Unit 14 · Ecological Adaptation

WORKSHEET

Full marks 35

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 35

1 Key words [4]

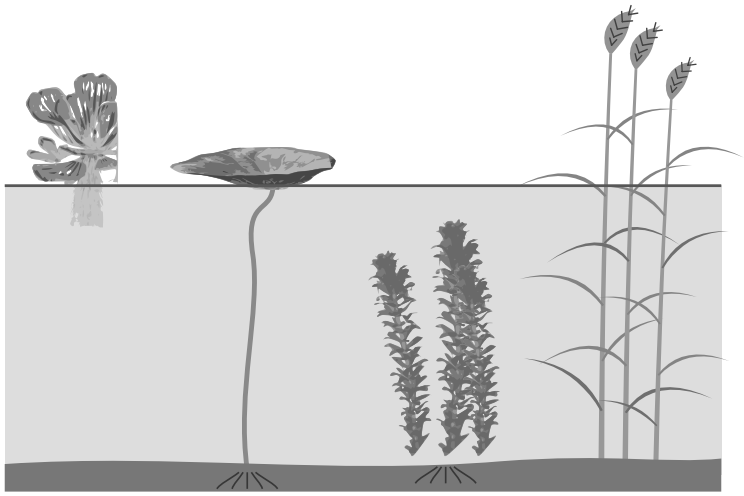
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

aerenchyma	**ephemerals**	**heterophylly**	**hydrophytes**	**mesophytes**	**phylloclade**
root pocket	**succulents**	**sunken**	**xerophytes**		

Plants of water or very wet places are _____, and plants of dry places are _____; plants with a moderate, regular supply of water are _____. Tissue with large air spaces, which carries oxygen down to roots buried in mud, is _____. In free-floating plants such as *Eichhornia* the root cap is replaced by a loose sheath, the _____. Stomata set in pits lined with hairs are _____ stomata. Xerophytes that escape the dry season as seeds are _____, and those that store water in fleshy tissue are _____.

2 Label the diagram [2]

The diagram shows four kinds of hydrophyte, each where it grows in a pond. Name the category of each, 1 to 4. Each carries 0.5 mark.



① ② ③ ④

1. _____ **2.** _____

3. _____ **4.** _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. What is another term used to describe ephemerals? [1]

a. drought avoiders
b. moisture evaders
c. drought escapers
d. water seekers

ii. Which of the following is an example of a plant belonging to the category of ephemerals? [1]

a. *Aloe*
b. *Acacia nilotica*
c. *Solanum xanthocarpum*
d. *Begonia*

iii. Why are the stomata of a floating leaf, like that of a water lily, on its upper surface only? [1]

a. the lower surface needs more light
b. only the upper surface is in contact with the air
c. the lower surface is covered by roots
d. stomata on the upper side reduce transpiration

iv. How do sunken stomata reduce transpiration? [1]

a. they close permanently in the dry season
b. the still, moist air trapped in the pit above them slows the escape of water vapor
c. they are covered by a thick cuticle
d. they absorb water from the air

v. *Trapa* (singhada), grown in ponds of the Tarai for its nut, is rooted in the mud and has a rosette of leaves lying on the surface. To which category does it belong? [1]

a. free-floating
b. rooted with floating leaves
c. rooted submerged
d. submerged floating

4 Very short answers [4]

Write very short answers to the following questions.

a. Name the three kinds of adaptation. [1]

b. Name one hydrophyte that has no roots at all. [1]

c. Why is the cell sap of a xerophyte highly concentrated? [1]

d. Why is *Begonia* not a xerophyte, though it has fleshy stems and leaves? [1]

5 Short answers [9]

Write short answers to the following questions.

a. Why are mechanical and vascular tissues poorly developed in hydrophytes, but well developed in xerophytes? [2]

b. What is CAM? How does it save water? [2]

c. A student squeezes the swollen leaf stalk of a water hyacinth and finds it spongy. Explain what is inside it and how it helps the plant. [2]

d. Describe three ways in which the leaves of xerophytes reduce transpiration. [3]

6 Long answers [8]

Write long answers to the following questions.

a. Explain the anatomical and physiological adaptations of hydrophytes to their aquatic environment. [4]

b. Compare a hydrophyte and a xerophyte under four headings: roots, leaves, cuticle and stomata, and cell sap. Give one example of each. [4]

7 Think [3]

Jomsom and Upper Mustang lie only about 50 km from some of the wettest slopes in Nepal, yet almost every plant there shows xerophytic features. Explain why, and say which features you would expect to find on a shrub growing there.

8 Activity: Leaves from wet and dry places

(not marked)

Collect a leaf of a water plant (water hyacinth, *Pistia* or a lotus, from a pond) and a leaf of a plant from a dry place (*Aloe*, *Agave*, siundi or oleander). Feel them, cut each across with a blade, and look at the cut with a hand lens.

Feature	Water plant	Dry-place plant
thickness and feel		
waxy or not		
what the cut surface looks like		
does water bead or spread on the surface?		

Which leaf would lose water faster if you left both in the sun, and why?