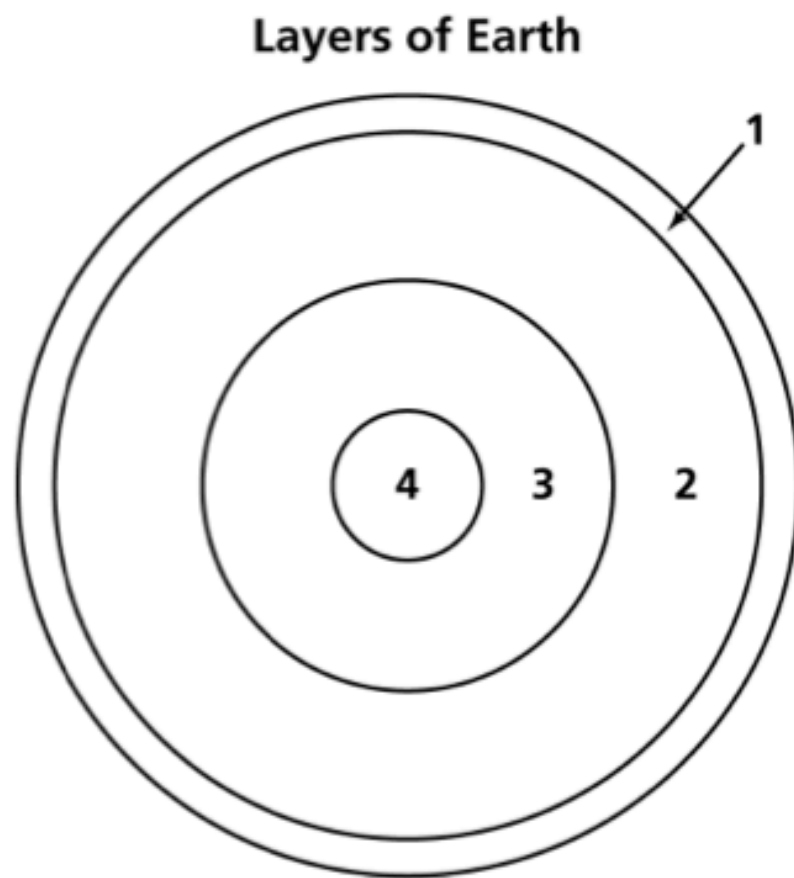


The diagram below shows the layers of Earth.



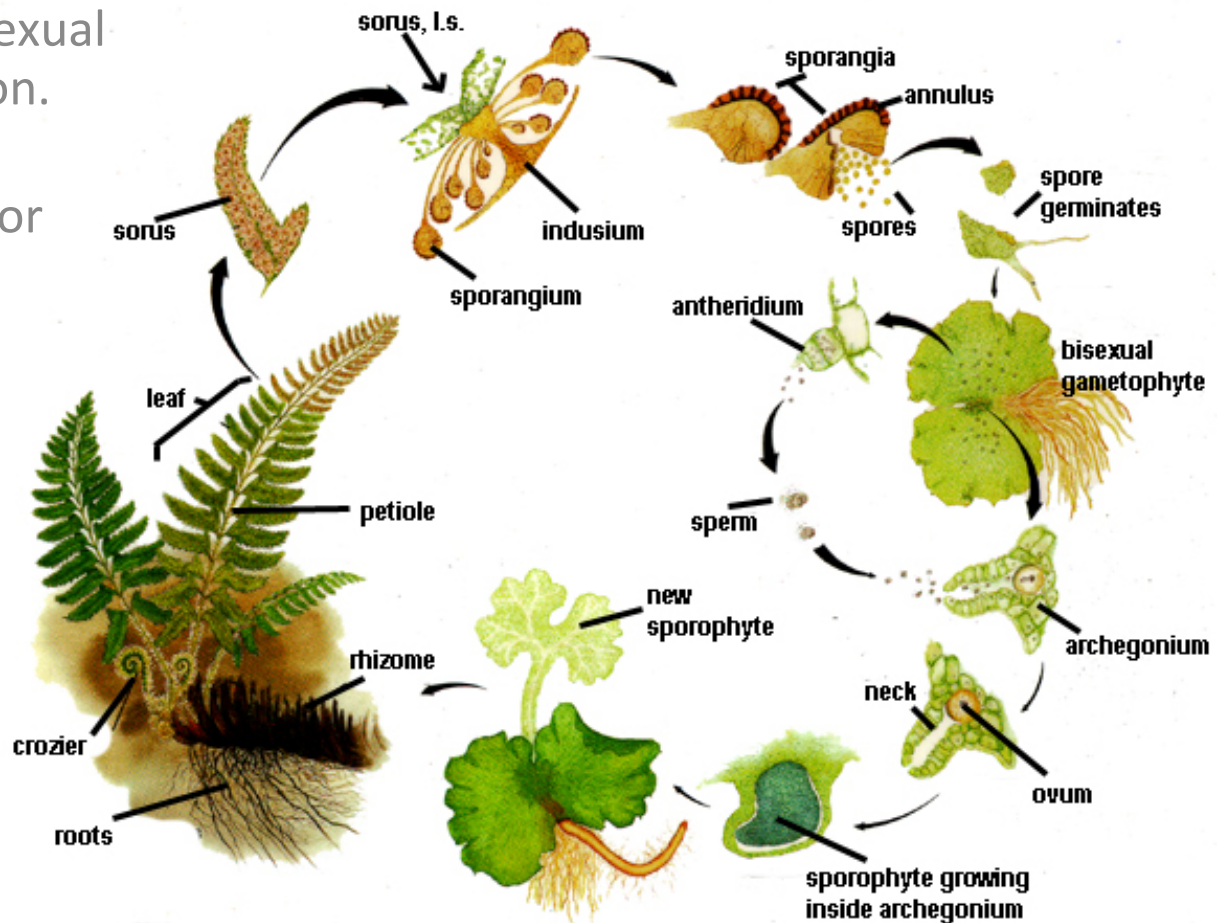
What makes up most of Layer 3?

- A liquid water
- B molten rock
- C hydrogen and helium gas
- D liquid iron and nickel

Seedless Reproduction

- Compare and contrast the fundamental features of sexual and asexual reproduction.
- Classify methods of reproduction as sexual or asexual.

Fern Life Cycle



Let's Recap

Nonvascular/Vascular Seedless Plants

- Nonvascular Examples

→ Algae

→ Moss



- Vascular Example

→ Ferns



Nonvascular



Liverworts are tiny nonvascular plants. The liverworts shown here are life-size.

Vascular



Ferns are vascular plants. Notice how tall a tree fern can grow.

READING
VISUALS

COMPARE AND CONTRAST How do the penny and the person help to show that the tree ferns are much larger than the liverworts?

Vascular Seedless Plants

- Most vascular seedless plants are ferns.
 - Horsetails and club mosses are also included in this group.
- All of these plants have a vascular tissue or transport water from their roots to the rest of the plant.
- Unlike the nonvascular plants, the gametophyte of vascular seedless plants is the part that is small and often overlooked.

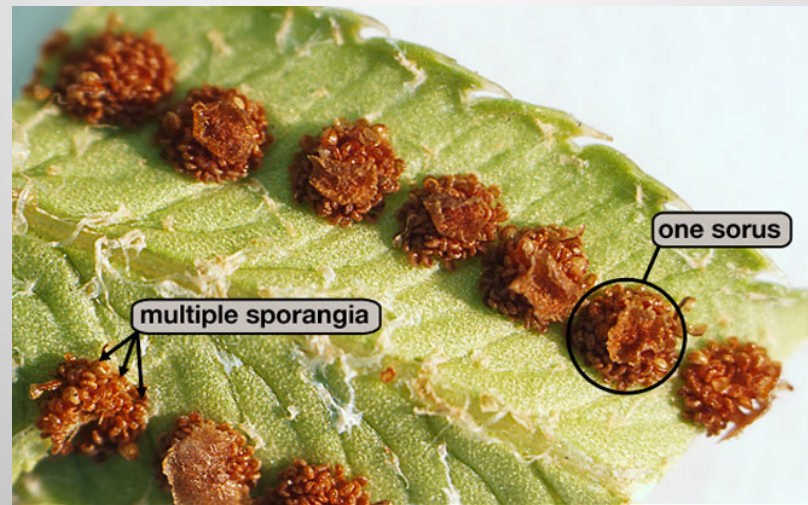
Fern Video

**A Fern Life Cycle: Plant Reproduction
Without Flowers or Seeds**



The Fern Life Cycle

- Fern leaves are called fronds.
- They grow from an underground stem called a rhizome.
- Roots that anchor the plant and absorb water and nutrients also grow from the rhizome.
- Fern sporophytes make their own food by photosynthesis.
- Fern spores are produced in structures called sori (sorus).



Fern sori on the underside of a frond

The Fern Life Cycle

- If a fern spore lands on damp soil or rocks, it can grow into a small, green, heart shaped gametophyte plant called a prothallus.
- This contains chlorophyll and can make its own food.
- It absorbs water and nutrients from the solid.
- Ferns may reproduce asexually, also. Fern rhizomes grow and form branches.
- New fronds and roots develop from each branch.
- The new rhizome branch can be separated from the main plant.
- It can grow on its own and form more fern plants.

Fern Life Cycle Diagram

Meiosis takes place to produce thousands of spores.

Sporophyte

Gametophyte

Young sporophyte growing on gametophyte

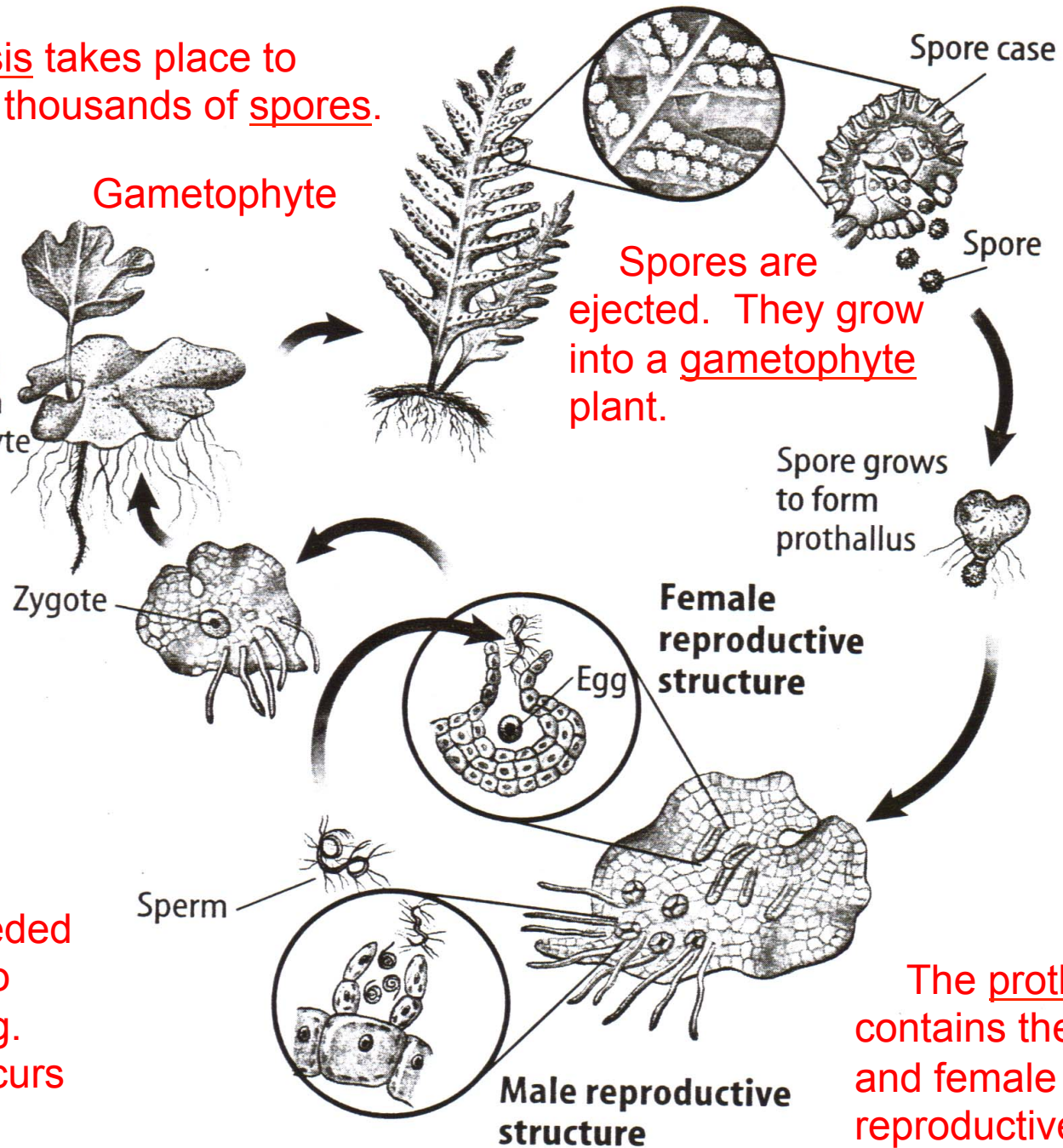
Spores are ejected. They grow into a gametophyte plant.

Spore grows to form prothallus

The zygote is the beginning of the sporophyte stage and grows into the familiar fern plant.

Water is needed for the sperm to swim to the egg. Fertilization occurs and a zygote is produced.

The prothallus contains the male and female reproductive structures.



Exit

- Compare and contrast the life cycle of the fern with the life cycle of the moss.
 - Use your notes and textbook to help.