**Biotechnology Unit**: 8.L.2

* **Essential Understanding**: Understand how biotechnology is used to affect living organisms.
  + Biotechnology can affect living organisms either directly or indirectly.

**Essential Question for unit**: What are the pros and cons of biotechnology?

**Essential Standard: 8.L.2.1**: Summarize aspects of biotechnology including:

* + Specific genetic information available
  + Careers
  + Economic benefits to NC
  + Ethical issues
  + Implications for agriculture
* **Essential Understanding #1**: \_\_\_\_\_\_\_\_\_\_\_\_ is essential to science for such purposes as sample collection and treatment, measurement, data collection and storage, computation, and communication of information.
* **Essential Understanding #2**: \_\_\_\_\_\_\_\_\_\_\_ biotechnology was (and still is) the use of living organisms to solve problems and make useful products.

Examples: Domesticated crop plants and farm animals through selective breeding

Yeast to make bread rise and produce wine

**Main Essential Question**: What are the pros and cons of biotechnology?

**Essential Questions**:

* Is it ethical to create/design living organisms?
* Should you know/have a say in which foods are genetically altered before eating them?
* How might advances in biotechnology affect society?
* How have we benefitted from biotechnology?
* Do the benefits of genetically altered food outweigh the risks?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**New Biotechnology**:

* Involves the use of \_\_\_\_\_\_\_\_\_\_ cells and their molecules to \_\_\_\_\_\_\_\_ problems and make \_\_\_\_\_\_\_\_\_\_ products.

**Biotechnology** is not just \_\_\_\_\_\_\_ technology, but \_\_\_\_\_\_\_\_\_\_.

* \_\_\_\_\_\_\_ basic kinds of biotechnology tools
* Working with \_\_\_\_\_\_\_\_\_. – selective breeding
* Working with \_\_\_\_\_\_\_\_\_\_
* Working with \_\_\_\_\_\_\_\_ - \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_: changes the genetic material of a living organism.

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_**

* Many industries are finding uses for new tools provided by biotechnology.
* \_\_\_\_\_\_\_\_\_\_\_\_ care industry: diagnose, treat and prevent disease.
* \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ industries are rapidly adopting the tools of biotechnology.
* \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_where living cells and their molecules can help us to clean up our environment, detect environmental contamination, reduce our dependence on petroleum.

**\_\_\_\_\_\_\_\_\_\_\_\_ World**

* Emerging world of biotechnology which gives us advances and new careers in medicine, agriculture, genetics and food science.

Even though biotechnology has benefitted NC in many ways, it has raised \_\_\_\_\_\_\_\_\_ issues.

**How does biotechnology affect us?**

* Through food, water and shelter
* Modern uses: Some examples:
  + penicillin,
  + human insulin for diabetes,
  + combat crime through DNA testing and forensic testing
  + Removing pollution from soil and water (bioremediation)
  + Improving quality of agricultural crops and livestock.

New areas that are controversial:

Genetic Modification

Cloning

Vocabulary: biotechnology, organism, microorganism, genetic engineering, selective breeding, bioengineering, bioremediation, clone, ethics, genetic modification,

Vocabulary from readings: genes, behavioral traits, physical traits, somatic cell, herbicides, enucleate, gene gun, specialized cells, unspecialized cells, undifferentiated cells, embryonic stem cells, adult stem cells