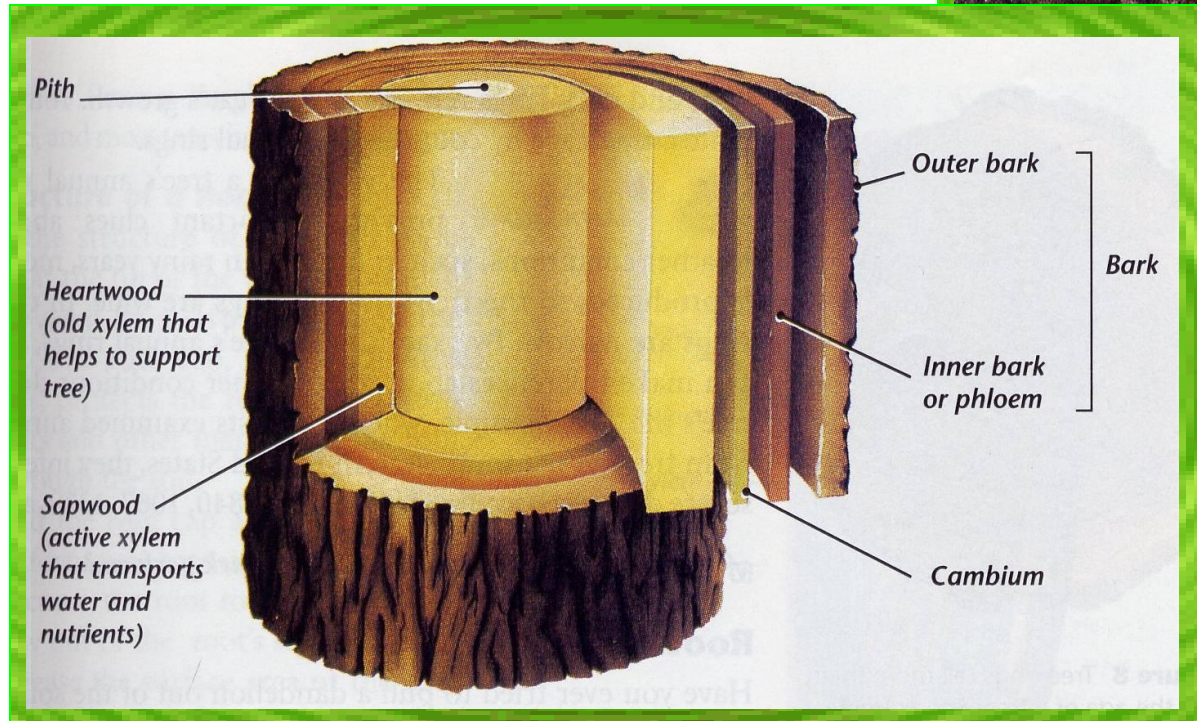
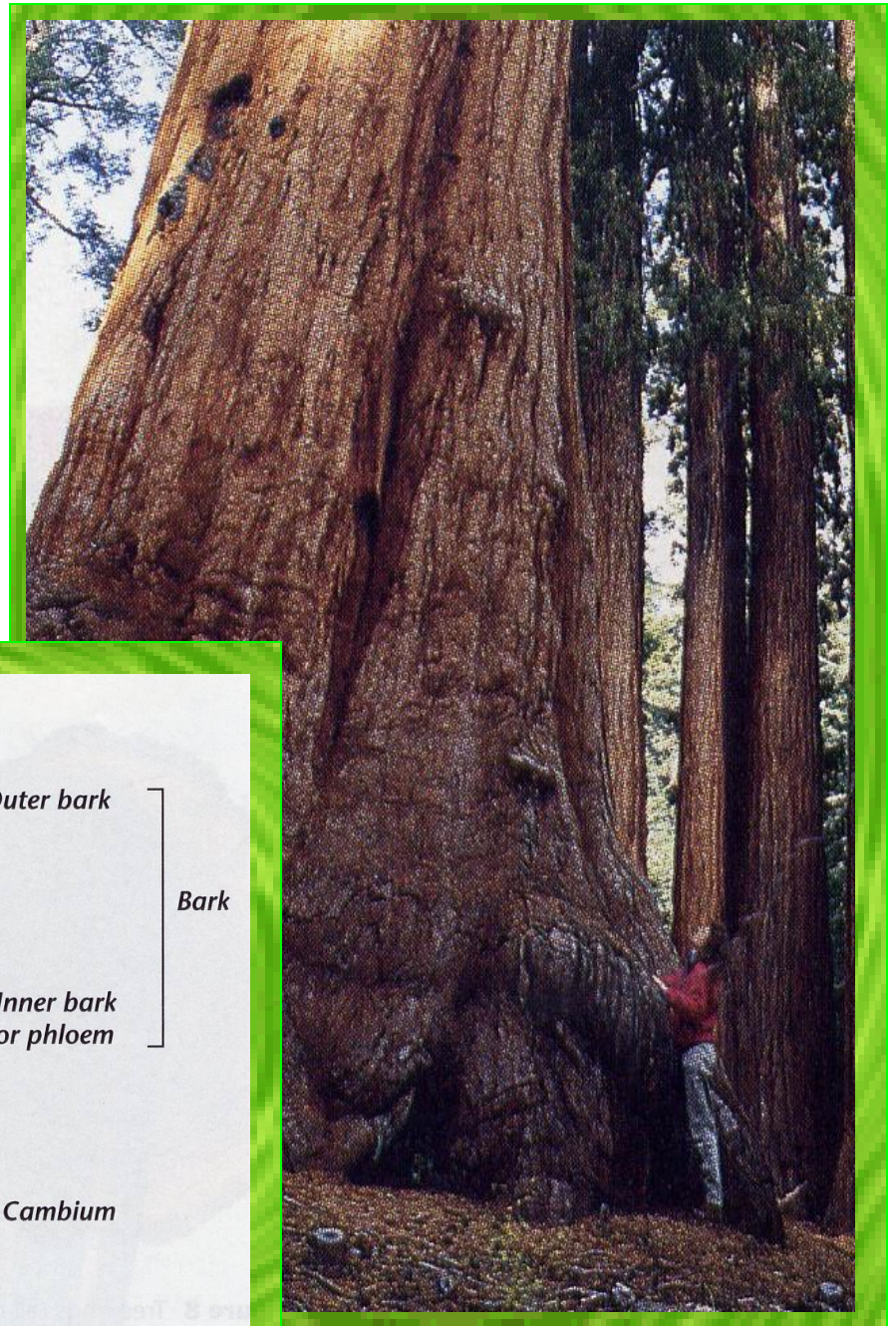


- **Vascular vs. Nonvascular**
- **Xylem vs. Phloem**
- **Seeds vs. Spores**
- **Root Types**

VASCULAR PLANTS

- largest group
- well-developed system for transporting water and food; they have true roots, stems, and leaves.
- help circulate water and food throughout the plant.
- **Xylem** transport water and minerals from the roots up to the rest of the plant.
- **Phloem** transport food from the leaves down to the rest of the plant.
- **Examples:**
 - woody* stems- trees & bushes
 - herbaceous* stems- grasses

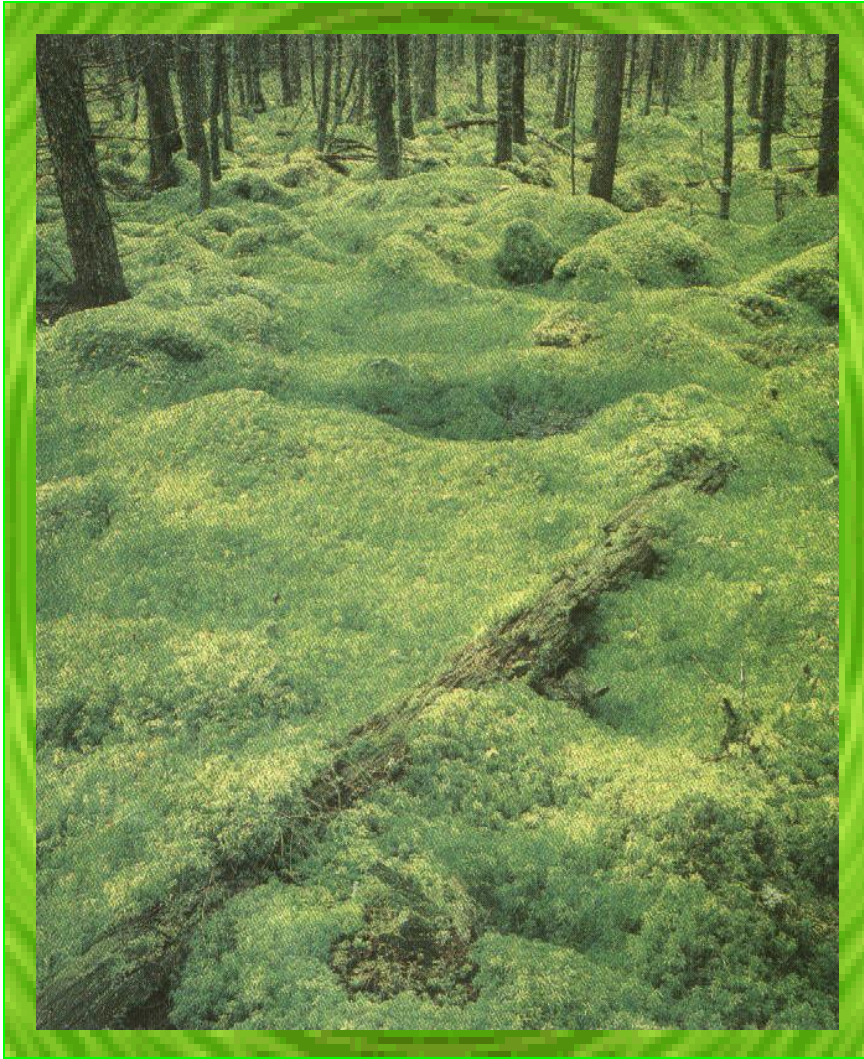
VASCULAR PLANTS



NON-VASCULAR PLANTS

- Plants do not have a well-developed system for transporting water and food; do not have true roots, stems, or leaves.
- They must obtain nutrients directly from the environment and distribute it from cell to cell throughout the plant. This usually results in these plants being very small in size.
- Examples: mosses, liverworts, and hornworts.

NON-VASCULAR PLANTS



Mosses



NON-VASCULAR PLANTS

LIVERWORTS



NON-VASCULAR PLANTS

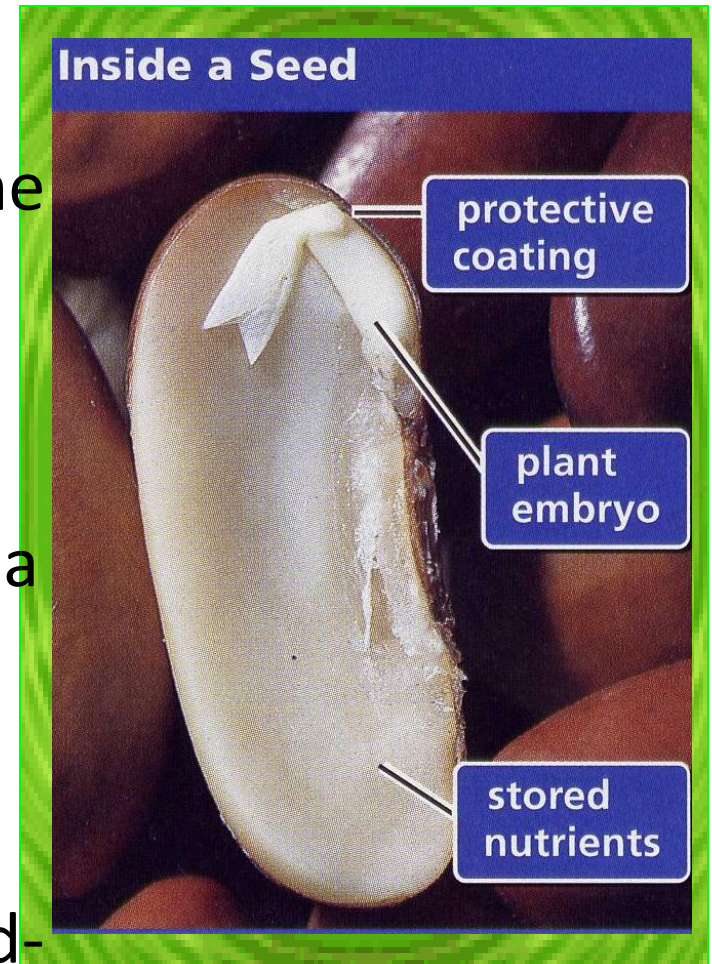


HORNWORTS



SEED PRODUCING PLANTS

- Seeds contain the plant embryo (the beginnings of roots, stems, and leaves) and stored food (cotyledons) and are surrounded by a seed coat. From those seeds, new plants grow.
- There are two major groups of seed-producing plants: cone-bearing plants and flowering plants.



TYPES OF SEEDS

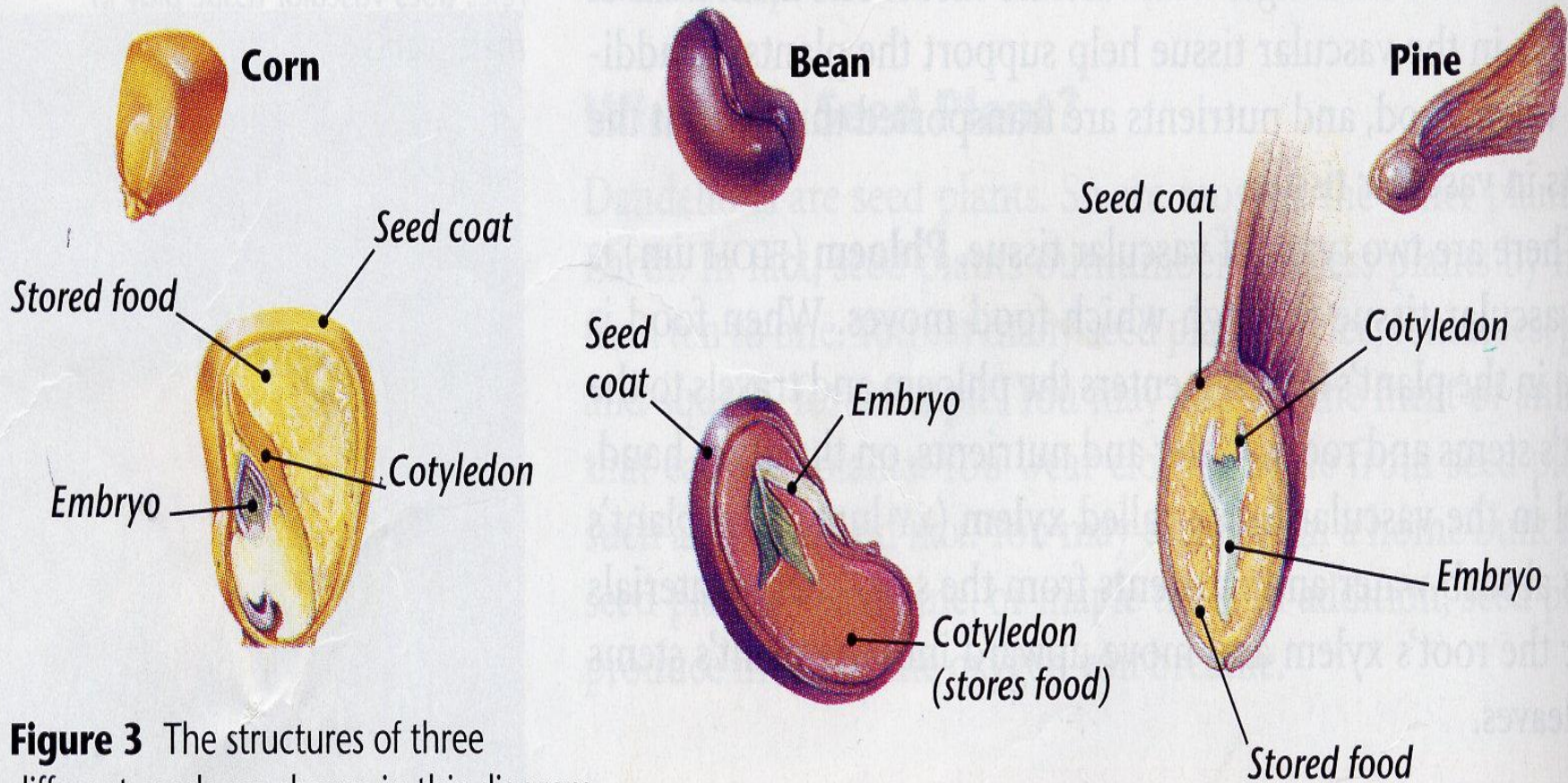


Figure 3 The structures of three different seeds are shown in this diagram.

Inferring Why do seeds contain stored food?

SPORE PRODUCING PLANTS

- Spores are much smaller than seeds.
- Almost all flowerless plants produce spores.
- Examples- mosses and ferns

Flowering Plants

- Flowering plants differ from conifers because they grow their seeds inside an ovary, which is embedded in a flower.
- The flower then becomes a fruit containing the seeds.
- Examples include most trees, shrubs, vines, flowers, fruits, vegetables, and legumes.

SPORE PRODUCING PLANTS



moss



ferns

SEEDS VS. SPORES

seeds

- have multicellular embryo inside
- contain supply of nutrients



spores

- made up of a single cell
- do not contain supply of nutrients



- have protective coating
- can survive dry, harsh conditions
- contain parent plants' genetic material

CONE BEARING PLANTS

- Most cone-bearing plants are evergreen with needle-like leaves.
- Conifers never have flowers but produce seeds in cones.
- Examples- pine, spruce, juniper, redwood, and cedar trees.



MONOCOTS

- A seed with one food storage area is called a monocotyledon, or monocot.
- Flowers of monocots have either three petals or multiples of three.
- The leaves of monocots are long and slender with veins that are parallel to each other.
- The vascular tube structures are usually scattered randomly throughout the stem.
- Examples-include grass, corn, rice, lilies, and tulips.



DICOTS

- A seed with two food storage areas is called a *dicotyledon*, or *dicot*.
- Flowers of dicots have either four or five petals or multiples of these numbers.
- The leaves are usually wide with branching veins.
- The vascular tube structures are arranged in circular bundles.
- Examples- roses, dandelions, maple, and oak trees.



MONOCOTS VS. DICOTS

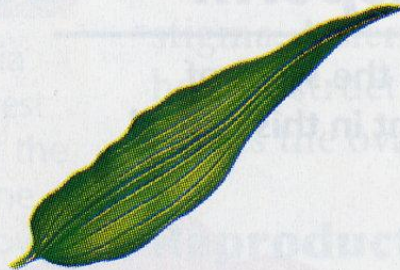
Monocots

Seed



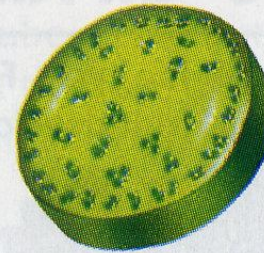
One cotyledon

Leaf



Parallel veins

Stem



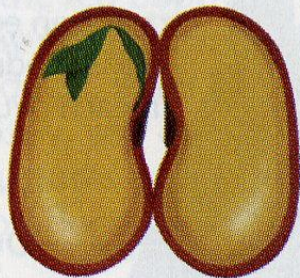
Scattered bundles of vascular tissue

Flower



Flower parts in threes

Dicots



Two cotyledons



Branching veins



Circle of vascular tissue

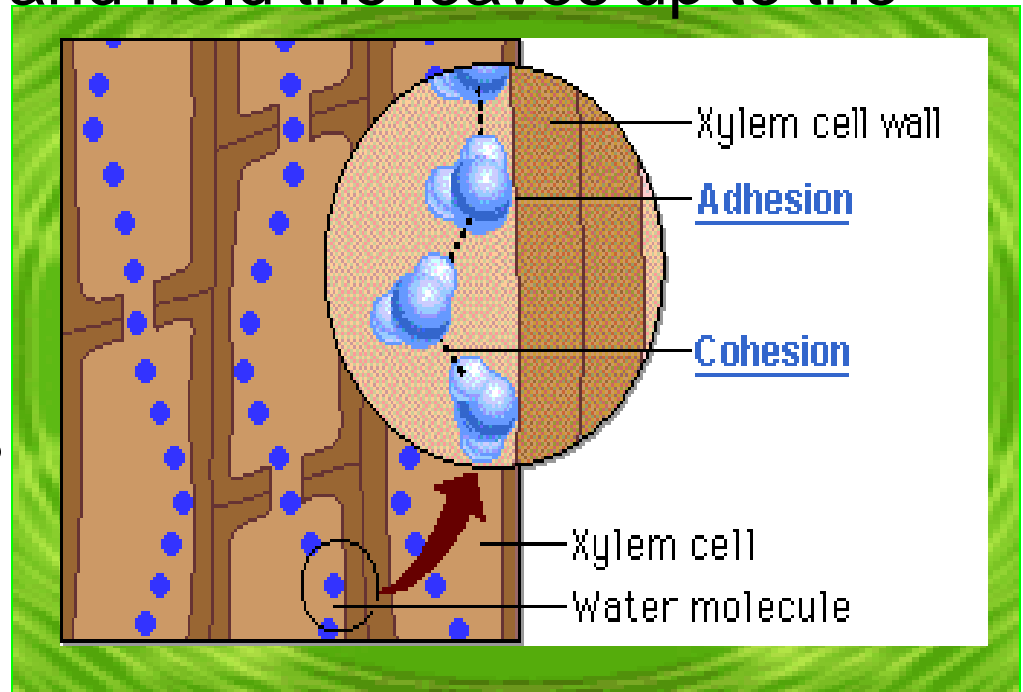


Flower parts in fours or fives

STEMS

- Stems support the plant and hold the leaves up to the light. Stems also function as food storage sites.

- The xylem in the stems transports water from the roots to the leaves and other plant parts.



- The phloem in the stems transport food made in the leaves to growing parts of the plant.

STEMS

- anchor the plant
- absorb water and nutrients from soil
- store extra food for the plants.
- increase surface area to absorb more water and nutrients

Root hairs help to increase this surface area.

- There are two types of roots:

1. **Fibrous roots** consist of several main roots that branch off to form a mass of roots.

Examples- grass, corn, and some trees.

2. **Taproots** consist of one large, main root with smaller roots branching off. Examples-carrots, dandelions, or cacti.

