Contributors

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Intended Audience

| Age Group |  
|-----------|---|
| K-4       |   |
| 5-8       |   |
| 9-12      | X |

Activity Characteristics

<table>
<thead>
<tr>
<th>Activity Characteristic</th>
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<tbody>
<tr>
<td>Classroom Setting</td>
<td>X</td>
</tr>
<tr>
<td>Requires special equipment</td>
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<tr>
<td>Uses hands-on manipulatives</td>
<td>X</td>
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<tr>
<td>Requires mathematical skills</td>
<td>X</td>
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<tr>
<td>Can be performed individually</td>
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<tr>
<td>Requires group work</td>
<td>X</td>
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<tr>
<td>Requires more than one (45 min class) period</td>
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<tr>
<td>Appropriate for special needs student</td>
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Introduction

Description
Students will learn about cancer what cancer is, possible causes, and possible contributors and preventers to mutations necessary for cancer to occur.

Abstract
Students will engage in a board game that will highlight the different means of acquiring mutations that can contribute to an increased or decreased risk of cancer. Students will learn about cancer what cancer is, possible causes, and possible contributors and preventers to mutations necessary for cancer to occur.

Core Themes Addressed

<table>
<thead>
<tr>
<th>Microbial Cell Biology</th>
<th>Microbial Genetics</th>
<th>Microorganisms and Humans</th>
<th>Microorganisms and the Environment</th>
<th>Microbial Evolution and Diversity</th>
<th>Other – Cancer</th>
</tr>
</thead>
</table>

Keywords
Cancer, uncontrolled growth, mutations, prevention, contribution

Learning Objectives
At completion of this activity, learner will

1. Recall the definition of cancer
2. Identify different possible contributors and preventers of cancer
3. Identify current treatments for cancer

National Science Education Standards Addressed

Standard A: Science as Inquiry
- Abilities necessary to do scientific inquiry

Standard C: Life Science
- The cell
Standard E: Science and Technology

- Understandings about science and technology

Standard F: Science in Personal and Social Perspectives

- Personal and community health
Teacher Handout

Cancer Risk

Student Prior Knowledge

Students should have a general background in cell division, hereditary information, and the role mutations play within cells.

Teacher Background Information

Cancer is an array of different diseases. It is commonly characterized as the uncontrolled division of cells. These fast growing cells form into tumors and can be malignant, spreading into other parts of the body. Benign tumors are considered non-cancerous and do not spread throughout the body. The cause of cancer isn’t completely understood. There are many factors known to increase an individual’s risk of cancer. These factors can range from, tobacco use, diet and exercise, environmental pollutants, exposure to radiation. These factors can incorporate mutations into cells causing them to change and grow out of control. There are a number of cancers that can be prevented by eating healthier, minimizing UV exposure, not smoking, and receiving vaccinations. It is important to understand that some cancer causing mutations can be passed down through family lines. In these cases, it isn’t necessarily a person’s lifestyle that contributes to their condition, but simply their genetics.

Class Time

This activity will require a minimum of one 45 minute class period.

1. Give a lecture detailing what cancer is and how it occurs, as well as, current treatments: 15 minutes.
2. Separate students into groups of four and begin gameplay: 20 minutes.
3. Discussion and Wrap-Up: 10 minutes.

Teacher Preparation Time

This lesson will require approximately 30 minutes of preparation time.

1. Print out game boards and game cards for each group: 20 minutes.
2. Supplies should be laid out at each lab station: 5 minutes.

Safety Precautions

There are no safety precautions to be aware of.
Materials and Equipment (Per Group of 4)

<table>
<thead>
<tr>
<th>Game Board</th>
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</thead>
<tbody>
<tr>
<td>Game Cards</td>
</tr>
<tr>
<td>4 Game Pieces</td>
</tr>
<tr>
<td>Die</td>
</tr>
</tbody>
</table>

Methods

1. Draw a chance card. This indicates the number of mutations that you acquire hereditarily (from your parents).
2. Place tally marks for these mutations in the column with an “X”.
3. Proceed with gameplay.
4. On your scorecard below, place tally marks for mutations received on each card in the appropriate column. (ie. Mutations received from cards with an “X” go in the X column, mutations received from cards with a leaf go in the leaf column)
5. Once you’ve totaled the number of mutations in each column, subtract the number on the right from the left. This will give you your overall number of mutations.

Tips/Suggestions

1. Take care with this topic. The students may be sensitive to the subject. Conversely, students will have fun playing the game, but should be gently reminded that this is a serious issue.

Answers to Student Handouts

1. Uncontrolled cell growth is known as _____________.
   Cancer

2. Identify possible contributors and preventers of cancer with either a C (contributor) or a P (preventer).
   - C Smoking  
   - P Healthy Diet  
   - C Excessive Tanning  
   - C Radiation Exposure  
   - P Exercise  
   - P Suntan Lotion

3. Besides chemotherapy and radiation, list one other current treatment for cancer.
   Possible Answers: Hyperthermia, Surgery, Lasers, Photodynamic Therapy
Student Handout

Cancer Risk

Introduction

Cancer is a disease that affects individuals from all demographics. It is commonly characterized as the uncontrolled division of cells. This uncontrolled division can be caused by mutations in the cells due to life choices, such as smoking. It is important to understand that some cancer causing mutations can be passed down through family lines. In these cases, it isn’t necessarily a person’s lifestyle that contributes to their condition, but simply their genetics.

Student Background Knowledge

Cancer is an array of different diseases. It is commonly characterized as the uncontrolled division of cells. These fast growing cells form into tumors and can be malignant, spreading into other parts of the body. Benign tumors are considered non-cancerous and do not spread throughout the body. The cause of cancer isn’t completely understood. There are many factors known to increase an individual’s risk of cancer. These factors can range from, tobacco use, diet and exercise, environmental pollutants, exposure to radiation. These factors can incorporate mutations into cells causing them to change and grow out of control. There are a number of cancers that can be prevented by eating healthier, minimizing UV exposure, not smoking, and receiving vaccinations. It is important to understand that some cancer causing mutations can be passed down through family lines. In these cases, it isn’t necessarily a person’s lifestyle that contributes to their condition, but simply their genetics.

Vocabulary

Cancer: Diseases caused by uncontrolled cell growth

Mutation: Occurs when a DNA gene is damaged or change

Safety Considerations

There are no safety precautions to be aware of.
Student Worksheet

Cancer Risk

Name:_______________________________________  Block:__________

Materials Checklist

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Procedure

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Total: ___________________  ___________________  ___________________

5. Once you’ve totaled the number of mutations in each column, subtract the number on the right from the left. This will give you your overall number of mutations.
   a. Overall Number of Mutations: ___________________
Questions:

1. Uncontrolled cell growth is known as ____________.

2. Identify possible contributors and preventers of cancer with either a C (contributor) or a P (preventer).
   
   ____ Smoking                     ____ Healthy Diet
   ____ Exercise                   ____ Radiation Exposure
   ____ Excessive Tanning          ____ Suntan Lotion

3. Besides chemotherapy and radiation, list one other current treatment for cancer.

4. Briefly discuss one thing that stood out to you today in our discussion.