PUNNETT SQUARES— CROSSES INVOLVING ONE TRAIT

Name _____

In a certain species of animal, black fur (B) is dominant over brown fur (b). Using the following Punnett square, predict the genotypes and phenotypes of the offspring whose parents are both Bb or have heterozygous black fur.

	B	b
B		
b		

Genotypes: _____% homozygous black fur (BB)

_____% heterozygous black fur (Bb)

_____% homozygous brown fur (bb)

Phenotypes _____% black fur

_____% brown fur

Now do the same when one parent is homozygous black and the other is homozygous brown.

Genotypes: _____% homozygous black fur (BB)

_____% heterozygous black fur (Bb)

_____% homozygous brown fur (bb)

Phenotypes: _____% black fur

_____% brown fur

Repeat this process again when one parent is heterozygous black and the other is homozygous brown.

Genotypes: _____% homozygous black fur (BB)

_____% heterozygous black fur (Bb)

_____% homozygous brown fur (bb)

Phenotypes: _____% black fur

_____% brown fur

mRNA AND TRANSCRIPTION

Name _____

Transcription

Fill in the blanks below. On the illustration of transcription, label the DNA, the newly-forming mRNA, the completed strand of mRNA and a free nucleotide.

Messenger RNA (mRNA) carries the instructions to make a particular _____ from the DNA in the _____ to the ribosomes. The process of producing mRNA from instructions in the DNA is called _____.

During transcription, the DNA molecule unwinds and separates, exposing the nitrogenous bases. Free RNA _____ pair with the exposed bases. There is no _____ (T) in RNA. _____ (U) pairs with adenine (A) instead. RNA contains the sugar _____ instead of deoxyribose. The mRNA molecule is completed by the formation of _____ between the RNA _____, and it then separates from the DNA. The mRNA molecule is a _____ strand, unlike DNA.

Codons

Each combination of three nitrogenous bases on the mRNA molecule is a codon, a three-letter code word for a specific amino acid. The table below shows the mRNA codon for each amino acid. Use the table to answer the questions below.

1. The codon for trytophan is _____.
2. For leucine, there are _____ different codons.
3. The codon GAU is for _____.
4. In a stop codon, if the second base is G, the first and third bases are _____ and _____.

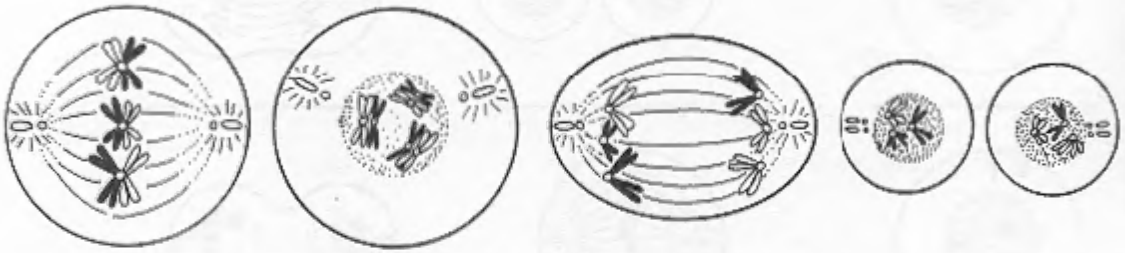
Second Base in Code Word

First Base in Code Word	A	G	U	C	Third Base in Code Word
A	Lysine	Arginine	Isoleucine	Threonine	A
	Lysine	Arginine	Methionine	Threonine	G
	Asparagine	Serine	Isoleucine	Threonine	U
	Asparagine	Serine	Isoleucine	Threonine	C
G	Glutamic Acid	Glycine	Valine	Alanine	A
	Glutamic Acid	Glycine	Valine	Alanine	G
	Aspartic Acid	Glycine	Valine	Alanine	U
	Aspartic Acid	Glycine	Valine	Alanine	C
U	"Stop" codon	"Stop" codon	Leucine	Serine	A
	"Stop" codon	Trytophan	Leucine	Serine	G
	Tyrosine	Cysteine	Phenylalanine	Serine	U
	Tyrosine	Cysteine	Phenylalanine	Serine	C
C	Glutamine	Arginine	Leucine	Proline	A
	Glutamine	Arginine	Leucine	Proline	G
	Histidine	Arginine	Leucine	Proline	U
	Histidine	Arginine	Leucine	Proline	C

STAGES OF MEIOSIS

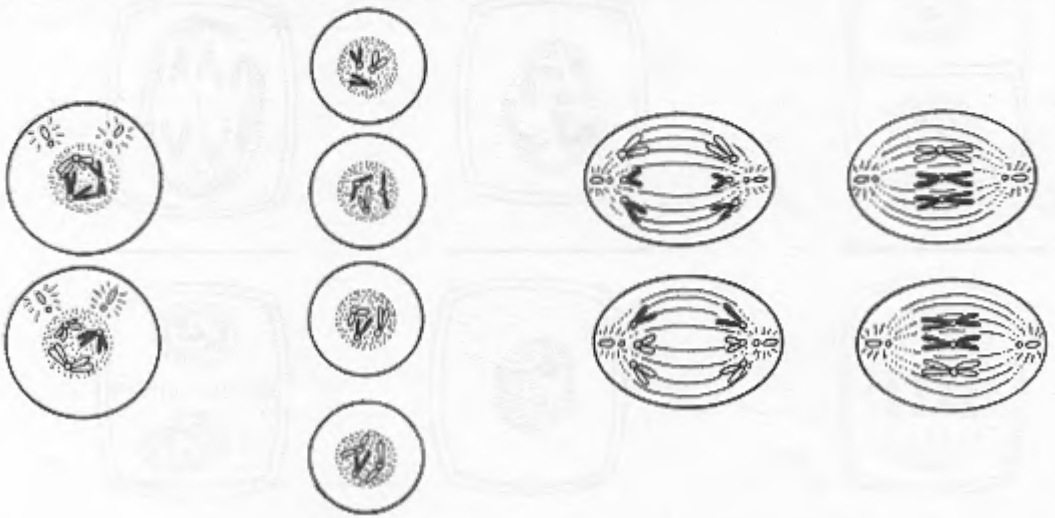
Name _____

Number the following diagrams of a first meiotic division in the proper order. Label each phase correctly as prophase I, metaphase I, anaphase I or telophase I.



_____ _____ _____ _____

Do the same for the diagrams of the second meiotic division. Label each phase correctly as prophase II, metaphase II, anaphase II, telophase II .



_____ _____ _____ _____

COMPARING MITOSIS AND MEIOSIS

Name _____

Determine whether the following characteristics apply to mitosis, meiosis or both by putting a check in the appropriate column(s).

	Mitosis	Meiosis
1. no pairing of homologs occurs		
2. two divisions		
3. four daughter cells produced		
4. associated with growth and asexual reproduction		
5. associated with sexual reproduction		
6. one division		
7. two daughter cells produced		
8. involves duplication of chromosomes		
9. chromosome number is maintained		
10. chromosome number is halved		
11. crossing over between homologous chromosomes may occur		
12. daughter cells are identical to parent cell		
13. daughter cells are not identical to parent cell		
14. produces gametes		
15. synapsis occurs in prophase		

BLOOD TYPE AND INHERITANCE

Name _____

In blood typing, the gene for type A and the gene for type B are codominant. The gene for type O is recessive. Using Punnett squares, determine the possible blood types of the offspring when:

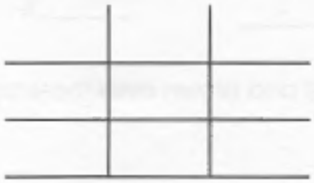
1. Father is type O, Mother is type O

_____% O
_____% A
_____% B
_____% AB

2. Father is type A, homozygous; Mother is type B, homozygous

_____% O
_____% A
_____% B
_____% AB

3. Father is type A, heterozygous; Mother is type B, heterozygous

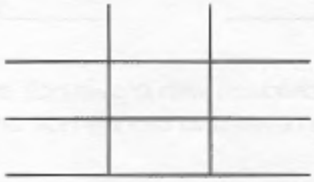


_____% O
_____% A
_____% B
_____% AB

4. Father is type O, Mother is type AB

_____% O
_____% A
_____% B
_____% AB

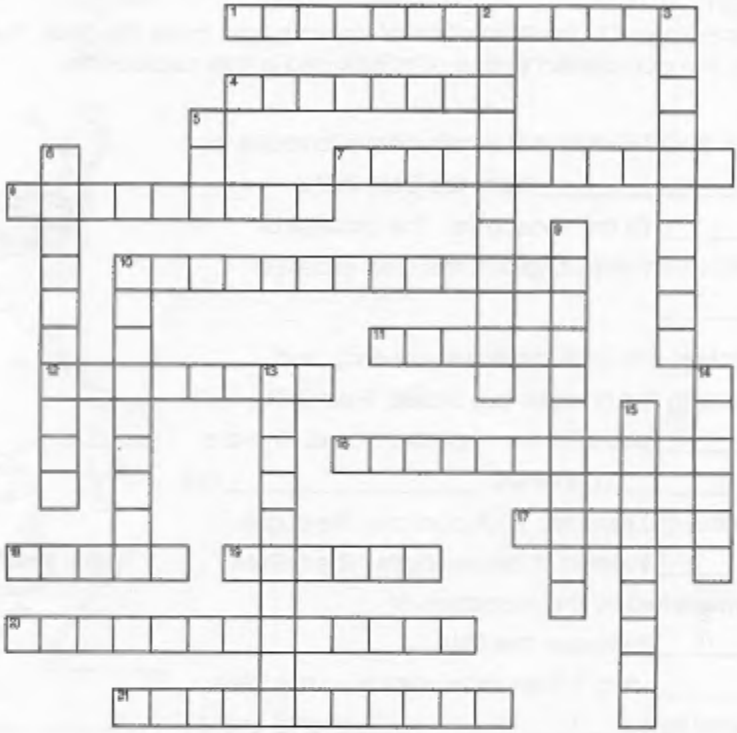
5. Father and Mother are both type AB



_____% O
_____% A
_____% B
_____% AB

GENETICS CROSSWORD

Name _____



Across

1. Occurs when a segment of chromosome breaks off and becomes reattached to another chromosome
4. An organism that is heterozygous for two traits
7. Humans have 46 of these.
8. Capacity of one allele to suppress the expression of a contrasting, recessive gene
10. Diagram used to predict the results of genetic crosses
11. This base is found in RNA, but not in DNA
12. Genetic makeup of an individual
16. Assembly of a protein molecule according to the code in a mRNA molecule
17. The sugar in RNA
18. Found on chromosomes, they determine specific characteristics of the organism
19. Different form of a gene
20. The process of producing mRNA from instructions in DNA
21. Sugar in DNA

Down

2. Occurs when both alleles are equally dominant
3. Subunit of DNA consisting of a nitrogenous base, a sugar and a phosphate group
5. Double helix in which the genetic code is found
6. Two dominant or two recessive genes for the same trait
9. Process by which DNA makes an exact copy of itself
10. Appearance of an individual due to its genetic makeup
13. Presence of complete extra sets of chromosomes
14. Conducted experiments on heredity in pea plants
15. Site of protein synthesis