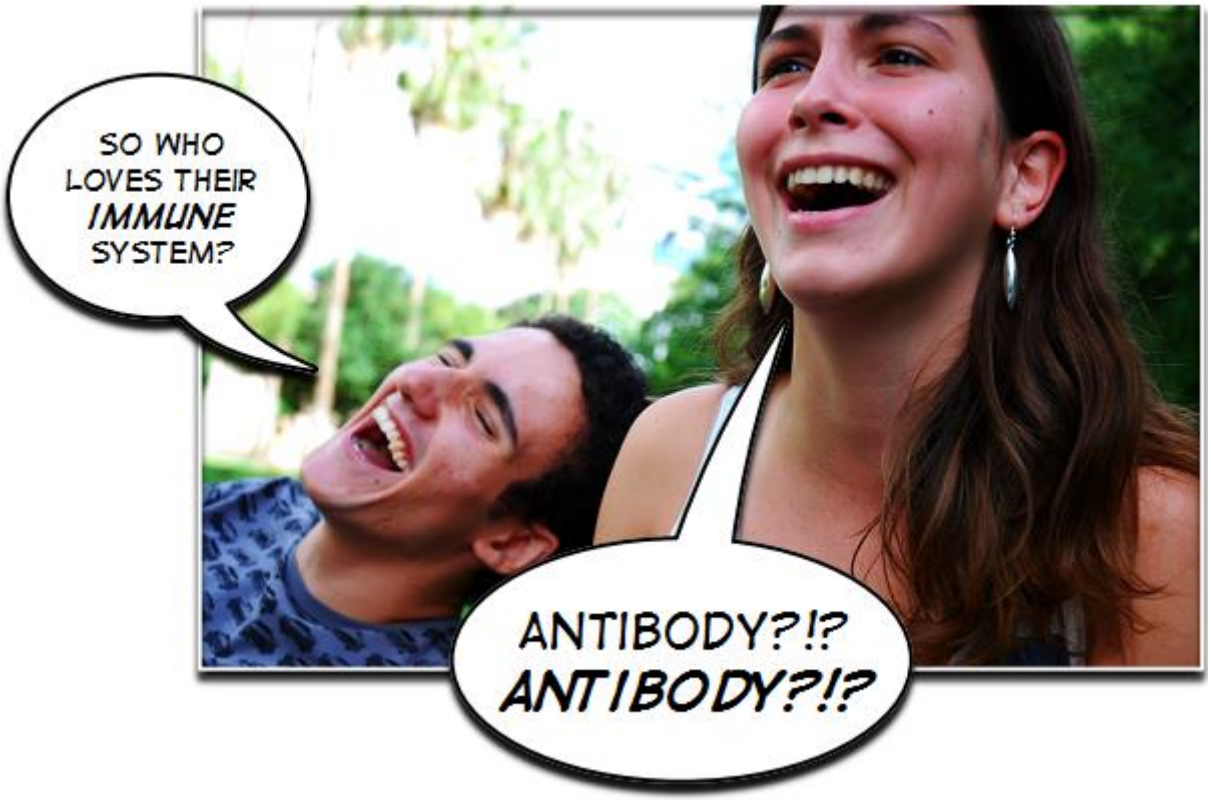
Chapter 34
Immune system



Day One:

Today, you and your child will:

1. Read the text
2. Review the text with your child
3. Complete the student worksheets
4. Collect the materials you will need for days two and three

National Science Education Standards covered this week:

Your immune system is comprised of your skin and white blood cells. Both of these structures act to prevent you from getting sick. Should any bacteria or other foreign substance get through your skin, your white blood cells act quickly to attack and destroy this substance.

When your body works too hard to get rid of a foreign substance, the immune system may cause reactions that are known as allergies. The use of antibiotics is intended to attack harmful bacteria while not harming the body or any of its organs.

Definitions

Immune system	the actions of your skin and white blood cells that protect your body from infections
Infected	the result of your immune system that misses some bacteria or other item that gets into your body; this makes a cut warm, red in color and filled with a gooey liquid
Lysozyme	"lie-so-zime"; an enzyme found in your body that destroys bacteria
White blood cell	blood cells that act to destroy anything that gets into your body that may be harmful
Allergy	result of your immune system working too hard to get rid of things in your body; itchy and watery eyes, sore throats and a runny nose are some of its symptoms
Antibiotics	"an-ti-bi-ot-icks"; chemicals that are made to attack bacteria and get rid of them without hurting you in the process

Sample questions to ask your child after completing the weekly reading.

What causes your immune system to start working?

Anytime something gets into your body that does not belong, the immune system starts to remove it immediately.

How may you feel if your immune system tries too hard to get rid of things in your body?

When this happens, you are said to have an allergy. Allergic reactions can include any kind of irritating or potentially dangerous reaction that may include itchy eyes, a sore throat, a runny nose, vomiting, etc.

How do antibiotics work?

Antibiotics are chemicals that are made to attack bacteria and get rid of them without hurting you in the process.

Answers to worksheet questions:

Page 1:

(Word search)

Page 2:

2 - immune system
4 - infected
1 - lysozyme
3 - white blood cell
5 - allergy
6 - antibiotics

Page 3:

"Compare and contrast The Red blood cells and the white blood cells"

Both are cells that can be found in the plasma of blood. They are both pumped by the heart and both help organisms to survive. Red blood cells are used to transport oxygen throughout the body while white blood cells attack things that get into our bodies. The white blood cells, unlike the red blood cells, are a part of the immune system.

Day Two:

Today, you and your child will:

1. Review Day One using the following text
2. Run the first activity this week

The following text will give you the most important items to review for your activity today.

The use of case studies is commonly used by medical students to prepare them for the real-life scenarios in their profession.

In order to be productive, the child must understand the background information on the immune system since they will be applying this knowledge in this activity.

Case study science

Objective:

Children will apply the information they have studied on the immune system to real-life scenarios.

Materials:

case studies (see attached)
paper/pencil

Procedure:

Review the definitions of the following words from their study of Chapter 34:

Immune system
Infected
White blood cell
Allergy
Antibiotics

Inform the child that they will be acting as doctors. They will be given a real-life scenario about a patient. Their job will be to explain what is happening to the patient that is making them sick.
Their explanations will need to be in written form and will need to include at least one of the definitions listed above.

Explanation:

The child's actions are very similar to what a doctor must do every day. In fact, people who study to become a doctor go through these case studies all the time. This method of learning is very helpful for people in the health-related fields.

Case study #1

You are hurrying to finish your science project and…oops! A splinter from your table gets stuck in your hand. You pull it out, but later that night your finger gets red and starts to swell (get larger). A few days later your entire hand is red and it is hurting very badly. What is going on?

Case study #2

This is the third day in a row that your throat has been very sore! Your parents take you to a doctor who gives you some medicine. After a couple of days, you start to feel better. What is going on?

Case study #3

You decide to help out your parents by sweeping up the dirt from the garage. You spend half the day in the garage sweeping, but you do not open a door. The air is filled with dust! Later that night, your eyes are itchy, you start to get a sore throat and you have a runny nose. What is going on?

Day Three: Lab Activity

Today, you and your child will:

1. Review Day One using the following text
2. Run the first activity this week

The following text will give you the most important items to review for your activity today.

The production of agar plates is an important industry for a scientist who studies bacteria. These individuals are known as microbiologists.

True "agar" is developed from a plant and is used as a food source for growing bacteria. There are plenty of alternatives to create homemade food sources for the growth of bacteria.

Care must always be taken when growing bacteria, especially when there is sufficient growth on the food source. Be certain not to touch, taste or smell the food source after you begin to grow your bacteria. When you are completed, be certain to dispose the container into the trash.

Homemade microbe food: Part Two

Objective:

Children will use their own growth medium to test the effectiveness of antibacterial soaps.

Materials:

saucepan and stove
packet of unflavored gelatin
water
sugar
beef bouillon
four foil muffin cups
muffin pan
measuring spoons
four sealable sandwich baggies
antibacterial soaps, lotions, etc.
raw meat
cotton swab
data chart (see attached)

Procedure:

In the saucepan, mix together one package of unflavored gelatin, one cup of cold water, 2 teaspoons of sugar and one teaspoon of beef bouillon.
Bring slowly to a boil, stirring constantly.
Allow the mixture to cool a little bit and pour into foil muffin cups placed inside of the muffin pan for support.Fill each cup about halfway with the mixture.
Place the muffin pan in the refrigerator until the gelatin hardens. Remove the foil cups from the pan and place one of them in a sealable sandwich baggie. Be certain not to touch the surface of the gelatin.
Take a cotton swab and gently roll it over a piece of raw meat. Now smear the cotton swab over the surface of the gelatin in one of the cups. Place the cup into a sealable sandwich baggie.

Take another cotton swab and cover the end with an antibacterial soap, lotion, etc. smear the contents over the surface of a fresh gelatin cup and place it into a baggie.
For the final cup, use a clean cotton swab to smear the antibacterial soap, lotion, etc. over one half of the surface of the gelatin. Then, with one more clean swab, roll it over the raw meat and smear the contents over the entire surface of the gelatin. You will be mixing the raw meat "goo" with the antibacterial soap. This is what you want. Place it inside the baggie and make certain all of the baggies are sealed tight.
Go wash your hands thoroughly and Place all of the baggies in a warm area, but not in direct sunlight! Check on them periodically for 2-3 days.
Ask the child to predict what will happen. Will there be a lot of growth? If so, which one will grow the most bacteria? The least?

Explanation:

You should notice that the cup with the raw meat only will have the largest collection of bacterial growth. You should not see nearly any growth from the cup that was untouched or that contained only the antibacterial agent.

The last cup, with the antibacterial agent and the meat, is the most important cup to observe. You should notice that very few bacterial colonies have developed on the side with the antibacterial agent. There will inevitably be some, but if you compare it with the cup with only the meat added, you should be able to see a comparable difference.

Naturally, different brands of antibacterial agents, their relative age and concentrations will affect the growth rate of bacteria. A good antibacterial agent should keep the majority of critters from growing in your media.

Homemade microbe food: Data chart

Gelatin cup	Contents	Prediction	Actual results
Cup #1	Nothing		
Cup #2	Meat only		
Cup #3	Antibacterial agent only		
Cup #4	Meat and antibacterial agent		