Kingdom Eubacteria

Grade Range: High School

Lesson Time: 40 minutes

Key Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Bacillus (bacilli)</td>
<td>Granule</td>
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<tr>
<td>Bacterium (bacteria)</td>
<td>Kingdom</td>
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<tr>
<td>Capsule</td>
<td>Pili</td>
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<td>Cell membrane</td>
<td>Prokaryote</td>
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<tr>
<td>Eubacteria</td>
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<tr>
<td>Flagellum (flagella)</td>
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Materials and Resources

- Kingdom Eubacteria session -- VIVED Science
- Kingdom Classification Chart

Activity Overview

Scientists agree that the first cells on Earth were simple, prokaryotic cells like bacteria. Prokaryotic cells are small, single-celled organisms that do not have a membrane-bound nucleus. Don’t be deceived by their small size, though. Bacteria are found everywhere on Earth and easily outnumber all other living organisms. In this activity, students will explore the structures and functions of the most prolific organisms on the planet.

Essential Questions

1. How are structures and functions related in nature?
2. How are organisms adapted for their environment?
3. How are organisms classified?

Objectives

- Dissect bacteria
- Identify the structures of bacteria
- Research the functions of the different structures
- Compare lifestyles of bacteria

Introduction

To begin the activity, provide the students with the Kingdom Classification Chart. Allow students time to do research and fill out the chart. (Alternatively, assign the chart as homework prior to this activity.) Review the information on the chart with the students. Ask the students to compare the characteristics of organisms in the different kingdoms. Explain that students will explore a representative organism from Kingdom Eubacteria in VIVED Science.

Encourage students to take notes as they progress through the sessions. Notes can include answers to questions, questions students have, and drawings.
zSpace Activity

Instructions for VIVED Science
1. Open the Kingdom Eubacteria session and follow the instructions.
2. Take notes as you progress through the session.

Session - Kingdom Eubacteria

Activity Questions Provided in VIVED Science
Answers may vary. Sample answers are provided below.
1. Kingdom Eubacteria is very diverse. All cells in this kingdom are prokaryotes. These simple cells were the first types of organisms to appear on planet Earth.
2. This Bacillus bacterium is rod shaped. It uses a flagellum to propel itself. The capsule is covered in tiny pili that allow the Bacillus to attach to the environment or other organisms.
3. Dissect the Bacillus bacterium. Locate the cell wall, cell membrane, and cytoplasm.
4. Prokaryotic cells have one chromosome and smaller rings of DNA called plasmids. Granules store nutrients for the bacterium.
5. Reassemble the bacterium.
6. Now you know about Kingdom Eubacteria.

Closing

After students complete the activity, discuss as a class the information the students discovered during their research.

Questions for Discussion
1. Describe the characteristics of prokaryotes.
   Prokaryotes are single-celled organisms with a single chromosome that is not enclosed in a nucleus. Some prokaryotes move using flagella, cilia, or pseudopods.
2. What types of microscopic features do scientists use to classify bacteria?
   Scientists use shape, mode of nutrition, and cell wall structure to help classify bacteria.
3. What types of macroscopic features do scientists use to classify bacteria?
   Scientists use colonial shape, color, elevation, and texture to help classify bacteria.
4. Name and describe beneficial bacteria.
   Lactobacillus acidophilus, Bacillus coagulans, and Bifidobacterium animalis are bacteria that can aid in digestion.
5. Name and describe pathogenic bacteria.
   Tuberculosis, pneumonia, and diphtheria bacterial species are bacteria that cause disease.

Follow-up Activity: Kingdom Protista - VIVED Science

Differentiation
- Group students heterogeneously to allow students with a strong command of the English language to assist in reading or interpreting questions
- Provide paper copies of diagrams for students to use as a reference
- Provide a handout with a list of vocabulary terms and definitions that will appear in the activity
- Allow students to provide answers that are handwritten, typed, or verbal
- Enrichment: Research the different bacteria and find out how they fit into the world. Focus on beneficial and/or disease-causing bacteria and share what you learn with classmates.
- Enrichment: Build a model of a bacterium.
- Enrichment: Culture bacteria on agar plates to investigate colonial characteristics, such as color, shape, elevation, and texture.

Resources