Plants

What is the life cycle of a simple plant?

More than 400 million years ago, small green plants became the first organisms on land. These early plants did not have roots, stems, or leaves. They depended on a constant supply of water to live and reproduce. These plants did not produce seeds. Instead, they reproduced asexually with spores. Today, the only surviving examples of these seedless, nonvascular plants are the bryophytes, including mosses, liverworts, and hornworts.

More complex plants with roots and stems eventually evolved from the seedless nonvascular plants. These plants were able to take advantage of drier habitats because they developed vascular tissue to transport water and nutrients. Like their nonvascular ancestors, these plants were also seedless. They include club and spike mosses, horsetails, and ferns. Ferns are the most complex and diverse of the seedless, vascular plants. There are at least 12,000 different known species of ferns.

Like all plants, ferns have an alternation-of-generations life cycle. In an alternation-of-generations life cycle, a haploid form of the organism alternates with a diploid form. In the haploid form, all cells contain both chromosomes of a homologous pair. In ferns, the haploid form is called the gametophyte, and the diploid form is called the sporophyte.

In this Virtual Lab you will investigate an alternation-of-generations life cycle by sequencing eight stages in the life cycle of a fern plant.

Objectives:

* 􀂇 Describe the life cycle of a fern plant.
* 􀂇 Define an alternation-of-generations life cycle.
* 􀂇 Sequence stages and events in the life cycle of a fern plant.

Procedure:

1. Drag one of the eight images of stages in the fern life cycle to the Fern Life Cycle display area. Observe the name, image, and description of the stage.

2. Click the Hear button to hear additional information about the stage in the fern life cycle. Watch the animations that play for the following stages: Release of Spores, Spore Germination, and Fertilization.

3. Sequence the stage in the life cycle of a fern plant by dragging the image of the stage to an empty space in the circular sequencing area.

4. Repeat the first three steps of the procedure with the remaining stages. When sequencing the rest of the stages, think about what stages happen before and after the stage you are trying to sequence.

5. Click the Check button to check your work after you have sequenced all eight stages in the fern life cycle. If a stage is sequenced incorrectly, it is highlighted yellow. Reexamine an incorrectly sequenced stage by dragging it to the Fern Life Cycle display area. Then drag the stage to a different space in the sequencing area.

6. When all the stages are sequenced correctly, view a complete slide show of the life cycle of a fern plant by clicking the Play button. Click the Pause button to pause at any stage. Click the Forward button to advance to the next stage; click the Back button to go back one stage; click the Rewind button to go back to the beginning of the slide show.

7. Complete the questions.

8. Click the Reset button to start over.

Questions:

1. What is meant by an alteration-of-generations life cycle?
2. What is the main function of the mature gametophyte?
3. What is the main function of the mature sporophyte?
4. Discuss how a fern plant can reproduce both sexually and asexually.
5. Based on what you know about fern reproduction, why do you think ferns tend to inhabit moist environments?