

PLANT ADAPTATIONS*

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1 NATURAL SCIENCES

2 Grade 8

3 BIODIVERSITY

4 Module 28

5 PLANT ADAPTATIONS

Like animals, plants have also made adaptations to survive under particular climatic conditions.

As water is of utmost importance for the survival of plants, their adaptations are related to the availability of water. Plants can be divided into three groups with regard to this type of adaptation.

- **XEROPHYTES** – minimal availability of water
- **MESOPHYTES** – moderate availability of water – as with most plants growing on land
- **HYDROPHYTES** – maximal availability of water

5.1 Activity: TO CLASSIFY PLANTS

Study the following sketches and classify the plants according to their structures as hydro-, meso- or xerophytes. Attempt to provide at least one reason for your classification in each instance.



Figure 1

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Figure 2



Figure 3

5.2 Activity: TO EXPLAIN THE WAY IN WHICH SOME PLANTS ADAPT

HYDROPHYTE ADAPTATION EXPLANATION

Roots Poorly developed, only for anchoring

Leaves Large surface

Floating Cuticle (waxy layer) on surface

Air pockets in leaf

Stomata (small openings) on top

Stems

Very little strengthening tissue

Slimy layer

Rhizome (stores food)

XEROPHYTE ADAPTATION EXPLANATION

Roots

Shallow root system

Corky layer

Leaves

Few stomata, mainly on underside

Small or converted to thorns

Stems Thick and fleshy

Waxy layer

Could you supply correct explanations for each adaptation?

Assessment of assignment: [LO 2.4]

5.3 ASSIGNMENT: Story

The San most probably were the first people to live in Southern Africa and we still think of their ability to survive such dry conditions with astonishment. Water was a very limited resource.

But we do not have to go very far to discover some of the solutions that the San found centuries ago in nature and in plants (xerophytes), in particular.

Read about the natural vegetation of the desert-like parts of our country.

Write a story about the survival of a plant in the Kalahari Desert. Write this from the point of view of the plant. Let the plant do the talking to describe the conditions and how it manages to survive, and how it

helps other plants, the San and animals to survive (its role in the food chain). Refer to the San people and how they used plants to survive.

Assessment of assignment:

5.4 Could you write a factually correct story about San culture and the Kalahari ecosystem? [LO 3.1]

5.5 Class Activity: Adaptations in xerophytes



Figure 4



Figure 5



Figure 6



Figure 7

Examine the sketches of these unusual xerophytes – which adaptations do they exhibit?

ALOE
CACTUS
LITHOPS
WELWITCHIA

Match the items in the following columns by writing the letters from COLUMN C in the appropriate spaces in COLUMN B. More than one match is possible.

[LO 2.4]

6 Activity: TO CONDUCT A RESEARCH PROJECT

Most xerophytes are used as medicine and for a variety of other purposes in different cultures. Even primitive cultural groups practised science thousands of years ago by determining the value of plants and finding ways to use them.

Do research on the Internet, in books and in libraries.

Write a research report, using the following headings:

- Planning of the investigation (which has to include research through the Internet and books and through conversations with homeopaths and sangomas or inyangas, as well as one or two older people).
- Information gathered:

Examples of the use of plants by cultural groups in South Africa.

Discussion of three specific plants, including the aloe (*Aloe vera*) (characteristics of the plants and medicinal, economic or other value).

- Summary (summary of findings)
- List of references: books, web addresses, and persons.

Assessment of RESEARCH PROJECT:

[LO 1.1; LO 1.2; LO 1.3]

7 Assessment

Learning outcomes 1: Scientific investigations

The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

This is evident when the learner

- 1.1 is able to plan investigations;
- 1.2 is able to conduct an investigation and collect data;
- 1.3 is able to evaluate data and communicate findings.

Learning outcomes 2: Constructing Science Knowledge

The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

This is evident when the learner

- 2.4 is able to apply knowledge.

Learning outcomes 3: Science, society and the environment

The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

This is evident when the learner

- 3.1 is able to understand science as a human endeavour.

8 Memorandum

Activity: IDENTIFICATION: PLANTS

- www.lithop.supanet.com

Activity: EXPLAIN THE FOLLOWING ADAPTATIONS

ASSIGNMENT: Story

- Do some reading about the natural vegetation of the arid regions of our country.
- Write a story about the survival of an animal in the Kalahari Desert. Write this from the point of view of the animal and from its situation in the food chain.

Class activity: XEROPHYTIC PLANTS – ADAPTATIONS

ASSIGNMENT: Research project

- Most xerophytes are used as medicines and in a variety of other applications, by various cultural groups.
- **The aloe** (*Aloe ferox*), in particular, has a wide range of applications – consult homeopaths, sangomas or an inyanga to find information in this regard.
- Do research through the internet, books and libraries.
- Write a research report with the following headings as a guideline:

Growing regions

Special properties of the plant, especially the leaves

Medicinal and economic value of the plant

- Include a list of all the sources and websites that you consult.