

## Lesson Plan Template

### Overview

*How does this lesson connect to my class and the unit?*

<b>Lesson Title:</b> Tattoo Removal	<b>Unit Title:</b> Science of Tattoos
<b>Duration of Lesson:</b> 1.5 hours	<b>Essential Questions:</b> <ul style="list-style-type: none"><li>● How are tattoos impacted over time?</li><li>● What happens if an individual changes their mind about a tattoo?</li><li>● How are tattoos removed?</li><li>● How does the body respond to the removal of tattoos?</li></ul>
<b>Instructor:</b> Lindsey Good	<b>Lesson Number:</b> 4 of 4
<b>YouthBuild Program:</b> Teacher Fellows	<b>Class Level:</b> Adult Education

### Why/Purpose

*What are my learning goals for my students in this lesson?*

<b>Learning Target(s):</b> <ul style="list-style-type: none"><li>● Students will understand that tattoos can change over time through fading.</li><li>● Students will understand that individuals may choose to remove a tattoo, and the process that this requires.</li><li>● Students will understand how the body responds to the removal of tattoos.</li></ul>	<b>Common Core Standard(s):</b> <ul style="list-style-type: none"><li>● 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.</li><li>● 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.</li></ul>
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### Anticipated Barriers:

- Some students may be resistant to writing the journal prompt. To support students who are anxious about writing, set a timer and reassure students that they will only need to write for ten minutes. Additionally, remind students that journal prompts are quick writes that do not need to be edited, and it's more important that they get ideas down on paper.

- For students who do not wish to work with a peer, it is possible to independently complete the ice cube experiment independently, but it will require that these students have a separate cup with water, so they can melt both the whole cube and the broken cube.

## Lesson Activities

### Academic Vocabulary:

These words are from a prior lesson, and may require quick review:

- Immune system
- White blood cells
- Macrophage
- Fibroblast
- Antigen

This word is new to this lesson:

- Picosecond

### Resources and Materials Needed:

- Paper and pencils for each student
- Skin structure cups for each student
- Extra cups and water for students absent from lesson 2
- Two ice cubes per student group
- Baggies
- Smartboard or projector
- Computer for teacher
- Computer or phones for students

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>To engage learners, we will start the lesson with a journal prompt. This will give students the opportunity to reflect on their perspective on tattoos.</p> <p>The lesson connects with</p>	<p><i>What opportunities will I provide for students to receive the information in different ways?</i></p> <p>Students will receive the information through writing, discussion, hands on activities and a game.</p> <p>Students will have the opportunity to work independently, with peers and as a whole class.</p>	<p><i>What opportunities will I provide for students to express what they know?</i></p> <p>Students can show what they know through discussion, as well as through a review game.</p> <p>Students will make connections with prior content, and review components of the full content at the end of the lesson.</p>

the last three lessons, allowing students to review prior content and deepen understanding.

Students will play Kahoot to review unit information.

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

**Entrance Activity - Journal Prompt (10 minutes):**

- Would you ever get a tattoo? If you did, what would it be and why?
- Ask for volunteers to share their response.
  
- Once done with the journal prompt, inform students that now that they know what goes into a tattoo, it's important to understand the process of getting a tattoo removed.

**Tattoo Fading Explanation (15 minutes):**

- No matter the skill level of a tattoo artist, or how well a particular tattoo is created, a tattoo will inevitably fade over time. There are a number of factors that contribute to this fading:
  - Placement of the tattoo: Tattoos tend to fade faster when on feet, fingers or lips. This is because the skin in these spots is thin. It has less fatty tissue, and more movement over the bone, causing the tattoo to wear over time. Due to the amount of fading, these tattoos need to be retouched frequently. In addition to fading, tattoo artists identify these as the most painful places to get a tattoo.
  - Quality of ink: This is tricky, as the tattoo artist does not need to disclose the ingredients used. However, it is wise to research tattoo shops and their reputations before getting a tattoo. Look online for pictures of prior tattoos created by the shop you are considering. Poor quality ink fades quickly, and can be harmful.
  - Color of ink: The lighter the ink, the faster it will fade. White ink is particularly prone to fading, as it is intended to highlight other colors. If an individual chooses to get a light colored tattoo, it will need to be touched up frequently.
  - Care of the tattoo: Proper care for the tattoo is essential, especially in the first month after it is done. Without proper care, the tattoo can easily get infected. Individuals with new tattoos should wash their hands carefully before touching the tattoo, keep out of water, and stay out of the sun. During the first month, the epidermis is healing and changing. If

an individual is exposed to pool chemicals or the sun, the tattoo can be permanently bleached, causing not only fading, but also a far higher risk of infection.

### **Tattoo Removal - Explanation (15 minutes):**

- After discussing fading, explain that there are many reasons why individuals choose to get a tattoo removed
  - Allergies
  - Job opportunity
  - Regret over time
  - Replacing one tattoo for another
- Ask students what they think needs to happen if an individual decides they no longer want their tattoo. Give students time to make predictions. Many will likely know that it is possible to remove tattoos with a laser. Ask if anyone knows how the laser tattoo removal works. Once students have made predictions and explained their prior knowledge on tattoo removal, elaborate further on the removal process.
  - Tattoo removal can take up to 10 visits, and may not always remove the full tattoo. Additionally, removal can cause scarring where the tattoo once was.
  - While small foreign particles are broken down and absorbed by the immune system, the pigments in tattoos are too large to be broken down and absorbed.
  - To account for this challenge, the laser uses extreme heat and speed to break down each individual pigment. The laser moves at the speed of a trillionth of a second, or a “picosecond.”
  - In order to break the pigments down, the ink must be heated to the point that it expands, then zapped while half of it is still cool. With half of the particle hot and half cold, the pressure causes the particle to tear apart.
  - Once the particles are broken down, the white blood cells are able to absorb the particles, and transport them to the liver.
  - It is easiest to remove single color or non-shaded tattoos, as multiple color tattoos must be broken down separately, pigment by pigment. Black ink is the easiest to remove, as the ink absorbs the full wavelength from the laser.

### **Tattoo Removal Demonstration (20 minutes):**

- At this point, give students the opportunity to try a component of this process. *Note: Although extreme heat and speed are not available, students can experience the melting of the ice, demonstrating that small particles are easier to break down than large particles.*
  - Have students break into pairs. Help as necessary, depending on students in the group.
  - Have students get their Skin Structure cups (honey, water and vegetable oil) from Lesson 2, then sit with their partner.
  - Make a T-Chart on chart paper, with “Whole Ice Cubes” on one half, and “Broken Ice Cubes” on the other half.
  - Ask them what will happen if they place a whole ice cube in the mixture, and jot down responses. After, ask what will happen if an ice cube is broken into multiple pieces. Again, jot down their responses.
  - After students make predictions, give each team a whole ice cube. Have each team drop their whole ice cube into the cup of one of the partners. Due to the density of the ice cube, it will sink below the vegetable oil and slowly begin to melt in the water.
  - Give each student a baggie and another ice cube. Tell them to place the ice cube in the baggie, and break it (they can use the table, the floor or stomp on it). Once the cube is broken, it should be poured in the other partner’s cup.
  - As both cubes melt, ask students why the broken ice cubes are melting faster than the whole ice cube.
  - Explain that when whole, the pigments of a tattoo will fade slowly over time. Although the ink will not vanish during a person’s lifetime, the ice cube represents the slow fading of these pigments. However, when broken down, the body’s white blood cells are able to absorb ink particles. In the same way, the ice quickly melts once broken down.

**Video (10 minutes):**

Smarter Every Day: [How Tattoo Laser Removal Works](#)

**Review and Exit (20 minutes)**

- To review information from the unit, have students take out a phone or computer.

- Attach your computer to a Smartboard or projector, and go to [Science of Tattoos Kahoot](#). Select “Start Now,” then “Player vs Player.” A game pin will pop up on your screen.
- Students should go to Kahoot.it, then enter the game pin that pops up on your screen.
- Each player should create a nickname, then play independently.
- You will be able to see how students respond after each question. If students miss a question, take the opportunity to review misconceptions as a class.
- After, wrap up and answer any remaining questions.

**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 learning objectives have been met as students are able to answer questions posed throughout the class. They will be able to show understanding through their Kahoot review at the end of class.

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

Students can reflect during the journal prompt and while playing Kahoot.

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

### **Academic Vocabulary**

**Picosecond:** One trillionth of a second.

**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.