

# Ecological Concepts

## LESSON PLAN

<b>Subject</b>	Natural Sciences
<b>Grade and Term</b>	Grade 8 Term 1
<b>Name of Topic and content</b>	<p>Refer to CAPS Natural Sciences Grade 7-9 Page No. 14</p> <p><b>Topic:</b> Interactions and interdependence within the environment</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>• Introduction to ecology</li> <li>• Ecosystems</li> <li>• Feeding relationships</li> <li>• Energy flow: food chains and food webs</li> <li>• Balance in an ecosystem</li> <li>• Adaptations</li> <li>• Conservation of the ecosystem</li> </ul>
<b>CAPS Link/Outcomes/Purpose</b>	<p>Refer to CAPS Natural Science Grade 8, Page 5</p> <p>This activity helps the learners to develop the following knowledge &amp; skills as described in CAPS:</p> <ul style="list-style-type: none"> <li>• Doing Science. Learners should be able to complete investigations, analyse problems and use practical processes and skills in evaluating solutions.</li> <li>• Knowing the subject content and making connection. Learners should have a grasp of scientific, technological and environmental knowledge and be able to apply it in new contexts.</li> <li>• Understanding the uses of Science. Learners should understand the uses of Natural Sciences and indigenous knowledge in society and the environment.</li> </ul>
<b>Sustainable Development Goal/s (SDGs)</b>	<p>SDG 3: Good Health and Well-being.</p> <p>SDG 4: Quality Education.</p> <p>SDG 6: Clean Water and Sanitation.</p> <p>SDG 14: Life Below Water.</p> <p>SDG 15: Life on Land.</p> <p>SDG 17: Partnerships For The Goals.</p>

<b>Name of Activity/ Programme</b>	Ecological Concepts
<b>Key words (Terminology)</b>	Ecology, ecosystem, biodiversity, conservation, habitat, communities, populations, species, adaptations, energy flow, food chain, food web, extinction.
<b>Materials needed for the Activity</b>	<ul style="list-style-type: none"> <li>• Poster of living and non-living things in an environment ('Wetland's are nature's way of providing water' poster)</li> <li>• Copies of activity resources on pages 5, 6 and 7.</li> </ul>
<b>Name of Worksheet/s (If applicable to activity)</b>	No worksheet. Copies of activity resources on pages 5, 6 and 7 required for each group.
<b>Any opportunity for using technology e.g. computers; GPS; cel phones; etc.</b>	<a href="https://www.youtube.com/watch?v=GlnFylwdYH4">https://www.youtube.com/watch?v=GlnFylwdYH4</a>
<b>References</b>	<ul style="list-style-type: none"> <li>• CAPS Natural Sciences Gr 7-9 Page no: 14</li> </ul>
<b>Activity developed/adapted by and date</b>	Kgaola Shai  February 2021
<b>Link to other subjects and WWET activities</b>	<ul style="list-style-type: none"> <li>• Grade 6 Natural Sciences. Term 1. Ecosystems and Food webs.</li> <li>• Grade 7 Natural Sciences. Term 1. Biosphere and Biodiversity.</li> <li>• Grade 10 Life Sciences. Term 4. Biodiversity and Classifications.</li> <li>• Grade 11. Life Science. Term 1. Biodiversity and Classification of Microorganisms.</li> </ul>

# ACTIVITY GUIDELINES

## Introduction

All life on Earth is interdependent and living things have a very strong interaction with the non-living things. Therefore existence of life depends mainly on these relationships. Ecology became the platform that put all those things that are living and non-living together. Understanding ecological concepts enables one to have an idea of their surroundings, all natural systems and how they function. Ecology enriches planet Earth because it is crucial to human wellbeing and prosperity. Ecology puts together the interdependence knowledge of nature (including humans) and how to ensure the sustainability of natural resources. Without basic knowledge of ecological concepts and their roles in life, it becomes more difficult for one to tell when things start going wrong and be able to predict how they will look like in the future. For example: sustainable use of available natural resources will safeguard future food production, good quality air, good quality water and a healthy biodiversity. Understanding ecological concepts brings forth the understanding of basics for nature conservation and how it can be scientifically modeled for the benefits of the present without compromising the needs of future generations. All of the Sustainable Development Goals can easily be achieved if the basics of ecology are known to all those that live on planet Earth. It can all be realised through education, especially when it is taught to the right emerging generation.

## Activity Outline

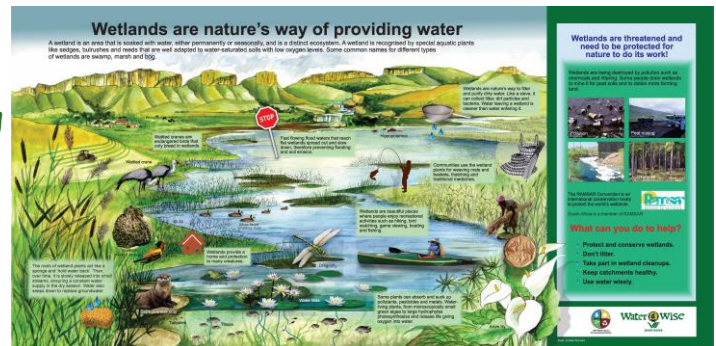
### Step 1:

- As an introduction and if you have access to a smart board or other means of displaying a video, play the following You Tube video:

Introduction to Ecology: <https://www.youtube.com/watch?v=GlnFylwdYH4>

### Step 2:

- Divide learners into groups of no more than 6 learners. This will enable learning and participation.
- Each group must be provided with a copy of the "Wetlands are nature's way of providing water" poster which displays an ecosystem.



(Poster available at: <http://www.waterwise.co.za/site/water/Wetlands/Index.html>)

### **Step 2 continued...**

- Introduce the concept of ecology by handing out copies of or displaying the activity resources Ecological Concepts 1 (page 5) and Ecological Concepts 2 (page 6)
- Go through the glossary on page 7 as you unpack the images on page 5 and 6.

### **Step 3:**

- Let learners identify living and non-living things on the visual provided ('Wetlands are nature's way of providing water' poster).
- Through group discussion, show or link the interdependency of the living and non-living things on the poster.

### **Step 4:**

- Each group to discuss what a healthy ecosystem looks like.
- Each group to discuss the main threats to ecosystems.
- Each group to discuss the possible sustainable solution/s to address the problem/s.
- Each group to discuss who is responsible to maintain the health of ecosystems.

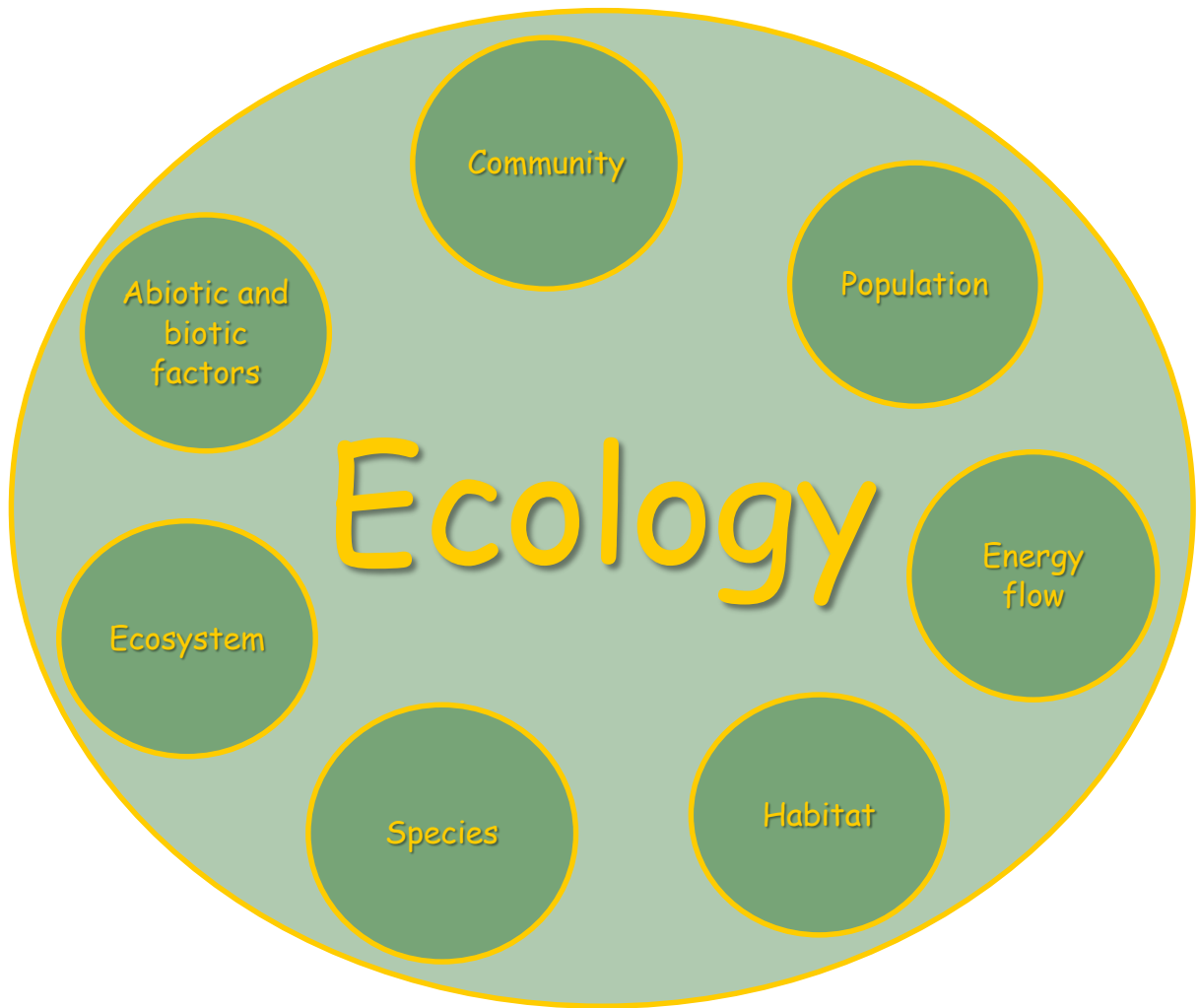
### **Step 5:**

- Group discussions to be verbally presented to each of the other groups. If learners wish to create a mind map they may do so.
- Groups to openly discuss all the problems identified and discuss/debate the best solutions.

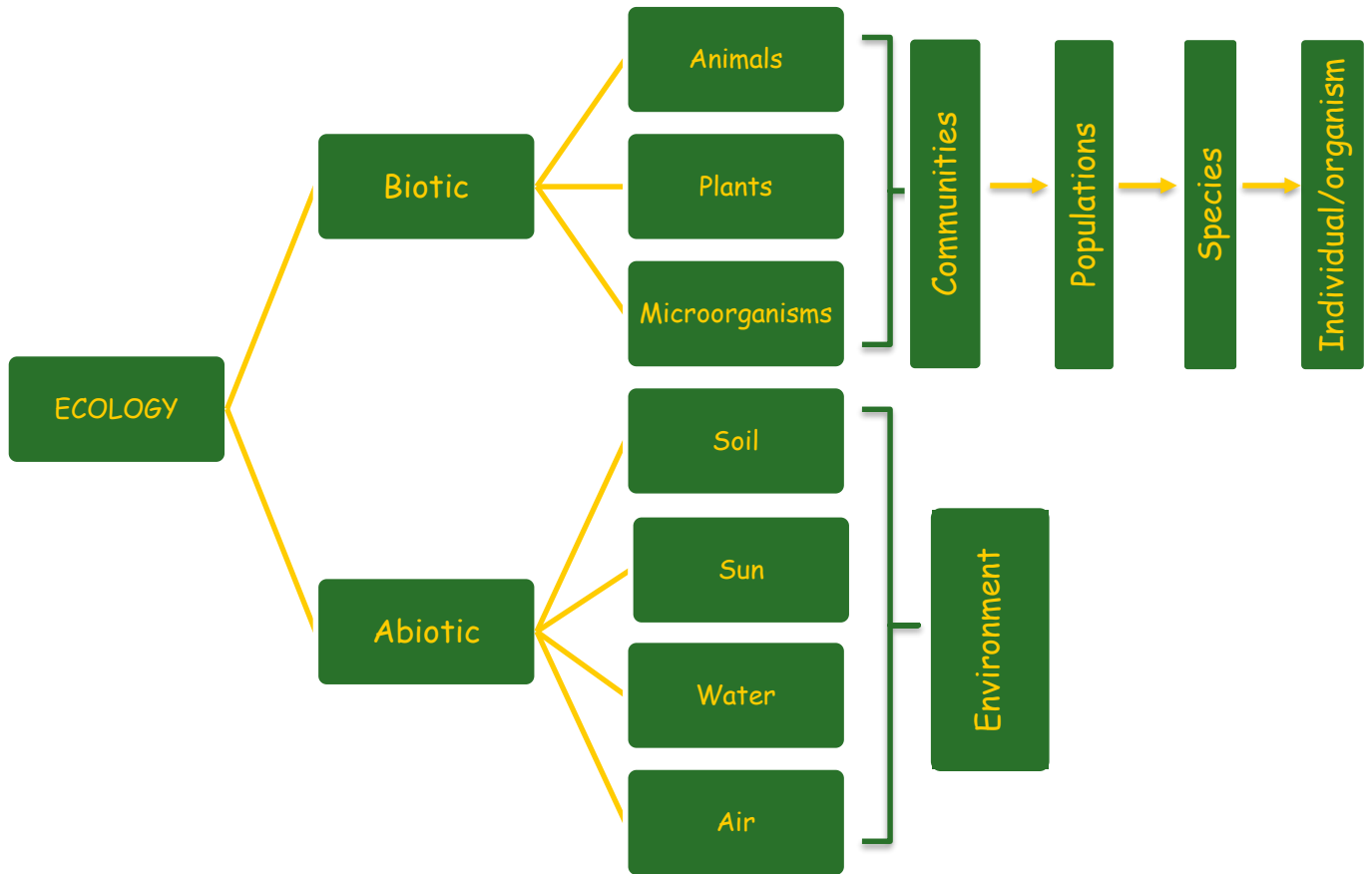
### **Step 6:**

- To assess the achievement of learning outcomes, the following criteria can be used:
  - Questioning,
  - Observations and
  - Student feedback.

# Ecological Concepts #1



# Ecological Concepts #2



# Activity Resources

## Glossary

WORD	DESCRIPTION
<b>Abiotic</b>	The non-living parts of an ecosystem that give shape to the environment.
<b>Adaptations</b>	The physical or behavioural characteristic of an organism that enables it to survive in its surrounding environment.
<b>Biodiversity</b>	Refers to all life forms on Earth at all levels ranging from microscopic to large organisms.
<b>Biotic</b>	The living organism that shapes its environment.
<b>Community</b>	A group of various organisms that are interacting in a common location.
<b>Conservation</b>	The long term scientific process of preserving and protecting the environment to ensure that natural areas or habitats are maintained while genetic diversity of species are sustained in the natural environment.
<b>Ecology</b>	The scientific study of organisms (biotic); their distribution; their abundance; their interaction amongst themselves; and their interactions with their environment (abiotic).
<b>Ecosystem</b>	A community of living organisms together with the non-living components of their environment interacting as a system.
<b>Energy flow</b>	Natural flow of energy through living things within an ecosystem.
<b>Extinction</b>	The total permanent disappearance of a particular type of species of organisms.
<b>Food chain</b>	The sequential transfer of energy in the form of food from one organism to the other.
<b>Food web</b>	The natural interconnection of food chains presented graphically showing the series of who eats who in an ecological community.
<b>Habitat</b>	A specific location whereby an organism or population lives as their home where they breed and forage.
<b>Population</b>	A group of organisms of a single species that interbreed, live and share the same environment.
<b>Species</b>	A group of very closely related organisms similar to one another which are able to naturally interbreed and produce genetically healthy offspring.

# Conclusion

Ecology and all its concepts need to be understood because they are very important to the life that we currently live. All life forms on Earth are interdependent and living things have a very strong interaction with the non-living things. The relationships need to be maintained as healthy as possible to ensure the sustainability of both living and non-living things. It helps everyone understand that they need to be cautious in their day to day activities, whether they are good or bad to their surroundings. The emerging scientists (learners) are an integral part of the ecological puzzle and they need to be fully involved in the process of preventing and remedying the damage to natural resources to ensure sustainable living.

All of the Sustainable Development Goals can easily be achieved if the basics of ecology are known to all those that live on planet Earth. The activity reinforces the relationships, helps learners to think critically about the current generations demands on nature and how this can be sustainable. Understanding what it means to them can instil the need to take care of what supports life. By following the principles of the six meanings of being Water Wise (image below), learners can learn to respect, not waste, not to pollute, take action and conserve not only water, but all parts of the environment. This activity supports all of the Sustainable Development Goals. Some of the SDG's that strongly apply are: SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), SDG 6 (Clean Water and Sanitation), SDG 14 (Life Below Water), SDG 15 (Life on Land) and SDG 17 (Partnerships For The Goals). The 17 Sustainable Development Goals (SDGs) are an urgent call for action by all countries - developed and developing - in a global partnership. They recognise that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth - all while tackling climate change and working to preserve our environment.

