

LEAF FUNCTION: SPECIALIZED LEAVES

Material:

- Examples of specialized leaves: leaf tendrils (pea, squash), spines (cactus), water storage or succulent leaves (jade plant), food storage leaves of bulbs (onion), leaves that reproduce (African violet), floral bracts (*Poinsettia*, *Bougainvillea*), bud scales (cottonwood tree), conifer needles (pine tree), and insect-trapping leaves (Venus fly-trap) gathered by the teacher and/or the children
- Specialized Leaves nomenclature cards
- 3 x 5 cards, blank labels, black pen

Presentation:

1. Share the specialized leaves with the children.
2. Say, "The purpose of the leaf is to make food for the plant. Specialized leaves perform a different function for the plant."
3. Ask the children if they can name or describe the specialized leaves: leaf tendrils, spines, water storage or succulent leaves, food storage leaves of bulbs, leaves that reproduce, floral bracts, bud scales, conifer needles, and insect-trapping leaves.
4. Name the specialized leaves. Write the title on a blank label. Label the specialized leaves. Ask the children to describe and define the specialized leaves and write the definitions on 3 x 5 cards.

5. Discuss the specialized leaves:
 - A. **Specialized Leaves** - The purpose of the leaf is to make food for the plant. Sometimes the leaf is specialized to perform a different function.
 - B. **Leaf Tendrils** - A leaf tendril is a specialized leaf. A leaf tendril coils around an object to help the plant to climb. Peas and squash are examples of plants with leaf tendrils.
 - C. **Spines** - Spines are specialized leaves. Spines are hard, sharp leaves that are specialized to defend the plant from being eaten by animals. Spines do not make food for the plant. The stem makes food for the plant. Cactus and ocotillo are examples of plants with spines.
 - D. **Water Storage or Succulent Leaves** - Water storage or succulent leaves are specialized leaves. Succulent leaves are leaves that are specialized to store water for the plant. The jade plant is an example of a plant with succulent leaves.
 - E. **Food Storage Leaves of Bulbs** - Food storage leaves are specialized leaves. Food storage leaves are leaves that are specialized to store food for the plant. Food storage leaves are underground leaves in bulbs. Food storage leaves do not make food for the plant. The onion is an example of a plant with food storage leaves.
 - F. **Leaves that Reproduce** - Leaves that reproduce are specialized leaves. Leaves that reproduce are leaves that are specialized to grow roots to make a new plant. The maternity plant and the African violet are examples of plants with leaves that reproduce.

- G. Floral Bracts** - Floral bracts are specialized leaves. Floral bracts are leaves that are specialized to attract pollinators such as insects. The floral bracts are colorful like petals, as the actual flowers are very small. The *Poinsettia*, the *Bougainvillea*, the banana, and the Indian paintbrush are examples of plants with floral bracts.
- H. Bud Scales** - Bud scales are specialized leaves. Bud scales are leaves that are specialized to protect the buds of deciduous plants during the winter. Bud scales prevent the buds from drying out. The cottonwood plant is an example of a plant with bud scales.
- I. Conifer Needles** - Conifer needles are specialized leaves. Conifer needles are leaves that are specialized to store water. Conifer needles are needle-shaped and have a thick cuticle to prevent water loss. Conifer needles contain resins to protect them from freezing and to prevent insects from eating them. Pine trees are examples of plants with conifer needles.
- J. Insect-Trapping Leaves** - Insect-trapping leaves are specialized leaves. Insect-trapping leaves are leaves that are specialized to trap insects. Insect-trapping leaves may be sticky to trap the insect, they may form containers to trap the insects, or they may snap shut when the insect lands on the leaves. The plant uses the nutrients, such as nitrogen, from the decaying insect to supplement the low nutrient supply in its environment. The sundews, the pitcher plant, and the Venus fly-trap are examples of the three types of plants with insect-trapping leaves.

6. Encourage the child to repeat the functions of the specialized leaves.
7. Have the children observe or collect specimens from nature that depict these functions.
8. Allow the children to draw or in other ways render what they observe. They may label the specialized leaves and write the definitions in their own words.
9. Lay out the pictures of the types of specialized leaves.
10. Distribute the labels for the children to match to the pictures.
11. Display the wall chart.
12. When the children know the definitions of the types of specialized leaves, distribute the definitions for the children to read and to match to the pictures.
13. Check the definitions with the booklet.
14. Place the Specialized Leaves classified nomenclature material on the shelf.
15. Place the Specialized Leaves booklet on the shelf.
16. Follow-up activities for the child:
 - A. Match the picture and the label (simple nomenclature).
 - B. Match the picture, the label, and the definition card (classified nomenclature).
 - C. Make a booklet of the Specialized Leaves. The children write the definitions in their own words.
 - D. Make a chart of the Specialized Leaves.
 - E. Examine the Specialized Leaves under a microscope.
 - F. Plant examples of Specialized Leaves in the classroom or outside.
 - G. Examine other Specialized Leaves without picking them.

LEAF FUNCTION: THE BULB

Material:

- Examples of the specialized leaves: food storage leaves of bulbs (onion), gathered by the teacher and/or the children
- The Bulb nomenclature cards
- 3 x 5 cards, blank labels, black pen

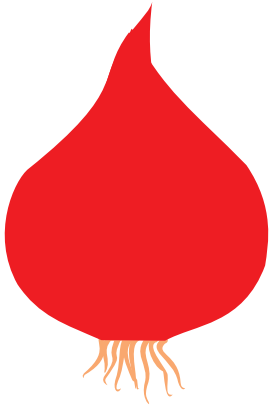
Presentation:

1. Review the specialized leaves with the children.
2. The purpose of the leaf is to make food for the plant. Specialized leaves perform a different function for the plant.
3. Ask the children if they can name or describe the specialized leaves: food storage leaves of bulbs.
4. Name the parts of the bulb. Write the title on a blank label. Label the parts of the bulb. Ask the children to describe and define the parts of the bulb and write the definitions on 3 x 5 cards.
5. Discuss the specialized leaves:
 - A. **The Bulbs** - The bulbs are subterranean or underground specialized leaves. The bulbs are short and wide. The bulbs have a large number of crowded, overlapping, fleshy leaves. The fleshy leaves store food. The fleshy leaves also protect the developing plant inside. The onion is an example of a bulb.
 - B. **The Parts of the Bulb** - The parts of the bulb are the roots, the stem, the fleshy leaves, the shoot, and the apical bud.

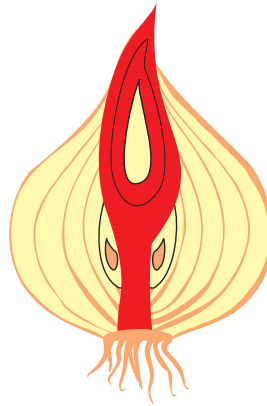
- C. **The Roots of the Bulb** - The roots of the bulb grow downward from the stem. The roots draw water and minerals from the soil to the bulb. The roots of the bulb are adventitious roots.
 - D. **The Stem of the Bulb** - The stem of the bulb is a sessile stem. The stem is at the base of the fleshy leaves. The fleshy leaves attach to the stem.
 - E. **The Fleshy Leaves of the Bulb** - The fleshy leaves of the bulb are the specialized leaves of the bulb. The fleshy leaves of the bulb store food. The fleshy leaves surround the shoot of the bulb.
 - F. **The Shoot of the Bulb** - The shoot of the bulb is the center part of the bulb. The shoot of the bulb grows straight up. The shoot will become the leaves and flowers of the plant.
 - G. **The Apical Bud of the Bulb** - The apical bud of the bulb is the beginning development of flowers. The apical bud is inside the shoot of the bulb.
6. Encourage the child to repeat the functions of the bulb.
 7. Have the children observe or collect specimens from nature that depict these functions.
 8. Allow the children to draw or in other ways render what they observe. They may label the parts of the bulb and write the definitions in their own words..
 9. Lay out the pictures of the parts of the bulb.
 10. Distribute the labels for the children to match to the pictures.
 11. Display the wall chart.
 12. When the children know the definitions of the parts of the bulb, distribute the definitions for the children to read and to match to the pictures.

14. Place The Bulbs classified nomenclature material on the shelf.
15. Place The Bulbs booklet on the shelf.
16. Follow-up activities for the child:
 - A. Match the picture and the label (simple nomenclature).
 - B. Match the picture, the label, and the definition card (classified nomenclature).
 - C. Make a booklet of The Bulbs. The children write the definitions in their own words.
 - D. Make a chart of The Bulbs.
 - E. Examine The Bulbs under a microscope.
 - F. Plant examples of The Bulbs in the classroom or outside.
 - G. Examine other bulbs without picking them.
17. Some true bulbs are allium, amaryllis, hyacinth, iris, narcissus, oxalis, and tulip.

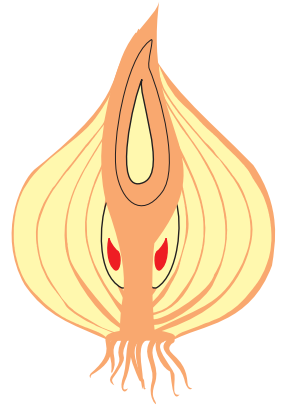
The Parts of the Bulb



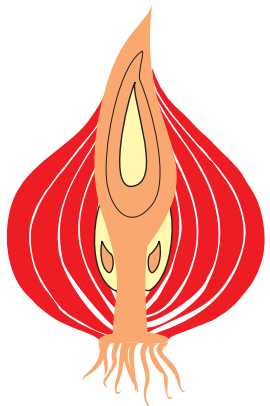
Bulb



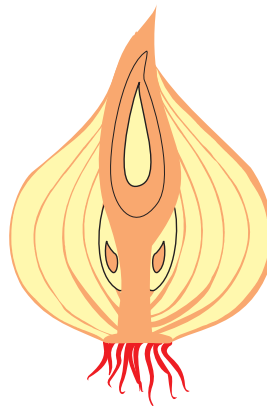
Stem



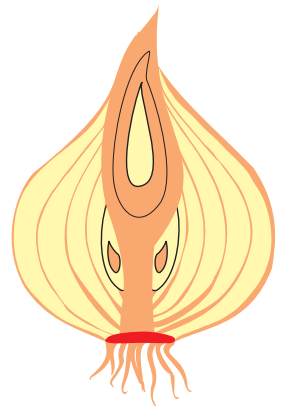
Bud



Fleshy Leaves



Roots



Disk

LEAF ABSCISSION

Material:

- Examples of branches with leaf abscission: the abscission zone, the protective layer, the separation or abscission layer, and the leaf scar gathered by the teacher and/or the children
- Leaf Abscission nomenclature cards
- 3 x 5 cards, blank labels, black pen

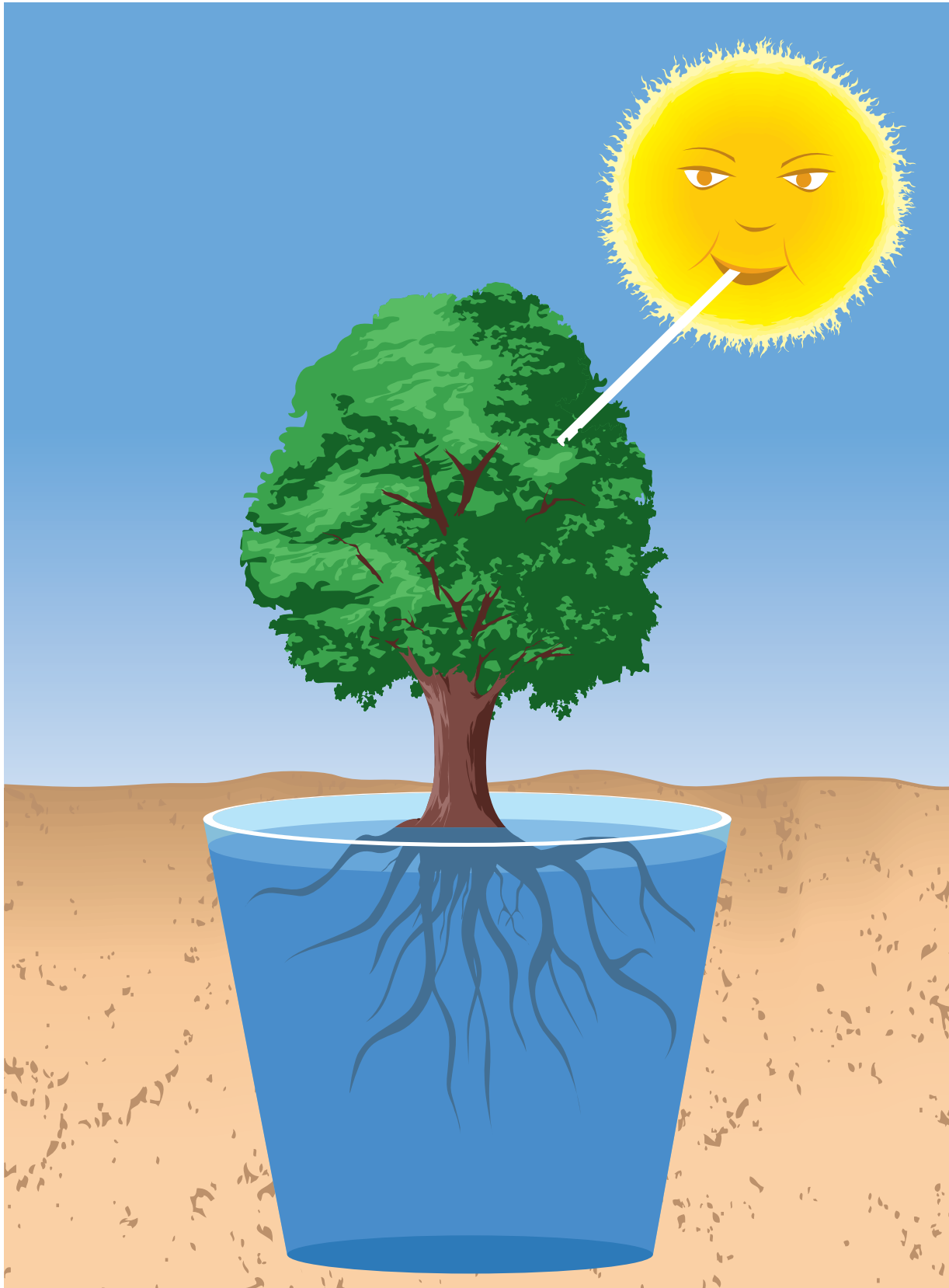
Presentation:

1. Share the branches with leaf abscission with the children.
2. Ask the children if they can name or describe leaf abscission: the abscission zone, the protective layer, the separation or abscission layer, and the leaf scar.
3. Name the parts of the branch involved in leaf abscission. Write the title on a blank label. Label the parts involved in leaf abscission. Ask the children to describe and define the parts and write the definitions on 3 x 5 cards.
4. Discuss the functions of the parts of the branch involved in leaf abscission:
 - A. **Leaf Abscission** - Leaf abscission is the process by which a plant sheds its leaves. Deciduous plants shed all their leaves each fall, while evergreen plants shed their leaves a few at a time.
 - B. **The Abscission Zone** - The abscission zone is the area where the plant sheds its leaves. The abscission zone of the leaf has two layers: the protective layer and the separation layer.

- C. **The Protective Layer** - The protective layer of the abscission zone is the layer next to the stem. The protective layer fills up with a waxy substance called suberin when the leaf is ready to fall off the plant. The suberin seals off the stem and waterproofs the stem.
 - D. **The Separation Layer or Abscission Layer** - The separation layer or abscission layer of the abscission zone is the layer next to the leaf. The separation layer thins, weakens and begins to break down when the leaf is ready to fall off the plant. The xylem is the only part of the leaf still attached to the stem. The wind or rain will knock the leaf off the stem.
 - E. **The Leaf Scar** - The leaf scar is the scar where the leaf once attached to the stem. The protective layer produced suberin to waterproof and to protect the stem at the leaf scar.
5. Encourage the child to repeat the parts of the branch involved in leaf abscission.
 6. Have the children observe or collect specimens from nature that depict these functions.
 7. Allow the children to draw or in other ways render what they observe. They may label the leaf abscission on the branch and write the definitions in their own words.
 8. Lay out the pictures of leaf abscission.
 9. Distribute the labels for the children to match to the pictures.
 10. Display the wall chart.
 11. When the children know the definitions for leaf abscission, distribute the definitions for the children to read and to match to the pictures.

12. Check the definitions with the booklet.
13. Place the Leaf Abscission classified nomenclature material on the shelf.
14. Place the Leaf Abscission booklet on the shelf.
15. Follow-up activities for the child:
 - A. Match the picture and the label (simple nomenclature).
 - B. Match the picture, the label, and the definition card (classified nomenclature).
 - C. Make a booklet of Leaf Abscission. The children write the definitions in their own words.
 - D. Make a chart of Leaf Abscission.
 - E. Examine Leaf Abscission under a microscope.

Chart 11: The Sun's Drink: Water Evaporates from the Plant in Transpiration



The Sun's Drink:
Water Evaporates from the Plant in Transpiration

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**Chart 12: The Sun's Worshippers: The Action of Light on Plants or
Phototropism and Apical Dominance**



**The Sun's Worshippers:
The Action of Light on Plants or Phototropism and Apical Dominance**

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