

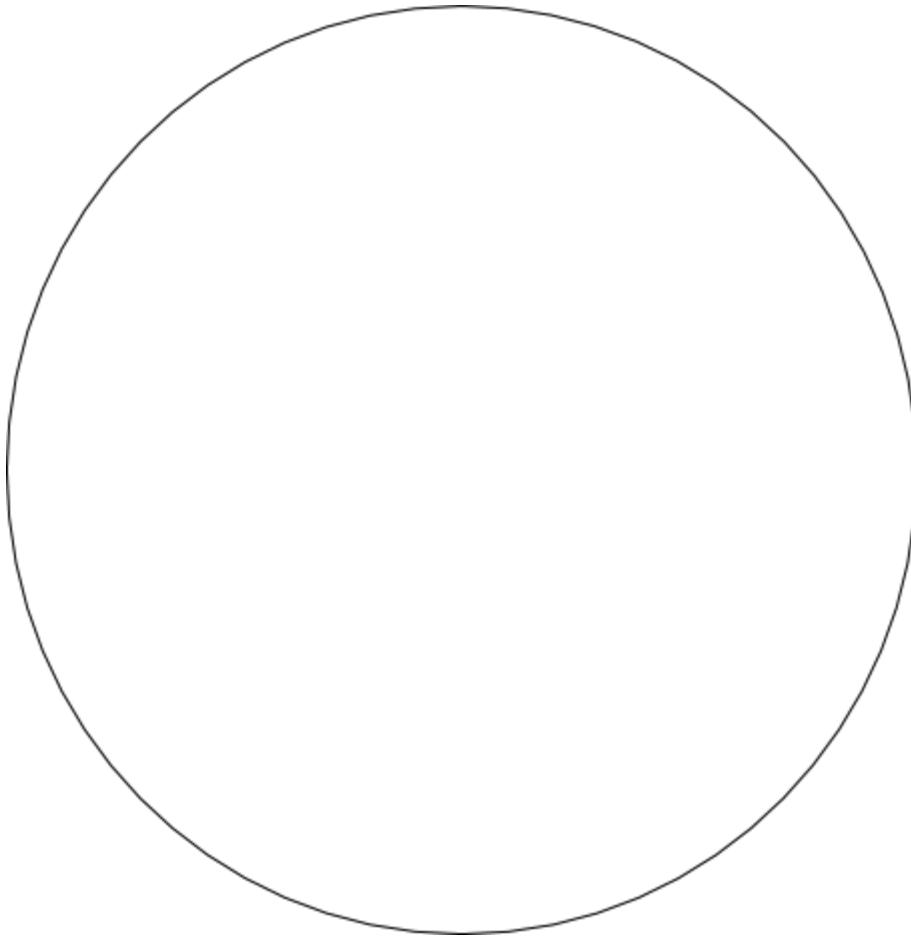
Seedless, Vascularized Plants

Objectives:

- Be able to define alternation of generations, antheridium, archegonium, sporophyte, sporangium, gametophyte
- Diagram the plant life cycle to show alternation of generations in Pteridophytes
- Recognize horsetails, ferns, and club mosses
- Identify and describe the function of sporophyte and gametophyte generation in ferns
- Distinguish and describe the functions of fern archegonia and antheridia

Phylum Pteridophyta: Horsetails

1. Use Google images to examine a living specimen of *Equisetum*. **DRAW** a full picture of the plant. **LABEL** the nodes (places on stems where leaves arise/hollow) and internodes (regions on stem between nodes/solid). The specimen may be highly branched –do not confuse branches with leaves. **LABEL** the small brown scale-like leaves at the nodes. The leaves are small and often brown, but they do have vascular tissue.

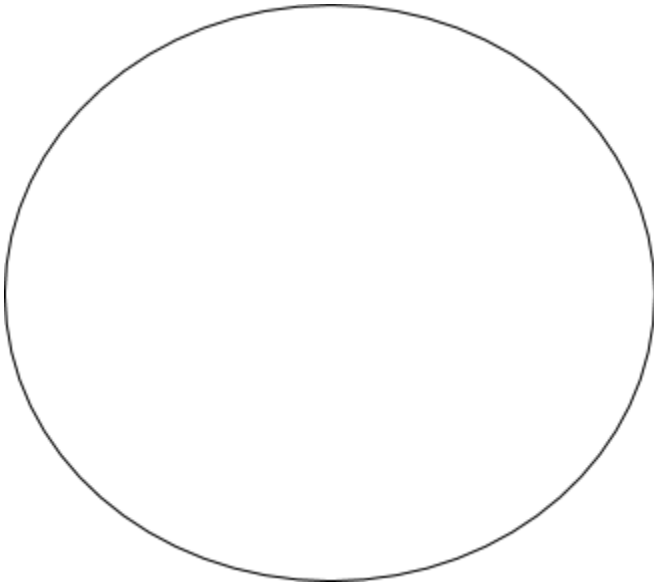


ANSWER (1): Do horsetails have true leaves?

ANSWER (2): What structure of *Equisetum* will undergo photosynthesis?

ANSWER(3): What generation of the plant life cycle are you looking at? What is the ploidy (haploid or diploid)?

2. **DRAW** the **strobilus** under the dissecting scope. Label the **sporangioophores**.

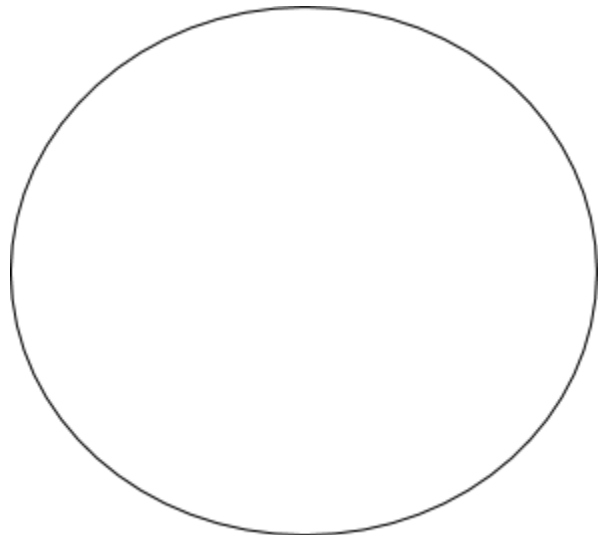
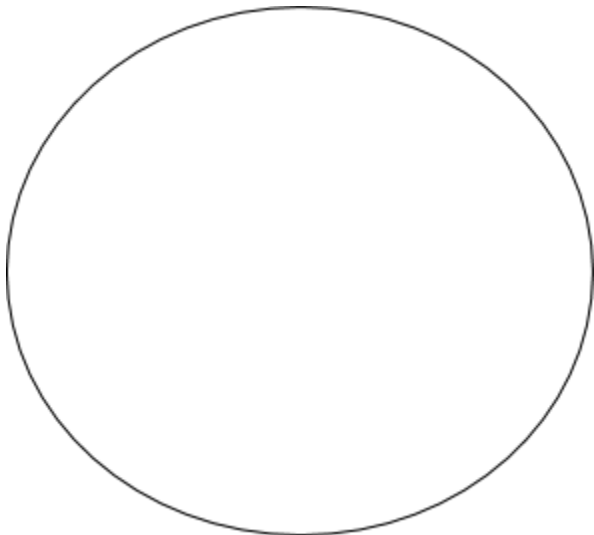


ANSWER(4): Where on the plant is the strobilus located? What do you expect to find within the strobilus?

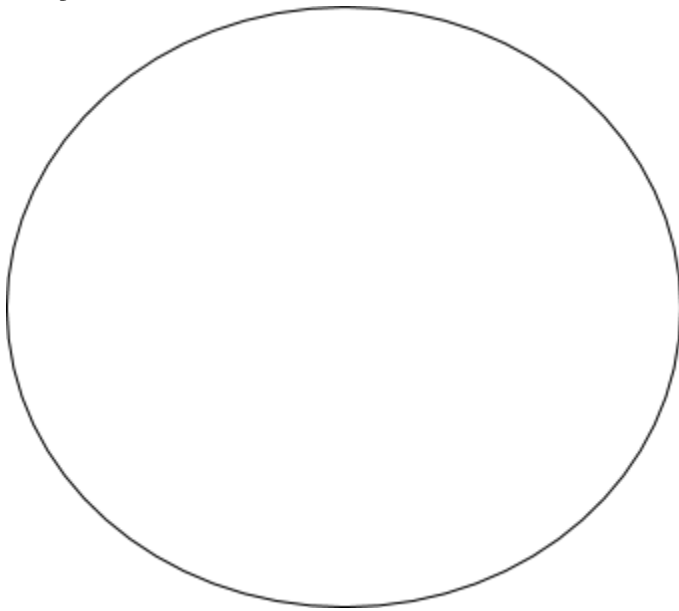
Phylum Pteridophyta: Ferns

Use the following link to observe ferns: <https://www.fs.fed.us/wildflowers/beauty/ferns/structure.shtml>

1. Observe an entire sporophyte fern. Look at a leaf frond.
2. **DRAW** both sides of the frond, on the underside, **LABEL** sori.

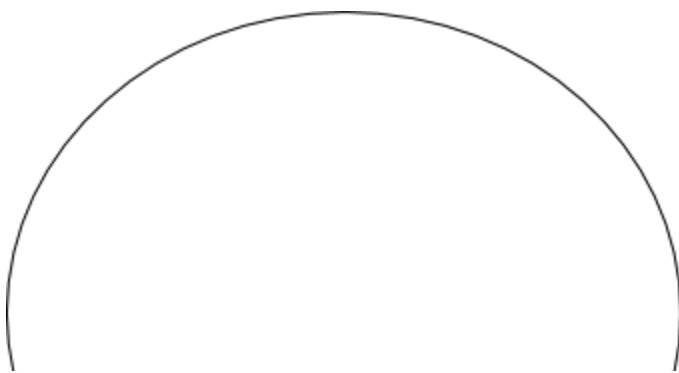


3. The microscopic view of a sorus, and **DRAW** it. Each sorus is a cluster of sporangia. **LABEL** sorus, sporangia and spores.



ANSWER(1): The sporangia is part of the sporophyte generation (diploid) and spores are the first cells of the gametophyte generation (haploid). What process occurred in the sporangia to produce the spores?

4. At the bottom of the webpage, click the “Next: Fern Reproduction” link, and look at the heart-shaped fern gametophyte. **DRAW** and **LABEL** the rhizoids, antheridia and archegonia.



ANSWER (2): What is the ploidy of the above stage of the Pteridophyte life cycle? _____

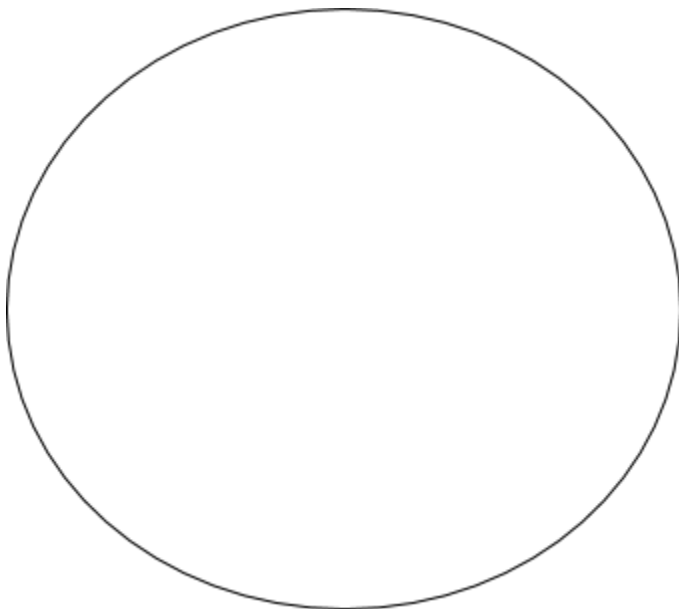
ANSWER (3): Is this part of the life cycle the most or least complex? Explain why.

ANSWER (4): What is the purpose of the antheridia?

ANSWER (5): What is the purpose of the archegonia?

ANSWER (6): Are the rhizoids true roots? Why or Why not?

5. Look at the drawing of the fern gametophyte with attached sporophyte on the webpage (under the gametophyte photo). **DRAW** and **LABEL** gametophyte, primary (first) leaf of young sporophyte and primary root of young sporophyte. With your labels, indicate whether the structure is haploid (n) or diploid (2n). As the sporophyte continues to grow, the gametophyte will wither away.



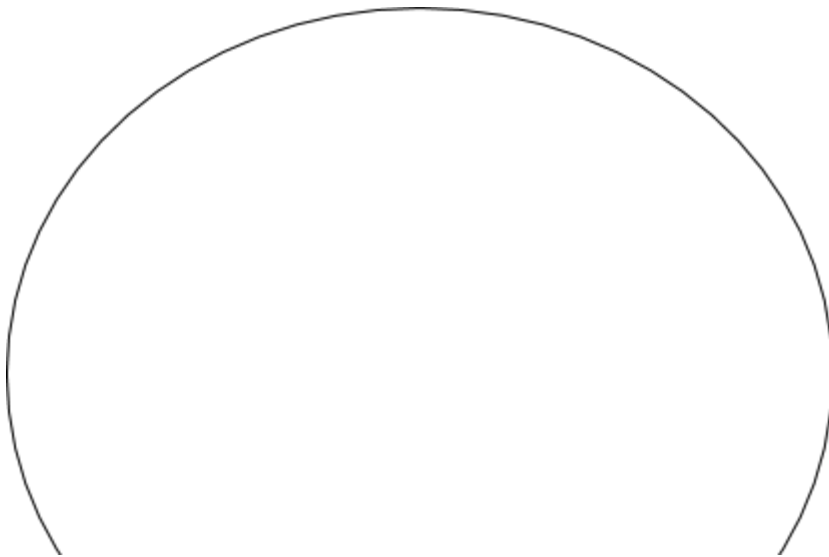
ANSWER (7): What is the dominant generation in ferns? How do you know?

ANSWER (8): What is the advantage of the sporophyte growing from the gametophyte? Is this common for members of Embryophyta?

ANSWER (9): Explain why all ferns are dependent on free water in order to complete their life cycles.
DRAW a Pteridophyte life cycle

Phylum Lycopphyta: Club Mosses

1. Search for *Lycopodium* or *Selaginella* in Google images and choose a live plant to view. At the tip of the upright stem, find the strobilus. Look closely at the strobilus. Notice that it is made up of tightly aggregated leaves. The leaves of the strobilus produce spores within sporangium. The plant you are looking at is the diploid sporophyte.
2. **DRAW and LABEL:** strobilus, true roots, stems and leaves and the rhizome to which the upright stems are attached



Since the spores produced in the sporangium are haploid, what nuclear division must take place to make spores?