Understanding the Components of

Stranger in the House
-Immunity-
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Objectives:

1.) The students will learn about the basic components of the immune system and assimilate an understanding for them using a real life scenario with familiar applications.

2.) The class will understand and be able to explain what pathogens, antigens, antibodies, and lymphocyctes are and how they relate to humoral and cell-mediated immunity.

Introduction: This lesson is designed to allow students the opportunity to develop an understanding for innate and adaptive immunity by relating its components to a real life scenario. This activity does not require many materials and can be modified according to the needs of the students. The activity portion of this lesson will be used to develop a working definition for immunity, pathogens, antigens, and antibodies.

Materials:

- 4 groups of students
- 4 index cards
- 4 transparencies and markers

Procedure:

1. The class will be divided up into four groups, with one person being responsible for writing, and one person responsible for speaking.
2. One index card will be distributed to each group that describes the scenario that they are responsible for working on.
3. The job of each group is to place themselves in a particular scenario and determine what course of action they would take.
4. All possible options must be explored and written down, and actions must be justified. After the groups have discussed their scenario and plan of action, the writer should write down the scenario they were given and describe how they dealt with it.
5. Each of the four index cards will have one scenario.

Scenario I You are home alone and it is 12:30 at night. Your parents are out of town and are not expected back until the following day. You wake up from a deep sleep when you hear a loud noise outside in the street. What are your options and which one would you be most likely to take? Â The sound is nonspecific, and could generate many different responses. The main point that this should be used to illustrate is that the immune system has primary and secondary defenses as well as specific and nonspecific defenses. This loud noise in the street could be a potential danger (such as somebody who sitting next to you in class who is visibly sick), but, at this point it probably will generate no significant response from the person in the house (your immune system).

Scenario II: You are home alone and it is 12:30 at night. Your parents are out of town and are not expected back until the following day. You are awakened from a sound sleep when you hear a

not expected back until the following day. You wake up from a sound sleep when you hear a window break downstairs. What are your options and which one would you most likely take?

Â This situation could generate several different responses, and these all should be explored and and developed. This scenario, however, could be used to develop an understanding for an inflammatory response generated from a foreign object penetrating the surface of the skin. The broken window (skin) could cause the person sleeping (histamines) to call the police (phagocytes)

placed in the beaker.
5. The students will be asked to form a hypothesis, write the procedure, record their observations, and develop a conclusion (the students can use a plastic knife in order to cut into the apples and make better observations).
6. The students must record their observations and note whether the whole apple and the cut section experience any color change.
7. The second portion of this activity requires students to determine the effects that temperature and pH have on yeast mortality (the students must first have an understanding for cellular respiration and alcoholic fermentation).
8. Each group will be given 3 zip lock bags with an equal amount of yeast and sugar in them.
9. They will be asked to collect 100mL of boiling water from the hot water bath using a 250mL beaker and with the assistance of the instructor. They will also collect 100mL of lukewarm water from a water bath that is regulated at 80^{0}F and 100mL of vinegar.
10. Each of these beakers will be poured carefully into one of each of the zip lock bags, and the bags will be sealed.
11. After 10 minutes have elapsed, the students will make observations on these three bags and the viability of the yeast.
12. After all of their observations and conclusions have been recorded, the groups will share their results as a class.
13. This discussion will be used to develop an understanding for innate immunity and its four component defenses which are *anatomic barriers* (skin and mucous), *physiologic barriers*

2.) The class will be able to explain how an immunologic memory can induce a heightened state of immune reactivity.
3.) The students learn about the functional cells of the immune system and understand how these cells distinguish between self and non-self cells.

Introduction: This activity allows the students to develop a hands-on appreciation for the components of specific immunity. The students work with the concepts of adaptive imm

You are a Pathogen! *You are a disease- causing agent, such as a bacteria, virus, or fungi that is about to attack a human body (classroom). You are susceptible to antibodies and cytotoxic T cells. There are, however, only certain ones that can harm you! The following antibodies (squares) can bind (stick) to you and killer T cells(toothpicks) can kill (pop) you.*

Balloon color *Pathogen*	Square color *Antibody*	Toothpick color *Killer T Cell*
red	green binds	green toothpick attacks
red	blue no binding	green toothpick attacks
yellow	purple binding	red toothpick attacks
yellow	yellow no binding	red toothpick attacks
blue	green binding	yellow toothpick attacks
blue	blue no binding	yellow toothpick attacks
green	purple binding	blue toothpick attacks
green	yellow no binding	blue toothpick attacks

You are an Antibody! *You are a protein that helps the body destroy pathogens (foreign invaders). You are involved in a type of immunity called humoral immunity. The body in this activity is the classroom and your job is to defend it to the best of your ability. Each member of the group was given a sheet of double sided adhesive square stickers: 5 green, 5 blue, 5 purple, and 5 yellow (antibodies). The challenge for your group is to try to determine which color antibody binds to each of the different colored balloons (*