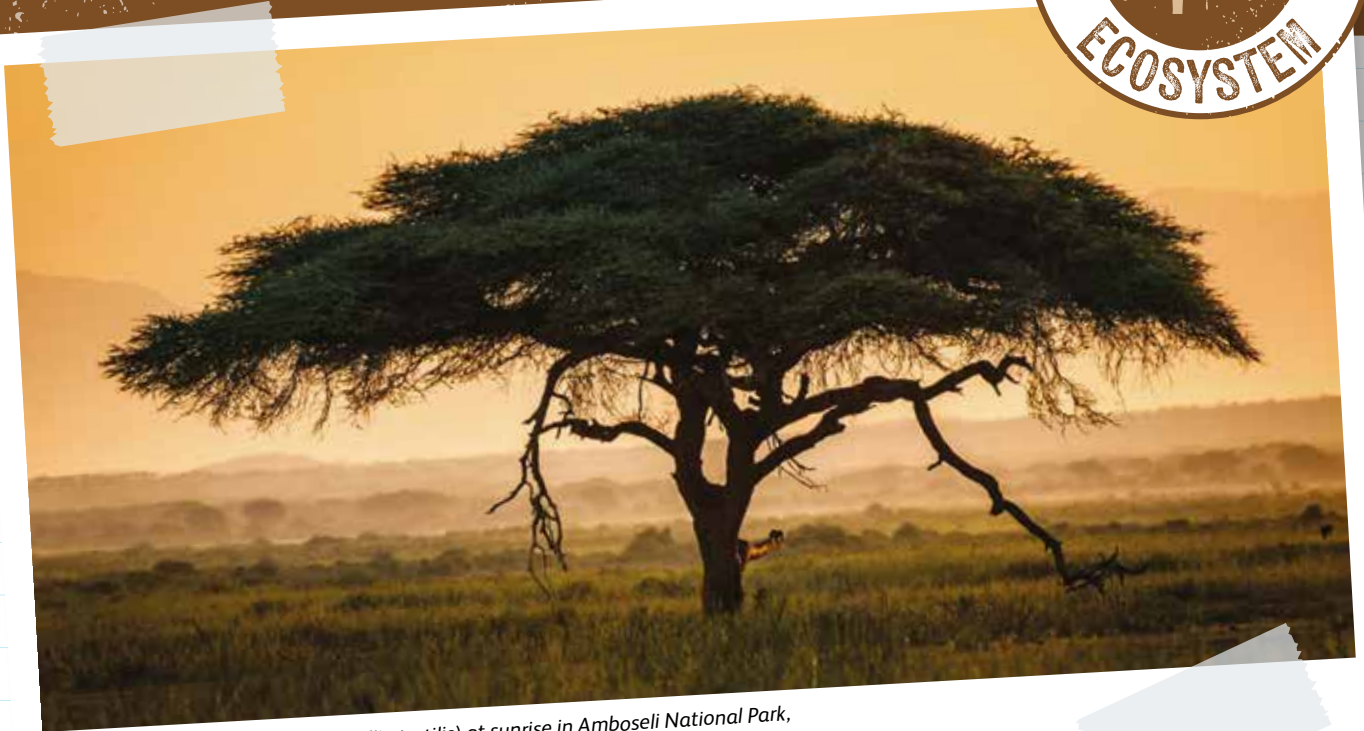
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UMBRELLA THORN ACACIA

Vachellia tortilis



"Umbrella thorn acacia tree (*Vachellia tortilis*) at sunrise in Amboseli National Park, Kenya, East Africa" by diana_robinson is licensed under CC BY-NC-ND 2.0.



HABITAT: They grow in the African savannah where there can be as little as 4cm of rainfall a year.



FOOD CHAIN: Acacia leaves are one of the favourite foods of giraffes. Giraffes have long rubbery tongues which can reach round the thorns and allow them to reach the leaves unharmed.



SIZE: These trees were given their name due to their shape. They can grow up to 20 meters high.



FACTS:

- It has two types of thorn, both straight and hooked, to try and protect its leaves from herbivores. Thorns can be up to 5cm long.
- Some species of acacia have a symbiotic relationship with ants. The ants live in the trees and are protected by the thorns, but if the tree is disturbed the ants swarm out and bite the attacker therefore protecting the tree.

AFRICAN SAVANNAH FOOD WEB



PRIMARY PRODUCER

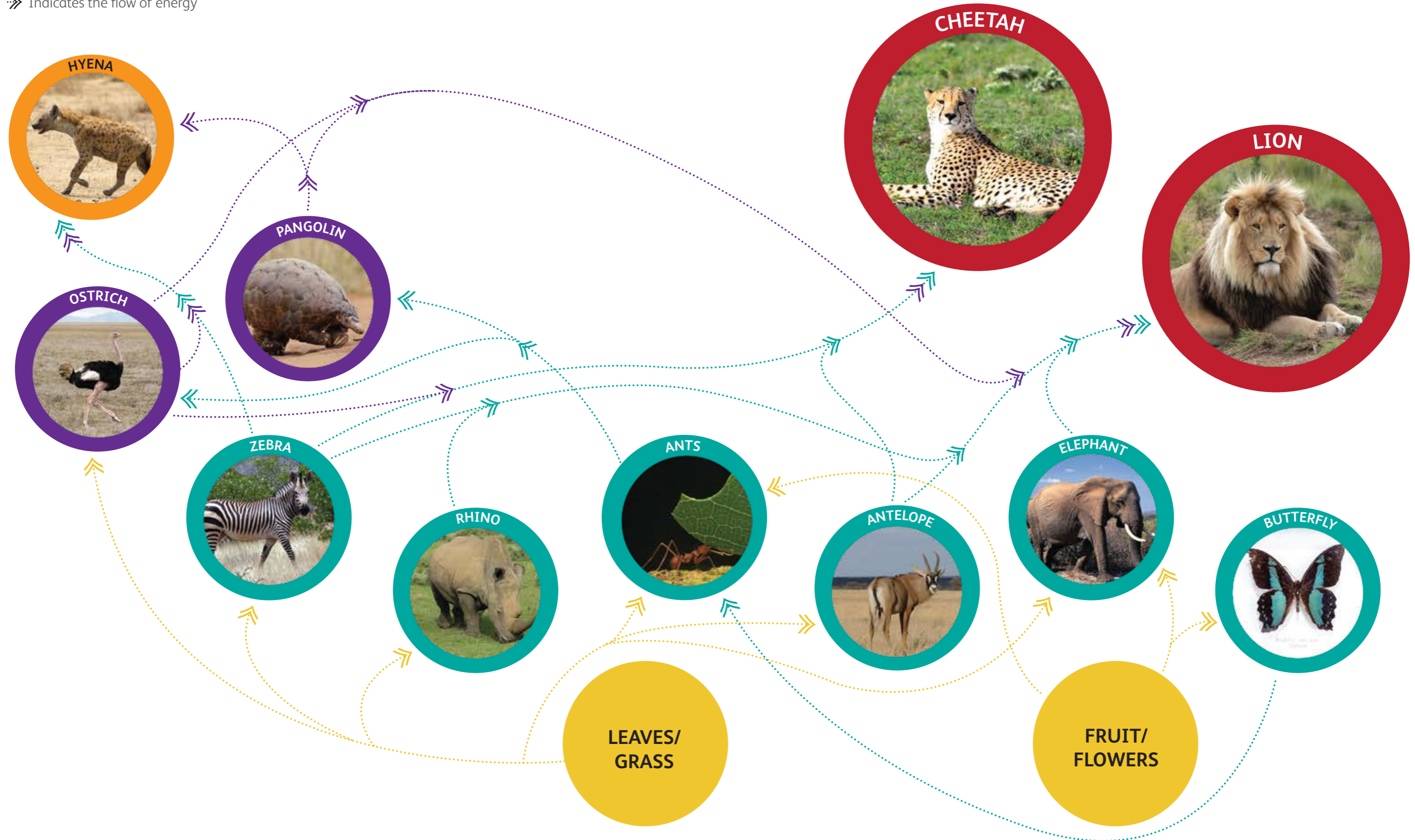
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BULL SHARK

Carcharhinus Leucas



"Carcharhinus leucas (Cub shark)" is licensed under CC BY-ND 3.0.



LOCATION



HABITAT: Bull sharks live in the shallow waters around the coast as well as in rivers and estuaries.



DIET: They eat a huge variety of things including fish, turtles, birds, other sharks and even land animals.



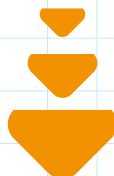
FOOD CHAIN: Nothing eats bull sharks, they are top of the food chain.



SIZE: They are 2–2.5m long which is about as tall as an adult human with their hands in the air.



FACTS: Sharks can keep replacing their teeth and can grow up to 20,000 throughout their lives.



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HAWKSBILL TURTLE

Eretmochelys imbricata



LOCATION

"Diving Maldives: Hawksbill Turtle (*Eretmochelys imbricata*)"
by Mal B is licensed under CC BY-ND 2.0.



HABITAT: They live near the coasts in warm tropical waters.



DIET: Turtles are carnivores and mostly eat crabs, lobsters and shellfish.



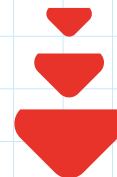
FOOD CHAIN: Several large species of sharks eat turtles.



SIZE: Hawksbill turtles are one metre long, the same distance as from the floor to a door handle.



FACTS: Turtles cannot hide inside their shells but it does give them protection from predators.



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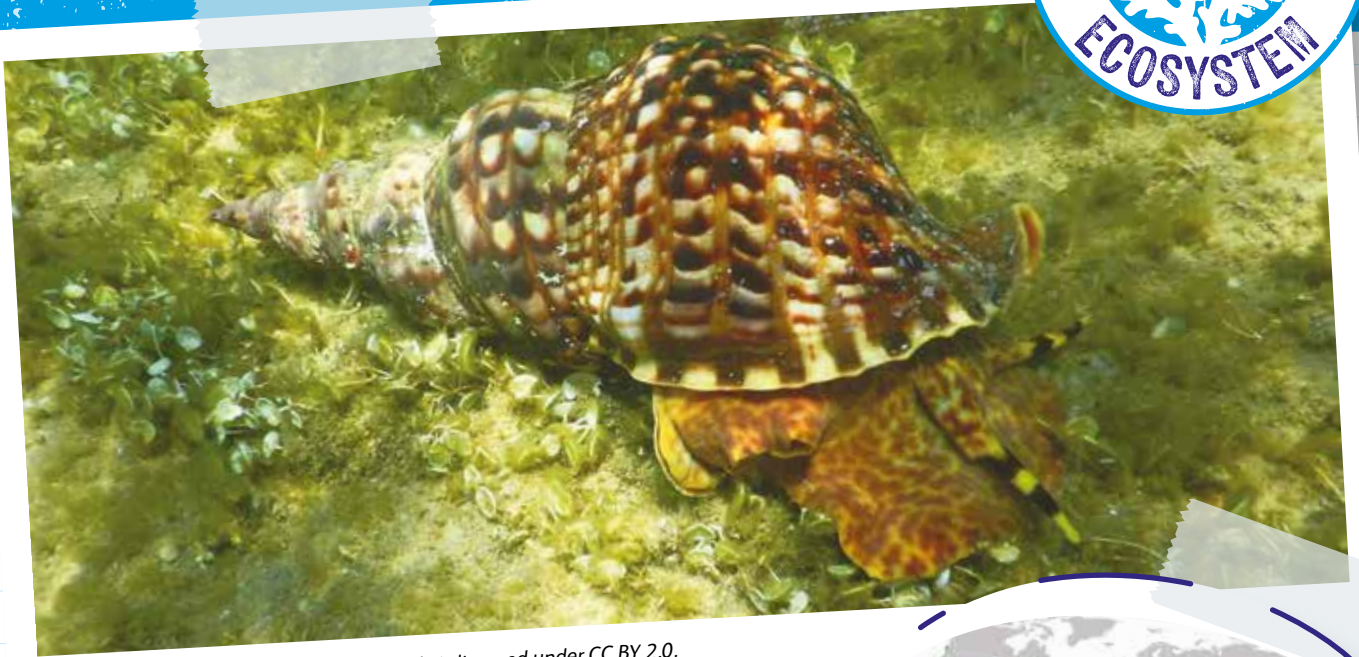
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TRITON

Charonia variegata



"Charonia tritonis variegata" by Aries Tottle is licensed under CC BY 2.0.



LOCATION



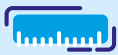
HABITAT: Triton snails live in ocean habitats all over the world.



DIET: Tritons are carnivores and eat other marine snails and starfish.



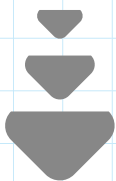
FOOD CHAIN: It is eaten by large fish (such as wrasse), large hermit crabs and some octopus.



SIZE: Tritons can grow to about 30cm long, which is as long as a ruler.



FACTS: It has paralyzing saliva which means it can immobilise prey to eat at its leisure.



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KNIFETOOTH SAWFISH

Anoxypristis cuspidate



"Happy Mr. Sawfish" by tricky (rick harrison) is licensed under CC BY-NC-SA 2.0.



LOCATION



HABITAT: Sawfish live in the west Pacific and Indian Oceans up to 40m deep.



DIET: Sawfish are believed to eat small fish, crabs, squid and shrimp.



FOOD CHAIN: They are eaten by sharks.

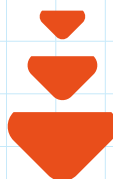


SIZE: Knifetooth sawfish can grow up to 4.7m which is as long as two cars!



FACTS:

- They hunt by slashing or stunning prey with their 'saw' or by digging into the ocean floor with it.
- The saw is the fish's extended nose (rostrum) with teeth on it!



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SPOT-FIN PORCUPINEFISH

Diodon hystrix



"Albuquerque Aquarium Porcupine Fish" by Frank Carey is licensed under CC BY-NC-SA 2.0.



LOCATION



HABITAT: This fish is found globally in tropical and subtropical seas.



DIET: They eat mainly sea urchins, small shellfish and hermit crabs.



FOOD CHAIN: They are eaten by sharks but not often because they are difficult to bite.



SIZE: Porcupinefish average around 40 cm, but they can grow as large as 91 cm.



FACTS: To defend themselves from predators they puff up by swallowing water or air.



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STAGHORN CORAL

Acropora formosa



"plausibly staghorn coral *Acropora formosa*" by Paul and Jill is licensed under CC BY 2.0.



LOCATION



HABITAT: Corals are colonies of animals all living together.



DIET: Corals are filter feeders and eat mostly plankton and small bits of dead plants that float in the water.

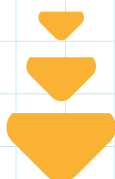


SIZE: These animals are very small, measuring 1–3mm.



FACTS:

- This coral lives in warm shallow water less than 30m deep.
- Staghorn corals are good reef building corals and colonies can grow up to 30cm a year.



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TROPICAL REEF FOOD WEB



PRIMARY PRODUCER

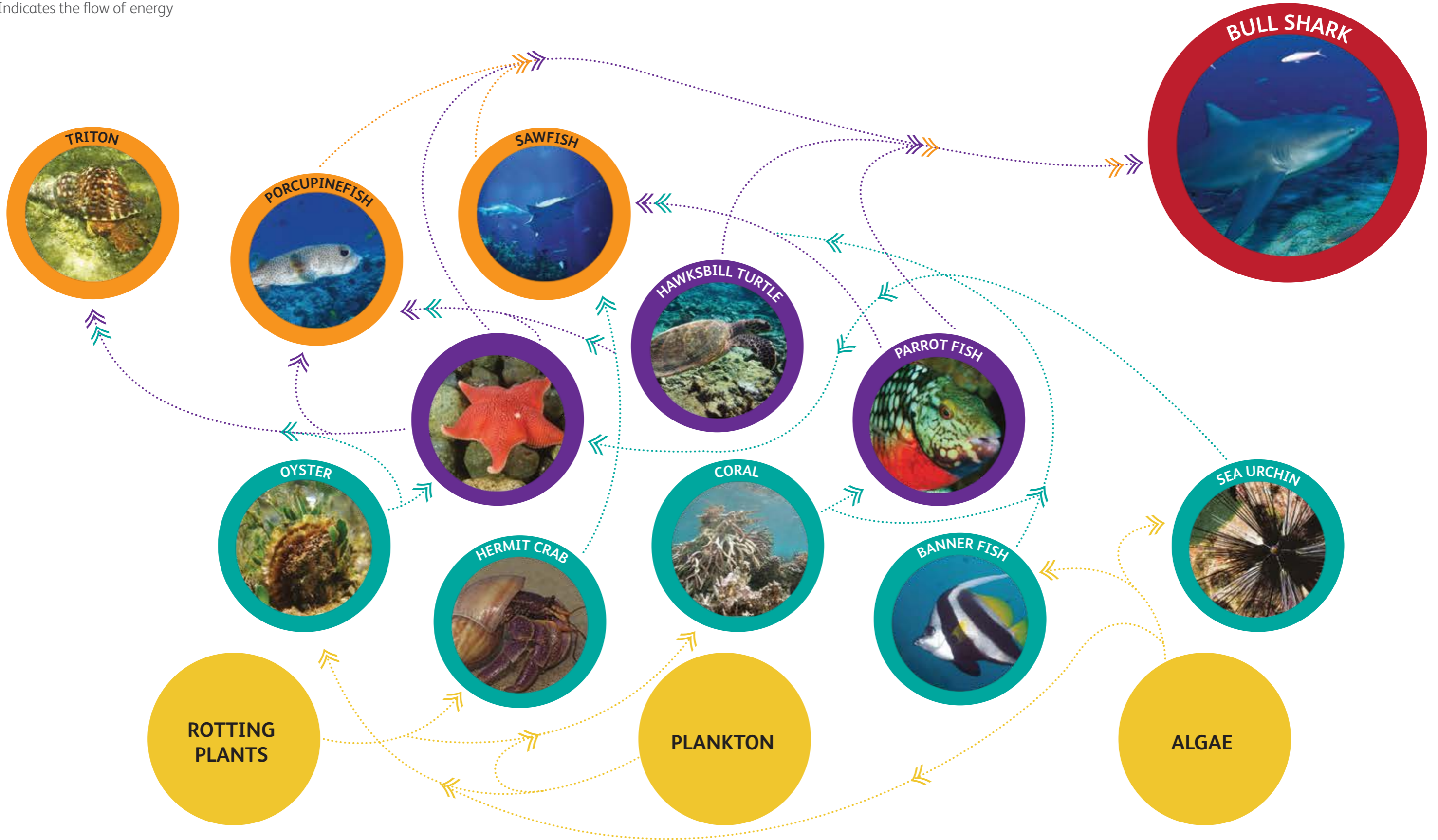
PRIMARY CONSUMER

SECONDARY CONSUMER

TERTIARY CONSUMER

APEX PREDATOR

⇒ Indicates the flow of energy



OLIVE TREE SKINK

Dasia olivacea



"*Dasia olivacea* (Olive Tree Skink)" by GeeC is licensed under CC BY 2.0.



LOCATION



HABITAT:

- There are many species of skink, these ones are found throughout South East Asia.
- They live in lowland forests and almost never walk on the ground.



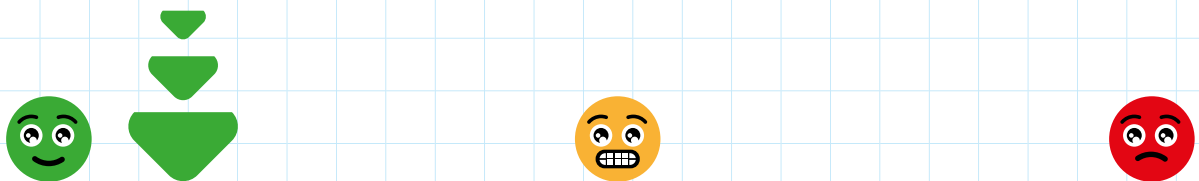
DIET: Skinks are omnivores and eat both plants and animals usually eating insects and fruit.



SIZE: This species of skink can grow up to 29cm long from nose to tail- that is about as long as a ruler.



FACTS: Because they almost never touch the ground these skinks lay their eggs under the bark of trees.



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LONG-TAILED MACAQUE

Macaca fascicularis



"Long tailed macaque" by shankar s. is licensed under CC BY 2.0.



LOCATION



HABITAT: They live in jungles and mangroves.



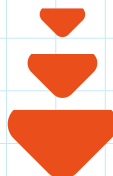
DIET: They are omnivores but mainly eat fruit, seeds and leaves as well as small birds, crabs and insects.



FOOD CHAIN: They are hunted by big cats, snakes and birds of prey.



FACTS: Long-tailed macaques are very good swimmers and often play in rivers and pools.



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JUNGLE NYMPH

Heteropteryx dilatata



"Jungle Nymphs (*Heteropteryx dilatata*)" by guppiecat is licensed under CC BY-NC-ND 2.0.



HABITAT: This insect is found in Malaysia and Indonesia.



DIET: They eat the leaves of many different trees and jungle plants.



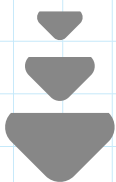
FOOD CHAIN: Jungle Nymphs are eaten by snakes, monkeys and other predators.



SIZE: The female can grow up to 20cm long which is as wide as this piece of paper.



FACTS: The females are big and bright green, the males are much smaller and brown.



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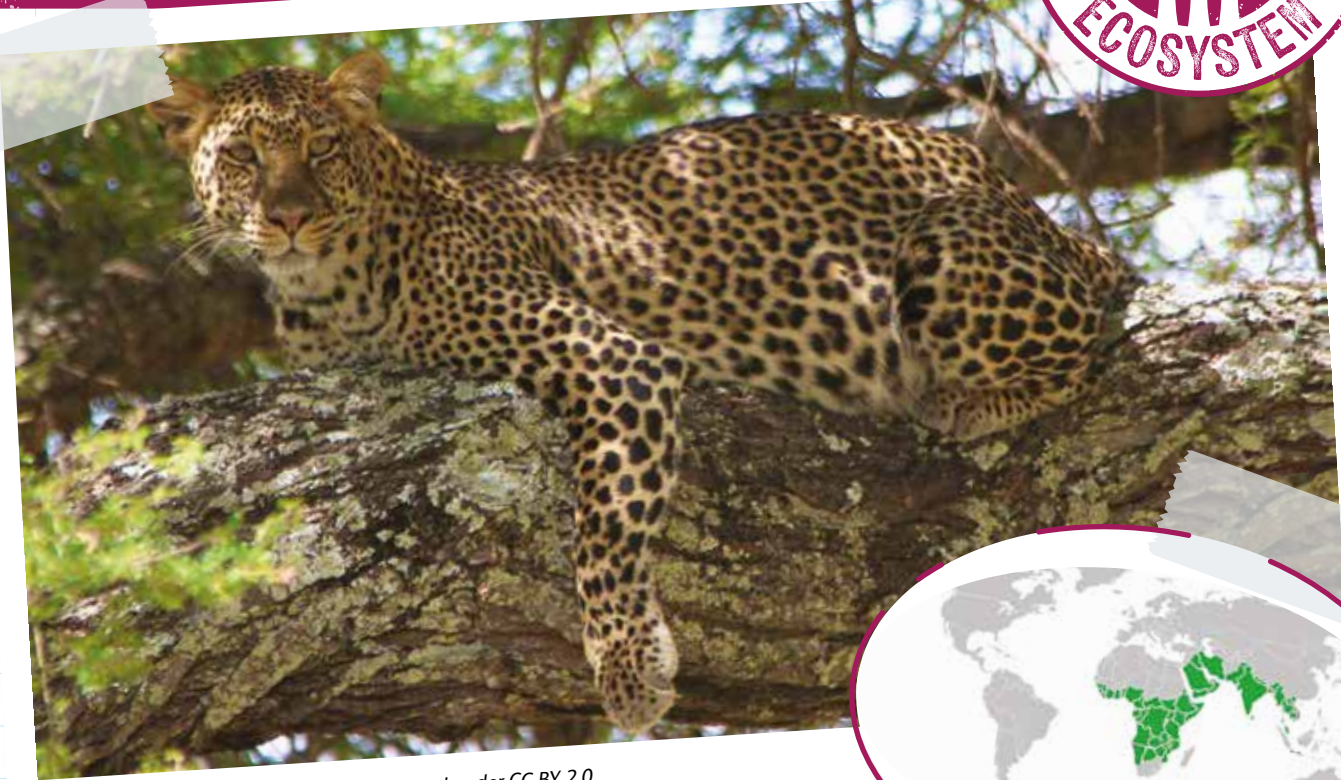
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LEOPARD

Panthera pardus



"Leopard" by Mitchell Fitzsimmons is licensed under CC BY 2.0.



LOCATION



HABITAT:

- Leopards have a huge range and are found throughout Asia and Africa.
- They occupied many different habitats from rocky hills to grasslands to forests.



DIET: They are carnivores and eat many different animals including birds, monkeys, rodents, deer and lizards.



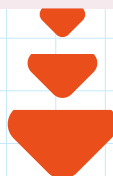
FOOD CHAIN: Leopards have no natural predators but will sometimes fight with other big cats over food.



SIZE: They are the smallest big cat but are still about four times the size of an average house cat! They can grow up to 285cm long.



FACTS: The leopards' spots are camouflage which make them difficult to see in long grass or in trees.



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GIANT CENTIPEDE

Scolopendra subspinipes



"Giant Centipede in Kaeng Krachan national park" by tontantravel is licensed under CC BY-SA 2.0.



LOCATION



HABITAT: This centipede is native across Asia and Australia but is also found in the Americas and Caribbean. Because of its size it is a popular pet and may have been introduced to some areas.



DIET: They are carnivores and will attack and eat almost anything the same size as them or smaller.



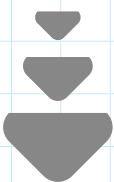
FOOD CHAIN: Birds, snakes and some larger mammals eat centipedes.



SIZE: It can grow up to 20cm which is about as wide as this piece of paper.



FACTS: This centipede is very venomous, and its bite can cause bruising and pain for up to a week.



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KLUGIA

Rhynchoglossum notonianum



"Kilaneeli (Malayalam:)" by Dinesh Valke is licensed under CC BY-SA 2.0.



HABITAT: This plant is found widely throughout India and Sri Lanka.



FOOD CHAIN: Leafcutter ants harvest both the leaves and the flowers and other insects will eat them too.



FACTS:

- The large, elongated bottom petal is called a bee platform to make it easy for bees to get the nectar.
- The leaves grow more on one side than the other which means that the plant can turn towards the sun.

WILD GINGER

Zingiber officinale



"Zingiber officinale" by D.Eickhoff is licensed under CC BY-NC-SA 2.0.



FOOD CHAIN: The leaves will be eaten by many insects and the fruit and flowers by birds and monkeys.



SIZE: They can grow up to 5m tall but usually are much smaller.



FACTS:

- This is the wild relation of the farmed ginger that we use as a spice.
- It is the root that is used and eaten by humans to season food.
- It grows large fleshy yellow or pink flowers which smell of ginger.

MALAYSIAN JUNGLE FOOD WEB



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