

Conservation Lessons

Grades 4/5, Eswatini

In collaboration with:



LESSONS IN CONSERVATION
SERVING TO SAVE

The Dombeya Conservation and Development Association facilitated the development of these conservation lesson plans, thanks to a generous grant from the UNDP GEF Small Grants Programme.

Lessons in Conservation is an existing non-profit organization, which is developing hands-on conservation lessons for primary school children across the continent.

Thank you to the core collaborators: Lessons in Conservation, as well as RES' Thembelisha Preparatory School, Donna Marucchi and Mbuluzi Game Reserve.

For questions or comments, please contact: Stephanie Login-McGinn, Dombeya Conservation and Development Association: steph@dombeya.org

Purpose/Aim of these lessons:

The purpose of these lessons is to excite and encourage learners to embody an eco-friendly and conscious mindset and lifestyle and to create a connection between people, wildlife and the environment.

How to use this guide:

This teaching guide was designed to be used as a reference guide to accompany the presentation PDFs. The aim of this guide is to provide context, extra information, and background knowledge to you as the teacher and enable you to teach the lesson to the best of your ability. Extra resource links have also been provided, should further information on a topic be required.

These lessons were designed to be as flexible as possible and fit into your school and schedule. This gives you the option to determine the length of the lessons, these lessons can be half an hour long or an hour long. This teaching guide provides a framework for you to work from. As the teacher, you can pick and choose which activities or examples you would like to focus on within the lessons, and which you would prefer to exclude. The length of the lesson is greatly dependent on how in depth the content is explained and the extent to which you discuss the content with the students. To manage time constraints, certain topics or points can be focussed on while other examples can be worked through quickly or even skipped over. This guide does not include time frames per slide, you as the teacher can decide what works best within the school's schedule/timetable.

These lessons were also designed so that the content can be as simple or in depth/complex as you make it. If your learners have been taught certain topics previously, then you do not have to reteach it in depth. Rather teach new topics in depth and revise content they have been previously taught. The aim behind the lessons is to foster an eco-friendly lifestyle and conservation conscious mindset. Therefore, try not to focus on the theory content of each lesson, but rather on how it applies to conservation as a whole. Learners do not have to remember this content to be able to regurgitate for a test, but rather to help create a love and excitement for conservation and passion for wanting to make the world a better place. You will see in the teaching guide that there are explanations and extra information allocated to a slide for every lesson. The information and explanations are there as a guide to assist you when teaching the lesson to ensure the objectives of every lesson are met. You do not have to use all the information as the information is also there to assist with your background knowledge and understanding before you teach the topics/lessons.

Lesson delivery:

It is important to note that the approach to teaching these lessons is not to ensure that students retain facts, but more so that they understand the fundamental importance of conservation and the role they play within the bigger picture. Approaching lessons as if you are simply sharing your passion for conservation and ecology, rather than "teaching" in a classroom, proves to be highly effective in keeping students engaged while promoting an interest in, and deeper understanding of, the content taught.

Preparation, energy and enthusiasm form the cornerstones for effective and impactful lessons. Due to the way we have set up these lessons, lessons tend to be quite chaotic. In order to teach effectively, preparation and detailed planning is fundamentally important. These lessons are tailored to various geographic areas and cultural contexts where possible. Thorough preparation ensures that you are comfortable and confident with the content of the lessons. Confidence in turn promotes adaptability, which is arguably the most necessary teaching competency for these types of lessons. Confidence allows you to be more adaptable to the needs of the students and allows you to think on your feet in terms of examples/demonstrations, etc. This, in turn, also encourages participation from the students.

The biggest factor in these lessons is energy and enthusiasm. These lessons should not feel like normal school lessons, but rather a fun, more informal and engaging feel. In order to keep the energy levels high during lessons, the lessons make use of many activities and demonstrations, where we try to get them out of the classroom as much as possible. The goal with these activities and demonstrations are to practically explain the content taught and form connections/associations in the learners' minds so that they better understand the content. This may seem disruptive, but we have found that it successfully allows the learners to focus more intently on the message being relayed, as well as meaningfully engage in the lesson itself.

This guide was designed to serve as a reference and allow for creative freedom. Please do not feel limited to the content of this guide. If you think of new activities or explanations that the students will love and will better their understanding, please feel free to use those instead. Again, the goal is to spark a love for conservation within the hearts of the students you teach, how you do that is entirely up to you as the teacher.

If you have any questions, concerns or feedback on this guide, any of the content, demonstrations or activities, or ideas to improve our lessons, please do not hesitate to contact us. Educating the youth of Africa should be a collaborative effort, and we cannot do it on our own. Please feel free to contact us at:

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We hope you enjoy teaching these lessons as much as we do, and wish you all the best.

The LiC Team

1: Learn all about conservation

Lesson Summary:

This lesson serves as an introduction to conservation and why it is crucial that we all become conscious of how we negatively or positively impact our world. It highlights how we are solely dependent on the planet and why we must use our resources sustainably.

Lesson Objectives:

- Introduction to conservation and its importance.
- Learners grasp the desperate need to conserve our planet and its limited resources.
- Learning various ways to conserve in our daily lives.

Core Competencies Grade 4-6

Learners will need to think about what resources we use and need from the planet. Learners will also have to think of ways to conserve our resources on a daily basis or in general.

Skills	Content	Strategies
Listening and Speaking	Unprepared speech	Express opinions.
	Debate	Share ideas and experiences and show understanding of concepts.
		Brainstorm and organise ideas.

Teaching Materials:

- Projector
- Screen
- Speaker
- Laptop
- Extension cords and adapters
- Lesson presentation on PDF
- Videos for lesson

Lesson Materials:

- Apple
- Knife
- LiC bag per child
- Paint
- Paint brushes
- Water cups
- Paint holders
- Pre-surveys
- Pens

Introduction:

Slide 2	<ul style="list-style-type: none">● Pre-surveys<ul style="list-style-type: none">○ The pre-surveys are not a test. It is important to create a relaxed environment before they start the pre-surveys. The aim of the surveys is to measure how helpful and impactful the lessons are.○ If learners do not know the answers to questions it is fine. They must not be made to feel as though it is a test and they have to know the answers.○ A good initial ice-breaker before pre-surveys is to go around the class asking what each learner's favourite animal is and to make the sound of that animal.
Slide 3	<ul style="list-style-type: none">● Black Bean video to introduce Lessons in Conservation and what the organisation does.<ul style="list-style-type: none">○ This video highlights that anyone can be a conservation hero and the impact a local hero can have.○ Video length: 5 minutes 6 seconds.

Conserving our planet:

Slide 4	<ul style="list-style-type: none">● Introduction into why we need to protect our planet and natural resources.● What is conservation?<ul style="list-style-type: none">- “Protecting our world so that our children can enjoy it too”.<ul style="list-style-type: none">○ Ensure to always give positive feedback when asking questions. It is important that learners feel encouraged and excited throughout the lessons.○ Give prompts and ask guiding questions to assist the learners with understanding the concept of conservation.
Slide 5	<ul style="list-style-type: none">● <i>Demonstration:</i> Imagine the Earth is an apple.<ul style="list-style-type: none">- This activity will demonstrate how we can only live on a small percent of the planet.- Step 1: Show the apple to the class and tell them to imagine it’s the Earth.- Step 2: Cut the apple in half, and then cut one of the halves in half again. 75% of the apple represents the ocean where we cannot live. *Hold up the apple piece to highlight how much of the planet is ocean.- Ask the learners if we can live in the sea. Then ask why can’t we live in the sea. Highlight how we need to look after the land we can live on.- Step 3: The other 25% represents land where we could live. *Hold up the apple pieces to emphasise the amounts.- Ask the learners if we can live in the desert, or in really high mountains or in freezing areas. The answer is no, which means we cannot live on all the land available.

	<ul style="list-style-type: none"> - Step 4: Cut the quarter in half again. This represents the land that is too hot, too cold or too mountainous to live on. - Step 5: Lastly, show the 1/8th of the apple. This represents the land we can live on. *Make sure to emphasise this statistic to highlight how crucial it is that we protect the land we have. ● This activity aims to illustrate how our resources are limited and why we must conserve and look after our resources, working with our fellow humans. ● Keep referring to the small piece of the apple throughout the lessons to emphasise how limited resources are.
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Conservation:

Slide 6, 7 & 8	<ul style="list-style-type: none"> ● What is conservation, and why is it important? <ul style="list-style-type: none"> - Conservation is the act of protecting Earth's natural resources for current and future generations. - Learners need to think and list all the resources the Earth gives us to highlight why we need to protect and conserve resources. Prompt and guide the learners to think about all the possible resources. Keep high energy and give positive feedback and responses. - The Earth provides for us in various ways : <ul style="list-style-type: none"> ○ Plants from the Earth give us food ○ Livestock that we eat ○ Energy from the sun ○ Water (oceans and rain) ○ Air that we breathe ○ Raw materials like wood so we can build our houses ○ Plants can give us medicine
Slide 9	<ul style="list-style-type: none"> ● Video on the resources the Earth gives us and the transformation of materials into other goods. ● Video length: 2 minutes 52 seconds. ● After the video, ask the learners again what the Earth gives us. Encourage all learners to try to answer questions and encourage learners to assist/help those who are nervous to answer.

Ways to conserve:

Slide 10	<ul style="list-style-type: none"> ● We are damaging our Earth. <ul style="list-style-type: none"> - We don't treat our Earth with respect. - The Earth is running out of resources quickly! - Nature is suffering. ● Imagine you lend someone something special to you and they return it broken. How would you feel? How do you think the Earth feels that we aren't looking after her?
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	<ul style="list-style-type: none"> ● Try encouraging the kids to empathise with how the Earth is potentially feeling to highlight key points. <ul style="list-style-type: none"> ○ How do you feel when people do not respect you? ○ How would you feel if you helped someone and they didn't say thank you or they weren't grateful? ● Ask the learners how they think they can help protect Earth's resources before going to the next slide.
Slide 10 & 11	<ul style="list-style-type: none"> ● Examples of how we can conserve resources on a daily basis. <ul style="list-style-type: none"> - Planting indigenous species in your garden or area. - Turn off lights and water when they are not needed to save resources. - Reduce plastic use – use options like material bags, reusable water bottles. - Don't litter, pick up litter.

Why is conservation important?

Slide 13	<ul style="list-style-type: none"> ● Conservation is not only important for our planet to protect resources. It also provides us with other important elements, such as: <ul style="list-style-type: none"> - Protection for animals and plants - Job creation - Tourism *Ask the learners if they know what tourism is and then explain it. When people visit other places. - Generates money for the country through jobs and tourism
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Employment in conservation:

Slide 14	<ul style="list-style-type: none"> ● There are various employment opportunities within conservation. ● Ask the learners what jobs they think are in conservation. ● Then work through the images on the slide briefly explaining the link to conservation. <ul style="list-style-type: none"> - Conservation creates jobs such as: <ul style="list-style-type: none"> ○ Photographer - photographing nature's beauty for others to see and hopefully others will want to protect nature after seeing the photos. ○ Anti-poacher - protecting animals from poachers. ○ Tracker - show people animals in their natural habitat by following their tracks. ○ Field Guide - show people animals in their natural habitat and tell guests facts and explain the importance of nature. ○ Chef - can work in a lodge. ○ Security guards - protect people and animals in protected areas. ○ Builders - build accommodation and buildings in protected areas like lodges. ○ Hospitality manager - runs lodges where people stay to see
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	<p>nature.</p> <ul style="list-style-type: none"> - There are countless jobs that are created and thousands of people earn an income due to conservation and nature tourism.
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Activity:

<p>Slide 15</p>	<ul style="list-style-type: none"> • The learners will paint a tote bag/reusable material bag for themselves rather than having to use plastic bags. • This is to demonstrate how it is possible to make eco-friendly changes
	
	<p>and that we can conserve in our lives every day.</p> <p>Image: Learner painting the tote bag</p>

Workbook explanation:

The workbook has 3 questions for the learners to answer based on the first lesson as well as a colouring page.

Worksheet answers:

1. *Why do we need to protect the Earth's resources?*

Possible Answers	
<ul style="list-style-type: none"> • To have food to eat (crops, fruit, animals) 	<ul style="list-style-type: none"> • To have water to drink and clean with
<ul style="list-style-type: none"> • To have clean air to breathe 	<ul style="list-style-type: none"> • To have raw materials (wood) to

	build
<ul style="list-style-type: none"> To have plants for medicine 	<ul style="list-style-type: none"> To have wildlife
<ul style="list-style-type: none"> To have a place to live 	<ul style="list-style-type: none"> To have resources like oil and coal

2. *How do you think you can conserve at home?*

Possible Answers	
<ul style="list-style-type: none"> Do not litter 	<ul style="list-style-type: none"> Plant indigenous species
<ul style="list-style-type: none"> Reduce plastic use 	<ul style="list-style-type: none"> Recycle when you can
<ul style="list-style-type: none"> Turn off water when you don't need it 	<ul style="list-style-type: none"> Turn off lights when you don't need them

3. *What do you think will happen if we don't look after the Earth?*

Possible Answers	
<ul style="list-style-type: none"> We won't have food (fruit, crops, animals) 	<ul style="list-style-type: none"> We won't have clean water to drink
<ul style="list-style-type: none"> We won't have clean air to breathe 	<ul style="list-style-type: none"> We won't have raw materials (wood) to build
<ul style="list-style-type: none"> We won't have plants for medicine 	<ul style="list-style-type: none"> We won't have wildlife
<ul style="list-style-type: none"> We won't have a safe place to live 	<ul style="list-style-type: none"> We won't have resources like oil and coal

Materials that need to be printed:

- Pre-surveys

Extra Resources:

- **Conservation:** <https://education.nationalgeographic.org/resource/conservation/>
- **Conservation:** <https://www.britannica.com/science/conservation-ecology>
- **Understanding conservation and its importance:** <https://www.nwf.org/Educational-Resources/Wildlife-Guide/Understanding-Conservation#:~:text=By%20conserving%20wildlife%2C%20we're.by%20environmental%20and%20human%20influences.>
- **Why conserve:** <https://www.conservationhandbooks.com/why-conserve/>
- **Wildlife Conservation:** <https://www.awf.org/wildlife-conservation>
- **How to conserve:** <https://kids.frontiersin.org/articles/10.3389/frym.2019.00084>
- **Daily ways to conserve:** <https://www.masterclass.com/articles/how-to-conserve-natural-resources>

Lesson 2: It's better to work together

Lesson Summary:

This lesson introduces how various animals work together and why it is important. The idea of working together is linked to an introduction of ecosystems and food chains. We highlight how all organisms depend on one another, and they are all equally important and need to be protected.

Lesson Objectives:

- Highlight how we can learn lessons from nature, such as teamwork.
- Expose learners to the various ways animals work together to help one another.
- Demonstrate how all species are interconnected and therefore all need to be protected.
- Introduction to ecosystems and food chains and their importance.

Core Competencies Grade 4-6

Learners will need to think about what resources we use and need from the planet. Learners will also have to think of ways to conserve our resources on a daily basis or in general.

Skills	Content	Strategies
Listening and Speaking	Unprepared speech	Express opinions
	Debate	Share ideas and experiences and show understanding of concepts
		Brainstorm and organise ideas

Teaching Materials:

- Projector
- Screen
- Speaker
- Laptop
- Extension cords and adapters
- Lesson presentation on PDF
- Videos for lesson

Lesson Materials:

- 5-7 balloons/beach balls

Introduction:

Slide 2 & 3	<ul style="list-style-type: none"> ● We can learn from nature. <ul style="list-style-type: none"> - Ants show us how important teamwork is and how we all rely on one another. - <i>Demonstration:</i> Ant carrying. <ul style="list-style-type: none"> ○ Step 1: All learners must stand in a big circle. ○ Step 2: Select one individual to be the “food” the ants will carry, and they must lay down on their back on the floor. ○ Step 3: Select one individual to pick up the “food” with only 1 finger on each hand.
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	<ul style="list-style-type: none"> ○ Step 4: Select one more individual to help (still only use one finger on each hand). ○ Step 5: All learners must help pick up using only one finger on each hand, and they will manage to lift the “food”. ○ This demonstrates how teamwork makes life easier, and we need help from one another.
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Animals working together:

Slide 4 & 5	<ul style="list-style-type: none"> ● Ask the learners why they think some animals work together and to give examples. ● Animals work together for food. The image shows a coalition of cheetah males working together to hunt their food. ● Other examples include: <ul style="list-style-type: none"> ○ Hunting in packs (wild dogs, lionesses, dolphins) ○ Scavenging (hyena) ○ Foraging (monkeys) ● Animals also work together for protection. The second image shows how meerkats take turns looking out for predators. Instead of them all worrying and looking out for predators, they take turns, so the others can find food or relax.
Slide 6	<ul style="list-style-type: none"> ● Learners must guess how the animals are working together. <ul style="list-style-type: none"> - Meerkats huddle together to keep warm. ● Ask if learners have seen birds flying in “V” formation before. <ul style="list-style-type: none"> - They fly like this to conserve their energy. Each bird flies slightly above the bird in front of them, resulting in a reduction of wind resistance. The birds take turns being in the front, falling back when they get tired. In this way, the geese can fly for a long time before they must stop for rest. - <i>Demonstration:</i> Flying like a bird. <ul style="list-style-type: none"> ○ Step 1: Pretend to be the bird in the front. Flap arms very hard to show how they work hard to break the wind for the other birds ○ Step 2: Pretend to move to the back of the v formation and flap softly to show how they take turns doing the hard work. ○ Step 3: After flapping softly and getting energy back start flapping hard again to show you move back to the front.
Slide 7 & 8	<ul style="list-style-type: none"> ● Different animals also help one another like zebras and ostriches. <ul style="list-style-type: none"> - How do zebras and ostriches help one another? - Zebras have great hearing but poor eyesight. - Ostriches have great eyesight but poor hearing. - They work together to warn each other about predators. - <i>Demonstration:</i> Work together.

	<ul style="list-style-type: none"> ○ Step 1: Cup hands around ears to imitate Zebras' good hearing. ○ Step 2: Cover eyes to show zebras have poor eyesight. ○ Step 3: Use your hands to make glasses around your eyes to show how ostriches see really well. ○ Step 4: Cover ears to show ostriches don't hear very well. ○ This shows how different senses are used between the two species to look out for predators. ○ Emphasise how the animals need one another and would struggle without the relationship.
Slide 9	<ul style="list-style-type: none"> ● How could a crocodile and plover work together? ● Crocodiles eat meat and cannot brush their teeth so food gets stuck and can lead to rotting teeth. ● The birds act like a toothbrush and help them clean their teeth and get food out of the process.
Slide 10	<ul style="list-style-type: none"> ● How are the oxpeckers helping the rhino? <ul style="list-style-type: none"> - Rhinos have ticks on them, which can make them sick. - The oxpeckers eat the ticks off the rhinos and other animals. - This helps the rhino and feeds the oxpecker.
Slide 11	<ul style="list-style-type: none"> ● Funny cartoon video on fake examples of animals working together. ● Video length: 1 minute 22 seconds

Activity: Work together

Slide 12	<ul style="list-style-type: none"> ● In this activity, the learners need to work together or they will not achieve the goal. ● The goal of this activity is to keep all the balloons/beach balls up in the air. <ul style="list-style-type: none"> - Step 1: One learner must try to keep all balls up in the air and not let any touch the floor. They will struggle. - Step 2: Add in all the other learners. They must all keep the balls up in the air and work together to ensure none end up on the floor. - Split learners up into smaller groups for this activity so all learners have a chance to play the game.
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Ecosystems:

Slide 13, 14 & 15	<ul style="list-style-type: none"> ● What is an ecosystem? ● This is a community of interacting things; this includes all plants and animals – the living things- <i>and</i> the non living things, like soil and air. ● All animals depend on one another and are all really important. ● If one animal vanishes or goes extinct then the whole system is broken. *This concept is crucial for the learners to understand and
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	<p>grasp.</p> <ul style="list-style-type: none"> ● Ecosystems are made up of abiotic (non-living) and biotic (living) factors, and both are important.
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Food chains:

Slide 16	<ul style="list-style-type: none"> ● Video on food chains ● Video length: 3 minutes 24 seconds ● Highlight how everything is interconnected and therefore important.
Slide 17	<ul style="list-style-type: none"> ● Example of a food chain and the circle of life. <ul style="list-style-type: none"> - The sun and water are the reason plants can grow therefore food chains begin with abiotic factors. - Food chain: <ul style="list-style-type: none"> ○ The impala eats the grass. ○ The lion eats the impala. ○ When the lion is old and dies, the decomposers (fungi and mushrooms) break down the body and put all the energy and nutrients back into the soil, which helps the grass grow. ○ Highlight how everything is important and if one link in the chain breaks all the animals are negatively affected. ○ Reiterate this point throughout lessons that everything is interconnected and depends on one another.
Slide 18	<ul style="list-style-type: none"> ● Terminology for food chains. <ul style="list-style-type: none"> - Herbivore: Plant-eating animals. - Carnivore: Meat-eating animals. - Omnivore: Eats both plants and meat.
Slide 19	<ul style="list-style-type: none"> ● More detailed example of a food chain. <ul style="list-style-type: none"> ○ Begin with the sun giving energy to the plants ○ The start of the food chain are producers. Producers are plants. ○ Primary consumers (herbivores – animals that eat plants only) eat the producers (plants). ○ Secondary consumers (carnivores - animals that eat meat only) eat primary consumers (herbivores). ○ When secondary consumers die, their bodies get broken down, and nutrients go back into the soil: the circle of life.
Slide 20	<ul style="list-style-type: none"> ● Video on the circle of life. ● Video length: 1 minute 13 seconds ● Highlight how everything is linked. This video shows how even the lions are linked to the grass. Ask the learners to re-explain how.

Importance of ecosystems:

Slide 21	<ul style="list-style-type: none">- Ecosystems help us.- They give us:<ul style="list-style-type: none">○ Pollination, which gives us crops and fruit.○ Clean air to breathe.○ Clean water to drink and cook with.○ Raw materials to make everything we need.○ Medicine.○ Energy.○ Waste removal.- Emphasise how much nature helps us and how we are not looking after it in return.
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Looking after the ecosystem:

Slide 22	<ul style="list-style-type: none">● There are actions we can all do every day to help our ecosystems and to protect the food chains.<ul style="list-style-type: none">- Educating and teaching others how important it is that we protect our planet.- Picking up litter and not littering.- Saving water when possible.- Saving electricity when possible.- Showing respect to wildlife and their habitats.- Recycling, reusing and reducing when we can.- Ask the learners if they think they could do these actions and educate others on how they can help as well. Make it sound exciting and encourage them to feel empowered when they introduce these actions into their daily lives.
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Workbook explanation:

The workbook has a word search with all the terminology from food chains and ecosystems.

Worksheet answers:

WORD SEARCH

Try to find all these words in the word search below.

food chain	herbivore	omnivore
producers	carnivore	organisms
consumers	habitat	animals
predators	prey	plants

i i i o r g a n i s m s
s w s p r e y m p u a v
h p r o d u c e r s u u
c a r n i v o r e h m f
k n u x d w w o p e g o
y i c o n s u m e r s o
t m a w w e h n r b p d
h a b i t a t i x l c
j l r x g c j v g v a h
u s b h u g u o v o n a
p r e d a t o r s r t i
e p q q p i j e p e s n

Extra Resources:

- Importance of ecosystems: <https://unu.edu/publications/articles/healthy-ecosystems-earth-people.html>
- Benefits of ecosystems: <https://infinitylearn.com/surge/biology/importance-of-ecosystem/>
- Food chains: https://wwf.panda.org/discover/knowledge_hub/teacher_resources/webfieldtrips/food_chains/
- Food Chain: Definition, Types, Importance & Examples: <https://sciencing.com/food-chain-definition-types-importance-examples-with-diagram-13719239.html>
- Importance of food chains in an ecosystem: <https://byjusexamprep.com/upsc-exam/what-is-the-importance-of-food-chain-in-ecosystem>

Lesson 3: Be a link in the chain

Lesson Summary:

This lesson focuses on food chains and food webs and highlights how crucial it is that no link in the chain can break. This lesson demonstrates how ecosystems break down if animals become extinct and how it affects the entire system.

Lesson Objectives:

- Recap of terminology – herbivore, carnivore, producer, consumer.
- Identify the differences between food chain and food web.
- Highlight the importance of food chains and food webs and how everything is interconnected.
- Illustrate how the whole system breaks if a chain/link is broken.

Core Competencies Grade 4-6

Learners are expected to understand and have knowledge regarding food chains within the Grade 4 curriculum. Learners must be able to show the links and relationships in different food chains. This lesson focuses on the transfer of energy; food chains and terminology.

Skills	Content	Strategies
Accessing and recalling information	Food chain showing how the energy from the Sun is transferred through the food made by plants, to animals/a person's body	Show the links and relationships in different food chains
Accessing and recalling information	All animals depend on plants as their primary source of food (herbivores, carnivores and omnivores)	Create food chains to show understanding

Teaching Materials:

- Projector
- Screen
- Speaker
- Laptop
- Extension cords and adapters
- Lesson presentation on PDF
- Videos for lesson

Lesson Materials:

- Hoola-hoops x2
- Food chain paper strips
- All learners will need:
 - Scissors
 - Glue
 - Colouring in pens/pencils

Introduction:

Slide 2 & 3	<ul style="list-style-type: none">● Recap of terminology and how everything is interconnected.● Terminology recap includes:<ul style="list-style-type: none">○ Herbivore○ Carnivore○ Omnivore○ Producer○ Primary Consumer○ Secondary Consumer● Ask learners to give examples and explanations of the terminology if possible.
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Food chain and food web:

Slide 4	<p><i>Don't break the chain activity</i></p> <ul style="list-style-type: none">● Learners will be split into two large groups.● They will need to stand in a long line holding hands.● The two groups will be opposite one another and have a race.● The goal is to get the hoola-hoop from one end of the line to the other without letting go of hands.● The hoop must go over each learner, and they will have to get their body through the hoop without breaking the chain.● This shows if one link (hand lets go) the whole system breaks and they must start again.● The group that successfully gets the hoop across first wins.● This activity can be repeated a few times.
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- Image: Passing the hula-hoop without letting go of each other's hands or “breaking the chain”.

Slide 5

- Recap of a food chain.
 - It starts with abiotic factors (water, sun, soil).
 - Recap on biotic factors and the transfer of energy.
 - A food chain is one example of how animals interact and depend on one another.

	<ul style="list-style-type: none"> - Ecosystems are made up of organisms that interact. They are all pieces of a large chain. - Emphasis that links cannot break, remind them of the hula-hoop activity. Reiterate that every species is crucial and that everything is important and interconnected.
Slide 6	<ul style="list-style-type: none"> ● Highlight the difference between food chains and food webs. <ul style="list-style-type: none"> - A food web is made up of lots of food chains. ● <i>Reflection activity:</i> Identify food chains. <ul style="list-style-type: none"> - A food web contains multiple food chains. - Show one food chain within the food web image. <ul style="list-style-type: none"> ○ Grass -> Zebra -> Lion -> Vulture ○ Grass -> Gazelle -> Lion -> Vulture ○ Grass -> Zebra -> Vulture ○ Grass -> Gazelle -> Vulture - Ask one or two learners to come up individually to point out a food chain to show understanding or ask learners to call out a chain while you point at the slide.
Slide 7	<ul style="list-style-type: none"> - Activity: Ask the learners to explain a food chain within the food web image. <ul style="list-style-type: none"> ○ Grass -> Rabbit -> Fox ○ Grass -> Rabbit -> Owl ○ Grass -> Mouse -> Owl ○ Grass -> Mouse -> Fox ○ Grass -> Grasshopper -> Frog -> Owl ○ Grass -> Grasshopper -> Frog -> Snake -> Hawk ○ Grass -> Grasshopper -> Bird -> Snake -> Hawk - Highlight how all the animals are dependent on one another. - If one animal goes extinct, the whole system breaks <ul style="list-style-type: none"> ○ This can lead to overpopulation of one animal, and ○ Loss of food for one animal, therefore they are competing more for food as there are fewer sources of food. ○ Example: <ul style="list-style-type: none"> ▪ If frogs go extinct then the owl and snake lose a source of food, which will lead to a decline in their numbers ▪ If there is a decline in their numbers then the hawk also loses a source of food (snakes), and their numbers will decline. ▪ There will be an overpopulation of grasshoppers which will lead to grasses being over eaten, which will lead to less food for mice and rabbits. ▪ If mice and rabbits are losing a food source, then the owl and fox also experience a loss in food sources.
Slide 8	<ul style="list-style-type: none"> ● Eswatini food chain example in a river. <ul style="list-style-type: none"> - Algae -> Small fish -> Big fish (Barbel) -> Fish Eagle

Slide 9	<ul style="list-style-type: none"> ● Eswatini food web example in a river. - Algae -> Small fish, tadpoles, crabs -> Big fish (Barbel), otters-> Crocodile
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Activity & classroom decoration:

Slide 10	<ul style="list-style-type: none"> ● Learners must work through the activity in their workbooks.
Slide 11	<ul style="list-style-type: none"> ● <i>Activity: Making Food Chains</i> ● Learners can work in pairs to make food chains. These can be used as classroom decorations. ● On the paper there are various pictures in strips. They are not in order. The learners need to cut the strips and work out which pictures go together to create a food chain. ● Learners will need colouring pencils/pens, scissors and glue for this activity. <div data-bbox="427 815 1369 1435" data-label="Image"> </div> <p data-bbox="427 1442 895 1473">Image: Learners colouring in the strips.</p>



Image: Learner assembling the food chain.

Workbook explanation:

The workbook has a food web that the learners must complete by filling in the arrows creating the correct links. It also has questions based on food chains and food webs to complete. There is also a colouring-in page.

Worksheet answers:

In the illustration below, use arrows to map out the energy transfer between organisms these are possible food chains within the food web:

1. Grass -> Grasshopper -> Frog-> Snake -> Eagle
2. Flower -> Ants -> Bird -> Snake
3. Grass -> Beetle -> Bird
4. Grass -> Ants -> Frog -> Snake -> Eagle
5. Grass -> Ants -> Frog -> Eagle

Name two producers in the food web above

Answers	
● Flower	● Grass

Name three consumers in the food web above

Possible Answers	
● Grasshopper	● Frog
● Insect/beetle	● Ants
● Snake	● Birds

What is the difference between food chains and food webs?

Answers	
● Food Chain	● A food chain shows a single path of energy from organism to organism.
● Food Web	● A food web is a complex network made up of many food chains, where the energy can follow many paths.

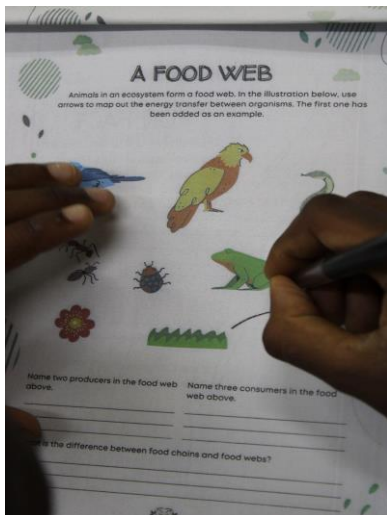


Image: The workbook page on food chains.

Materials that need to be printed:

- **Food chain strips**

Extra Resources:

- **Paper Food chain example:** https://www.youtube.com/watch?v=VAqfp1b_Wsk
- **Food Web:** <https://education.nationalgeographic.org/resource/food-web/>
- **Importance of food webs:** <https://sciencing.com/food-important-5525614.html>
- **If links are broken in the chain what happens?:** <https://environment.co/the-effects-of-endangered-species/#:~:text=As%20species%20go%20extinct%2C%20they,can%20proliferate%2C%20unbalancing%20local%20ecosystems.>

Lesson 4: Discover the smaller things

Lesson Summary:

This lesson highlights the importance of insects and why we need them. The lesson also introduces diversity and biodiversity, emphasising how everything is equally important. Examples such as butterflies and moths are focused on while introducing life cycles.

Lesson Objectives:

- Introduction to biodiversity (bio: life; and diversity: many different types of things), and recapping how every species is connected and important.
- Introduction to life cycles.
- Introduction to the importance of insects.

Core Competencies Grade 4-6

Learners are expected to understand life cycles under the content and concept of growth and development. This lesson focuses on metamorphosis and thus the life cycle of a butterfly.

Skills	Content	Strategies
Accessing and recalling information	Life cycles	Learn life goes through stages through an example of a butterfly

Teaching Materials:

- Projector
- Screen
- Speaker
- Laptop
- Extension cords and adapters
- Lesson presentation on PDF
- Videos for lesson

Lesson Materials:

- Wrapping paper
- Butterfly wings
- Sticky tape
- Small sweets
- Plain white paper
- Learners will need colouring pens/pencils

Introduction:

Slide 2	<ul style="list-style-type: none">● The smaller things in life are just as important as the bigger animals and are also crucial within the ecosystem and food chains/webs.
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Diversity:

Slide 3	<ul style="list-style-type: none"> ● Explain diversity and biodiversity. <ul style="list-style-type: none"> - Ask the learners if there is only one type of insect or plant etc. - Help them recognise that diversity means a variety of different species. - Explain biodiversity, the variety of plant and animal life in the world or in a particular habitat. Biodiversity- and high levels of diversity - are important and desirable in nature/ecosystems. - Biodiversity is important as this is what keeps ecosystems and food chains/webs working; all the different species are essential. - Highlight the idea of extinction and breaking links in the food web, and remind the learners why this is bad (to show the importance of biodiversity). - Reiterate how diversity is crucial and that every link in the food chain/system is important. If one link breaks the whole system breaks.
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Insects:

Slide 4	<ul style="list-style-type: none"> ● There are many, many, many species of insects. ● Although insects are small, they are the most abundant living things on Earth. ● Highlight how many insects there are by showing the pie chart image. <ul style="list-style-type: none"> - Insects make up 52% of all living things on the planet. - Explain to the learners that 52% is more than half a cake and then show how much smaller all the other “slices” of the pie are. - Us humans are part of the chordate group (animals with spines), only making up 3% of all living things. While we humans are only a tiny piece of the pie, we have a BIG impact on nature and other species, and we need to look after the other living things on Earth. - This explanation can be extremely simple. The aim is for the learners to understand that there are many insects on the planet and they are just as important as any other animal/species.
Slide 5	<ul style="list-style-type: none"> ● Here is something interesting: some insects are unique with how they see. <ul style="list-style-type: none"> - Some insects have compound eyes. Which means they have better vision than us. - <i>Demonstration:</i> Help learners identify their peripheral vision. <ul style="list-style-type: none"> ○ Begin with telling the learners they cannot move their head, only their eyes. ○ They must hold their hands up in front of their face with their arms stretched out straight. ○ Slowly, begin to tell the learners to move their hands apart and move little by little. ○ After moving bit by bit, keep asking the learners if they can see their hands. ○ After moving bit by bit, their hands should be by the side of their body, and they should only just be able to see their

	<p>hands with their peripheral vision.</p> <ul style="list-style-type: none"> ○ Then tell the learners to put their hands behind their heads and ask if they can see them. The answer will be no, then tell the learners that our eyes are different to insects. ○ If we had compound eyes, we would be able to see our hands behind our head, as we would have a wide field of view.
Slide 6	<ul style="list-style-type: none"> ● Video on insects and compound eyes. ● Video length: 4 minutes 51 seconds ● Can ask the learners questions after the video: <ul style="list-style-type: none"> ○ Would you like to have compound eyes? ○ What new facts did you learn? ○ What did you like the most?

Metamorphosis:

Slide 7	<ul style="list-style-type: none"> ● Insects go through different life cycles. <ul style="list-style-type: none"> - They begin as eggs. - Then they grow into larvae. - Then they become pupae. - Then the pupae grow into an insect. ● Butterflies go through a life cycle and this process is called metamorphosis. <ul style="list-style-type: none"> - They also start as an egg. - Then they become a caterpillar. - Then they make a cocoon. - When they emerge from the cocoon, they are a butterfly.
Slide 8	<ul style="list-style-type: none"> ● <i>Activity:</i> Becoming a butterfly. <ul style="list-style-type: none"> - Every child gets a sweet, which represents the egg. - One learner will come up to be the butterfly and demonstrate metamorphosis. - This learner then places their arms next to their body and has wrapping paper wrapped around them. - They then break free from the wrapping paper and put on butterfly wings.



Image: Learners dressed up as butterflies.

Butterflies:

<p>Slide 9</p>	<ul style="list-style-type: none"> ● Africa has more than 1000 species of butterflies. ● Slide shows a Yellow Pansy Butterfly. ● Butterflies are important because they are pollinators. When they fly from flower to flower and to different trees and plants, their bodies collect pollen and carry it to other plants. This helps fruits, vegetables and flowers to produce new seeds. The majority of plants need pollinators like bees and butterflies to reproduce.
<p>Slide 10</p>	<ul style="list-style-type: none"> ● Some butterflies are really cool, like the Gaudy Commodore Butterfly. This butterfly is blue when it is born in winter, but red when it is born in summer. ● Ask the learners why they think this is the case.

	<ul style="list-style-type: none"> ○ Answer: the colour difference between seasons is to be able to easily blend into their surroundings. On cooler winter days these butterflies are known to congregate in large numbers in the shade of walls and river banks.
Slide 11	<ul style="list-style-type: none"> ● Ask the learners if they have seen any of these butterflies before and which one they like the most: <ul style="list-style-type: none"> - Brown-veined White Butterfly - Common Diadem - Citrus Swallowtail Butterfly
Slide 12	<ul style="list-style-type: none"> ● Here is something interesting: Monarch Butterflies are really clever. <ul style="list-style-type: none"> - Birds eat butterflies, therefore to avoid being eaten Monarch butterflies make themselves poisonous to birds. - When Monarch butterflies are caterpillars, they eat a poisonous plant called Milkweed. - As they eat so much of this plant, the caterpillar itself becomes poisonous to birds. - When the caterpillar turns into a butterfly, it is still poisonous. - Therefore, when birds try to eat a Monarch butterfly it will spit it out because they know it will make them sick.
Slide 13	<ul style="list-style-type: none"> ● Video on Monarch butterflies. ● Video length: 1 minute 15 seconds

Difference between butterflies and moths:

Slide 14	<ul style="list-style-type: none"> ● Ask the learners what they think the differences are between moths and butterflies. <ul style="list-style-type: none"> - Moths <ul style="list-style-type: none"> ○ Come out at night. They use the moon for direction; that's why they will often fly towards lights at night because they think it is the moon. That's why it is important we try to minimize light pollution. They are important pollinators. ○ They have fluffy wings. The powder on their wings helps them to fly, so you must try not to touch them, or they won't be able to fly nicely. ○ They often have dull/boring colours. ○ Thick body. - Butterflies <ul style="list-style-type: none"> ○ Come out during the day to look for flowers and help pollinate to give us food. ○ They have smooth wings. ○ They are more brightly coloured. ○ Thin body.
Slide 15	<ul style="list-style-type: none"> ● Moths can be huge - the size of your hand. ● Moths also are important pollinators, particularly those that are

	<p>active after dark, when many other pollinating animals have settled down for the night. One study found that nocturnal moths visit more plant species than day active bees do, highlighting their importance in pollen transport. Moths have wide-ranging tastes in flowers. While some species are generalists, others have evolved to rely on a single plant species or group of species.</p> <ul style="list-style-type: none"> ● They often have spots on their wings that look like eyes. <ul style="list-style-type: none"> ○ This is a defence mechanism. ○ These spots look like eyes to trick predators into thinking they are actually a big animal, so they don't try to eat them. This is called mimicry.
Slide 16	<ul style="list-style-type: none"> ● Video of caterpillar mimicking a snake. ● Video length: 1 minute 48 seconds

Crickets:

Slide 17	<ul style="list-style-type: none"> ● Let's talk about crickets: you might hear crickets before you see them. ● Ask the learners what noise do crickets make? ● <i>Demonstration:</i> Be a cricket. <ul style="list-style-type: none"> - Crickets make their noise through friction. They rub their legs together and onto a special structure on top of wings called a scraper, and that's how they make their noise - this is called stridulation. - Learners must stand up and rub their legs together while making a cricket noise.
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Importance of insects:

Slide 18	<ul style="list-style-type: none"> ● Insects help to pollinate plants, which gives us fruit and crops which we need to survive. ● Humans need plants to eat and to give us oxygen to breathe so without insects we are in trouble.
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Activity and classroom decoration to conclude:

Slide 19	<ul style="list-style-type: none"> ● Learners are given a blank piece of paper to design their own butterfly or moth. ● They can design any butterfly or moth. ● They must give their new species of moth or butterfly a name. ● Encourage the learners to think about why they are using certain colours or patterns on their butterfly or moth. Is it a defense mechanism, is it for camouflage etc. However, encourage them to be creative! ● Learners must create their own species and give it a name.
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- Examples: Blue Rainbow Butterfly.
- Yellow spotted pink moth.



Images: Examples of learner' butterflies

Workbook explanation:

The workbook has technical and personal questions for the learners to answer regarding insects. There is also an “I Spy Insects” activity where learners must count the number of each insect species.

Worksheet answers:

1. Which species makes up the most living things on Earth?

Answer: *b - insects*

2. What would happen if we didn't have insects?

Possible Answers	
<ul style="list-style-type: none">● We would not have pollination. Therefore, no fruit, crops or plants	<ul style="list-style-type: none">● Less plants results in less oxygen being produced
<ul style="list-style-type: none">● Food chains and webs would break	<ul style="list-style-type: none">● No food for other animals such as birds, frogs
<ul style="list-style-type: none">● Seeds would not be dispersed	<ul style="list-style-type: none">● Soil would not be as healthy, as there are less species breaking down and recycling nutrients

I Spy Insect Answers	
Grasshopper	5
Mosquito	12
Ladybug	3
Fly	11
Ant	7
Cockroach	5

Extra Resources:

- **Importance of biodiversity:** <https://www.unicef.org/globalinsight/stories/why-biodiversity-important-children#:~:text=Biodiversity%20provides%20vital%20ecosystem%20functions,and%20crop%20and%20tree%20pollination>.
- **Importance of butterflies:** <https://www.environment.sa.gov.au/goodliving/posts/2018/12/benefits-of-butterflies#:~:text=They%20pollinate%20plants%20in%20your%20garden&text=When%20they%20do%20this%20their,bees%20and%20butterflies%20to%20reproduce>.
- **Importance of moths:** <https://xerces.org/blog/for-love-of-moths#:~:text=Moths%20play%20a%20vital%20role,settled%20down%20for%20the%20night>.
- **Importance of insects:** <https://www.almanac.com/why-do-we-need-bugs>

Lesson 5: Fluff your feathers

Lesson Summary:

This lesson focuses on birds and biodiversity and reinforces the idea that all species are important and are needed within an ecosystem. The lesson also introduces how to identify birds.

Lesson Objectives:

- Introduction to birds and bird identification.
- Introduction to migration.
- Learn several species of birds to highlight biodiversity and create excitement around learning about nature.

Core Competencies Grade 4-6

Learners need to be taught about biodiversity throughout their Natural Science curriculums. This lesson focuses on general facts and information about birds to further their understanding of ecosystems and the importance of all life on Earth.

Skills	Content	Strategies
Accessing and recalling information	Plants and animals on Earth that create biodiversity	Discuss various animals and describe them

Teaching Materials:

- Projector
- Screen
- Speaker
- Laptop
- Extension cords and adapters
- Lesson presentation on PDF
- Videos for lesson

Lesson Materials:

- Ruler
- Bird booklets provided by LiC
- Pre-cut square paper
- Laminated how-to fold guide for bird origami

Bird's feathers:

Slide 2	<ul style="list-style-type: none">● Feathers help birds to fly.● They help to control the wind when flying through the air.● They also help birds stay warm in winter.● Did you know birds also use their feathers to show off?<ul style="list-style-type: none">○ If possible try to have bird feathers for the learners to see and feel for a visual and tactile element.
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Speed of the Peregrine Falcon:

Slide 3	<ul style="list-style-type: none">● Ask learners if they can guess what the fastest bird is before changing to this slide.● The Peregrine Falcon is the world's fastest animal.● They can fly at speeds of more than 300 km per hour.
Slide 4	<ul style="list-style-type: none">● Video of Peregrine Falcon.● Video length: 2 minutes 12 seconds

Migration:

Slide 5 & 6	<ul style="list-style-type: none">● Migration is the seasonal movement between breeding grounds and feeding grounds. Students can repeat this nice rhyme many times.● Most birds migrate in big groups called flocks.
Slide 7	<ul style="list-style-type: none">● The Amur Falcon is one example of a bird species that flies across the world during their migration.● The image shows real tracking data of Amur falcons. They fly 22 000 km twice a year. 22,000 kms is about the same as flying from Mbabane to Johannesburg 63 times! They fly over the sea for 4000 km and do not stop for 2–3 days.● They breed in Eastern China, Northern Mongolia and Russia.● Birds lay eggs in a nest. After the chicks (baby birds) hatch and are grown, they will often need to migrate to find food.

Male vs female birds:

Slide 8	<ul style="list-style-type: none">● Birds use their feathers to attract mates.<ul style="list-style-type: none">- Male birds are often brightly coloured to attract females.- Female birds are often duller as they don't need these colours.
Slide 9	<ul style="list-style-type: none">● Video: Birds using their feathers to display to get a mate.● Video length: 3 minutes 40 seconds● Learners can join in and copy the bird's dancing if they want. This can assist with movement and keeping the learners' excitement and energy. If teachers copy the dancing, students will probably copy.
Slide 10	<ul style="list-style-type: none">● Video: Peacock displaying feathers.● Video length: 1 minute 54 seconds
Slide 11	<ul style="list-style-type: none">● Activity: Bird Origami.<ul style="list-style-type: none">- Use laminated how-to guide to explain to the learners how to create paper birds.- Each learner will receive pre-cut paper to make their bird with.



Image: Learner with her origami bird.

- After the learners have made their birds there are 2 possible activities depending on time. You can use one or both or neither if time is limited.
 - After the learners have their origami birds, demonstrate migration. Get all the learners up and in one corner of the class. “Currently we are in our feeding grounds so what are we doing?” then ask all the learners to use their birds and they can pretend to be eating. Then tell the learners its time to migrate, and learners can fly their paper birds to the other side of the class. Once there ask the learners why they migrated. “We are now in our breeding grounds” (flying from feeding grounds to breeding grounds).
 - The second activity is to have a flying competition. Ask all the learners to line up outside and on the count of 3 they need to throw/”fly” their birds. The bird that lands the furthest away wins. This can be repeated a few times.

Fun facts:

Slide 12	<ul style="list-style-type: none">● These next slides help learners feel amazed by nature. Here is something interesting: birds don't have teeth! They have an organ called a gizzard, which grinds up their food.● All female birds lay eggs.
Slide 13	<ul style="list-style-type: none">● The Bee Hummingbird is the smallest bird on the planet. It can grow only from 5 to 6.1 centimetres as an adult.<ul style="list-style-type: none">- Demonstration: Learners take out their ruler to see how small the Bee Hummingbird is: 5-6 cm.
Slide 14	<ul style="list-style-type: none">● Ostriches are the biggest birds in the world.<ul style="list-style-type: none">- They have the largest eggs.- Activity: ask learners to each guess how many chicken eggs is equivalent to one ostrich egg. Answer: 24 chicken eggs equals one ostrich egg.
Slide 15	<ul style="list-style-type: none">- Males are black and go pink during breeding season to impress the females.- Females are grey.<ul style="list-style-type: none">○ The males are black because they look after the nest at night, so they camouflage into the night.○ The females are grey because they look after the nest during the day, so they camouflage into the surrounding area during daylight.
Slide 16	<ul style="list-style-type: none">- Ostriches are very aggressive when defending their nests.- They can run up to speeds of around 70 km/h.
Slide 17	<ul style="list-style-type: none">● Video: Ostrich running. They can't fly, but they are the fastest running bird.● Video length: 1 minute 14 seconds

Identifying birds:

Slide 18	<ul style="list-style-type: none">● Birds can be identified in many different ways.<ul style="list-style-type: none">- Size and shape<ul style="list-style-type: none">○ How does the bird look; the size of its head; what shape is it.- Colour and pattern<ul style="list-style-type: none">○ What colour is the bird, does it have any patterns.○ Look on the head, stomach, chest, wings, tail- Habitat<ul style="list-style-type: none">○ Where does the bird live?○ Is it on the ground, in trees or by water?- Behaviour<ul style="list-style-type: none">○ How does the bird act?○ What actions does it do?○ Does it fly a certain way, how does it move or sit?
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	<ul style="list-style-type: none"> ○ What noises does it make? ● Physical features help you identify a bird as well. <ul style="list-style-type: none"> - Eye colour and size. - Beak – shape, size and colour (can also show you what it eats). - Wing colour/patterns. - Chest colour/patterns. - Feet – length, colour, where do the feathers stop. - Tail length and colour. - Back colour/patterns. - Head size, colour/patterns.
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Bird identification challenge:

<p>Slides 19-28</p>	<ul style="list-style-type: none"> ● This activity takes at least 30 minutes to ensure learners can identify birds correctly. ● Learners must split into smaller groups of about 4-8 students. ● Every group needs a bird identification book. <ul style="list-style-type: none"> ○ It is important that only one learner in each group, in each round of identification, is in charge of the book to ensure it does not get damaged. The learner in charge of the book is the one who turns the pages and at the end of the round explains how their group identified the bird to the class. Try alternating between the groups regarding the learner who goes to the board to explain. You might have to explain how the book is organised. ● The group to correctly name the most birds wins. <ul style="list-style-type: none"> ○ This activity does not have to be a set competition between groups. However, it is fun for the groups to race each other to see who finds the bird first. You do not have to keep score. ○ If one group is struggling or taking too long to find the bird you can take the book from the group who correctly identified the bird and show the group who is struggling to assist with time management. ○ You can also give hints if it takes the groups too long. For example, for the Lilac-breasted roller, you can tell the learners that it is a roller to guide them in the book. ● Learners must be able to explain how they identified the bird. Once both groups have identified the bird, ask one group’s learner to go to the board to show and explain how they identified the bird. Once they are explaining to the class, encourage them to point out the features such as the beak, legs, colour of the eyes or wings. <ul style="list-style-type: none"> ○ This shows the learners how to identify birds, practically. ● Remind the learners for what they are looking for every round. <ul style="list-style-type: none"> ○ Such as: eye colour, feather colour, shape of the head, what the legs look like etc. ● Each slide will show a different bird. <ul style="list-style-type: none"> - Slide 20: Southern Ground-Hornbill - Slide 21: African Jacana - Slide 22: White-Fronted Bee-Eater
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- Slide 23: Emerald - Spotted Wood Dove
- Slide 24: Green-Winged Pyillia
- Slide 25: Lilac-Breasted Roller
- Slide 26: African Hoopoe
- Slide 27: Black-headed Oriole
- Slide 28: Crowned Eagle



Image: Learner showing how he identified the bird.



Image: Using the bird book to search for and identify the birds.

Workbook explanation:

The workbook has a “how to” for the learners to fold their own origami bird out of paper.

Materials that need to be printed:

- *Origami instruction page for the teacher*

Extra Resources:

- **Why learn about birds?:** <https://www.birdpop.org/pages/whyStudyBirds.php#:~:text=But%20perhaps%20the%20most%20important,on%20which%20we%20depend%20function>.
- **Migratory Birds:** <https://www.birdlife.org.za/old-navigation/conservation/migratory-birds/#:~:text=Migratory%20birds%20travel%20very%20long,used%20by%20birds%20for%20refuelling>.
- **General bird facts:** <https://www.funkidslive.com/learn/top-10-facts/top-10-facts-about-birds/>

Lesson 6: Spin like a spider and slither like a snake

Lesson Summary:

This lesson emphasises the importance of species people may not like, or are scared of, such as snakes and spiders. This lesson aims to show the importance of these species and why we need them in our lives and ecosystems.

Lesson Objectives:

- Introduction to snakes and spiders and their importance.
- Attempt to break down negative connotations with some species.
- Highlight that we can live in harmony with nature.

Core Competencies Grade 4-6

Learners need to be taught about biodiversity throughout their Natural Science curriculums. This lesson focuses on general facts and information about snakes and spiders to further their understanding of ecosystems and the importance of all life on Earth.

Skills	Content	Strategies
Accessing and recalling information	Plants and animals on Earth that create biodiversity	Discuss various animals and describe them

Teaching Materials:

- Projector
- Screen
- Speaker
- Laptop
- Extension cords and adapters
- Lesson presentation on PDF
- Videos for lesson

Lesson Materials:

- Sticky Tape
- Sticks/Rulers
- Fluffy balls

Spiders:

Slide 2	<ul style="list-style-type: none">● Spider facts.<ul style="list-style-type: none">- They have 8 legs.- They are not insects; they are Arachnids.- They make webs from silk.
Slide 3	<ul style="list-style-type: none">● Spiders have different hunting strategies.<ul style="list-style-type: none">- Webs to catch prey.- Wolf spiders seek their prey out on the ground.- Trapdoor spiders dig holes, cover them up with dirt doors, and lie in wait for passing prey.

	<ul style="list-style-type: none"> - Crab spiders hide inside flowers to catch feeding insects by surprise.
Slide 4	<ul style="list-style-type: none"> ● Some spiders are dangerous. <ul style="list-style-type: none"> - The Black Button Spider is very small and has a red hour-glass on the bottom of its abdomen (stomach).
Slide 5	<ul style="list-style-type: none"> - The Sac Spider has a black mouth and cream-coloured body.
Slide 6	<ul style="list-style-type: none"> ● Ask the learners if they think there are cute spiders in the world. ● One of the cutest spider on Earth is the Masked Peacock Spider. This spider was voted cutest spider in the world. <ul style="list-style-type: none"> - It is only a few millimetres in length (3 to 5 mm), and the soft, furry appearance has led to it being named the cutest spider in the world.
Slide 7	<ul style="list-style-type: none"> ● <i>Demonstration:</i> Watch the video of the Masked Peacock Spider doing its display dance. <ul style="list-style-type: none"> ○ As the video starts, ask the learners to join in and copy the spider. ○ Keep this fun and exciting to help break negative stigmas around spiders. It's more fun if teachers join the dancing. ○ Video length: 3 minutes 2 seconds
Slide 8	<ul style="list-style-type: none"> ● Ask the learners if they think spiders are important and why. ● Spiders are important. <ul style="list-style-type: none"> - They are a link in the food chain; they are predator and prey and keep the ecosystem healthy. - They eat pests, which eat our crops and therefore control insect populations, which helps us. - They are food for other animals like birds. - Emphasise to the learners that they don't have to like spiders, they just need to respect them and understand that they are important. Remind the learners of the food chain and how if one link breaks then the whole system breaks.
Slide 9	<ul style="list-style-type: none"> ● <i>Activity:</i> Make a web. <ul style="list-style-type: none"> - Step 1: Use rulers or sticks to make a spider web. - Step 2: Use the sticky tape to make the sticky part of the web. - Try to have the web pre-made before the lesson to assist with time management. - Step 3: Learners take turns throwing fluffy balls at the web, which will imitate insects getting trapped on the web. - You can also make this a competition and see which group gets the most balls to stick onto the web.

- This activity can be repeated so learners have more than one chance to throw.



Image: An example of how to build the web.

Snakes:

Slide 10 & 11	<ul style="list-style-type: none"> ● Ask the learners if they do, or do not, like snakes and why. ● General snake facts. <ul style="list-style-type: none"> - There are more than 3000 species of snakes on the planet. - Snakes can't chew food, so they have to swallow it whole. - Snakes never stop growing. When they get too big, they shed their skin. It's like us getting bigger clothes as we get older. Ask the learners if they have ever seen a snake's skin before.
Slide 12	<ul style="list-style-type: none"> ● Do you know how snakes smell? <ul style="list-style-type: none"> ○ They have a Jacobson's organ, which allows them to detect prey. <ul style="list-style-type: none"> ▪ If a strong smell or vibration stimulates a snake, its tongue is flicked in and out rapidly. With each retraction, the forked tip touches the roof of the mouth near the opening of the Jacobson's organ, transferring any odour particles sticking to the tongue. This allows the snake to smell and taste as the particles stick to their tongue and are processed by the Jacobson's organ. ○ <i>Demonstration:</i> Learners stick out their tongues and see how snakes smell/taste. ○ Imagine if we could smell and taste with our tongues! Snakes are so interesting.

Slide 13	<ul style="list-style-type: none"> ● There are 2 ways different snakes hunt. ● Ask the learners if they know how snakes hunt. <ul style="list-style-type: none"> ○ Venom – They use their 2 fangs to bite or inject venom into their prey. ○ Constriction – They use their strong bodies to squeeze their prey till it stops breathing. <ul style="list-style-type: none"> - <i>Demonstration:</i> Demonstrate by getting a teacher or learner to gently squeeze another. One learner pretends to be a python and the other prey. Alternatively, you can bring a stuffed toy and all learners can pretend to be a python and squeeze their prey, which is the toy.
Slide 14	<ul style="list-style-type: none"> ● There are 3 types of venom. <ul style="list-style-type: none"> ○ Different snake venom affects different parts of the body. ○ Cytotoxic = cells/tissue ○ Hemotoxic = blood ○ Neurotoxic = nervous system (brain and muscles)
Slide 15	<ul style="list-style-type: none"> ● What to do if you get bitten by a snake? <ul style="list-style-type: none"> - Stay calm. - Take a picture of the snake if you can. - Call an adult and get to the nearest clinic. ● What not to do if you are bitten by a snake. <ul style="list-style-type: none"> - Do not cut and suck the wound. - Do not use ice or hot water. - Do not tie something around the wound - Do not catch the snake.
Slide 16	<ul style="list-style-type: none"> ● The most dangerous snake is the Black Mamba. <ul style="list-style-type: none"> - It's venom attacks the heart - The snake is grey with a black mouth and coffin shaped head. - A Black Mamba's skin is not black. It is actually grey. Show the learners the picture. - It gets its name from its mouth. The inside of their mouth is black. They display their mouth and open it wide to show the black when they feel threatened, therefore it is a defence mechanism and display.
Slide 17	<ul style="list-style-type: none"> ● The longest snake in Eswatini is the Southern African Python. <ul style="list-style-type: none"> - It can grow to be over 4 metres long. - It kills by constriction. - <i>Demonstration:</i> Ask 4 learners to lay on the floor head to toe to show roughly how long a python can be.
Slide 18	<ul style="list-style-type: none"> ● How do we identify a snake? <ul style="list-style-type: none"> - Head shape - Colour - Patterns - Thickness of its body



	<ul style="list-style-type: none"> - Movement - Scales - Habitat (ground/tree)
Slide 19	<ul style="list-style-type: none"> ● Video on general facts of snakes and their importance. ● Video length: 4 minutes 32 seconds

How to act around a snake:

Slide 20	<ul style="list-style-type: none"> ● Snakes are very scared of people. ● They normally only bite us when they try to protect themselves. ● If we try to hurt them, catch them or corner them, then they will probably bite us, as they are scared and trying to protect themselves. ● <i>Demonstration:</i> Snake in a corner. <ul style="list-style-type: none"> - Step 1: Place one learner in the corner of the room and tell them they are pretending to be a snake and must protect themselves; they must pretend to bite if they feel scared or can't get away. - Step 2: Walk towards the “snake” without giving the learner a chance to leave/blocking. This imitates when someone corners and tries to catch a snake. The learner will not be able to escape and must pretend to bite you. Ask the learners how they think the snake feels. Imagine someone was trying to catch you. Wouldn't you feel scared and try to protect yourself? - Step 3: Now stand far away from the learner and leave the door open and let them try to escape. The learner will be able to leave easily, and no one will get bitten. - This activity shows if we leave snakes alone, then it is unlikely that they will bite us. They bite us in self-defence as we often leave them no choice but to defend themselves.
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Snakes are important:

Slide 21	<ul style="list-style-type: none"> ● Snakes are important. <ul style="list-style-type: none"> - They are a link in the food chain; they are predator and prey and keep the ecosystem healthy. - They keep rats, mice and frogs under control. - They are food for other animals like birds. - We use their venom to make medicine, which helps us. ● Emphasise to the learners that we need snakes. It is okay to be afraid of them, or to not like them, however we have to respect and protect them. Remind them of the food chain, if one link breaks then the whole system breaks. We need every species on the planet as everything is interconnected. Snakes help us, and we need them. ● Ask the learners if any of them like snakes now that they have learnt about them and how important they are.
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Crocodiles:

Slide 22	<ul style="list-style-type: none">● Crocodiles are very interesting. They don't sweat; to cool down they open their mouths known as mouth gaping.● They can hold their breath underwater for more than an hour.<ul style="list-style-type: none">○ <i>Demonstration:</i> Ask learners to hold their breath. Time who can hold their breath for the longest and compare it to a crocodile's time.
Slide 23	<ul style="list-style-type: none">● Temperature of their nest controls the gender of the babies.<ul style="list-style-type: none">- Hot = Males- Cooler = Female- Crocodiles dig a hole in a sand bank and lay their eggs in this hole. The temperature of the sand determines the gender of the babies. If the eggs are at the top of the nest where the sand is hotter due to the sun they will be males. If the eggs are at the bottom of the nest where the sand is cooler they will be females.- They can lay anywhere between 25 to 80 eggs at a time/ in one nest.● Females are really good mothers.<ul style="list-style-type: none">○ We will watch a video soon and you will see how well they take care of their babies.
Slide 24	<ul style="list-style-type: none">● Crocodiles have between 60 and 110 teeth.● They go through 2000 to 4000 teeth over their lifetime.
Slide 25	<ul style="list-style-type: none">● Video on crocodiles.● Video length: 2 minutes 56 seconds<ul style="list-style-type: none">○ Before playing the video, tell the learners that the crocodile is looking after her babies and not hurting them. Comment throughout the video how amazing she is with her babies. A crocodile is known for being strong and fierce, however, she is gentle and caring with her babies.○ During the videos you will hear the baby crocodiles making a high pitch noise; you can get the learners to try to imitate their noise.

Conclusion:

- Emphasis to the learners that they do not have to like/love these species. However, they need to understand that they are important, and they help us. Every species is needed in the food chain/web and ecosystem and if one vanishes then the whole system breaks. Therefore, we need to respect and protect all species, even the ones that scare us at times.
- You can ask the learners if they have a new respect or liking for any of these animals now that they have learnt more about them.

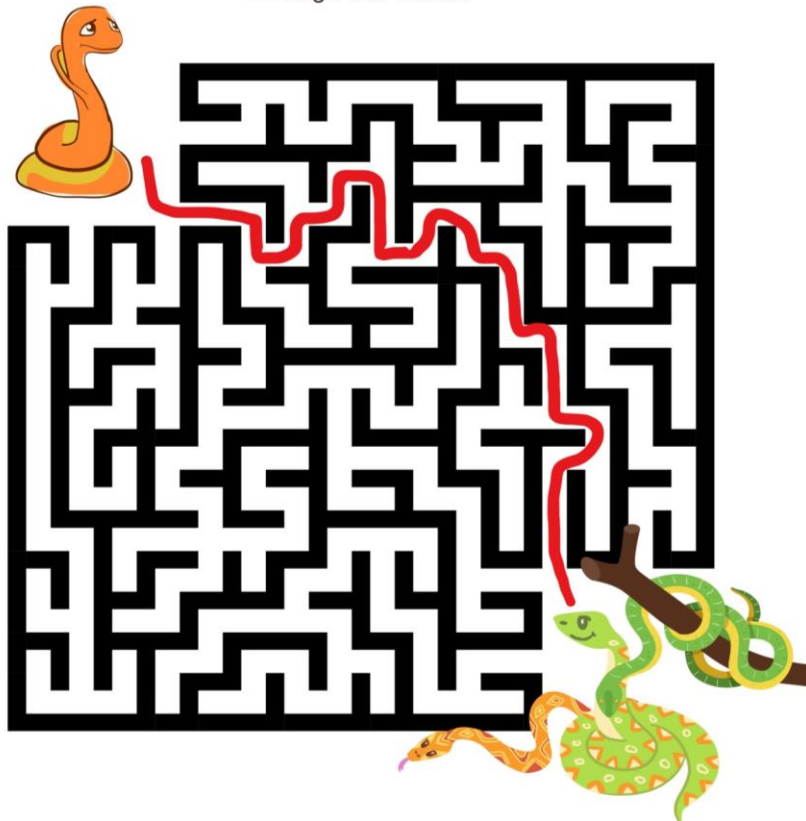
Workbook explanation:

The workbook has a maze activity for the learners to complete to help the snake get to his/her friends.

Worksheet answers:

HELP THE LOST SNAKE GET TO HIS FRIENDS:

Can you help the snake by guiding him
through the maze?



Extra Resources:

- **Importance of spiders:** <https://www.servicemaster.co.za/blog/the-importance-of-spiders-to-the-environment/#:~:text=In%20fact%2C%20spiders%20play%20a,insect%20numbers%20are%20not%20overwhelming.>
- **10 reasons spiders are important:** <https://theimportantsite.com/10-reasons-why-spiders-are-important/>
- **Importance of snakes:** <https://www.peaceparkstv.com/the-importance-of-snake-awareness/#:~:text=Snakes%20play%20an%20integral%20role,sustains%20a%20healthy%20snake%20population.>
- **Why you should care about snakes:** <https://vetmed.illinois.edu/wel/why-you-should-care-about-snakes/>
- **When do snakes bite?:** <https://www.westerncape.gov.za/news/snake-season-here-what-you-need-know#:~:text=Snakes%20are%20usually%20not%20aggressive,to%20react%20in%20self%20Ddefence.>

Lesson 7: End endangerment

Lesson Summary:

This lesson aims to address negative stereotypes, or stigmas, around species such as owls, chameleons and vultures. The lesson emphasises why we need all species and the important work these species do for nature and us. Although we may not like every species, it is important that the learners understand why we need all species and the role they play in the ecosystem.

*This lesson needs to be handled sensitively and with respect due to cultural beliefs. This lesson requires energy and understanding. As the teacher, you need to encourage the learners to feel free to say their opinion without feeling judged. At the start of each introduction of owls, chameleons and vultures, we will do a small icebreaker regarding negative stigmas surrounding these animals.

Learners and teachers need to be respectful towards all opinions. The aim of the lesson is not to force learners to change their opinions, but rather to raise awareness about the importance of these animals and why we need to protect them, even if we do not like them or if they have negative stigmas attached to them.

Lesson Objectives:

- Introduction to animals with stigmas and breaking down negative connotations.
- Introduction to endangered species with specific Eswatini examples and the consequences of endangerment.
- Discussion and reflection about endangerment and ecosystem breakdowns.

Core Competencies Grade 4-6

Learners will need to use content from the lesson to brainstorm what the world would look like without species such as owls, chameleons and vultures. Learners will then present their ideas to the class.

Skills	Content	Strategies
Listening and Speaking	Unprepared speech	Express opinions
	Debate	Share ideas and experiences and show understanding of concepts Defend a position
Writing and Presenting	Short written speeches	Brainstorm and organise ideas

Teaching Materials:

- Projector
- Screen
- Speaker
- Laptop
- Extension cords and adapters
- Lesson presentation on PDF
- Videos for lesson

Lesson Materials:

- Ruler

Introduction:

Slide 1	<ul style="list-style-type: none">● This lesson requires energy and understanding. As the teacher you need to encourage the learners to feel free to say their opinion without feeling judged.● At the start of each introduction of owls, chameleons and vultures, do a small icebreaker regarding negative stigmas surrounding these animals. Learners and teachers need to be respectful towards all opinions. The aim of the lesson is not to force learners to change their opinion, but rather to raise awareness about the importance of these animals and why we need to protect them even if we do not like them or if they have negative stigmas attached to them.● Stand in the middle of the class when you do the ice-breaker activities so learners do not feel pressured to copy/stand where you are.
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Owls:

Slide 2	<ul style="list-style-type: none">● Ask the learners if they think owls are good or bad.● <i>Activity:</i> Small icebreaker to introduce owls.<ul style="list-style-type: none">○ Ask the children to stand on the right-hand side of the class if they like owls and the left side if they do not.○ Ask the learners why they do or do not like owls.○ Remind the learners to be respectful. Count the number on each side and compare at the end of the lesson to see if learners changed their minds at all.○ Learners can sit back at their tables.
Slide 3	<ul style="list-style-type: none">● General facts about owls to spark interest in the animal.<ul style="list-style-type: none">- Demonstration: Ask children to make the sound an owl makes.- Note: noises owls make; owls are carnivores; how their eyelids work.● Explanation as to their importance within the ecosystem and why humans need owls.<ul style="list-style-type: none">- They have an important role in the food chain.- Owls keep populations under control, such as rats and mice, which helps humans by protecting crops and preventing the spread of diseases.● Remind learners that they don't have to like owls, but ask the learners if they think owls serve a purpose or are important now.● Ask the learners what would happen if we did not have owls (abundance of mice and rats)?<ul style="list-style-type: none">○ This shows the importance of the species. The aim is for learners to understand every species is important and vital in the ecosystem even if we don't like them.
Slide 4	<ul style="list-style-type: none">● Video on the Spotted Owl.● Video length: 1 minute 46 seconds

Chameleons:

<p>Slide 5</p>	<ul style="list-style-type: none"> ● Ask the learners if they think chameleons are good or bad. ● <i>Activity:</i> Small icebreaker to introduce chameleons. <ul style="list-style-type: none"> ○ Ask the children to stand on the right-hand side of the class if they like chameleons and the left side if they do not. ○ Ask the learners why they do or do not like chameleons. ○ Remind the learners to be respectful. As above, count the numbers of learners on each side, and compare at the end of the lesson. ○ Learners can sit back at their tables.
<p>Slide 6</p>	<ul style="list-style-type: none"> ● General facts about chameleons to spark interest. <ul style="list-style-type: none"> - Note: how they are able to focus their eyes; most species are endemic; different sizes of various species. ● Explanation as to their importance within the ecosystem and why humans need chameleons. <ul style="list-style-type: none"> - They play an important role in the food chain as predator and prey. - They keep insect populations under control, which helps humans. ● Remind learners that even if they don't like chameleons, can they see how they are important? What would happen if we didn't have chameleons (abundance of insects, and loss of food source for other species that eat chameleons)?
<p>Slide 7</p>	<div data-bbox="475 1086 1305 1706" data-label="Image"> </div> <ul style="list-style-type: none"> ● <i>Demonstration:</i> Children need to take out rulers to measure the sizes of two chameleon species. Malagasy Giant Chameleon – 70 cm. Brookesia Micra Chameleon – 3 cm. <p><i>Image: Using a ruler to show the length of a Malagasy Chameleon.</i></p>
<p>Slide 8</p>	<ul style="list-style-type: none"> ● Video on chameleons.

	<ul style="list-style-type: none"> ● Video length: 3 minutes 38 seconds <ul style="list-style-type: none"> ○ The information in the video is quite complex, therefore it may be better to explain the video yourself as it plays. Mute the video and narrate yourself, and explain the important and cool facts in the video for the learners. Or play the video and add explanations on top to help the learners understand.
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Vultures:

Slide 9	<ul style="list-style-type: none"> ● Ask the learners if they think vultures are good or bad. ● <i>Activity:</i> Small icebreaker to introduce vultures. <ul style="list-style-type: none"> ○ Ask the children to stand on the right-hand side of the class if they like vultures and the left side if they do not. ○ Ask the learners why they do or do not like vultures. ○ Remind the learners to be respectful. Count the number on each side and compare at the end of the lesson to see if learners changed their minds at all. ○ Learners can sit back at their tables.
Slide 10	<ul style="list-style-type: none"> ● General facts about vultures to spark interest. <ul style="list-style-type: none"> - Their bodies are designed to be scavengers (bare necks for when they eat carcasses); the design of their wings; how much they eat. ● Explanation as to their importance within the ecosystem and why humans need vultures. <ul style="list-style-type: none"> - Help break down carcasses, so nutrients can return to the soil. - Prevent the spread of diseases by cleaning carcasses, which helps humans stay safe and have a clean environment. - Ask the learners what would happen if we didn't have vultures. Imagine how dirty and disease filled our earth would be. - Remind the learners that even if they don't like vultures, can they see how they are important? What would happen if we didn't have vultures (dead animals rotting in the bush, spread of diseases).
Slide 11	<ul style="list-style-type: none"> ● Video on vultures. ● Video length: 2 minutes 14 seconds

Endangered Species:

Slide 12	<ul style="list-style-type: none"> ● Begin with a recap of what species are and how they all interact to create biodiversity. ● How is a species categorised as endangered? <ul style="list-style-type: none"> - Experts perform assessments and look at criteria such as habitat loss; how many individuals are left and how drastically are numbers dropping. - There are 3 categories: critically endangered; endangered and vulnerable. - Go through the three blocks to highlight how situations can either
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	<p>improve with conservation or, if there is no conservation, then the situation gets worse and worse.</p> <ul style="list-style-type: none"> ○ Vulnerable: A species is vulnerable if its population has declined at least 50% and the cause of the decline is known. Habitat loss is the leading known cause of population decline. A species is also classified as vulnerable if its population has declined at least 30% and the cause of the decline is not known. ○ Endangered: An endangered species is a type of organism that is threatened by extinction. If a species is endangered it is in a worse state than a vulnerable species. ○ Critically endangered: A species is classified as critically endangered when its population has declined at least 90 percent and the cause of the decline is known such as habitat loss or poaching. <p>- It is important to explain to the learners that through conservation and education we can reverse the categorisations and help species get stronger, help their numbers get higher. We can take a critically endangered species and fix the threat so that it becomes less endangered. Then we can fix the threat more so they become only vulnerable, and then we can fix the threat more until it becomes “normal” again, and the species is safe from extinction.</p>
Slide 13	<ul style="list-style-type: none"> ● Extinction - If species are endangered and they keep disappearing due to habitat loss or poaching then they could become extinct. Extinction is the complete disappearance of a species from Earth. ● Ask the learners if they know of any species that are extinct. Some common answers are: dodo bird, passenger pigeon, dinosaurs, woolly mammoths. These went extinct a long time ago, but species are still going extinct every year. This is why conservation is so important. ● Some animals are considered extinct in the wild. This means that the only surviving members of the species live in captivity, like in a zoo. ● If we do not look after our planet and our species then they will become extinct.
Slide 14	<ul style="list-style-type: none"> ● Up to one million plant and animal species face extinction because of humans and our actions.
Slide 15	<ul style="list-style-type: none"> ● Did you know that owls are endangered. <ul style="list-style-type: none"> - 24 species are vulnerable; 13 endangered and 3 critically endangered. - Causes leading to their endangerment include habitat loss; hunting, poaching and climate change. <ul style="list-style-type: none"> ● How many of these causes are because of humans? All of them.
Slide 16	<ul style="list-style-type: none"> ● Owls that are endangered in Eswatini include: <ul style="list-style-type: none"> Scops Owl Spotted Eagle-Owl Barn Owl Verreaux’s Eagle-Owl ● Who remembers the role owls play and why they are important? Allow the learners to explain.

Slide 17	<ul style="list-style-type: none"> ● Chameleons are endangered. <ul style="list-style-type: none"> - Current statistics show nearly 40% of chameleon species are threatened with extinction. - Chameleons are becoming endangered due to habitat loss through agriculture mainly, which is an issue as most species are endemic, therefore they cannot live in other areas. - Imagine if someone tore down your house and you couldn't live anywhere else?
Slide 18	<ul style="list-style-type: none"> ● The Chapman's Pygmy chameleon is an example of a chameleon that was thought to be extinct, however has recently been found in Malawi. It is still endangered due to habitat loss. <ul style="list-style-type: none"> ○ This is a happy and sad example. It's sad because this species was thought to be extinct. Then it was found in Malawi. However, due to deforestation, the species may actually become extinct now.
Slide 19	<ul style="list-style-type: none"> ● Vultures are endangered. <ul style="list-style-type: none"> - All species of vultures are endangered or critically endangered. - They are endangered as they are killed for traditional medicine, poaching and poisoning. - In the video we watched earlier, it explained that poachers poison vultures on purpose so that they die and cannot fly over carcasses of the animals they have killed/poached and bring attention to the area.
Slide 20	<ul style="list-style-type: none"> ● Vultures that are endangered in Eswatini include: <ul style="list-style-type: none"> Lappet-faced Vultures White-backed Vultures White-headed Vultures

Activity/Reflection:

Slide 21-23	<ul style="list-style-type: none"> ● After learning more about these animals, maybe you like some of them more because you know they are important. ● Fly like an owl to the left if you like owls more now or fly to the right if you still don't like them. ● Walk like a chameleon to the right if you like chameleons more now or to the left if you do not. ● Soar like a vulture to the middle of the class if you like vultures more now or to the left if you do not. Compare to the original activities and see if any opinions have changed.
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Conclusion:

Slide 24	<ul style="list-style-type: none"> ● Discussion and reflection activity. ● Split children up into smaller groups to reflect and discuss what the
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	<p>world would look like if we did not have these animals.</p> <ul style="list-style-type: none"> • Present their thoughts to the class. • Emphasise how bad/horrible earth would be without these species. Highlight to the learners again how important every species is and how every species has a specific role to play in the ecosystem and without them the system breaks.
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Workbook explanation:

The workbook has technical and personal questions for the learners to answer as well as an activity on how to draw an owl.

Worksheet answers:

1. *How do chameleons help humans?*

Possible Answers	
<ul style="list-style-type: none"> • They help humans by eating insects 	<ul style="list-style-type: none"> • Eating insects means they control populations, which is important for food chains and food webs
<ul style="list-style-type: none"> • Controlling insect populations helps humans, as they eat insects that eat our food (fruit and crops) 	<ul style="list-style-type: none"> • They are predator and prey so they balance the ecosystem and food chains and webs

2. *How do owls help humans?*

Possible Answers	
<ul style="list-style-type: none"> • They are important in food chains and webs, which keeps ecosystems healthy 	<ul style="list-style-type: none"> • Control populations such as rats and mice
<ul style="list-style-type: none"> • Help prevent spread of diseases 	

3. *How do vultures help humans?*

Possible Answers	
<ul style="list-style-type: none"> • They are important in food chains and webs, which keeps ecosystems healthy 	<ul style="list-style-type: none"> • Help put nutrients back into the soil
<ul style="list-style-type: none"> • Help keep environments clean by cleaning carcasses, which also prevents diseases 	

Extra Resources:

- **Importance of biodiversity and all species:** <https://www.conservation.org/blog/why-is-biodiversity-important>
- **Importance of Biodiversity:** <https://royalsociety.org/topics-policy/projects/biodiversity/why-is-biodiversity-important/#:~:text=Biodiversity%20is%20essential%20for%20the,and%20the%20food%20we%20eat.>
- **Importance of biodiversity:** <http://sustainablefootprint.org/en/extra-information/why-is-biodiversity-important-to-ecosystems-and-people/>
- **Endangered Species:** <https://education.nationalgeographic.org/resource/endangered-species/>
- **Endangered Species:** <https://www.britannica.com/science/endangered-species>
- **Why owls are important:** <https://longacresranch.org/whoooo-is-important-owls/#:~:text=Owl%20Importance&text=They%20keep%20the%20large%20numbers,these%20mysterious%20and%20elusive%20predators.>
- **Why vultures are important:** <https://education.nationalgeographic.org/resource/role-scavengers-carcass-crunching/>
- **Chameleon facts:** <https://kids.nationalgeographic.com/animals/reptiles/facts/chameleon>
- **Chapman's Pygmy Chameleon:** <http://www.edgeofexistence.org/species/chapmans-pygmy-chameleon/>

Lesson 8: Join the pride

Lesson Summary:

This lesson focuses on the Big 5 and uses these animals as an example as to why nature is important with regard to job creation and tourism. The lesson also focuses on threats to various animals, such as poaching.

This lesson has lots of content. If possible try to budget most of the time in the lesson for watching the videos and doing the activities and demonstrations.

Lesson Objectives:

- Introduction to the Big 5 and their importance.
- Introduce conservation threats, such as poaching and habitat loss.
- Introduction to tourism and employment with conservation.

Core Competencies Grade 4-6

Learners need to be taught about biodiversity and the importance of nature throughout their Natural Science curriculums. This lesson focuses on the Big 5 to further their understanding of ecosystems and the importance of all life on Earth.

Skills	Content	Strategies
Accessing and recalling information	Plants and animals on Earth that create biodiversity	Discuss various animals and describe them (Big 5)

Teaching Materials:

- Projector
- Screen
- Speaker
- Laptop
- Extension cords and adapters
- Lesson presentation on PDF
- Videos for lesson

Lesson Materials:

- Paper towel rolls

Introduction:

Slide 2	<ul style="list-style-type: none">● Africa is full of diversity and different types of animals, and so is Eswatini. People come from all over the planet to see our animals and nature. This creates jobs and brings in money through tourism. Therefore, it is crucial that we protect nature, not only for itself, but also to keep jobs and money coming into the country.● Tourism: Tourism means travelling to a different place for various purposes, often to see animals or natural attractions.● It is important that we conserve wildlife, not only because of the food chain and balance of the ecosystem, but also because it brings in money and creates jobs. Animals are always helping us.
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The Big 5:

Slide 3	<ul style="list-style-type: none">● Who knows which animals are in the Big 5?● Who knows why it is called the Big 5?<ul style="list-style-type: none">○ Originally classified as the 5 most dangerous African animals to hunt on foot.● The Big 5 animals bring lots of tourists to Africa, which means lots of jobs and money into our economy. The big 5 animals include:<ul style="list-style-type: none">- Leopard- Lion- Elephant- Buffalo- Rhino
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Elephant:

Slide 4 & 5	<ul style="list-style-type: none">● General facts:<ul style="list-style-type: none">- Elephants are the largest land animal.- Elephants are pregnant for 22–24 months and have 1 calf once every 4/5 years.- They can weigh up to 7 tons, which is the equivalent to 96 adult men.- They live in herds led by a matriarch (female).- She leads the herd to water and food.- Young elephants are protected by the herd.- Young males leave the herd at a certain age and roam by themselves looking for a mate.- Elephants have incredible memories and can feel emotions; they will mourn the death of a herd member and even return to the place the elephant died.- How much food do you think an elephant eats in a day? 300 kgs worth of food!- Slide 5: why do you think the elephant is throwing sand on itself?<ul style="list-style-type: none">○ To protect its skin! Let's all make a trunk and pretend to be an elephant.
Slide 6	<ul style="list-style-type: none">● Why are elephants important for the environment, and why should we try to live with them?<ul style="list-style-type: none">- Seed transporter: they can disperse seeds over more than 60 kms.- Provide lots of food for dung beetles.- Help keep soil fertile, and help plants grow.- Dig wells to access water underground for themselves and other animals.- Modify environments – clear forested areas and make paths for other animals.
Slide 7	<ul style="list-style-type: none">● Elephants are in danger.<ul style="list-style-type: none">- Elephant tusks are made out of ivory and are their huge teeth.<ul style="list-style-type: none">○ Imagine being killed for your teeth.

	<ul style="list-style-type: none"> - Elephants are poached for their tusks to make jewellery and other ornamental items. - Around 100 elephants are killed every single day by poachers for their tusks.
Slide 8	<ul style="list-style-type: none"> ● Elephants used to live in very big areas and were not restricted. ● As humans have created borders and fenced off areas, they do not always have access to their usual travelling routes. ● This is why wildlife corridors and protected areas are so important to make sure elephants have enough room to live. ● Here is a map that shows where some elephant bulls travel.
Slide 9	<ul style="list-style-type: none"> ● Elephants are big and take up lots of space. <ul style="list-style-type: none"> - Sometimes humans and elephants want to occupy and use the same space, and this often causes conflict. - This conflict can negatively impact both humans and elephants.
Slide 10	<ul style="list-style-type: none"> ● How can we live in harmony with elephants and help our environment? <ul style="list-style-type: none"> - Protect areas specifically for elephants to roam free like game reserves. This allows elephants to have their own home and to stay away from ours. - Special fences: Elephant beehive fence project - Increase our understanding and knowledge about elephants. - Teach others about the importance of all species and how we need them all.
Slide 11	<ul style="list-style-type: none"> ● Video on elephant co-existence. ● Video length: 1 minute ● Highlight how we need to live with wildlife and work together in harmony rather than against it.

Rhinos:

Slide 12	<ul style="list-style-type: none"> ● Africa has 2 types of rhino. <ul style="list-style-type: none"> - White rhino - Black rhino - Their names have nothing to do with their skin. - Ask the learners if they can spot differences <ul style="list-style-type: none"> ○ White Rhinos have a wide mouth as they are grazers (eat grass). ○ W for White and W for wide mouth ○ Black Rhinos have a pointed lip as they are browsers (eat leaves) therefore this helps them pick leaves. ○ B for Black and B for browser. - Rhinos are endangered, as they are poached for their horns.
Slide 13	<ul style="list-style-type: none"> - To identify them, we can also look at their forehead. <ul style="list-style-type: none"> ○ White rhinos have a longer forehead. ○ Black rhinos have a shorter forehead.

Slide 14	<ul style="list-style-type: none"> ● Black Rhinos. <ul style="list-style-type: none"> ○ Black rhino are smaller than white rhino ○ They are browsers that feed mainly on small trees called shrubs with their pointed upper lip. ○ They live in thick bushes and the calf walks behind the mother when moving.
Slide 15	<ul style="list-style-type: none"> ● White Rhinos. <ul style="list-style-type: none"> - White rhino are the second-largest land mammal after the mighty elephant. - They use their large broad mouths to graze on grass, acting like a bush lawn-mower. - They live in open grasslands with the calf walking ahead of the mother when moving.
Slide 16	<ul style="list-style-type: none"> ● Demonstration: What is the difference between browsing and grazing? ● Ask the learners if they know what browsers and grazers are. <ul style="list-style-type: none"> ○ Step 1: You need 2 learners to pretend to be a Black rhino and a White rhino. ○ Step 2: The white rhino must use their wide mouth and pretend to eat grass off the floor. ○ Step 3: The Black rhino must pretend to use their pointy lip to eat leaves off a shrub. ○ G for grass and g for grazer; b for black rhino and b for browser. <div data-bbox="448 1137 1370 1899" data-label="Image"> </div> <p data-bbox="448 1939 1091 1973"><i>Image: Demonstrating how a Black Rhino eats leaves.</i></p>

Buffalo:

Slide 17	<ul style="list-style-type: none">● General facts.<ul style="list-style-type: none">- They live in huge herds, sometimes up to 1000 animals.- Buffalo feed on grass mainly and are called grazers.- They use their large, curved horns to defend themselves from predators such as lions, sometimes even killing the cats.- Buffalo are often seen with birds called oxpeckers that feed on ticks that are on them.
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Lion:

Slide 18	<ul style="list-style-type: none">● General facts:<ul style="list-style-type: none">- Lions are often known as the “King of the beasts”.- They live in a group that is called a pride.- They are very social cats.- Males have a magnificent mane, while females do not.- They are carnivores, feeding on other animals of various sizes that they catch and kill.- Their claws are retractable – they can extend them out of their paws or pull them into their paws.
Slide 19	<ul style="list-style-type: none">● Lions communicate with each other by roaring loudly.<ul style="list-style-type: none">- Their roars may travel as far as 8 km.
Slide 20	<ul style="list-style-type: none">● Video on lion roaring.● Video length: 0 minutes 32 seconds
Slide 21	<ul style="list-style-type: none">● <i>Demonstration/Activity:</i> Lion roar.<ul style="list-style-type: none">- Step 1: Learners will use a paper towel roll to make a lion roar.- Step 2: Breathe in and out with the roll pressed to your mouth to make a lion roar noise.
Slide 22	<ul style="list-style-type: none">● The females hunt more often than males, using their large canines and sharp claws.<ul style="list-style-type: none">- Lionesses work together when hunting.
Slide 23	<ul style="list-style-type: none">● Lions are in trouble.<ul style="list-style-type: none">- Lions are poached by humans for their bones and skins, which people sell to make money.- They are often poisoned by people who want to protect themselves or their livestock from lions.- Each year, around 600 wild lions are killed.

Leopard:

Slide 24	<ul style="list-style-type: none">● General facts<ul style="list-style-type: none">- They are solitary hunters (hunting alone)
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	<ul style="list-style-type: none"> - They often take their prey up into trees so that larger predators like lions and hyenas do not steal the kill - Leopards are nocturnal, hunting mainly at night. <ul style="list-style-type: none"> o Ask the learners if they know what nocturnal means. o Nocturnal - active at night o Diurnal - active during the day (example: us, humans).
Slide 25	<ul style="list-style-type: none"> ● <i>Activity:</i> Find the leopard. <ul style="list-style-type: none"> - Leopards are the kings of camouflage. - Can you spot the leopard? <ul style="list-style-type: none"> o Learners must not shout out when they find the leopard, so all learners have a chance to look.
Slide 26	<ul style="list-style-type: none"> ● Answer on this slide.
Slide 27	<ul style="list-style-type: none"> ● Leopards are also in danger. <ul style="list-style-type: none"> - They are hunted for their beautiful skin. - Every year, between 100 and 250 leopards are poached every year that we know of.

Difference between leopard and cheetah:

Slide 28	<ul style="list-style-type: none"> ● Leopards and cheetahs often get confused. ● Ask the learners what differences they see. <ul style="list-style-type: none"> - Cheetahs have a thinner/smaller body. - They have different spots. <ul style="list-style-type: none"> o Leopards have spots that are grouped together called rosettes. o Cheetahs have single spots. - Cheetahs have lines that look like tear marks from their eyes down their face, and leopards don't. <ul style="list-style-type: none"> o These tear marks act like sunglasses for cheetahs, absorbing the light.
Slide 29	<ul style="list-style-type: none"> ● Learners can guess which ones are leopards and which ones are cheetahs.
Slide 30	<ul style="list-style-type: none"> ● Cheetahs are extremely fast. ● Ask the learners if they can guess how quickly cheetahs run. <ul style="list-style-type: none"> o The top speed of a mature cheetah is around 120 km per hour.
Slide 31	<ul style="list-style-type: none"> ● <i>Activity:</i> Cheetah race. <ul style="list-style-type: none"> o Sprint race outside with all learners to practice being a fast cheetah.

Why is the big 5 so important:

Slide 32	<ul style="list-style-type: none">● The big 5 are very important to Africa.● Animals bring in tourist, which brings in money, which creates jobs.● There are a number of threats to the big 5, which is a big problem as they are important in the food webs and ecosystem.<ul style="list-style-type: none">○ Poaching○ Deforestation○ Habitat Loss○ Pollution○ Overfishing○ Climate change○ Conflicts with humans (for space, for resources)● We need to tell people about the big 5 and how amazing they are to conserve them so future generations can see them too!
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It's up to you!:

Slide 33	<ul style="list-style-type: none">● We can all play a part in protecting our wildlife!● Conservation starts with YOU.<ul style="list-style-type: none">○ Highlight that our everyday actions and educating others is how we will change the world for the better.○ We need to protect the planet for animals and for ourselves.○ We humans need the Earth and ALL wildlife.
Slide 34	<ul style="list-style-type: none">● Video: About our incredible world and the surrounding nature that we need to protect.● Video length: 2 minutes 55 seconds● To stay active and engaged, as the animals pop up on the screen, the learners can shout out the names.

Workbook explanation:

Fun colouring-in page of a lion for the learners to complete.

Extra Resources:

- **Nature-based Tourism:** <https://www.youth4nature.org/blog/nature-based-tourism-benefits-and-youth-involvement>
- **Tourism creates jobs:** <https://worldtraveltourismcouncil.medium.com/tourism-provides-jobs-where-theyre-needed-most-200f11ac2029>
- **Big 5 facts:** <https://www.worldwildlife.org/blogs/good-nature-travel/posts/ten-wild-facts-about-the-big-five#:~:text=The%20term%20E2%80%9CBig%20Five%20originally,hunter%20to%20bring%20them%20home.>
- **Elephant co-existence:** <https://creatureconserve.com/human-elephant-coexistence>

Lesson 9: Promise to protect the planet

Lesson Summary:

This lesson highlights how destructive pollution and littering is and why we need to encourage everyone to become more conscious about how our actions either help or harm the planet and those around us. The lesson also introduces the importance of rivers, and why we need to conserve all habitats.

Lesson Objectives:

- Highlight the terrible effects of litter and pollution on the environment, and how we can prevent it.
- Learn about river systems in Eswatini and the importance of rivers.

Lesson Materials:

- Post-surveys
- Pens

Core Competencies Grade 4-6

Learners need to be taught about biodiversity and the importance of rivers as habitats throughout their Natural Science curriculums. This lesson focuses on river systems and the harmful effects pollution has on the environment.

Skills	Content	Strategies
Accessing and recalling information	Importance of rivers as habitats	Highlight how rivers are important for animals and humans. Highlight how animals need habitats for food, water, shelter, to have babies and escape from danger

Teaching Materials:

- Projector
- Screen
- Speaker
- Laptop
- Extension cords and adapters
- Lesson presentation on PDF
- Videos for lesson

Lesson Materials:

- Fishing rods with magnets
- Laminated fish with magnets
- Laminated rubbish with magnets
- Pond/river

Pollution and litter:

Slide 2 & 3	<ul style="list-style-type: none">● Ask the learners what pollution and litter means to them. Why is pollution and litter bad?● The focus of the lesson is to learn the damaging effects of our actions, such as pollution, and how we can rectify the situation.
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Pollution:

Slide 4	<ul style="list-style-type: none">● Pollution: when humans put substances or materials into the environment that are harmful or poisonous to living things.● There are different types of pollution.● Air pollution<ul style="list-style-type: none">○ The release of harmful contaminants (chemicals, toxic gases, particulates, biological molecules, etc.) into the earth's atmosphere.● Water pollution<ul style="list-style-type: none">○ The contamination of dams, rivers and bodies of water by litter or chemicals/sewage.● Noise pollution<ul style="list-style-type: none">○ Excessive noise that disrupts the natural environment.● Light pollution<ul style="list-style-type: none">○ Artificial lights at night, and the excessive or poor use of artificial outdoor lights, and how it disrupts the natural patterns of wildlife that use light and dark.
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Litter:

Slide 5	<ul style="list-style-type: none">● Litter: when rubbish and trash are discarded where they are not meant to be.● Litter is not natural and should not be in nature.
Slide 6	<ul style="list-style-type: none">● Where do you see litter?<ul style="list-style-type: none">○ Rivers○ Beach○ School○ In town○ Next to roads○ Almost everywhere
Slide 7	<ul style="list-style-type: none">● Video on littering.● Video length: 2 minutes 27 seconds● Highlight that we can all be conservation heroes and make a positive difference.

Rivers in Eswatini:

Slide 8	<ul style="list-style-type: none"> ● Ask the learners if they know of any rivers in Eswatini.
Slide 9	<ul style="list-style-type: none"> ● Eswatini has 5 main river systems. <ul style="list-style-type: none"> - The Lomati - The Komati - The Umbuluzi - The Usutu - The Ngwavuma
Slide 10	<ul style="list-style-type: none"> ● Rivers are important because they serve as a home for many animals, as we saw with the food chains and ecosystems. ● Rivers also provide us with important resources ● Ask the learners what resources these rivers provide us with. ● Water: for drinking and for cooking, watering our plants/crops. ● Food, such as fish.

Danger of littering:

Slide 11	<ul style="list-style-type: none"> ● Why is litter dangerous? <ul style="list-style-type: none"> - Rivers become blocked, so they cannot flow. - Animals die (which also means we lose food sources such as fish and a link in food chains/webs). - Ends up in the ocean and hurts ocean animals - Takes a long time to decompose, so it's around for a long time. - Expensive to clean up large amounts. ● <i>Reflection:</i> How long do these items take to break down? <ul style="list-style-type: none"> - This shows that items do not disappear and cause damage for years. - Learners must guess how long these items take to break down/disappear.
Slide 12	<p><i>Activity: Fishing for food.</i></p> <ul style="list-style-type: none"> ● This activity aims to show how dependent humans are on rivers for resources, and how pollution diminishes these resources and destroys habitats. <ul style="list-style-type: none"> - This activity will highlight how litter prevents natural resources from growing and kills animals. - Step 1: Learners will fish for food (fish) with no rubbish: this will be easy. - Step 2: Some rubbish will be added to the pond, which results in some fish dying and being taken out. - Step 3: There will be more rubbish than fish, making it hard to get any food.



Image: Setting up the “river”.

Slide 13-16

- Ask the learners how long they think these items take to break down, or decompose:
 - Cigarette butts – 5 to 30 years.
 - Banana peel – 5 weeks.
 - Plastic bag – about 20 years, but the tiny/micro/very small pieces can stay in the environment for hundreds of years. A plastic bag in a landfill can take up to 1000 years to degrade
 - Aluminium cans – 200 to 500 years.
 - Car tyres – 1 million years.
- This shows how bad litter is and that it is not natural.
- Some plastics are called single use, like a straw- or the wrapping on some fruits and vegetables in the supermarket: they can’t be re-used, and these are the worst for the planet. Some plastics can be re-used, which is better for the planet. ‘
- We should always try and re-use things so they don’t become polluting litter.
- Litter stays in the environment for much longer than we humans fully understand, which means it causes more harm than we know.

How bad is the litter problem?:

Slide 17

- The Great Pacific Garbage Patch is one example of how huge the littering problem is.
 - In this garbage patch in the ocean, there is 80 000 tonnes of litter/rubbish.

Slide 18

- That’s the same amount as 13 333 elephants.

Slide 19	<ul style="list-style-type: none"> - There are around 1.8 trillion pieces of rubbish there. <ul style="list-style-type: none"> ○ That's 250 pieces of rubbish for every human on Earth. ○ Imagine if we just each picked up our own litter and recycled!
Slide 20	<ul style="list-style-type: none"> ● The Great Pacific Garbage Patch is 1.6 million square kilometres big. <ul style="list-style-type: none"> ○ It is bigger than South Africa.
Slide 21	<ul style="list-style-type: none"> ● Video on pollution and how we can stop polluting. ● Video length: 1 minute 19 seconds

Be a conservation hero:

Slide 22	<ul style="list-style-type: none"> ● Make sure you throw your rubbish in a bin. ● Try not to use plastic when you can avoid it. <ul style="list-style-type: none"> ○ Try not to use plastics or styrofoam that have only 1 use (like a straw, or take-away container). ○ Try to re-use plastics whenever you can. ○ These are easy every day actions we can all do to change the world!
Slide 23	<ul style="list-style-type: none"> ● Post-Surveys. <ul style="list-style-type: none"> ○ The post-surveys, like the pre-surveys, should not feel like a test. ○ Learners must not feel pressured to answer all the questions correctly. ○ The aim of the post-surveys is to measure the impact the course has had on the learners and if their attitudes and views on conservation have remained the same or changed.

Workbook explanation:

The workbook has 4 written questions regarding littering and pollution for the learners to answer as well as a mix and match question on pollution.

Worksheet answers:

1. What is pollution?
 - When humans put substances or materials into the environment that are harmful or poisonous to all living things.

2. What is litter?
 - Rubbish and trash that is discarded where it is not meant to be.
 - Not natural.

3. Why are litter and pollution bad and harmful?

Possible Answers	
<ul style="list-style-type: none"> • Rivers become blocked so they cannot flow 	<ul style="list-style-type: none"> • Plants suffer
<ul style="list-style-type: none"> • Animals die which results in a loss of food for us as well 	<ul style="list-style-type: none"> • Litter ends up in oceans and hurts ocean animals
<ul style="list-style-type: none"> • Takes a long time to decompose so it negatively affects the environment for a long time 	<ul style="list-style-type: none"> • Expensive to clean up large amounts so it is often left
<ul style="list-style-type: none"> • Air pollution ruins the air we all breathe 	<ul style="list-style-type: none"> • Light pollution negatively affects animals that use the stars for navigation

4. How can we stop litter and pollution?

Possible Answers	
<ul style="list-style-type: none"> • Do not put rubbish/litter on the floor 	<ul style="list-style-type: none"> • Put rubbish and litter in a bin
<ul style="list-style-type: none"> • Educate and teach everyone around you why we need to protect our environment 	<ul style="list-style-type: none"> • Educate and teach everyone what happens if we litter
<ul style="list-style-type: none"> • Use cloth/material bags rather than plastic ones 	<ul style="list-style-type: none"> • Reuse items if you have to buy plastic
<ul style="list-style-type: none"> • Try get everyone to pick up litter every day, even if its only one piece 	<ul style="list-style-type: none"> • Have a litter drive where everyone cleans up a specific area

POLLUTION:

Match the picture to the type of pollution!

Noise Pollution

Air Pollution

Water Pollution

Light Pollution

Materials that need to be printed:

- *Post-surveys*
- *Templates for the fishing activity*

Extra Resources:

- **Types of pollution:** <https://byjus.com/biology/types-of-pollution/>
- **Harmful effects of litter:** <https://www.plano.gov/486/Harmful-Effects-of-Litter#:~:text=Litter%20is%20Harmful,stuck%20and%20starve%20to%20death.>
- **Litter harms animals:** <https://www.conserve-energy-future.com/littering-effects-humans-animals-environment.php#:~:text=The%20plastic%20creates%20health%20problems,and%20cause%20injury%20or%20death.>

*Note: Lesson 10 is an excursion to a Game Reserve.