

Genetics Review Assignment

1. Describe the shape of a DNA molecule. Use the following terms in your answer: sugar molecules, phosphates, double helix, nitrogen bases.

2. What does DNA stand for?

3. DNA Replication:
 - a. Write the steps of DNA replication.

 - b. Why is this an important process?

4. Add the pairs for the following DNA chain:

G

C

T

T

C

G

A

G

5. Which scientists discovered the structure of DNA?
6. Explain the relationship between DNA, genes and chromosomes.
7. Mendel discovered that in pea plants the green pea pod is dominant over the yellow pea pod.

Using *G* to represent the allele for green pods, and *g* to represent the allele for yellow pods, write the **genotypes** for:

- i a homozygous plant with yellow pods: _____
- ii a heterozygous plant with green pods: _____
8. John has genotype NN. His **genotype** would best be described as:
- A homozygous recessive
- B homozygous dominant
- C heterozygous recessive
- D heterozygous dominant
9. For each of the genotypes (AA, Aa or aa) below determine what the **phenotype** would be.

Purple flowers are dominant to white flowers.

PP _____ Pp _____ pp _____

Hairy knuckles are dominant to non-hairy knuckles in humans.

HH _____ Hh _____ hh _____

No-cleft chin is dominant. Cleft chin is recessive.

CC _____ Cc _____ cc _____

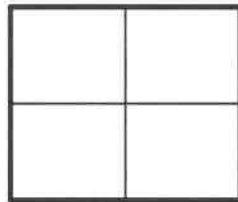
10. For each of the following write whether it is homozygous dominant, heterozygous or homozygous recessive.

- a) AA
- b) Ff
- c) Aa
- d) gg
- e) GG
- f) Pp
- g) li
- h) tt
- i) TT
- j) Tt
- k) aa

11. If mom and dad both have blue eyes, what is the probability of their child having brown eyes?

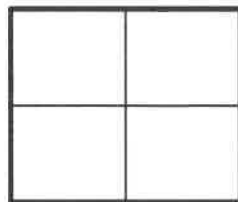
(B = Brown eyes, b = blue eyes)

- a) 100% b) 75% c) 50% d) 25% e) 0%



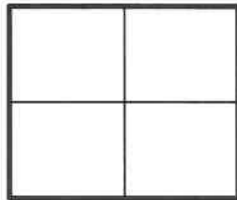
12. If mom is homozygous dominant and dad is homozygous recessive, what is the probability of their child having brown eyes? (B = Brown eyes, b = blue eyes)

- a) 100% b) 75% c) 50% d) 25% e) 0%



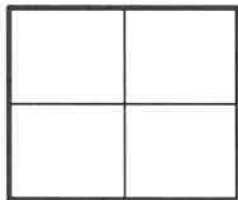
13. If mom is heterozygous and dad has blue eyes, what is the probability of their child having brown eyes? (B = Brown eyes, b = blue eyes)

a) 100% b) 75% c) 50% d) 25% e) 0%



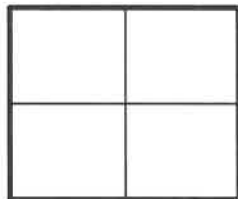
14. If mom is homozygous dominant and dad heterozygous, what is the probability of their child having brown eyes? (B = Brown eyes, b = blue eyes)

a) 100% b) 75% c) 50% d) 25% e) 0%



15. If mom and dad are both heterozygous, what is the probability of their child having brown eyes? (B = Brown eyes, b = blue eyes)

a) 100% b) 75% c) 50% d) 25% e) 0%



16. Widow's Peaks are dominant. Look at the phenotypes of Beyonce and Jay Z. If these two had children, could they have children with a widow's peak? Why or why not? Use a Punnett Square to explain your answer.



Name: _____

Date: _____

Life Science

Period: _____

Genetics

punnett square practice

1. Let's say that in seals, the gene for the length of the whiskers has two alleles. The dominant allele (W) codes long whiskers and the recessive allele (w) codes for short whiskers.
- a. What is the probability of producing offspring that have short whiskers from a cross of two long-whiskered seals, one that is homozygous dominant and one that is heterozygous? Show your work on the punnett square.

_____ % long whiskers

_____ % short whiskers

- b. If one parent seal is a heterozygous long-whisker and the other is short-whiskered, what is the probability that the offspring will have short whiskers?

_____ % long whiskers

_____ % short whiskers

2. In purple people eaters, one horn (H) is dominant and no horns (h) is recessive. Complete the punnett square to show the cross of two hybrid purple people eaters. Summarize the genotypes and phenotypes of the possible offspring.

Possible genotypes of offspring:

Possible phenotypes of offspring:

3. In cats, long hair (L) is dominant over short hair (l). Complete the punnett square to show a cross between two short-haired cats.

What is the probability that the parents will produce a short-haired kitten?

_____ %

4. In Noombats, yellow bellies (Y) are dominant over green bellies (y).

- a. Complete the punnett square to show a cross between a purebred yellow bellied noombat and a noombat that is a hybrid for belly color. What is the probability that the parents will have yellow bellied offspring?

_____ % yellow bellied

_____ % green bellied

- b. Is it possible for two yellow bellied noombats to have a green bellied child? Identify the genotypes of the parents and complete the cross on the punnett square.

- a. Genotypes of the parents:

_____ and _____

- b. Can the yellow bellied parents produce a green bellied child?

- c. If yes, explain how and identify what the probability would be.

Punnett Square Worksheet-Human Characteristics

Directions: Complete the following Punnett Squares. Be sure that you include the ratios of the genotypes (and the words used to describe those alleles) and phenotypes of the characteristics.

1. B= Brown eyes b= blue eyes Mom= Bb Dad= BB

What are the eye color possibilities if they chose to have children?

Genotypes

Phenotypes

2. Curly hair is recessive, and straight hair is dominant. A woman with curly hair marries a man who is homozygous dominant for straight hair. Predict the outcomes for their children.

Genotypes

Phenotypes

3. Black hair is homozygous dominant. Brown hair is heterozygous. Blonde hair is homozygous recessive. (This is an example of incomplete dominance.) A woman with brown hair marries a man with brown hair. What are the possible outcomes for their kids?

Genotypes

Phenotypes

4. Attached earlobes are dominant over free hanging earlobes. Complete the Punnett Square for the following individuals: Mom=BB and Dad=bb

Genotypes

Phenotypes

5. Incomplete dominance problem: T=tall (5'11"-6'2"); Tt=medium height (5'4"-5'10"); t=short (5'3" or smaller)

Mom= 5'5"

Dad= 6'0"

What are the possible height outcomes of their children?

Genotypes

Phenotypes

6. Freckles are recessive. No freckles are dominant.

Mom = heterozygous; Dad = homozygous recessive

Possible outcomes for kids?

Genotypes

Phenotypes

16. What polymer makes up our characteristics (eye color, hair color, etc)? _____
17. The order of nitrogen bases (A,T,C,G) determines the type of _____ that is assembled.

Protein Synthesis Review Worksheet

1. How are DNA and mRNA alike?
2. How are DNA and mRNA different? Fill in the table below.

DNA		mRNA
	Shape	
	Nitrogen bases	
	Sugars	
	Location	

Transcription: DNA to mRNA:

1. How many strands of mRNA are transcribed from the two "unzipped" strands of DNA? _____
2. If the following were part of a DNA chain, what mRNA bases would pair with it to transcribe the DNA code onto mRNA? G-G-A-T-C-G-C-C-T-T-A-G-A-A-T-C

3. If DNA is described as a double helix, how should mRNA be described? _____
4. How are the accuracy of DNA and mRNA codes assured? _____

Translation: mRNA to PROTEIN:

5. Name and describe the three types of RNA's involved in protein synthesis?
6. What is located at EACH end of a tRNA molecule? _____
7. Where must an mRNA attach before protein production can begin? _____
8. How many bases are needed to specify an mRNA codon? _____
9. If a strand of mRNA contain the sequence, U-A-G-C-U-A-U-C-A-A-A-U, what tRNA anticodons would be needed to translate the sequence? _____
10. How does mRNA get out of the nucleus? _____
11. What is the difference between an amino acid and a protein? _____
12. What type of bond is formed between amino acids? _____

