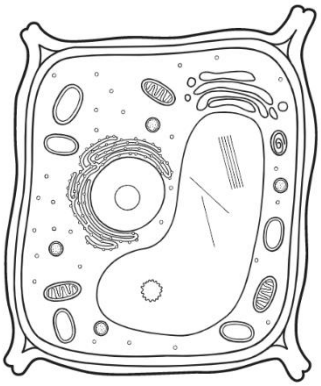
CONCEPT: PLANT DEVELOPMENT

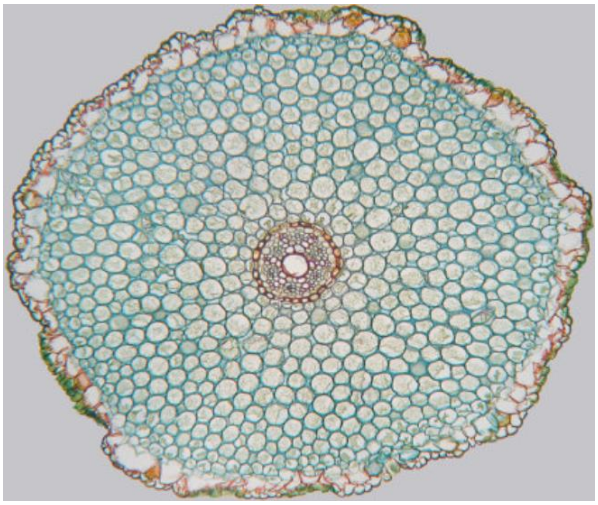
- ***Embryogenesis*** – fertilized ovule develops into a seed containing a plant embryo
    - □ Plant cells don't migrate during development, like animal cells do
- ***Germination*** – process by which a plant forms from a seed
- ***Vegetative development*** – process that develops roots, leaves, and stems (nonreproductive parts of the plant)
- ***Reproductive development*** – process that develops reproductive parts of the plant

EXAMPLE:



- ***Apical-basal axis*** – from roots to shoots of the plant, and stem to tip of leaves
    - □ ***Apical*** – toward the tip of the shoots, or leaf
    - □ ***Basal*** – toward the ends of the roots, or stem of a leaf
- ***Radial axis*** – from the center of the stem/root outward

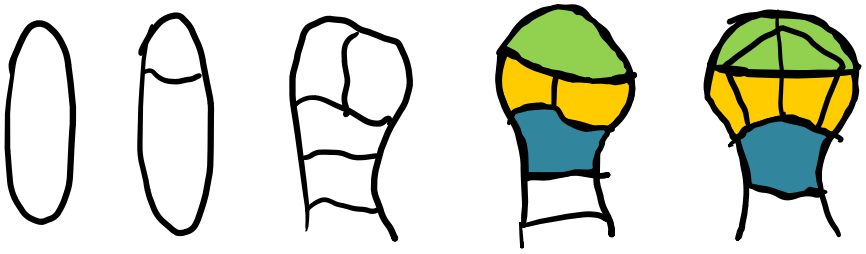
EXAMPLE:



CONCEPT: PLANT DEVELOPMENT

- Following fertilization, the zygote undergoes asymmetric cell divisions
- Apical cell forms plant, dividing along the apical-basal, and radial axes
- Basal cell forms suspensor, which contributes to supportive structures to the embryo (like placenta in mammals)
    - □ Only one cell in the suspensor contributes to the plant embryo

EXAMPLE:



- ***Cotyledons*** – embryonic leaves
- ***Hypocotyl*** – embryonic stem
- ***Shoot*** – cotyledons and hypocotyl, the photosynthetic and reproductive parts of the plant
- ***Root*** – underground portion of plant that forms from radicle

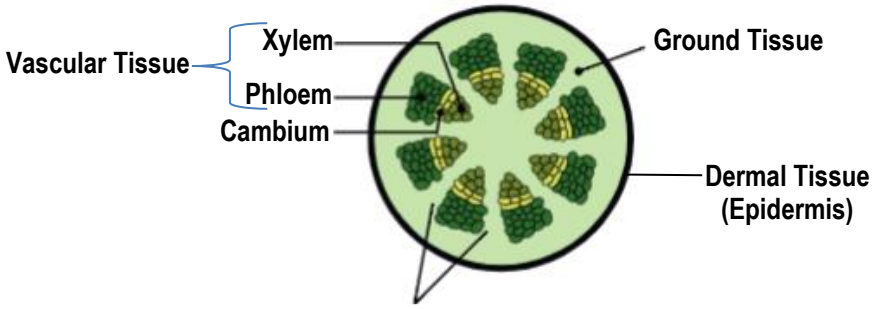
EXAMPLE:

- Meristem – groups of plant stem cells that can produce daughter cells and differentiate into adult tissues and structures
    - □ ***Shoot apical meristem*** (SAM) – gives rise to organs like flowers and leaves
    - □ ***Root apical meristem*** (RAM) – gives rise to roots
    - □ Meristems provide lifelong growth in plants at the roots and shoots

CONCEPT: PLANT DEVELOPMENT

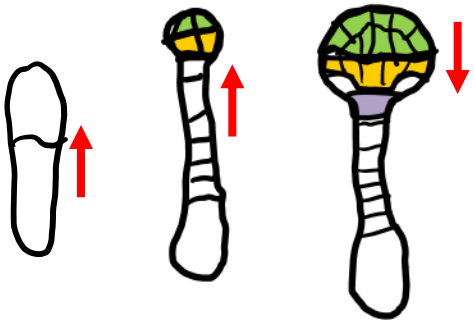
- Embryonic tissues form along the radial axis during development.
  - □ ***Epidermis*** – outer covering of specialized cells that protect the organism
  - □ ***Ground tissue*** – cells that differentiate into specialized cells (like photosynthetic cells)
  - □ ***Vascular tissue*** – cells that will differentiate into specialized transport cells for food and water

EXAMPLE:



- Plant embryo development, like animals', is governed by chemical signals leading to differential expression
  - □ Auxin is a common morphogen that provides positional information

EXAMPLE:



- Unlike animal cells, some plant cells can dedifferentiate to become different types of cells

EXAMPLE: