October 7, 2020

Welcome to science class!
ZOOM MEETING EXPECTATIONS

MICROPHONE 🎤
When you enter the virtual meeting, mute yourself (if you aren't already). You can unmute yourself when it is your turn to speak.

ETIQUETTE 🎾
Always be polite and respectful, pay attention to the speaker, and use the digital platform and its features appropriately.

CONTRIBUTIONS 💬
When you have something to contribute to the discussion, type it in the chat box OR use the "raise hand" button for the teacher to give you permission to unmute yourself so that you can speak.

SOUND 🎧
If you can, wear headphones so you can hear better. Try your best to find a quiet place, free from distractions.

QUESTIONS 🙋‍♀️
When you have a question, type it in the chat box OR use the "raise hand" button so that you can unmute and ask your question.
Wednesday, Oct. 7, 2020

I can demonstrate my knowledge of the science standards covered during the past nine weeks on the Quarter 1 assessment.
I can construct and use a pedigree to explain how a trait or disease is passed from one generation to the next in a family.
Genetics is the study of DNA and the transfer of information from one generation to the next.

DNA is the material located in the nucleus of a cell that codes for all of the information the body will need to develop.

Transcription is the process by which DNA is turned into RNA for the purposes of replicating the material.

A mutation may occur when DNA is translated incorrectly or in exposure to some kind of mutagen.
ESSENTIAL QUESTIONS

1. How are traits passed from parents to offspring?

2. How can we determine the possible traits from a genetic cross of two organisms?
AGENDA

✔ Vocabulary
✔ Review Notes
✔ Assignment
Vocabulary REVIEW
Heredity

The transfer of traits from one generation to another generation.

Genetics

The study of how traits transfer from one generation to another generation.
Inherited Traits

Genes

• Genes determine traits.
• A stretch of DNA on a chromosome with instructions for one trait.
• Like chromosomes, genes also come in pairs.
• Each parent has two copies of each of their genes.
• Each parent passes along just one copy to make up the genes of the offspring.
Genetics

Vocabulary

• **Genotype** - the genetic makeup of an organism.

• **Phenotype** – the appearance of an organism based on its genotype, plus environmental factors
Alleles

- Variants (differences) in a gene
- Occurs on a fixed spot on a chromosome
- In humans an allele might indicate blood type, colorblindness, or many other traits.

What does the allele indicate in this pair of homologous chromosome?
Dominant/Recessive

- Describes how likely it is for certain phenotype traits to pass from parent to offspring
- **Dominant Alleles** – show their effect with only one copy of the allele
- **Recessive Alleles** – show their effect with two copies of the allele

Blue Eyes - Recessive

Brown Eyes - Dominant
Genetics

Inherited Traits

• Genetically determined characteristics

• Come from both parents, so offspring has a combination of both parents’ genes.

• Examples: skin, hair, and eye color, height, and freckles
Genetics

- **Homozygous Dominant** – carries two copies of the same dominant allele (BB)
- **Homozygous Recessive** – carries two copies of the same recessive allele (bb)
- **Heterozygous** – carries two different alleles (Bb)

![Genetics diagram](image-url)
Pedigree

- Geneticists use charts called pedigrees to show how a trait is passed through generations of a family.
- A pedigree is a diagram that shows the phenotype of individuals of multiple generations of a family.
Pedigree

• A shape represents each individual.
  – Squares represent males.
  – Circles represent females.

• Lines connect the individuals to each other.
  – A horizontal line connecting a male and female represents marriage.
  – A vertical line and bracket connects parents to their children.
Pedigree

- The shapes are shaded to indicate whether members of that family possess a specific trait.
  - If an individual possesses a trait, its shape is shaded in.
  - If an individual does not possess a trait, its shape is not shaded in.
  - Some pedigrees represent carriers or heterozygous individuals by shading half the shape.
Pedigrees can help predict the genotype of family members.

If the geneticists know that a trait is dominant, all the family members that lack the trait must be homozygous recessive.

If parents express the trait but at least one of their children does not, then the parents must be heterozygous for the trait.

Pedigrees are only helpful in predicting genotypes of individuals for a trait that is controlled by a single gene.
Pedigree

- Pedigrees can predict how traits or diseases are inherited.
- Pedigrees can help determine whether the trait is dominant, recessive or X-linked by the pattern and frequency of the disease in a family.
Pedigree

- Autosomal dominant traits/diseases usually appear in every generation of a family.
• Autosomal recessive traits/diseases appear less frequently in generations of a family.
Recessive X-linked diseases appear more often in males.
A male will be affected if he inherits just one copy of the disease gene because males only have one X chromosome.
A heterozygous female that possesses or “carries” but does not express a recessive X-linked disorder is called a carrier.
Cystic Fibrosis is an autosomal recessive disease.

Write the possible genotype(s) of each individual below...

Possible Genotype(s) of Individual I - 1
Possible Genotype(s) of Individual I - 2
Possible Genotype(s) of Individual III - 1

Genotypes:
FF  Ff  ff
PEDIGREE

Cystic Fibrosis an autosomal recessive disease.

Define Carrier. Explain how to determine them in a pedigree...

Circle all the confirmed Cystic Fibrosis Carriers in the pedigree above.
SEX-LINKED TRAITS
Match the Genotype of each individual listed below:

Genotype of Individual I-1: $X^BY$
Genotype of Individual I-2: $X^bX^b$
Genotype of Individual II-2: $X^bX^b$

GENOTYPES
$X^BX^B$  $X^BX^b$  $X^bX^b$
$X^BY$  $X^bY$

COLORBLINDNESS PEDIGREE
Red-Green Colorblindness is an X-Linked Recessive Trait.

- Normal Vision Male: $X^BY$
- Normal Vision Female: $X^BX^B$ or $X^BX^b$
- Colorblind Male: $X^bY$
- Colorblind Female: $X^bX^b$
SEX-LINKED TRAITS

Calculate the probabilities if a colorblind father and a mother that is a carrier have children. Complete the Punnett Square.

Genotypes Gametes

\begin{array}{c|c|c}
\hline
& X^b & Y \\
\hline
X^bX^b & & \\
X^bY & X^b & \\
X^B X^b & X^B & \\
X^B Y & X^b & \\
X^B X^B & & \\
\hline
\end{array}

Red-Green Colorblindness is an X-Linked Recessive Trait.

Probability of having Colorblind Daughter

Probability of having Colorblind Son
Pedigree Genetics - October 7
Due: October 9th

https://docs.google.com/presentation/d/1n6IM1iSbbEmazziuYVNKsQokAH CpMYAn9rsXMnkhY2g/copy#slide=id.ga019b72032_0_8

Click the link, make a copy, complete the assignment, email it to mrs.yazzie2021@gmail.com
Emoji Genetics - October 6
Due: October 9th

https://docs.google.com/spreadsheets/d/1brDm-29_U7DK6ZGExpxyW9IANh1lxCz5xJnRgSwsXAM/copy#gid=1948032975

Click the link, make a copy, complete the assignment, email it to mrs.yazzie2021@gmail.com
Symbiosis Review - October 5

Click the link, make a copy, complete the assignment, email it to mrs.yazzie2021@gmail.com

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Pedigree Genetics - October 7
Due: October 9th

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Click the link, make a copy, complete the assignment, email it to: Ms. Etsitty
Exit Ticket

None today