WARM UP

1. Take out your laptop and Chapter 12 Notes
2. Log in to Google Classroom
3. Wait for me to post the quick quiz!

AGENDA

- Warm up- Quick Quiz
- Chapter 13 Notes: Genetic Technology
- Genetic Engineering Lab and summary questions (on google classroom)
- Chapter 12 & 13 Quizlet Live (Combined)

- **Homework: 13.2 Section Assessment (pg. 348 #105)**

Start studying for your final!! Study guide posted on website

Monday, December 17th - Finals

A1: 7:30 - 8:50
B1: 8:55 - 10:15
Break 10:15 - 10:25
4th - Study Hall 10:30-11:45

Tuesday, December 18th- Finals

A2: 7:30 - 8:50
B2: 8:55 - 10:15
Break 10:15 - 10:25
4th period Final 10:30 - 11:45

Wednesday, December 19th- Finals (Last day of school)

A3: 7:30 - 8:50
B3: 8:55 - 10:15
Break 10:15 - 10:25
4th (Make up finals) 10:30 - 11:45

Red Track Finals:

Monday, December 17th:

English: 12:00 -1:20

Math: 1:30 - 2:50

Tuesday, December 18th:

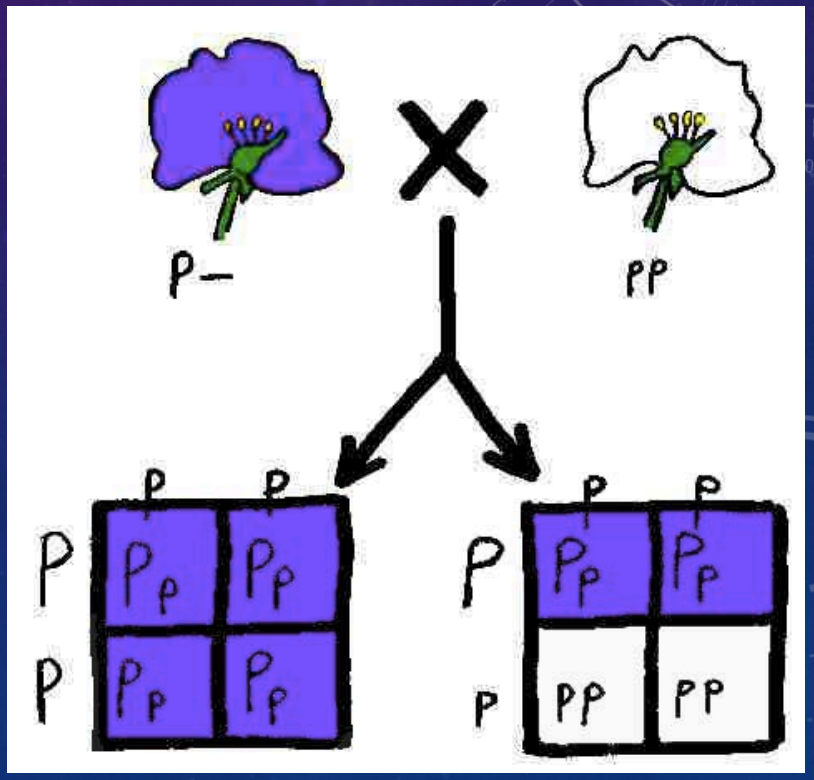
History: 12:00-1:20

Spanish: 1:30 - 2:50

Wednesday, December 19th:

Make-up Finals: 12:00

CH 13: GENETIC TECHNOLOGY



SELECTIVE BREEDING & INBREEDING

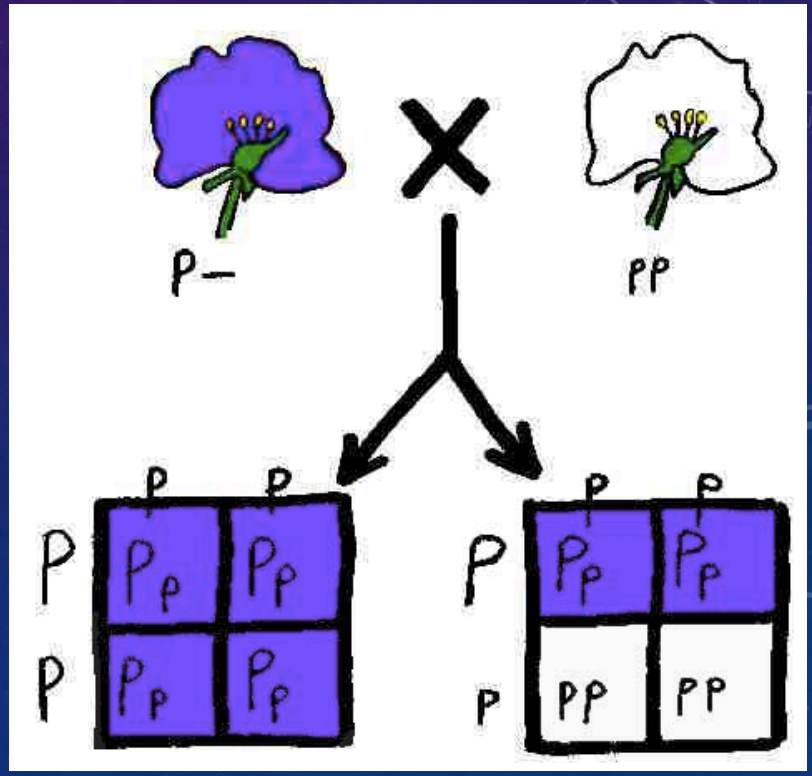
- **Selective breeding:** When humans select plants/animals with certain qualities and breed them together
  - GOAL: To increase frequency of desired alleles in a population

- **Interbreeding**: Breeding between closely related individuals
  - Creates offspring homozygous for most traits- “pure breds” BUT can bring out harmful recessive traits
  - Closely related individuals will have similar genetics, so its more likely that both the parents will carry a harmful recessive allele.

https://youtu.be/fHS-OY9XDZc

HOW CAN WE DETERMINE THE GENOTYPE FOR SELECTIVE BREEDING?

- Important because you want to know what to breed together to have the best chance at passing on the trait you want to the next generation.
- **Test cross**- cross a known genotype (homozygous recessive) with an unknown genotype.



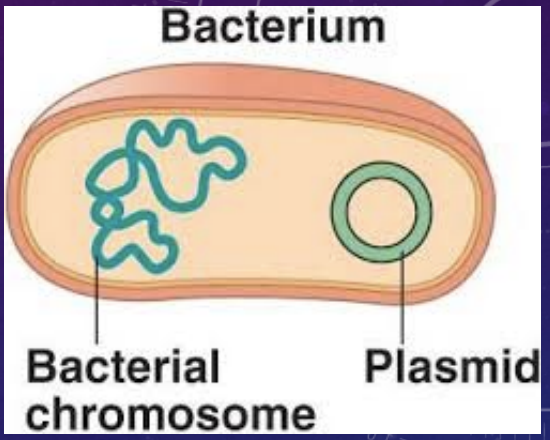
GENETIC ENGINEERING

- The process of manipulating genes- Cut DNA from one organism into small fragments and insert them into a host organism (same or different species)
- Recombinant DNA- DNA that has been formed artificially by connecting DNA fragments from different sources.
- Transgenic organism- Organisms that contain the foreign DNA as part of their genome
- Clones- Genetically identical copies (can be of a gene or an entire organism)

https://www.youtube.com/watch?v=3IsQ92KiBwM

STEPS OF GENE CLONING

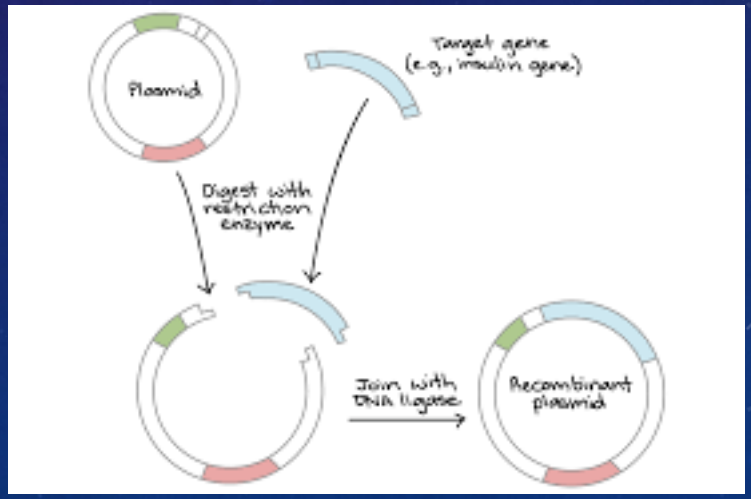
1. Isolate desired gene by using restriction enzymes to cleave DNA
   - Restriction enzymes cut DNA at specific nucleotide sequence



2. Cut open plasmid using SAME restriction enzyme and insert the gene

- Plasmid: Circular DNA in a bacteria cell
- Another enzyme (DNA ligase) bonds the gene seamlessly

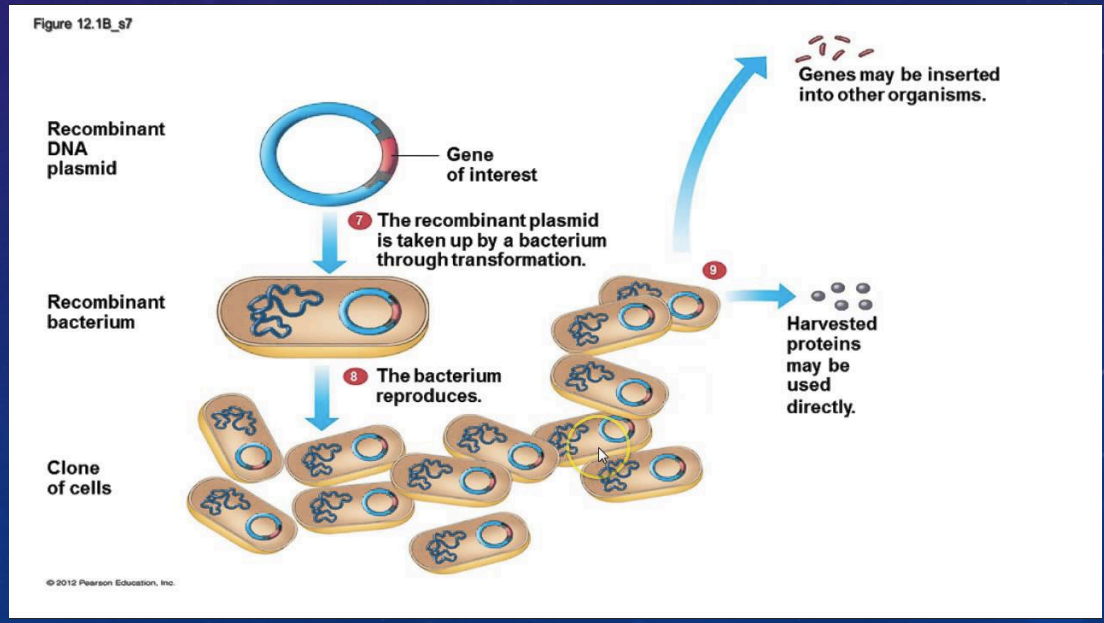
  Into the plasmid



3. Put it into a bacteria cell using a vector (plasmid, virus, gene gun)
4. Allow it to copy itself (gene clones) and make protein
    - Get the protein out of the bacteria cell and purify it
    - Can be used for experiments, given to patients, etc.

http://www.hhmi.org/biointeractive/

genetic-engineering



GENETIC ENGINEERING APPLICATIONS

- Genetically modified bacteria for sewage treatment
- Agricultural and food industry
  - Better tasting, resistant to disease, stay fresher longer
- Medicine and gene therapy
  - Insulin, human antibodies, hormones, etc.
- Production of chemicals used for industry
  - EX: E. coli bacterium modified to produce indigo dye used to color denim blue genes

HUMAN GENOME PROJECT

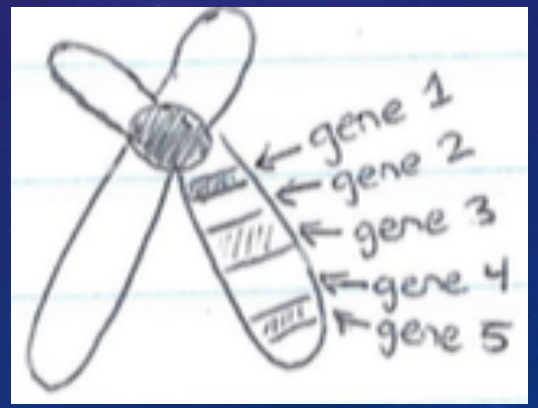
- Map of the approximately 20,000 genes on 46 human chromosomes (around 3 billion base pairs)
- Cut DNA into fragments (restriction enzymes),

fragments are cloned and sequenced, aligned by overlapping sequences to make a longer fragment

- **Linkage map**: Genetic map that shows the location of

genes on a chromosome

https://youtu.be/AhsIF-cmoQQ



APPLICATIONS OF THE HUMAN GENOME PROJECT

- **Diagnosing genetic disorders**- If you know exactly where a gene is and what mutation causes the disorder, you can diagnose even before birth.
  - Analyzing cells found in the fluid surrounding the fetus.
- **Gene therapy**- Inserting normal genes into human cells to correct genetic disorders
  - Most successful on single gene defects
- **DNA fingerprinting-** Used in forensic science to determine whether a suspect was at the scene of a crime

https://youtu.be/AkBUriMK9u8