UNIVERSITY OF LEEDS

MedTech:
Exploring the Human Genome

Scheme of Work

	Lesson 1	**Lesson 2**	**Lesson 3**
Length	Approx. 1 hour	Approx. 1 hour	Approx. 1 hour
Objectives	To understand the difference between genetics and genomics. To list the stakeholders who are affected by genomics and explain their needs. To explore genomic testing and consider its benefits for patients.	To compare the benefits and drawbacks of genomic sequencing. To reflect on the ethical challenges of genomics.	To produce a report detailing the My Cancer, My DNA project. To consider the implications and needs for patient care in genome sequencing. To describe possible misconceptions about genome sequencing and how these could be addressed.

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

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Lesson 1 plan

<table>
<tr><th>Starter activity</th><th>Learning objectives</th></tr>
<tr><td>In pairs, students discuss any prior knowledge they have about genomics.

Lead a brief discussion. Can anyone explain, or guess, the difference between genetics and genomics?</td><td>• To understand the difference between genetics and genomics.
• To list the stakeholders who are affected by genomics and explain their needs.
• To explore genomic testing and consider its benefits for patients.</td></tr>
<tr><th>Main activities</th><th>Resources required</th></tr>
<tr><td rowspan="4">The class watches the video ‘What is a genome?’ in Step 1.3 and takes notes. Briefly check understanding afterwards by asking students to clarify the difference between a gene and a genome.

In small groups, ask students to brainstorm as many different stakeholders in the field of genomics (check understanding of stakeholder if necessary). Then hand out the quiz from Step 1.9 ‘Meeting different stakeholders’ needs’ (or ask students to access the exercise on devices) and ask each group to discuss and complete the exercise.

Lead a class discussion on the exercise, asking if anything surprised them, or if they can think of any other stakeholder needs or solutions which were not included.</td><td>1. Device for watching videos.
2. Prepared stakeholder exercise sheets or devices to do it online.
3. Materials for writing reflections.</td></tr>
<tr><th>Assessment for Learning</th></tr>
<tr><td>Group exercise answers, individual assignments.</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>Watch the video on how genomic testing works in Step 1.10, then ask students to write a brief paragraph on the following questions:

• What are the benefits of genomic testing for patients?
• What are the barriers to genomic testing in healthcare and how might these be overcome?</td></tr>
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Lesson 2 plan

<table>
<tr><th>Starter activity</th><th>Learning objectives</th></tr>
<tr><td>Recap the learning from last week with a brief verbal quiz. Ask students to define genomic sequencing and list everything they remember about it from the last lesson.</td><td>• To compare the benefits and drawbacks of genomic sequencing.

• To reflect on the ethical challenges of genomics.</td></tr>
<tr><th>Main activities</th><th>Resources required</th></tr>
<tr><td rowspan="5">Divide the class into two groups and explain that one is going to research the benefits of genomic sequencing/testing, and the other will research the drawbacks.

Groups should take into account ethical considerations, and give relevant examples from the media. Information in Steps 1.11 and 1.12 will be useful sources. Monitor the research process and elicit relevant ideas via discussion (e.g. ‘designer babies’, equality, data protection).

After group research is finished, hold a vote in which students decide whether or not they would choose to have their genome sequenced.

Each group then presents their findings and arguments to the other.

After this, hold another vote and compare how responses have changed. Ask students who have changed their vote to discuss why they have done so.</td><td>1. Devices for performing research.
2. Materials for collecting and presenting research.</td></tr>
<tr><th>Assessment for Learning</th></tr>
<tr><td>Contribution to group work, votes and discussions.</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>Students discuss the following question in pairs:

• Do you think there is a risk that patients may confuse a genomic risk (identified through testing) with a diagnosis?
• What are the implications of this?</td></tr>
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Lesson 3 plan

<table>
<tr><th>Starter activity</th><th>Learning objectives</th></tr>
<tr><td>Ask students to spend a few minutes looking up the 100,000 genomes project.

Lead a brief class discussion on the benefits that having large amounts of genomic data for the improvement of healthcare.</td><td>• To produce a report detailing the My Cancer, My DNA project.

• To consider the implications and needs for patient care in genome sequencing.

• To describe possible misconceptions about genome sequencing and how these could be addressed.</td></tr>
<tr><th>Main activities</th><th>Resources required</th></tr>
<tr><td rowspan="3">In pairs, students will research and complete a brief individual report on the My Cancer, My DNA project.

Reports should include the following:

• The aim of the project
• A description of the process
• The findings
• A summary

After students have completed their reports, ask the following questions:

• Drawing on what you have learned in this course so far, what would you tell a patient who was having their genome sequenced?
• What misconceptions do you think they might have, and how would you address these?

This could be in the form of a brief whole class discussion, or (if safe and appropriate) students could role play the situation in pairs.</td><td>1. Devices for researching genomic projects.
2. Materials for writing reports (including frames or templates if helpful).
3. Space for role plays if using.</td></tr>
<tr><td>Assessment for Learning</td></tr>
<tr><td>Reports, discussion contribution/role play and individual assignments.</td></tr>
<tr><td>Differentiation</td><td>Plenary</td></tr>
<tr><td>SEND: Teacher-led support, report frames or templates.
Low ability: Peer-learning.
Gifted and Talented: Peer-teaching.</td><td>Students write a short paragraph which details three things they have learned throughout the three classes.</td></tr>
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