

ONCOLOGY LESSON PLAN

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Subject / Grade Level: Oncology / Lower elementary

Materials:

- ▶ three colors of Play-Doh

NGSS Essential Standards and Clarifying Objectives:

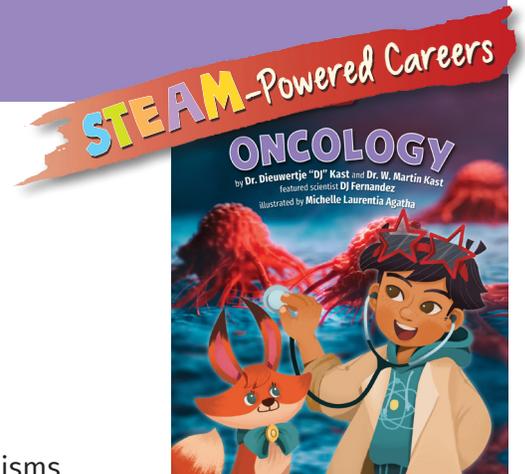
- ▶ **Disciplinary Core Ideas: LS1.B:** Growth and Development of Organisms
- ▶ **Science and Engineering Practices:** Developing and Using Models
- ▶ **Crosscutting Concepts:** Scale, Proportion, and Quantity; Stability and Change

Lesson Objective:

- ▶ Students will learn about the process used to make new cells (cell division), the different types of cells in the body, and the differences between healthy cells and cancer cells.

Differentiation Strategies to Meet Diverse Learner Needs:

- ▶ Think-pair-share, for students who learn best when engaging with classmates
- ▶ Multisensory learning, to accommodate auditory and visual learners, and to encourage students' use of their senses as they learn



ENGAGEMENT

- ▶ Watch the following video with the students: <https://www.youtube.com/watch?v=leUANxFVXKc>
- ▶ Ask students what they think is going on in the video. What observations can they make from what is happening with the healthy cells compared with the cancer cells?
 - ▶ Response example:
 - ▶ The cancer cells are growing really fast.

EXPLORATION

Healthy Cells:

1. Tell students to begin with one color of Play-Doh and to start with a parent cell that is the size of a marble.
2. Tell students to divide the cell into two daughter cells.
 - a. Ask students: What must happen before the cell divides?
3. Tell students to divide the two cells. They should now have four cells.
4. Tell students to continue dividing the cells until they have enough to fill an area the size of a small plate.

Cancer Cells – Uncontrolled Cell Division:

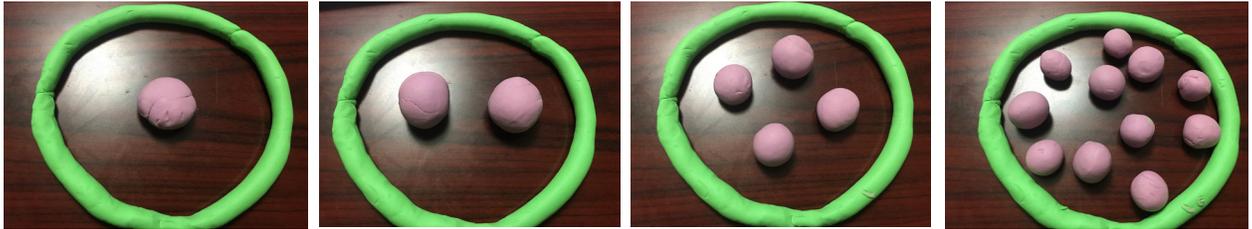
Tell students that the instruction manual (DNA) in one of the healthy cells has been changed. The healthy cell is now a cancer cell.

1. Tell students to replace one of the healthy cells in their model with a cancer cell. Students should use a different color of Play-Doh to make cancer cells.
2. Tell students to divide the cancer cell several times.
 - a. Ask students: Where will the cancer cells go?



- b. Ask students: What will this do to the healthy cells?
- 3. Show how this accumulation of cancer cells leads to the formation of a tumor that contains an abundance of cancer cells.

Setup:



Cancer Cell division

EXPLANATION

- ▶ Have students discuss and work to explain their observations of the cell-division process and compare the difference between a healthy cell that is replicating normally and a cancer cell that is replicating uncontrollably.

ELABORATION

Vocabulary:

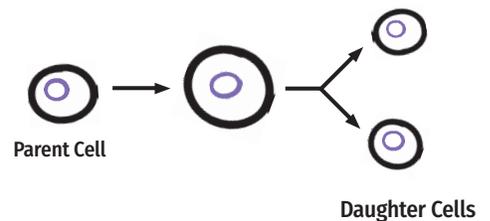
- ▶ cancer cells
- ▶ cell division
- ▶ healthy cells
- ▶ tumor
- ▶ cell death (apoptosis)
- ▶ DNA
- ▶ tissues

Activity Summary:

- ▶ All living things are made of cells. Humans are made of a very large number of cells.
- ▶ There are many different types of cells, each with a specific job.
- ▶ Division of healthy cells is important for growth and repair.
- ▶ There are several differences between healthy cells and cancer cells.
- ▶ Cancer cells divide when they should not.
- ▶ Cancer cells do not perform the normal jobs of healthy cells.

Cell Division:

- ▶ New cells are made when one cell splits into two cells. The starting cell is called a parent cell. The two new cells are called daughter cells.
- ▶ Before a cell divides, it doubles in size.
- ▶ The new cells look and act like the parent cell. This is because the parent cell copies its DNA before it divides, and each daughter cell gets one copy.



Healthy Cells

- ▶ Healthy cells are carefully arranged in the body. For example, skin cells form tidy layers of cells.
- ▶ Most healthy cells divide only when new cells are needed. Red blood cells divide rapidly, for example, so when you have your blood drawn, your body quickly replaces the blood you have lost. Brain cells, on the other hand, don't ever divide, so they are precious.
- ▶ Ask students: When else does a person need new cells? Possible answers: When they are growing or when they have an injury needing repair.

Cancer Cells:

- ▶ Cancer cells do not look and act like healthy cells. This is because their DNA has mistakes in it.

- ▶ Cancer cells divide too much. They divide even when new cells are not needed.
- ▶ Cancer cells can push their way into healthy tissues*. The cancer cells steal food and oxygen and harm the healthy cells.
 - ▶ *Tissues are groups of similar cells that do a specific job in the body.
Examples are skin or muscle tissue.
- ▶ Cancer cells can pile on top of one another. This pile of cancer cells is called a tumor.

EVALUATION

- ▶ Make drawings of regular cell division and uncontrolled cell division. Label each accordingly.