3.1 What do you know about DNA and genetics?

Lesson outcomes

At the end of this activity students will be able to:

- share their knowledge of DNA, genetics and gene technology
- share their opinions about some current and contentious scientific issues.

Key vocabulary:

DNA, deoxyribonucleic acid, gene, genetics, paternity testing, mutation, double helix, chromosomes, Down syndrome, gene therapy, designer babies, GMO (genetically modified organism), GM food (genetically modified food), gene testing, in vitro fertilisation (IVF).

Equipment list

Graffiti walls

The CLASS will require:

- six sheets of poster or butcher paper
- three *graffiti walls*: have two sheets of poster or butcher paper in each area labelled with one of the three topics (DNA, Genetics, Gene technology)

Each GROUP will require:

- differently coloured marker for each student

Each STUDENT will require:

- *Science by Doing* ***Notebook***
- Internet access

Things to consider

This diagnostic assessment activity is designed to engage students and for the teacher to assess students' knowledge on the subject. If time is short you may consider running only one of the two activities.

Graffiti walls

- The graffiti walls will be displayed on the classroom walls throughout the unit, so encourage students to use large, clear writing.
- This activity works best with six groups with four-to-five students per group.
- Remind students there are no right or wrong answers at this stage. Explain you wish to understand what they already know about this topic.

Notebook: **What's your opinion?**

- Familiarise yourself with the digital resource to decide the best way to support your students' learning and manage internet access. The learning experience has been designed to put technology into the hands of the students, with the teacher taking a facilitating role.
- It is important to remind students that there is no right or wrong viewpoint for each issue. Students may have widely different opinions depending on their background, media exposure and religious beliefs. Explain that by the end of the unit, they will be better able to argue and justify their point-of-view.

Teacher content information

The Australian Academy of Science released a Q & A called Genetic Modification which provides a clear, concise description of genetic modification technology for Australians, including how it is used and how it is regulated (http://www.science.org.au/genetic-modification).

The NSW Government's Centre for Genetics Education (CGE) produces genetics fact sheets to help individuals, families and health professionals better understand genetic health information, testing techniques and the impact genetics has on health and the community (http://www.genetics.edu.au/publications-and-resources/facts-sheets).

In particular, you might like background material about:-

Genetic testing (http://www.genetics.edu.au/publications-and-resources/facts-sheets/fact-sheet-15-genetic-and-genomic-testing)

Pre-Implantation Genetic Diagnosis (PGD) (http://www.genetics.edu.au/publications-and-resources/facts-sheets/fact-sheet-29-preimplantation-genetic-diagnosis-pgd)

Lesson plan

Graffiti walls

Step 1: Explain that students will be learning about DNA and genetics. What do they know already? You may pose the following questions from the *Student Guide*:

- How do we inherit characteristics from our parents?
- What do people mean when they say 'it's in his/her genes'?
- What is gene technology?

Step 2: Outline the activity in the *Student Guide* and invite students to form six groups of four to five students.

Step 3: Ask groups to complete the ***Notebooking*** step, deciding as a class how much time they will need (usually about 10-to-15 minutes).

Suggested question/s:

1. What do the images show?
2. How do they relate to the topic?
3. What else do you know about each of the three topics?

Step 4: Distribute markers to groups. Assign groups to *graffiti walls* and ask students to write clearly or draw what they know about the topic on that wall. They can write in any direction or anywhere on the paper, as shown in the *Student Guide*. Each student must contribute.

Step 5: Move groups to a different graffiti wall after an agreed period (5-to-10 minutes).

Step 6: Repeat **Step 5**.

Step 7: When groups have completed all three topics, select groups to present the information on their last *graffiti wall* to the class**.**

Suggested question/s:

- Can you tell me about some of the information on your wall?
- Can you tell me about what you wrote?
- Is there anything on your wall you would like to know more about?

What's your opinion?

Step 1: Explain that students will be exploring some contentious scientific issues that are often in the media. During the unit they will explore how characteristics are inherited and they will learn how to argue their point-of-view on a scientific issue.

Step 2: Introduce the digital activity. Invite students to complete the ***Notebook*** task individually, as they work through each of the three scientific issues. They can use the **Hints** to get some ideas for positive and negative aspects of each issue.

Step 3: Explain to students that they will now show where they stand on each issue by taking up a position across the classroom. For each issue, invite students to stand at one end of the room if they agree, the other end of the room if they disagree, or somewhere across the continuum (middle of the room) if they have mixed feelings.

Step 4: For each issue, invite a few students, across the continuum, to explain their position to the class. Allow others to respond to their ideas.

Step 5: After the voting activity, encourage the class to ***Notebook*** any new ideas that they did not think of (you may wish to list ideas on a whiteboard during the voting activity).

Step 6: Explain to students that they will be revisiting some of these issues later in the unit, after they have learnt more about the science behind each issue. Collect and read the students' ***Notebook*** entries. Use their responses to plan how to accommodate and challenge prior knowledge during the unit.

Suggested question/s:

- Explain why you voted in that position?
- Who disagrees/agrees with that viewpoint? Why?

Follow up:

Use the information in the graffiti walls to plan how to accommodate and challenge prior knowledge during the unit.