4.1 Stem Anatomy

- Stems have many important jobs in a plant.
- Stems are responsible for the _____ and _____ of a plant.
- Some stems are made of _____, and some are _____ or soft.
- The following are four functions of stems.
    - Stems _____ the leaves. They hold the leaves in the most efficient position to collect sunlight.
    - Stems _____ water, minerals, and manufactured food throughout the whole plant. The movement of materials through vascular tissues is known as _____.

3. Stems that are green in color help _____ food through _____. While this is not usually the primary food production, it can be quite important in plants with no leaves or very small leaves.

1. Stems _____ food that has been manufactured by the plant.

- Many structures on the stem are useful to us in identifying plants.
- The following are some _____structures on a stem.
    - The growing point at the tip of the stem, called the _____, is contained inside of the ***bud*** at the end of the stem, which is called the _____.
    - The apical meristem is the same type of structure that the tip of the root has and is responsible for growth in the length of the plant.
    - The leaf is attached to the stem at the _____.
    - The area between leaves is called an _____.
    - At the node, just above where the leaf is attached, there is always a side bud called the _____.
    - On the outside of both terminal and lateral buds are small protective structures called _____.
    - When the leaf falls off of the stem, it leaves behind a small scar just below the lateral bud.
        - This scar is called the _____.

  - When the buds sprout each spring, the bud scales fall off, leaving behind a ring of scars called the _____ _____ _____.
  - The distance between bud scale scars represents _____ growth of the stem.
  - _____ are small spots on the stem that allow it to exchange gases with its environment.
- Inside of the stem, there are tissues used to transport materials throughout the plant.
- Stem tissues are organized in one of the following ways.
- The important vascular tissues are either found in small bundles scattered throughout the stem or arranged in rings or a ring of vascular bundles, which are located in the _____.
- The first way, scattered bundles, is found in _____
- The second way, in rings, is found in _____.
- There are three important types of tissue found inside of the stem.
- The _____ is tissue that conducts the water and minerals throughout the plant.
- The xylem is made of _____that grow together to conduct _____.
- Xylem tends to be found closer to the center of the stem.
- The _____ is tissue that conducts food that is produced in the leaf to the rest of the plant.
- Phloem cells also form _____.
- Phloem is generally found toward the outside of the stem.
- _____ _____is tissue that is responsible for the production of new xylem and phloem.
- It is responsible for growth in girth of the stem and is generally found between the xylem and the phloem.
- The darker wood to the center of the tree is called the _____.
  - The xylem cells of the heartwood are filled with gums, resins, pigments, and tannins.
  - They provide strength and no longer function in conducting materials.
- The lighter wood circling the heartwood is called the _____.
  - The younger sapwood actively conducts water and dissolved minerals.
- The age of a tree can be determined by counting _____ _____ _____.

- During rapid growth, the cells of the wood are thin walled and are large in diameter.
- As growth slows during mid-to-late summer, the wood cells produced by the cambium become smaller and have thicker walls.
- Each ring is the growth during _____