

Field Trip: Ecological Relationships

Activity: Arctic Ecosystem, Kingdoms – part 1

Approximate time: 40 Minutes

Materials per group:

- 1 Kingdom Fact Sheet handout **per student**
- 1 set of Kingdom images **per student**
- Scissors
- Glue sticks
- 1 set of ecosystem card

Procedure:

1. Have students cut out images and find matching ecosystem card.
2. From the info on the back of the ecosystem card, glue each cut out image at the top of the correct column in the Kingdom Fact Sheet.
3. Depending on previous knowledge of group, either let them complete the table independently or guide them through possible answers for each row:
 - a. Number of cells can be unicelled, both, mostly multicelled and multicelled
 - b. Type of cells can be prokaryote or eukaryote
 - c. Mode of nutrition can be autotroph/heterotroph, heterotroph or autotroph

Discussion Topics:

1. The bacteria are both prokaryotes (pro = before, karyote = kernel). Prokaryotes typically have a cell wall (may have a capsule – protective cover outside cell wall), cell membrane, nucleoid region (area containing DNA but no nucleus), ribosomes – to make proteins and cytoplasm.
2. Archaeobacteria are the “ancient” bacteria that live in hydrothermal vents, hot springs and anoxic (without oxygen) environments. Some Archaeobacteria are chemosynthesizers.
3. Eubacteria are the bacteria that live all around us and in us all the time. They can be good bacteria that help protect your body. They are also the type of bacteria found in yogurt and used to ferment cheese.
4. All the other kingdoms are eukaryotes (eu = true, karyote = kernel). They all have a nucleus but they are all different based on their cell types and characteristics.
5. Fungi are multicelled, heterotrophs who have a cell wall – made of chitin, typical organelles, no chloroplasts and digest their food externally outside their body. Fungi send out hyphae (root like structures) that secrete digestive enzymes onto a decomposing substance and then absorb the nutrients.
6. Protists are the odds and ends kingdom. They can be uni or multicelled, autotroph or heterotroph but they are eukaryotes. Protists range from giant kelp to giardia and the plasmodium that gives you malaria. Protists usually have cell walls, normal organelles and if autotrophs, chloroplasts.
7. Plantae have cell walls made of cellulose, organelles including a large central vacuole used for storing water and chloroplasts. When plant cell vacuoles are full, the cell exerts turgor pressure on the cell membrane and cell wall and the plants look full. When the vacuole is empty, plants wilt.
8. Animalia have all organelles, lysosomes for destroying waste/old organelles and no chloroplasts. Animals ingest their food unlike fungus who digest externally.

KINGDOMS

Archaeobacteria are the “ancient” bacteria that live in hydrothermal vents, hot springs and anoxic (without oxygen) environments. Some are chemosynthesizers, producing food by using chemicals not by using light energy. Archaeobacteria are prokaryotes (cells have no nucleus).

Eubacteria are the bacteria that live all around us and in us all the time. They can be good bacteria that help protect your body. They are also the type of bacteria found in yogurt and used to ferment cheese. Eubacteria are prokaryotes (cells have no nucleus).

Protists are the odds and ends kingdom. They can be uni or multicelled, autotroph (producers) or heterotrophs (consumers). Protists range from giant kelp to the tiny plasmodium that gives you malaria. If they are autotrophs (producers), they contain chloroplasts. Protists are eukaryotes (cells have a nucleus).

Fungi are multicelled heterotrophs (consumers), which have a cell wall made of chitin. They have typical organelles but no chloroplasts. They digest their food externally (outside their body). Fungi send out hyphae (root like structures) that secrete digestive enzymes onto a decomposing substance and then absorb the nutrients through the hyphae. Fungi are eukaryotes (cells have a nucleus).

Plantae have cell walls made of cellulose, organelles including a large central vacuole used for storing water and chloroplasts. When plant cell vacuoles are full, the cell exerts turgor pressure on the cell membrane and cell wall and the plant looks full. When the vacuole is empty, the plants wilt. Plantae are eukaryotes (cells have a nucleus).

Animalia have all organelles, have lysosomes for destroying waste or old organelles, and have no chloroplasts. Animals ingest their food and digest it internally. Animalia are eukaryotes (cells have a nucleus).

Break up scientific terms to make them easier to remember.

Archae = ancient Archaeobacteria is compared to bacteria that may have began long ago not needing oxygen or light energy to make food.

Pro = before **karyote** = kernel Prokaryotes have no cell nucleus.

Eu = true **karyote** = kernel Eukaryotes have a cell nucleus.

Eu = true Eubacteria is true bacteria

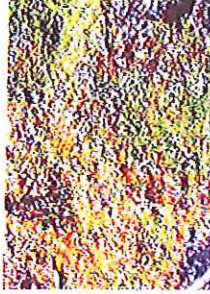
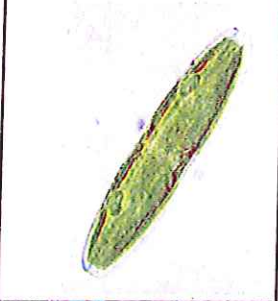
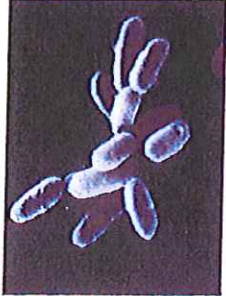
Uni = one Unicelled means its whole body has only one cell.

Multi = many Multi-celled means it has many cells in its body.

Auto = alone Autotrophs make food alone in their own bodies.

Hetero = another Heterotrophs need another organism to eat.

Kingdom Fact Sheet



Name of Kingdom

Numbers of Cells


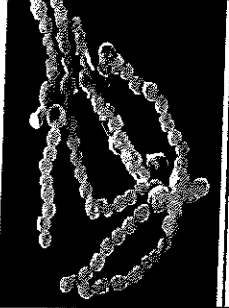
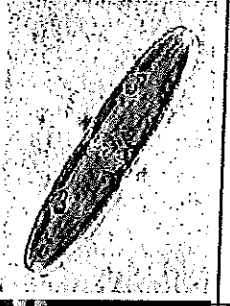

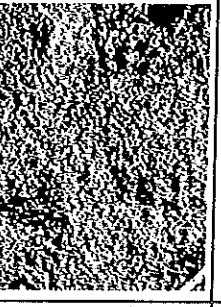

Type of Cells

Mode of Nutrition



OCEAN
EXPLORIUM
at New Bedford Wharf

Kingdom Fact Sheet

						
Name of Kingdom	Archaeobacteria	Eubacteria	Protista	Fungi	Plantae	Animalia
Numbers of Cells	Unicelled	Unicelled	Both	Mostly Multi-celled	Multi-celled	Multi-celled
Type of Cells	Prokaryote	Prokaryote	Eukaryote	Eukaryote	Eukaryote	Eukaryote
Mode of Nutrition	Autotroph/ Heterotroph	Autotroph/ Heterotroph	Autotroph/ Heterotroph	Heterotroph	Autotroph	Heterotroph