Investigating Plant Structures

Introduction:
In the evolution of plants, major structural adaptations have allowed for living on land without drying out. Plants evolved roots to absorb water from their environment, vascular tissue to transport that water toward leaves where photosynthesis occurs, and a cuticle to keep water in. Roots anchor plants in the soil and allow for the absorption of water. Vascular tissues include xylem and phloem, which run through stems. Xylem transports water away from the root, toward the leaf through cells called tracheids. Phloem transports carbohydrates away from the leaves and toward the root through cells called sieve-tube elements. The cuticle is a waxy covering over the epidermis of the plant. The cuticle helps the plant retain water. In this investigation, you will explore the anatomy of a vascular plant both macro- and microscopically.

Materials:
examples or pictures of plants
celery and carrots cut into pieces
turnip Leaves
plant roots, stems, and leaves from a variety of plants

 Procedures:
1. Observe the both living plant roots. Carefully draw the roots, and make notes about the structure in your science notebooks.

2. Observe the cut celery and carrot. Carefully draw the vascular tissue, and make notes about the structure in your science notebooks.

3. Observe and/or feel the leaves of a plant. Make notes about your observations in your science notebooks.
Analysis:
Answer the following questions in your science notebooks.
1. Describe the macroscopic appearance/structure of roots (carrot). Relate the structure of the root to its function.

2. What is the significance of root hairs?

3. Describe the macroscopic appearance/structure of stems (celery). Relate the structure of the vascular tissue in the stems to its function.

4. Describe the macroscopic appearance/structure of leaves (Turnips). Relate the structure of leaves to the function of leaves.

5. Consider all of the environments in which plants exist on Earth. Identify and describe how plant structures, the roots, stems, or leaves, might be further adapted in order to survive in different environments (for example: very dry environments, very cold environments, very wet environments, etc.)