

Chapter Eleven: Protists and Fungi

Teacher Notes

Lesson One: Protists

- General Characteristics
- Protist-an organism that belongs to the kingdom Protista.
 - very diverse and few traits in common
 - most protists are single celled
 - some are many celled and some live in colonies
 - some produce their own food and some eat other organisms
 - are related on how they are different from animals in other kingdoms
- Protists and Food
 - Producing Food
 - Producers-make their own food
 - producers have special structures called chloroplasts that capture energy from the sun.
 - they use these structures in photosynthesis to make food.
 - Finding Food
 - heterotrophs-an organism that gets food by eating other organisms or their byproducts and that cannot make organic compounds from inorganic materials.
 - eat small living organisms such as bacteria, yeast, or other protists
 - some are decomposers (eat dead organisms)
 - parasite-an organism that feeds on an organism of another species (the host) and that usually harms the host; the host never benefits from the presence of the parasite.
 - host-an organism from which a parasite takes food or shelter.
- Producing More Protists
 - Asexual Reproduction
 - most protists reproduce asexually (offspring from one parent)
 - offspring are identical to the parent
 - binary fission-single-cell divides into two cells
 - multiple fission-makes more than two offspring from one parent
 - Sexual Reproduction
 - reproduction with two parents
 - may use conjugation-two individuals join together and exchange genetic material by using a small, second nucleus. They then divide to produce four protists that have new combinations of genetic material.
 - many protists can reproduce sexually and asexually
 - usually alternate between sexual and asexual reproduction
 - usually use sexual reproduction when conditions are difficult
- Reproductive Cycle
 - protists have complex reproductive cycles
 - cycle of reproduction of malaria
 - step 1-when an infected mosquito bites a human, it releases P. vivax into the blood.

- step 2-the P. vivax infects human liver cells, reproduces, and enters the bloodstream in a new form.
- step 3-The P. vivax invades red blood cells and multiplies rapidly. The red blood cells burst open with P. vivax in another new form.
- step 4-a mosquito bites a human and picks up P. vivax
- step 5-in the mosquito, the P. vivax matures into its original form, the cycle repeats.

Lesson Two: Kinds of Protists

-Protist Producers

- use the sun's energy to make food
- algae-eukaryotic organisms that convert the sun's energy into food through photosynthesis but that do not have roots, stems, or leaves.
 - all have green pigment chlorophyll; many have other pigments and most live in water.
- photoplankton-the microscopic, photosynthetic organisms that float near the surface of marine or fresh water.
 - can't be seen without a microscope
 - they produce the world's oxygen

-Red Algae

- most of the world's seaweed
- lives in tropical oceans and attaches to other algae
- usually less than 1 m in length
- contain red chlorophyll that gives them their color
 - allows them to absorb the light that filters deep into the clear water of the Tropics.

-Green Algae

- most diverse group of protist producers
- are green because of chlorophyll (main pigment)
- most live in water or moist soil
- many green algae are single-celled organisms; others are made of many cells.
 - may grow to be 8 m long; and many live in groups called colonies

-Brown Algae

- seaweed found in cool climates
- attach to rocks or form large floating beds in ocean waters
- have chlorophyll and a yellow-brown pigment
- many are very large – some grow 60 m in one season

-Diatom

- are single-celled
- found in fresh and salt water
- usually get energy from photosynthesis
- have unusual shape; the cell walls contain cellulose and a glasslike substance called silica.
 - are enclosed in a two-part shell

-Dinoflagellates

- most are single-celled
- most live in salt water; a few live in fresh water (some even live in snow)
- have two whiplike strands called flagella
 - by beating the flagella causes the cells to spin through the water
- most get energy through photosynthesis but a few are consumers, decomposers, and parasites.
- Euglenoids
 - single-celled
 - most live in fresh water
 - use flagella to move through water
 - many are producers; if not enough light they can get food as heterotrophs
 - some don't contain chlorophyll
- Heterotrophs That Can Move
 - mobile protists are sometimes called protozoans
 - Amoebas
 - soft, jellylike protozoans
 - found in both fresh and salt water, in soil and in animals
 - have contractile vacuoles to get rid of excess water
 - many eat bacteria and small protists
 - some are parasites
 - Amoebic Movement
 - move with pseudopodia (false feet)
 - stretches a pseudopod out from the cell; cell then flows into the pseudopod
 - may use pseudopodia to catch food
 - surrounds the food with pseudopodia which forms a food vacuole
 - to get rid of waste the process is reversed
 - Shelled Amoeba-Like Protists
 - radiolarian shells look like glass ornaments
 - foraminiferans-have snail-like shells
 - move by poking pseudopodia out of pores in the shells
 - Flagellates
 - protists that wave flagella back and forth to move
 - some live in water; others in the bodies of other organisms
 - some are parasites that cause disease
 - some live in mutualism with other organisms (each organism helps each other)
 - Ciliates
 - complex protists
 - have hundreds of tiny, hairlike structures known as cilia
 - move the protist forward by moving cilia
 - sweep food toward the protist's food passageway
 - best known is the paramecium
 - two kinds of nuclei
 - macronucleus-a large nucleus

-micronucleus-smaller nucleus passes genes to another paramecium during sexual reproduction.

-Heterotrophs That Can't Move

-Spore-Forming Protists

-all are parasites

-absorb nutrients from their hosts

-have no cilia or flagella and can't move

-have complicated life cycles that usually include two or more hosts

-Water Molds

-can't move

-most are small and single-celled

-live in water, moist soil, or other organisms

-some are decomposers

-Slime Molds

-can move only at certain phases of life cycle

-look thin, colorful, shapeless globs of slime

-live in cool, moist places in woods and in fresh water

-use pseudopodia to move and eat bacteria and yeast

-decompose same bits of rotting organic matter

-some live as a group

-will continue to grow as long as there is food

-when conditions are stressful they grow stalklike structures with rounded knobs at the top.

-knob contains spores (reproductive cells)

Lesson Three: Fungi

-Characteristics of Fungi

-Fungi-an organism whose cells have nuclei, rigid cell walls, and no chlorophyll and that belongs to the kingdom Fungi.

-Food for Fungi

-can't catch or surround food

-live near food supply

-most are consumers

-get nutrients by secreting digestive juices onto a food source and then absorbing the dissolved food.

-many are decomposers

-some live in mutualism

-Hidden From View

-hyphae-a nonreproductive filament of a fungus

-mycelium-the mass of fungal filaments, or hyphae, that forms the body of a fungus.

-Making More Fungi

-can be sexual or asexual

-asexual reproduction occurs two ways

-hyphae break apart and each new piece becomes a new fungus

- production of spores; are easily spread by wind; where they land they grow into a new fungus.

- sexual reproduction

- special structures form to make sex cells. Cells join to produce sexual spores that grow into a new fungus.

-Kinds of Fungi

-Threadlike Fungi

- mold-a fungus that looks like wool or cotton

- most live in soil and are decomposers; some are parasites

- can reproduce asexually and sexually

-Sac Fungi

- largest group of fungi

- include yeasts, powdery mildew, truffles, and morels

- reproduce sexually and asexually

- when they reproduce sexually they form a sac called an ascus

- most are many cells

- although yeasts are single-celled

- when yeasts reproduce asexually they use a process called budding.

- some are useful to humans

- yeasts for breads and alcohol; antibiotics and vitamins, truffles and morels

- many are parasites

- may cause plant diseases such as Dutch elm disease

-Club Fungi

- most familiar fungi

- gets name from structures that the fungi grow during reproduction

- basidia-special hyphae that form clublike structures

- most of a mushroom is underground

- gill fungi-most familiar

-Nonmushroom Club Fungi

- bracket fungi, puffballs, smuts, and rusts are also club fungi

-Imperfect Fungi

- includes species of fungi that do not quite fit in the other groups

- don't reproduce sexually

- most are parasites that cause diseases in plants and animals

- some are useful

- penicillium is used to make penicillin

- some are used to make cheeses, soy sauce, and citric acid is used to make cola drinks.

-Lichens-combination of a fungus and an alga that grow together

- alga actually lives inside the protective walls of the fungus

- is a mutualistic relationship

- are producers

- need only air, light, and minerals to grow they can grow in rock

- absorb water and minerals from air