

Lesson Plan Template

Overview <i>How does this lesson connect to my class and the unit?</i>	
Lesson Title: The Immune System and Tattoos	Unit Title: Science of Tattoos
Duration of Lesson: 1.5 hours	Essential Questions: <ul style="list-style-type: none">• What role does the immune system play in tattoos?• How is the immune system impacted by an individual's choice to get a tattoo?
Instructor: Lindsey Good	Lesson Number: 3 of 4
YouthBuild Program: Teacher Fellows	Class Level: Adult Education
Why/Purpose <i>What are my learning goals for my students in this lesson?</i>	
Learning Target(s): <ul style="list-style-type: none">• Students will have an understanding of the immune system, and how it responds to antigens, viruses and bacteria.• Students will recognize how the immune system responds to tattoos, and the impact this response has on tattoo permanence.	Common Core Standard(s): <ul style="list-style-type: none">• Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.• Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
Anticipated Barriers: <ul style="list-style-type: none">• If students have difficulty drawing information from prior lessons, encourage the use of their illustration and notes.• For students who are not interested in tattoos, this lesson may not be immediately engaging. To make it relevant to these students, draw a focus to the immune system and the role it plays in response to any foreign substance.• For students who prefer to work alone, the Think-Pair-Share could be modified to allow these	

students to write and think during this time, as opposed to being required to work with a partner.

- If students have a difficult time answering the Snowstorm question aloud, they are welcome to share their response with a peer or write a quick response on paper.

Lesson Activities

Academic Vocabulary:

Immune system
 White blood cells
 Macrophage
 Fibroblast
 Antigen

Resources and Materials Needed:

- White board
- Computer
- Projector/Smart Board
- [Immune System and White Blood Cells Notes](#)
- Khan Academy video, [Your immune system: Natural born killer](#)
- Paper and pens for each student
- 1 copy per student of the Huffington Post article, [“Getting Tattooed Makes Your Immune System Stronger.”](#)
- Ted Talk video, [What Makes Tattoos Permanent?](#)
- Paper and pens for each student

Multiple Means of Engagement	Multiple Means of Representation	Multiple Means of Action and Expression
<p><i>What opportunities will I provide to stimulate interest and motivation for learning?</i></p> <p>This lesson is geared toward a topic many students will be interested in learning about. Tattoos are a major part of our culture, and often a big part of our students’ lives.</p> <p>There are clear</p>	<p><i>What opportunities will I provide for students to receive the information in different ways?</i></p> <p>Students can interact with the material through a variety of means (Think-Pair-Share, discussion, videos, article and Snowball activity).</p> <p>Relationships are drawn between key concepts, allowing students to revisit and practice each concept.</p>	<p><i>What opportunities will I provide for students to express what they know?</i></p> <p>Students are given time to reflect on prior lessons at the start of the class, and throughout the lesson.</p> <p>Students can show understanding individually and with the group during the Think-Pair-Share activity.</p> <p>Information can be rephrased</p>

connections to the prior two lessons, allowing the content to naturally build.

The article and videos used are accessible and easy to understand.

and practiced during the Snowstorm activity.

Lesson Activities: *What learning activities will help students meet the learning objectives?*

Settle and Review (10 minutes):

- Prompt students to review content from the prior lessons.
 - What do we know about the skin's structure?
 - How is the skin's structure utilized to make tattoos permanent?
 - Answer any questions students may have.

The Immune System (20 minutes):

- What is the immune system?
 - Discuss the immune system and the role white blood cells play in defending the body against viruses, bacteria and antigens.

Note: For information on the immune system and white blood cells, refer to the [Immune System and White Blood Cells](#) document.

- Immune System video:
 - <https://www.khanacademy.org/science/biology/crash-course-bio-ecology/crash-course-biology-science/v/crash-course-biology-131>

Think-Pair-Share (10 minutes):

- Have students take a few minutes to write down a response to the following two questions. Once done, ask them to turn to a partner and discuss their responses. After the partners have talked, discuss student responses as a class.
 - Based on your knowledge of the body's immune system, how do you think the immune system responds when foreign ink from a tattoo enters the body?
 - What role does this system play in the longevity of tattoos?

Discuss (10 minutes):

- As a class, discuss the immune system's response to tattoos.
 - Upon encountering a tattoo, the immune system recognizes it as an antigen.
 - In response to this antigen, the immune system begins the inflammatory process.
 - Macrophages try to absorb the dye, but only a portion of the ink gets absorbed. Instead, the macrophages and the ink get trapped beneath the epidermis, in the dermis layer.
 - Fibroblasts then respond and build scar tissue.
 - Since the immune system sees the foreign ink as an infection, the body continues to "fight" the tattoo forever.
 - As cells die, new cells absorb the ink.

Watch and Discuss (10 minutes):

- Show students the Ted Talk video, [What Makes Tattoos Permanent?](#)
- Give students time to reflect
 - How does the body's immune system help to make tattoos permanent?

Read and Discuss (15 minutes):

- As a class, read the Huffington Post article, ["Getting Tattooed Makes Your Immune System Stronger."](#)
- Discuss the outcomes of this study, and how tattoos influence the immune system.

Exit Activity (15 minutes):

- Snowstorm
 - Have each student write a review question based on something they've learned in the past three classes.
 - After writing questions, students should crumple the paper and throw it in the center of the room.
 - All students should go to the center of the room and retrieve a crumpled paper, then take turns reading and answering the questions aloud. If a student gets stuck, they are encouraged to ask the class for help.

Evidence of Success (Formative Assessment): *How will my students and I know the extent to which the lesson objectives have been met?*

We will know the lesson objectives have been met when students can volunteer new and prior information about the immune system and how the human body reacts to tattoos.

Students can show understanding through discussion, Think-Pair-Share, and the Snowstorm activity.

Closing Connections: *How will I provide opportunities for reflection and transfer of knowledge/skills?*

Students will be able to reflect on prior information with peers through the Think-Pair-Share activity. At the end of class, students can reflect on new knowledge through the Snowstorm activity.

Reflections: *What can I include next time? What went well and what needs adjusting?*

Academic Vocabulary

Immune system: The immune system protects the body from foreign substances, viruses and bacteria.

White blood cells: White blood cells, or leukocytes, protect the body from infection and disease.

Macrophage: Macrophages are large white blood cells, which are stationary in connective tissue and mobile within the bloodstream. They help to fight infections and antigens.

Fibroblast: A cell found in connective tissue that produces collagen.

Antigen: A foreign substance that causes the immune system to react to prevent infection and illness.