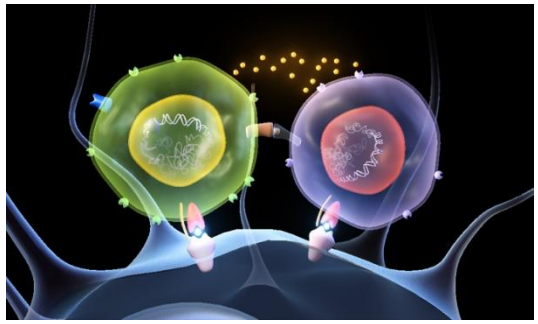
Biotechnology



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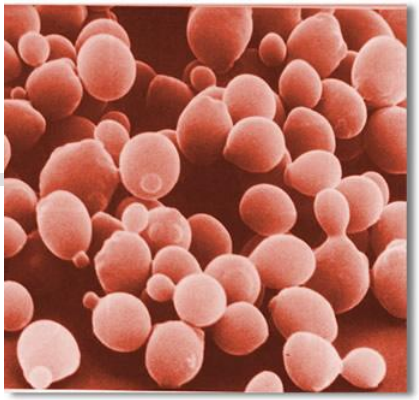
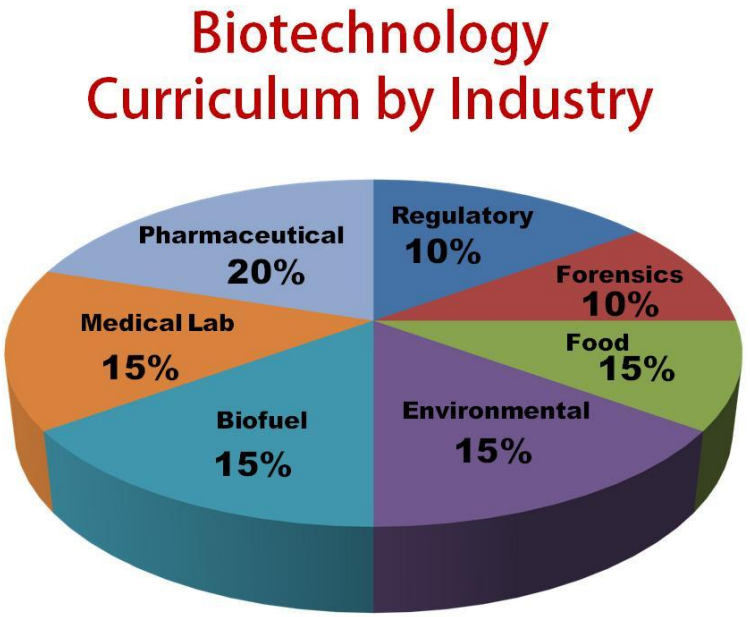


- The manipulation of biological processes or organisms to achieve a goal
- <u>Applications of Biotechnology:</u>
  - Biofuels
  - Genetic Engineering
  - Bioremediation
  - GMO's
  - Cloning



Biofuels

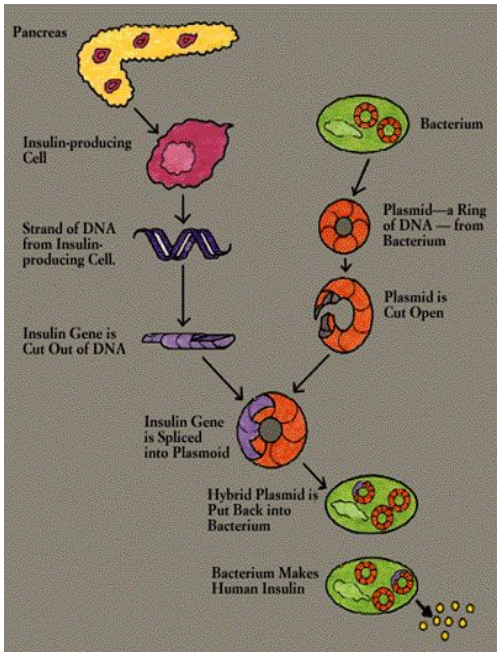
- A type of energy derived from renewable plant and animal materials or organic matter.
- Examples: Ethanol and Biodiesel

Genetic Engineering

- DNA manipulation of cells or organisms
  - Genes are added, deleted or changed

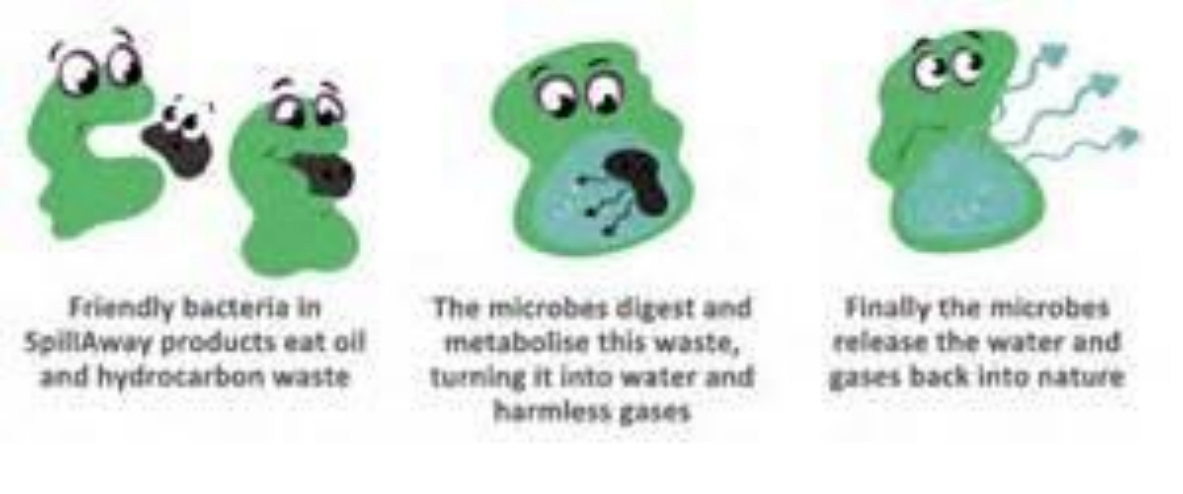
Genetically Engineered Insulin

- The gene for human insulin can be inserted into bacteria.
- Bacteria are able to produce human insulin.



Bioremediation

- Using microbes and other living things to clean up the environment
- Example:
  - Genetically engineered Bacteria can be used to clean up an oil spill.



Genetically Modified Organisms

- An organism that has been changed by genetic engineering
- Also called “GMO’s”

Genetically Modified Plants

- The goal is to improve crops and our food.

Trait	Advantage	Sample Product
Pest-Resistance	Less damage by insect, virus, bacteria, etc.	Corn
Herbicide-Resistance	Hebicides will kill only weeds, not crops	Cotton
Delayed Ripening	Can be shipped with less damage	Tomato
Miniature Size	Improved eating quality	Watermelon
Improved Sweetness	Better tasting	Sweet peas
Cold-Resistance	Withstands freezing and thawing	Strawberries
High Starch	Absorbs less oil when fried	Potato
Polyester Gene Added	Better fiber properties	Cotton
Growth Hormone Added	Faster growth	Salmon
Hepatitis B Virus Protein Added	May provide immunity to Hepatitis	Banana

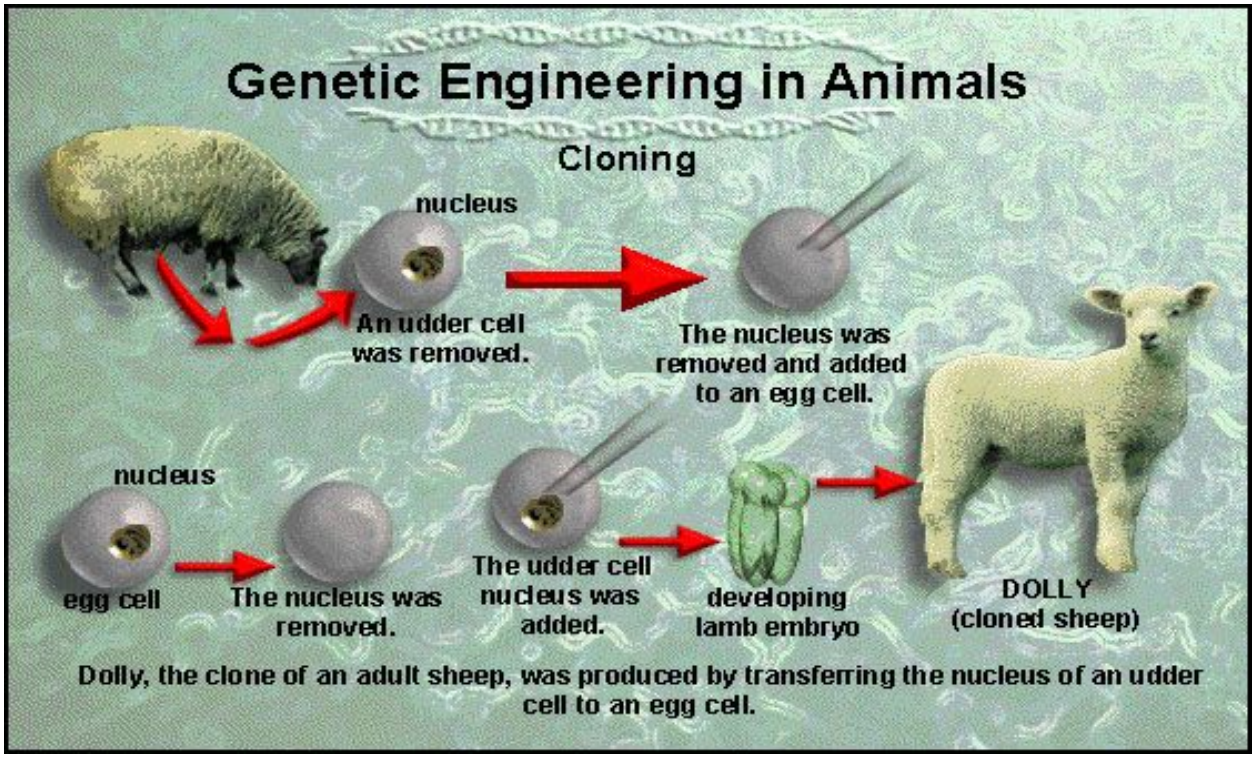
Genetically Modified Animals

- Used to produce beneficial proteins, drugs, tissue for transplants

- Examples:
  - Mice used to study medicine, cancer, etc.
  - Zebrafish made into “Glo-fish”

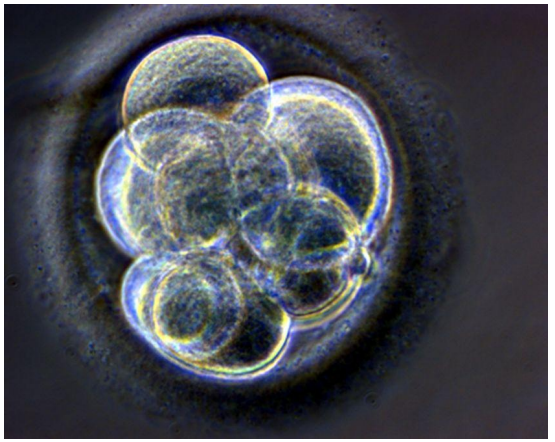
Cloning

- Organisms that are genetically identical
  - Cloning began in 1952 with frogs
  - **Dolly** was the first animal cloned from adult cell



Biotechnology Ethics

- Society's responsibilities regarding uses of biotechnology



Biotechnology

Pros (Good)	Cons (Bad)
1. 2. 3.	1. 2. 3.

Brainstorm with your partner about 3 ways that Biotechnology can be good and 3 ways it can be bad.

Biotechnology Protest Sign

- Choose one application or use of Biotechnology (Example: Cloning)
- Decide if you are FOR or AGAINST it.
- Create a Protest Sign that clearly identifies:
  - What the application/use is
  - Whether you think it is good or bad
  - WHY you are for or against it
  - Use a catchy slogan if possible