LESSON PLAN: Metastasis Demonstration

Topic: Cancer Metastasis

Subject | Stream: Science (Biology)

Grade Level: *Intermediate (7-10) & Senior (11, 12)*

Length of Lesson: 45 minutes

Objective(s):

- Demonstrate a general mechanism of cancer metastasis to students.
- Develop the element of chance that exists in tumour development.

Brief Summary: This activity aims to teach students about the complicated process of metastasis and how it relates to cancer progression, treatment difficulties and spread of disease.

Background Information:

What is cancer?

- Cancer is the uncontrolled growth of abnormal cells in the body.
- These extra cells may form a mass of tissue, called a tumour.
- Cancer can occur anywhere in someone's body.

What is a brain tumour?

- A mass of abnormal cells within or around the structure of the brain.
- A brain tumour is either cancerous (malignant) or non-cancerous (non-malignant).
- Most brain tumours are considered primary and start in the brain and stay in the brain or central nervous system (spine)
- However, other cancers in the body, can possibly metastasize to the brain.

Metastasis

- The development of a secondary tumour (growth) at a distance other than the primary location of the tumour.
- *Simplified definition: two lumps develop throughout the body in different places.*

Primary Tumour

- An abnormal mass of cells that forms when cells grow and divide more than they should.
- *Simplified definition: a lump that forms in your body.*

Resources | Materials Required per Pair:

- 6 individual dice (place one die at each station).
- 6 pieces of paper (place one piece of paper at each station to be used for tallying)
- Name tags (one for each student).
    - Instead of writing names, it is the names of the different stations.

ACTIVITY INSTRUCTIONS

PRE-SET UP FOR THE ACTIVITY:

A. Set up 6 stations around the room, each labelled a different body organ (e.g., brain, lungs, kidney, bone, liver, colon) with a clear path between each station:

1. Brain (station #1)
2. Lungs (station #2)
3. Kidney (station #3)
4. Bone (station #4)
5. Liver (station #5)
6. Colon (station #6)

These numbers will align with the numbers on the die.

NOTE: Because brain tumours do not metastasize to other parts of the body (other than the spine), teams will be initially assigned to the stations 2 through 5.

B. Organize name tags ahead of time. Instead of writing name on name tags, the names of each station will be written on each name tag (i.e.) lungs, kidney, bone, live, or colon.

C. Split the class into five (5) groups and assign each group to any of the following stations:

- Lungs
- Kidney
- Bone
- Live
- Colon

D. Each student grabs a name tag based on the initial station they are assigned to.

HOW TO PLAY THE ACTIVITY:

1. To begin, ONE student from EACH team rolls the die and moves to the station that the dice corresponds to (i.e.) if the student started at station #2 (lungs) and rolls a 3, they move to station #3 (kidney).
   - *This represents a secondary location of tumour cells.*

2. When arriving at the secondary location, students DO NOT need a new name tag. They keep their original name tag as a point of reference to where they started at the beginning of the activity.

3. The next student rolls the die and repeats step 1 and continues to do so.

4. As students move around to different stations, they will add a tally to the piece of paper.

5. When that station receives 5 tally's, the group will raise their hand to call the teacher over.

6. The teacher will add a STRIKE to that station.

7. When a station gets 3 strikes, its out of play. The station has been taken over and is damaged.
   - *This represents how cancer can metastasize and damage other organs in the body.*

8. Students continue rolling the dice, if they get a number corresponding to a damaged station, they roll again until they get an active station.

9. As stations are damaged, we see how the subsequent stations are damaged faster because the same number of students are occupying a smaller number of stations.

10. The last station to remain standing will be the organ that cancer could not successfully take over.

11. As students continue to flow through, multiple tallies will appear in the different stations (corresponding to different sites in the body), representing how tumour cells can move beyond the secondary location.

Extension Lesson Idea

An addition to this game, like having a group of students be the 'treatment' that can revive the stations that are down.

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