UNIVERSITY OF LEEDS

Causes of Human Disease: Exploring Cancer and Genetic Disease

Scheme of Work

	Lesson 1	Lesson 2	Lesson 3
Length	Approx. 1 hour	Approx. 1 hour	Approx. 1 hour
Objectives	To produce a detailed image of DNA. To understand the basics of DNA replication. To investigate DNA replication mistakes.	To identify some common causes of cancer. To define the five groups of carcinogens. To consider the way in which some specific carcinogens cause cancer.	To explore single gene disorders. To produce an informative leaflet. To understand the difference between dominant and recessive genes.

Lesson plans for each session can be found on the following pages.

Causes of Human Disease: Exploring Cancer and Genetic Disease

Lesson 1 plan

<table>
<tr><th>Starter activity</th><th>Learning objectives</th></tr>
<tr><td>As a class, students summarise everything they already know about DNA. Collect the responses on the board.</td><td>• To produce a detailed image of DNA.

• To understand the basics of DNA replication.

• To investigate DNA replication mistakes.</td></tr>
<tr><th>Main activities</th><th>Resources required</th></tr>
<tr><td rowspan="6">Divide students into small groups and give each group flipchart paper and coloured pens, pencils, any other creative materials. Explain that they are going to create visual representations of DNA and DNA replication. Students watch the video in Step 1.5 (on DNA replication) and make notes, then create their images in their groups, re-watching the video if needed. Images must contain and represent as many different components of DNA as possible.

Each group then researches and makes notes on DNA replication mistakes. Inform groups that their research must answer the question:

• Why is it important that mistakes sometimes occur in DNA? Consider the variation in lifeforms on this planet.

Information from Step 1.11 can be used to aid the research.</td><td>1. Flipchart paper and creative materials.
2. Device for watching the video.
3. Pens, paper, devices for research.</td></tr>
<tr><th>Assessment for Learning</th></tr>
<tr><td>Visual representations of DNA replication.</td></tr>
<tr><th>Differentiation</th></tr>
<tr><td>SEND: Videos have subtitles.
Low ability: Peer-learning.
Gifted and Talented: Peer-teaching.</td></tr>
<tr><th>Plenary</th></tr>
<tr><td>Share findings on DNA replication research as a class. Extract key learning from the groups and record on the board.</td></tr>
</table>

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Lesson 2 plan

<table>
<tr><th>Starter activity</th><th>Learning objectives</th></tr>
<tr><td>Students name as many carcinogens as they can think of and put on post-it notes on the board.

Students should move and place the carcinogens in order of importance (in terms of how many cancer cases they cause worldwide).</td><td>• To identify some common causes of cancer.

• To define the five groups of carcinogens.

• To consider the way in which some specific carcinogens cause cancer.</td></tr>
<tr><th>Main activities</th><th>Resources required</th></tr>
<tr><td rowspan="4">Introduce the five groups of carcinogens: chemical compounds, infectious agents, minerals, radiation and physiological (information from Step 2.2 can be used for this). Ask students to think of definitions for each one and guide the discussion.

Place an A4 sign for each group in five different places around the classroom. Through discussion, students now place the carcinogen post-it notes from their list into one of the categories around the room. Can they think of any more to add now that they have considered the categories?

Divide the class into 3 groups and ask each group to research one of the following carcinogens: UV light, hepatitis C virus, and alcohol. Each group should explore the mechanism by which each carcinogen causes cancer.</td><td>1. A4 paper and post-it notes for signage and carcinogens.
2. Pens.
3. Enough space for physical movement around the room.
4. Devices for research.</td></tr>
<tr><th>Assessment for Learning</th></tr>
<tr><td>Lists of carcinogens grouped into categories, monitoring student discussion, research findings.</td></tr>
<tr><th>Differentiation</th></tr>
<tr><td>SEND: Teacher-led support.
Low ability: Peer-learning.
Gifted and Talented: Peer-teaching.</td></tr>
<tr><td></td><th>Plenary</th></tr>
<tr><td></td><td>Each of the three groups presents their findings back to the class.

Ask students if any of the carcinogens discussed today surprised them and why.</td></tr>
</table>

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Lesson 3 plan

<table>
<tr><th>Starter activity</th><th>Learning objectives</th></tr>
<tr><td>Verbally quiz the students on what they learned last lesson. Ask students to name one carcinogen, giving one example of a cancer it can cause, and the carcinogenic group that it is in.</td><td>• To explore single gene disorders.

• To produce an informative leaflet.

• To understand the difference between dominant and recessive genes.</td></tr>
<tr><th>Main activities</th><th>Resources required</th></tr>
<tr><td rowspan="6">Introduce the idea of single gene disorders. Ask students to come up with a definition of what ‘dominant’ and ‘recessive’ mean and guide the discussion. Information from Step 2.10 can be used for this.

Individually, students choose and research one example of a single gene disorder. They should create an informative leaflet on this disorder, including information on symptoms, statistics, and treatments.

Ask some of the students to present their leaflet and teach the class about the disorder they have researched.</td><td>1. Creative materials for leaflets.
2. Devices for research.</td></tr>
<tr><th>Assessment for Learning</th></tr>
<tr><td>Informative leaflets.</td></tr>
<tr><th>Differentiation</th></tr>
<tr><td>SEND: Teacher-led support.
Low ability: Peer-learning.
Gifted and Talented: Peer-teaching.</td></tr>
<tr><th>Plenary</th></tr>
<tr><td>Ask students to write a short reflection on their key learning about cancer and genetic disease from the last three lessons.</td></tr>
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