Protists Questions **Name_____ #_____**

Write true if the statement is true or false if the statement is false.

_____ 1. Protists are prokaryotes.

_____ 2. There is currently no scientific evidence supporting the endosymbiotic theory.

_____ 3. According to the endosymbiotic theory, eukaryotic cells evolved from prokaryotic cells.

_____ 4. According to the endosymbiotic theory, mitochondria evolved from small aerobic bacteria that were engulfed by a larger prokaryotic cell.

_____ 5. According to the endosymbiotic theory, chloroplasts evolved from small protists.

_____ 6. Chloroplasts, but not mitochondria, have DNA.

_____ 7. Chloroplasts and mitochondria are surrounded by membranes.

_____ 8. Protists contain organelles.

_____ 9. All protists are multicellular.

_____ 10. Most protists require a watery environment in which to live.

_____ 11. Protists have no way of moving on their own; they must hitch a ride with a motile organism.

_____ 12. Algae are protists.

_____ 13. Spores can be produced by some protists as a response to harsh conditions in their environment.

_____ 14. Some protists can carry out photosynthesis.

_____ 15. Protists cannot reproduce sexually.

Evolution of Protists

Scientists think that protists are the oldest eukaryotes. If so, they must have evolved from prokaryotic cells. How did this happen? The endosymbiotic theory provides the most widely accepted explanation. That's because it is well supported by evidence.

The First Eukaryotic Cells

According to the endosymbiotic theory, the first eukaryotic cells evolved from a symbiotic relationship between two or more prokaryotic cells. Smaller prokaryotic cells were engulfed by (or invaded) larger prokaryotic cells. The small cells (now called endosymbionts) benefited from the relationship by getting

a safe home and nutrients. The large cells (now called hosts) benefited by getting some of the organic molecules or energy released by the endosymbionts. Eventually, the endosymbionts evolved into organelles of the host cells. After that, neither could live without the other.

Some of the endosymbionts were aerobic bacteria. They were specialized to break down chemicals and release energy. They evolved into the mitochondria of eukaryotic cells. Some of the small cells were cyanobacteria. They were specialized for photosynthesis. They evolved into the chloroplasts of eukaryotic cells.

Evidence for Endosymbiotic Theory

Many pieces of evidence support the endosymbiotic theory. For example:

- Mitochondria and chloroplasts contain DNA that is different from the DNA found in the cell nucleus. Instead, it is similar to the circular DNA of bacteria.
- Mitochondria and chloroplasts are surrounded by their own plasma membranes, which are similar to bacterial membranes.
- New mitochondria and chloroplasts are produced through a process similar to binary fission. Bacteria also reproduce through binary fission.
- The internal structure and biochemistry of chloroplasts is very similar to that of cyanobacteria.

Questions

1. What does the endosymbiotic theory attempt to explain?

2. What benefits did the ancient endosymbionts get from their host cells?

3. What benefits did the host cells get from the endosymbionts?

4. Describe two examples of scientific evidence that support the endosymbiotic theory.

5. What does the “endo” part of endosymbiosis refer to? What does the “symbiosis” part refer to?

Vocabulary

Fill in the blank with the appropriate term.

1. A term for the ability to move is _____.

2. Whip-like cellular appendages some protists use to help them move are _____.

3. Cells that live inside other cells in a beneficial relationship are called _____.

4. _____ are the simplest eukaryotes.

5. A temporary, foot-like extension of the protist's cytoplasm that it can use for movement is a _____.

6. Mitochondria are cellular _____.

7. Photosynthesis in protists occurs in _____.

9. _____ are the haploid cells that can survive in harsh environments.

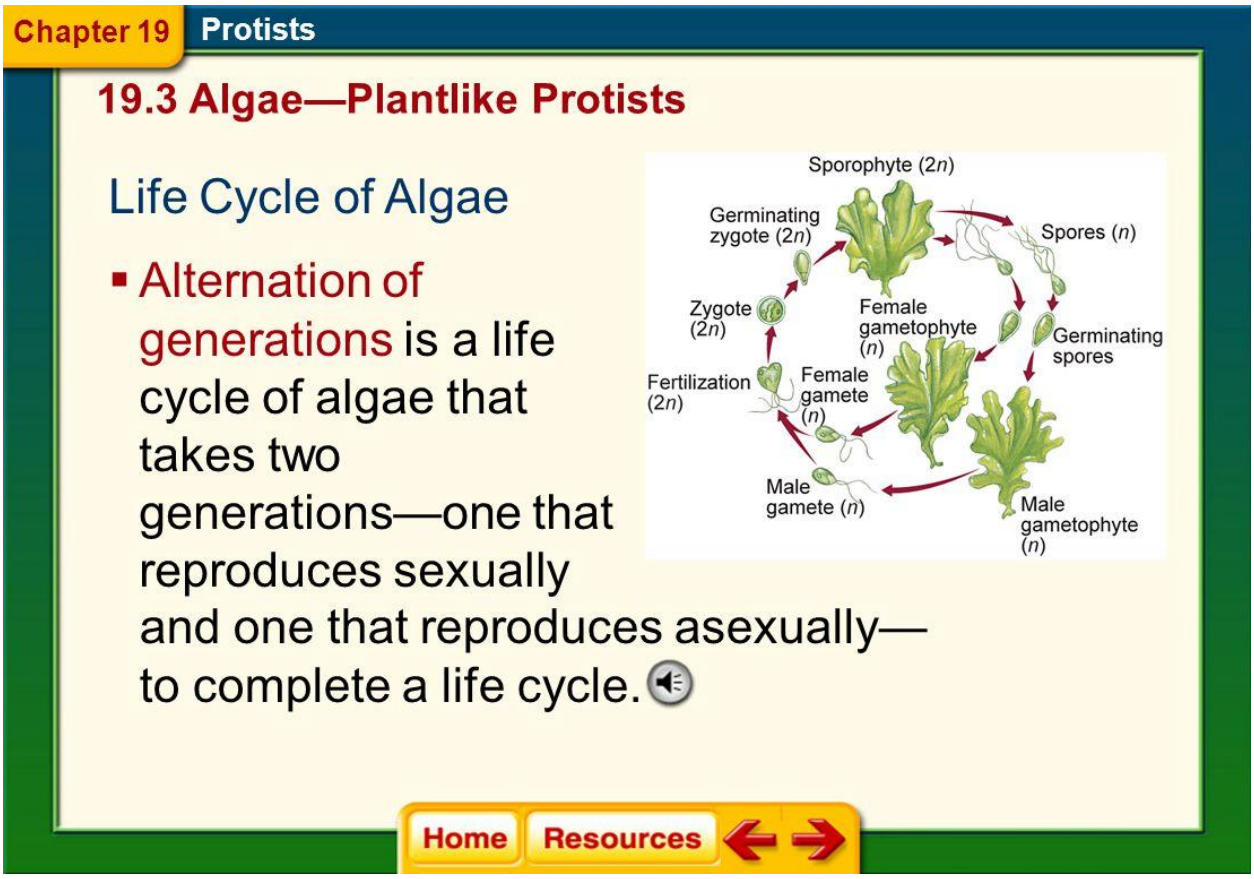
10. Haploid cells are produced from a diploid zygote by this process: _____.

11. Protists can be single celled or _____.

12. Protists obtain food by _____, _____, or _____.

Reproduction of Algae

Algae have varied life cycles. Two examples are shown in the figure below. Both cycles include phases of asexual reproduction (haploid, *n*) and sexual reproduction (diploid, *2n*). Why go to so much trouble to reproduce? Asexual reproduction is fast, but it doesn't create new genetic variation. Sexual reproduction is more complicated and risky, but it creates new gene combinations. Each strategy may work better under different conditions. Rapid population growth is adaptive when conditions are favorable. Genetic variation helps ensure that some organisms will survive if the environment changes.

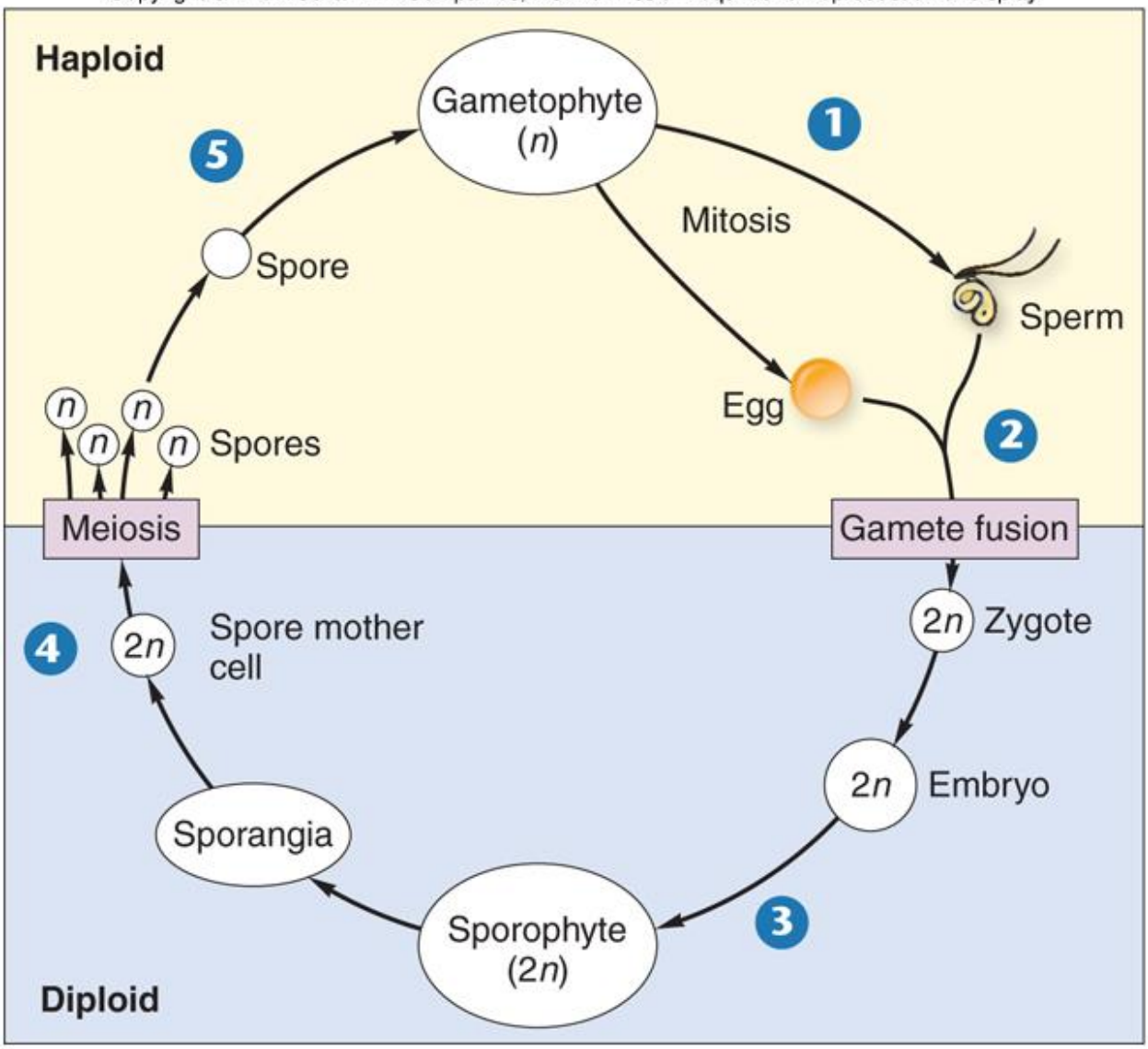


This is a general diagram for the Alternation of Generations. Make sure you understand what is occurring in the diagram. Could you label each step? Make sure that you can!

1. What are the advantages of asexual and sexual reproduction?

2. Compare and contrast a spore and a zygote. **Which has variation?*

This is a general diagram. We will be referring to it when we study plants, so keep it handy!



Vocabulary- Matching

Match the vocabulary word with the proper definition. MAY BE USED MORE THAN ONCE

Definitions

_____ 1. animal-like protists that use pseudopods, cilia or flagella for motility

_____ 2. fungus-like protist typically found on decaying organic matter & absorbs the nutrients

_____ 3. plant-like protists; photosynthetic

_____ 4. Protists with no cell wall

_____ 5. Protists with cell walls of cellulose

_____ 6. Decomposers

Terms

a. algae

b. protozoa

c. slime mold