Introduction to the Biotechnology Supplement
What is Biotechnology?

“Any technological application that uses biological systems, living organisms or derivatives thereof, to make or modify products or processes for specific use.” [1]

What are the historical uses of biotechnology?

Food Production

- Bread
- Yogurt
- Cheese
- Beer
- Wine
What are the historical uses of biotechnology?

Waste Management
- Composting plant waste
- Sewage treatment
- Animal waste
What are the historical uses of biotechnology?

Agriculture

• Artificial selection
• Cultivation of food crops
• Absorbing concentrated contaminants such as salt from agricultural fields
What are the recent uses of biotechnology?

• Advances in genetics have led to the identification of specific genes or larger pieces of DNA that are of interest to scientists

• These genes can be removed from the organisms where they occur naturally and inserted into other organisms that don’t normally contain this particular piece of genetic information

• This process is called genetic engineering
How has genetic engineering affected agriculture?

Inserting specific genes can:

• Allow plants to be resistant to large applications of pesticides
• Allow plants to tolerate environmental stress such as drought
• Increase the nutritional value of crops
• Allow unacceptably high levels of pesticides to be detected on food crops
How has genetic engineering affected industry?

Inserting specific genes can be used to:

• Improve the efficiency of the waste treatment
• Make consumable goods
• Test soil, air and water for contamination
• Produce food supplements
How has genetic engineering affected the pharmaceutical field?

Inserting specific genes can be used to:

• Mass produce drugs such as penicillin and cortisone
• Make diagnostic lab tests
• Produce human proteins for hemophiliacs and diabetics
• Produce and convey vaccines
How might advances in biotechnology affect me?

Already you are affected by biotechnology because:

- 80% of cotton is genetically modified so you are likely to be wearing genetically modified fibers
How might advances in biotechnology affect me?

Already you are affected by biotechnology because:

- More than 125 approved drugs are produced using genetic engineering
How might advances in biotechnology affect me?

Already you are affected by biotechnology because:

- Much of the soybean, corn, canola and other common food crops are grown from genetically modified seeds
How might advances in biotechnology affect me?

It is possible biotechnology may be used to:

- Clean up environmental toxins in the air, soil and water
How might advances in biotechnology affect me?

It is possible biotechnology may be used to:

- Preserve genetic diversity
How might advances in biotechnology affect me?

It is possible biotechnology may be used to:

- Allow for the sustainable production of wood
How might advances in biotechnology affect me?

It is possible biotechnology may be used to:

- Provide biofuel from plant and animal waste
How might advances in biotechnology affect me?

It is possible biotechnology may be used to:

- Offer advances in medicines and medical treatments
How might advances in biotechnology affect me?

- Genetically engineered organisms do not go through some of the evolutionary constraints that screen out naturally selected organisms.
How might advances in biotechnology affect me?

• Selected genes can escape from their inserted location to become a part of other organisms in an ecosystem
How might advances in biotechnology affect me?

- Genetically engineered crops may increase the resistance of some pest species
How might advances in biotechnology affect me?

• No international laws or oversight committees exist yet for biotechnological practices
What interests you about biotechnology?

• Which processes would you like to learn to perform?
• What topics would you like to learn more about?
• What do you think about the continued or increased use of biotechnology?
• What aspects of biotechnology would you like to see regulated, researched, supported or advanced?