Kimberly Towne

March 26, 2021

Lesson Plan

Topic: Stem cells

Standard(s):

**HS-LS1-1**. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells. **HS-LS1-4**. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

Twenty-first century skills: Critical Thinking, Communication

Hook: 10 min.

Materials: Chart paper, markers, small household objects

Stem cells are a prime example of versatility, so I want students to understand what it is. I will bring in several common household objects (paper clips, coffee mug, hand towel, Ziplock bag, etc.) and in small groups or individually, students will choose one of those objects and try to come up with as many different uses as possible (Critical Thinking, Communication). They will have three minutes to do so, and the remaining time will be spent sharing ideas and discussing what about these objects allows them to have a range of uses.

Lesson: 40 min.

Materials: Poll Everywhere presentation, Differentiate! card game and materials

To start off this lesson, I want to have a class discussion about the specialization of cells in the human body. The following questions could guide the conversation:

1. What are some examples of cells in your body?

2. What makes one cell different from another? (i.e., skin vs. blood)

3. Is it possible for one cell type to function like a different cell type? Why?

4. What happens when cells stop functioning as they should?

5. How are dead/nonfunctioning cells replaced?

Questions will be asked and answered using a Poll Everywhere so we can go over each one before moving to the next (Critical Thinking). Students may take notes during conversation on paper or using their laptops, but it is not required.

\*\*\*For the remainder of the lesson, we will be playing Differentiate! A Stem Cell Card Game in groups of 2-4 students (Communication). Before they start, I will briefly explain how to play, but each group will get instruction sheets along with the necessary materials. We’ll also go over any new or unclear vocabulary. With this game, students will learn the different stages of stem cell differentiation and specialization. After every group has played at least one game, we’ll talk about how it connects with the hook, specifically about how stem cells are a basic cell which lends to its versatility (Critical Thinking, Communication).

\*\*\*Covid friendly version

Half of the game takes place on individual gameboards (the labs) while the other half is a collaborative “human body” to differentiate stem cells. For the purpose of our class, we will play in teams of two or three, where each team has one gameboard and a partial deck of cards with the same number of each type of card. The teams play against each other, but I will act as a moderator in charge of adding cards to the “human body,” which will be simulated on Jamboard rather than in between all players. This method is also ideal when learning how to play for easier clarification of questions.