

Science 30	Unit A: Biology
Lesson 14 - Genetic Technologies	84 mins

Beneficial Mutations

- Mutations in animals and insects for camouflage.	White rabbits in winter, all green insects... bacteria resistance....
--	---

Bacteria Resistance

<ul style="list-style-type: none"> - Bacteria that are not affected by antibiotics <p>Transformation in Bacteria</p> <ul style="list-style-type: none"> - Bacteria gaining DNA - Dead Bacteria <ul style="list-style-type: none"> - Plasmids 	<ul style="list-style-type: none"> - Occurs when bacteria are not fully treated.. DRAW!! - DNA fragments are taken in and placed in their DNA (from dead bacteria) - Plasmids are self replicating pieces of DNA that can be passed between living bacteria... like a virus... but beneficial...
--	---

Artificial Selection

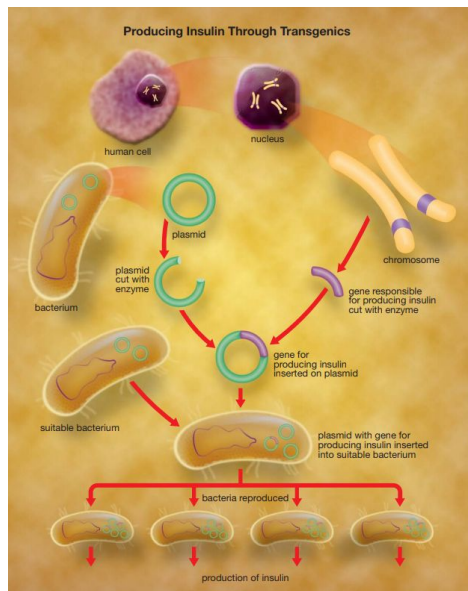
- Only allowing the best of the best to breed	<p>Weed turned into:</p> <ul style="list-style-type: none"> - Cabbage - Lettuce - Broccoli - Brussel Sprouts - Colliflower....
---	---

DNA Fingerprinting

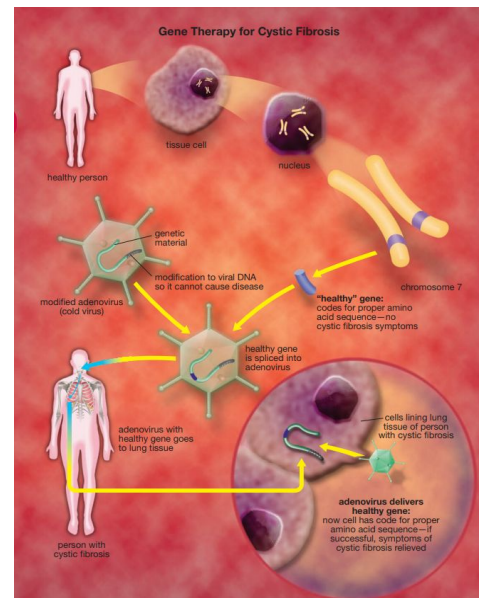
<ul style="list-style-type: none"> - a unique pattern of bands created when DNA is processed by running it through a special gel A DNA fingerprint can be used to match individuals to biological remains. 	
---	--

Transgenics

- The inserting of genes from one organism into another.
- recombinant DNA: DNA containing the genes spliced from two or more organisms
- Creates Genetically Modified Organisms (GMOs)



- Make mice and rabbits that glow in the dark (jellyfish DNA)
- Make Bacteria make insulin (human DNA)
- Genetic Engineering and Gene Therapy
- Bioweapons...



CRISPR - Cas9

<https://www.youtube.com/watch?v=jAhjPd4uNFY>

Science 30 - Lesson 14 - Genetic Technologies

Name: _____

1) Match the following terms with the example that best describes each term.

(transgenics, recombinant DNA, genetic modification, gene therapy, DNA fingerprinting)

a) A farmer uses a plastic bag to collect pollen from his fastest-growing corn plants and then sprinkles some pollen on the corn silk of his most disease-resistant corn plants. He collects the seeds produced from this cross-pollination and grows his next crop from these seeds.

b) Enzymes are used to cut up DNA left at a crime scene, and then the DNA is run through a gel. The distinctive pattern of bands produced is used to compare with the patterns of suspects in the crime.

c) A modified virus is used to deliver a non-defective version of the gene that causes cystic fibrosis in body cells.

d) A researcher uses enzymes to cut some human DNA into smaller pieces and then uses different enzymes to splice the DNA into a bacterial plasmid. The new DNA is a combination of bacterial DNA and human DNA.

e) A gene from the bacterium *Bacillus thuringiensis* (Bt) produces a protein with insecticidal properties. The bacterial gene is isolated and spliced into the DNA of a cotton plant. When the cotton plant is grown, it produces the bacterial insecticide.

2) List some potential advantages of genetically modified plant crops.

3) Describe one possible risk of applying transgenics to produce a new type of organism.

4) Explain why virus vectors need to be used in gene therapy.

5) A sample of biological material was left at a crime scene. The DNA from this sample was isolated and a DNA fingerprint was created. The three crime suspects all volunteered to let their DNA be taken, and a DNA fingerprint was created for each person. Compare the unique banding pattern produced for each suspect to identify the suspect who was at the crime scene. This information can be seen in “DNA Fingerprint Patterns.”

DNA Fingerprint Patterns



6) Explain why a person who receives gene therapy will not pass on to her offspring the repaired gene that has been inserted into her cells by a virus.

7) The gene that produces a blood-clotting factor that some people who have hemophilia lack has been isolated. Explain the steps used to develop a strain of genetically engineered bacteria that produce large amounts of this factor to treat people with hemophilia.

8) Most of the citizens of Iceland have volunteered to have their genetic information collected and compiled in an electronic database. The genetic makeup of Iceland’s population has changed little since the Vikings colonized the island in the ninth century. This history makes it easier for researchers to identify gene mutations that may be associated with diseases. Describe one risk and one benefit of a nation possessing a gene bank for its citizens.
