

Summary Description

This is the third in a series of 11 lessons that introduces the student to Biology.

Learning Objectives

To have the student learn a few key facts about microbes, microscopic life forms.

Approximate Time for Lesson

40 minutes

Suggested Maturity Level for Instruction

Student should be able to read simple words and perform simple addition and subtraction. Also, student should be able to sit still and engage in one-on-one conversation.

References:

Bacterial Cells - http://www.eurekascience.com/ICanDoThat/bacteria_cells.htm

What's a Germ? - http://www.sciencenetlinks.org/interactives/germs_resource.html

Biology Online - <http://www.biology-online.org/dictionary/Cell>

Materials Needed

1. Internet Access - Pull up the following:
 - a. Picture of a prokaryotic cell (go to http://en.wikipedia.org/wiki/File:Average_prokaryote_cell-en.svg)
 - b. Picture of a eukaryotic cell (go to http://en.wikipedia.org/wiki/File:Animal_cell_structure_en.svg)
2. Coloring Worksheet of the Anatomy of a Cell

Preparation

Make sure you have materials open, printed and/or available prior to beginning the lesson.

Script

Introduction (5 minutes)

1. Teacher: Ok. So last lesson we learned about food chains. Can you give me an example of a food chain for a forest? [Engage the Student in conversation, but any answer of at least 3 living things that depend on each other as a food source in the forest is correct. For example, fruits, bats, and snakes would be correct since bats eat fruit and snakes eat bats]
2. Teacher: Great, now that we learned about ecosystems and food chains, it's time to learn about what living things are made of. So, are you ready to learn about what living things are made of? [Get positive response from Student and begin lesson]

Lesson (30 minutes)

1. Teacher: Great. Now, let's take us humans for example, some of the things we are made of are skin, bones, and hair. If we take plants, can you tell me what they are made of? [Engage the Student in conversation but come to the point that plants are made of leaves, stems, etc.]
2. Teacher: That's right. But the things that make up skin, bones, and hair for humans are the same things that make up leaves and roots for plants. These things are called "cells". Cells are definitely the smallest living thing on Earth. Cells make up living things the same way that bricks make houses - you need a lot of them to build a single living thing. And cells are small - too small to see with your own eyes.
3. Teacher: To give you an idea of how small is small, one billion cells (that's the number "1" with nine zeros behind it) could fit in a single teaspoon. And a teaspoon is about half the size of the spoon that you use to eat your food.
4. Teacher: So if one billion cells could fit in one teaspoon, guess how many cells you need to build a human body? If you guessed 100 trillion, you're right. You are made of about 100 trillion cells. Oh by the way, 100 trillion is a one with fourteen zeros after it. [Write the number one hundred trillion on a piece of paper and show the Student]
5. Teacher: So, now that you know you are made of 100 trillion cells, let's find out what a single cell looks like. Here's a picture of a cell. [Show the Student the picture of a prokaryotic cell]
6. Teacher: Now, you don't need to know what the things are inside the cell - you'll learn that later. But the picture that you're looking at is actually one kind of cell. You see, there are two kinds of cells. This cell you're looking at is a kind of cell that has all of its insides just floating around and the red snake-looking thing in particular is not covered by anything. That red snake-looking thing, called a nucleoid [point to the nucleoid], is what helps the cell make another cell, kind of like having a baby. Well, this kind of cell that has all of its insides floating around and does not have covering around the nucleoid is called a "prokaryotic cell". Can you say "prokaryotic cell"? [Have the Student repeat what you said]
7. Teacher: On the other hand, a "eukaryotic cell" is a cell that has covering for each of the things that are inside it and has covering around the nucleus, which is the same as a nucleoid in the prokaryotic cell. Here's a picture of a eukaryotic cell and look at how the nucleus is different from the nucleoid - the difference is in the shape - can you see it? [Show the Student the picture of a eukaryotic cell]
8. Teacher: Ok - enough about the eukaryotic and prokaryotic cells. Let's get to the fun stuff. Now, as I said before, cells are living things that make up other living things. But did you know that there are living things are made up of a single cell? That's right, some living things called bacteria are made up of just one single cell. And since bacteria are living things, they need to eat and have a place to live just like you do.

9. Teacher: And since bacteria are so small, they can live almost anywhere, in the water, on surfaces, even in the air...in fact, you may be breathing in some bacteria right now!
10. Teacher: But don't worry. Not all bacteria are bad. For example, did you know that you have bacteria living inside of you? That's right, an example of good bacteria is called E. Coli. E. Coli lives inside you and helps turn more of your food into energy.
11. Teacher: However, there are also bad types of bacteria. Some bad forms of bacteria like the strep bacteria are so strong that they can attack the healthy cells in the throat and when this happens, you start to feel sick because your healthy cells are dying. Another bad thing is, since bacteria are so small, when the sick person coughs or sneezes near a healthy person, that healthy person can also get sick if the strep bacteria goes into her mouth, eyes, or nose.
12. Teacher: Not only that, but if the strep bacteria lands on a hard surface like a phone, door knob, or a computer keyboard, the bacteria can live for a short time and if a healthy person touches the surface and then touches her eyes, nose, or mouth, that healthy person can become sick.
13. Teacher: And that's why doctors and parents are always saying to wash your hands after outdoors because you might have touched some bad bacteria that could get you sick. Washing your hands kills off the bad bacteria, making it hard for them to get you sick.
14. Teacher: And I hate to tell you this but there are other microbes out there (microbes are living things that you can't see with your eyes) like viruses, fungi, and even something called protozoa that can really make you sick. These are all example of bad cells - we usually call these microbes "germs".
15. Teacher: So, how do you even fight off all these bad microbes? That's where your white blood cells come in. White blood cells are like soldiers that protect you from sickness. What they do is they look for and kill bad microbes in your body. White blood cells work hard to keep you healthy. In fact, if it weren't for white blood cells, you would get sick very easily.
16. Teacher: Now that we talked about bad cells, let's talk about good cells. Any cell that is needed for building a living thing is considered a good cell. For example, the cells that are needed to make a leaf are good cells. The cells that are needed to make your heart are also considered good cells. Also, those white blood cells of yours are good cells. Can you think of examples of good cells? [[Engage the Student in conversation](#)]
17. Teacher: That's right. So now that we've come to the end of our lesson, I hoped you learned that cells make up all living things in this world - plants, frogs, people - they are all made from cells. And there are also many kinds of cells - good cells and bad cells, and each kind of cell does one kind of job, like make a heart or even get people sick. There are also living things that can't be seen with the eye alone - these are called microbes. Bacteria, viruses, fungi, and protozoa are examples of microbes.

18. Teacher: Before we finish, I want to hand out a coloring worksheet that is an example of a cell. Please color it after our lesson today. [[Give the Student the Coloring Worksheet of the Anatomy of a Cell](#)]
19. Teacher: Ok – time for review, stand up and get in front of the class (consider inviting other members of the family also to set the stage). [[Ask Student the following](#):
- a. What are all living things made of? Cells
 - b. Give me an example of a good cell? Any response that is related to making a living thing is correct (i.e., cells that make the ear of a human)
 - c. Give me an example of what happens between good bacteria and bad bacteria when a healthy person becomes sick. The bad bacteria start to kill off the good bacteria and when that happens the healthy person starts feeling sick.

Teacher reviews any questions that the Student missed].

Wrap Up (5 minutes)

Teacher: [[Clapping](#)] You did GREAT! Wonderful job! Are there any questions that you have regarding cells and microbes? [[Engage in conversation with the Student and follow up with questions you cannot answer by researching the Internet](#)]