**Activity**: **Exploring the impacts of biotechnology on society**

By the end of this activity, students should be able to:

* define biotechnology
* identify a range of recent biotechnology developments in New Zealand
* discuss current or potential positive and negative impacts of recent biotechnologies on society
* understand that biotechnologies can impact differently on different groups of people.

**Introduction**

There are numerous definitions of the term ‘biotechnology’. In the New Zealand curriculum, the definition is broad and includes examples of both ancient and modern biotechnologies.

**Get article**: [Definitions of biotechnology](https://www.sciencelearn.org.nz/resources/1202-definitions-of-biotechnology)

Biotechnology is a rapidly growing industry both in New Zealand and throughout the world. In New Zealand, research and development in this area has increased employment opportunities with huge benefits for our economy.

**Get article**: [Biotech in New Zealand](https://www.sciencelearn.org.nz/resources/2182-biotech-in-new-zealand)

Biotechnologies are often controversial because they involve using organisms or parts of organisms to make products. This raises many social and ethical issues, and people have many different views of what is acceptable and how new biotechnology developments may impact on people and the environment in the future. Public debate about biotechnology often features in the media, and it is important for people to develop their own informed view about potential impacts and acceptability.

The predominant view of what is acceptable in one country is often different in another country, and consequently, government policy and legislation varies. This impacts on progress in research and development in different countries and also on implementation, making some biotechnology developments accessible in some countries and not others.

**Get article**: [Impacts of biotechnology on society](https://www.sciencelearn.org.nz/resources/1209-impacts-of-biotechnology-on-society)

**What you need**

* A selection of images of different technologies
* A selection of articles on New Zealand biotechnologies
* Definitions of biotechnology

**What to do**

1. Show [image cards](#images), [slide show](https://www.sciencelearn.org.nz/embeds/103-exploring-the-impacts-of-biotechnology-on-society-slide-show) or examples of different technologies, including biotechnology. Have students identify what they think are biotechnology examples and explain their decisions. As a result of the discussion, have students ‘think, pair, share’ a possible definition for biotechnology and record these on the whiteboard or a large sheet of paper.
2. Refer to [Definitions of biotechnology](https://www.sciencelearn.org.nz/resources/1202-definitions-of-biotechnology) and have students compare their definitions with these published versions and identify the key elements of biotechnology. Decide on a class definition that you will use in this activity (possibly the New Zealand Technology Curriculum definition), and write this on the board.
3. Select a range of news articles of interest to your students or relating to a particular unit or theme that you are studying and ensure the level is appropriate. A selection of article links is included below.
4. Allocate each student or group a different article or topic. You could print the pages to hand out to students, provide a link or get students to search the Science Learning Hub website themselves using the search function.
5. Have students read and discuss the articles in groups and record the following:

* Why is this an example of biotechnology, according to the class definition?
* Describe a possible positive and negative impact of this biotechnology on society and justify your position.

1. Have students share their discussion outcomes with the class. You could extend the discussion and allow groups to add to others’ possible impacts and/or state an alternative view regarding whether they consider an impact to be positive or negative and why.

**Discussion questions**

* What are the benefits of this biotechnology?
* What groups of people will benefit and how will they benefit?
* What possible harm could this biotechnology cause?
* Who could be harmed by this biotechnology?
* What possible long-term benefits and/or harm could this biotechnology cause?
* **Examples of New Zealand biotechnology on the Science Learning Hub**

Topic: [www.sciencelearn.org.nz/topics/biotechnology](http://www.sciencelearn.org.nz/topics/biotechnology)

Search: [www.sciencelearn.org.nz/search?term=biotechnology](http://www.sciencelearn.org.nz/search?term=biotechnology)

* **Developing a Mānuka honey bandage to help heal wounds**

[www.sciencelearn.org.nz/resources/1700-honey-to-heal-introduction](http://www.sciencelearn.org.nz/resources/1700-honey-to-heal-introduction)

* **Changing fish waste into cosmetics**

[www.sciencelearn.org.nz/videos/1172-changing-fish-waste-into-cosmetics](http://www.sciencelearn.org.nz/videos/1172-changing-fish-waste-into-cosmetics)

* **Using a microorganism to reduce methane emissions of sheep to lower greenhouse gas emissions**

[www.nzherald.co.nz/environment/news/article.cfm?c\_id=39&objectid=10598534](http://www.nzherald.co.nz/environment/news/article.cfm?c_id=39&objectid=10598534)

* **Functional foods and prototypes**

[www.sciencelearn.org.nz/resources/1069-prototypes-of-functional-foods](http://www.sciencelearn.org.nz/resources/1069-prototypes-of-functional-foods)

* **Distinguishing native bird species, such as takahē and pūkeko, using DNA barcoding**

[www.sciencelearn.org.nz/resources/1939-barcoding-new-zealand-swamp-hens](http://www.sciencelearn.org.nz/resources/1939-barcoding-new-zealand-swamp-hens)

* **Introducing an Irish wasp to control the clover root weevil**

[www.sciencelearn.org.nz/resources/1739-irish-wasp-to-the-rescue](http://www.sciencelearn.org.nz/resources/1739-irish-wasp-to-the-rescue)

