

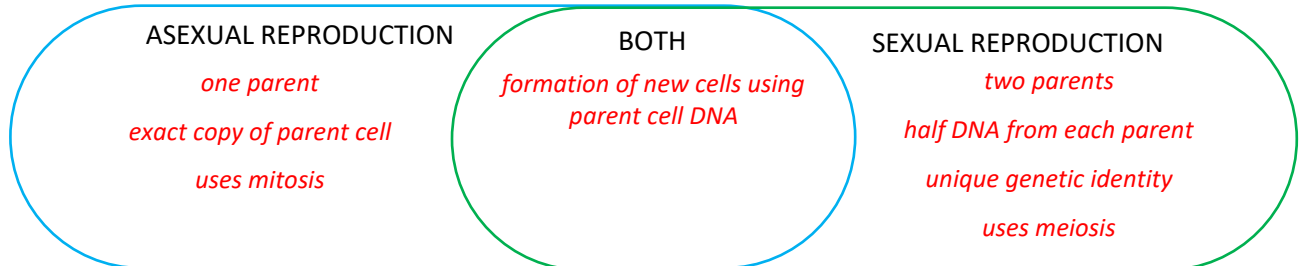
HEREDITY

VOCABULARY – Use the resources on Mr. Hanna’s website to define the following key terms related to heredity.

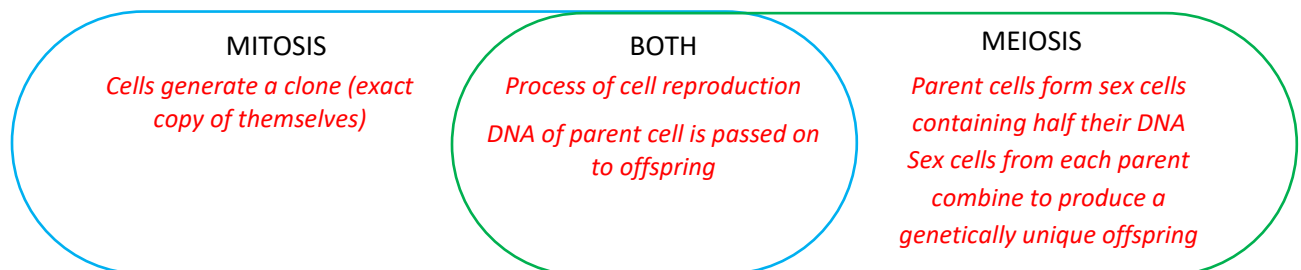
- 1) Reproduction - *When new organisms (**OFFSPRING**) are formed from parent organisms*
- 2) Asexual Reproduction – *an offspring is produced from one original organism with identical DNA as the parent*
- 3) Mitosis – *process of cellular reproduction used in asexual reproduction in which a cell creates an exact copy of itself*
- 4) Sexual Reproduction – *two parent cells contribute half their DNA to produce one new offspring with a unique genetic identity*
- 5) Meiosis – *a form of cell division where parent cells split their DNA in half to produce sex cells for sexual reproduction*
- 6) Mutation – *an error that occurs when DNA is copied during mitosis or meiosis*
- 7) DNA – *deoxyribonucleic acid – a molecule that contains the biological instructions that make each species/organism unique*
- 8) Chromosomes – *coils of DNA found within the cell’s nucleus*
- 9) Genes – *sections of DNA which contain specific sequences of nucleotides that tell the cell what to do*
- 10) Homozygous – *combinations of the same allele (both dominant or both recessive)*
- 11) Heterozygous – *combinations of different alleles (one dominant and one recessive)*
- 12) Genotype – *the specific combination of alleles (capital and lower-case letters)*
- 13) Phenotype – *the outward appearance of a trait (the visible characteristic)*
- 14) Punnett Square – *a method of predicting the traits of an offspring using the parents’ genotypes*

SHORT RESPONSE – Provide a short answer (a few sentences or less) in response to each prompt.

- 15) Complete the Venn diagram below comparing sexual and asexual reproduction (in terms of heredity).



- 16) Complete the Venn diagram below comparing the processes of mitosis and meiosis.



- 17) How are DNA, chromosomes, and genes related?

***Genes** are sections of DNA that code for specific traits in the organism. **DNA** contains the genetic instructions that tell each cell in the organism what to do. The DNA is coiled up around proteins in “X”-shaped structures found within the cell’s nucleus called, **chromosomes**.*

PRACTICE – Use Punnett squares to respond to the prompts below.

- 18) In a population of rabbits, brown fur (B) is dominant over white fur (b). Complete the Punnett square below for a mating pair of rabbits and answer the accompanying questions.

		MOTHER	
		b	b
FATHER	B	<i>Bb</i>	<i>Bb</i>
	b	<i>bb</i>	<i>bb</i>

- What is the genotype of the mother (*top*)? *bb*
- What is the phenotype of the father (*side*)? *Bb*
- What are the chances of this pair producing a brown furred offspring? *50%*
- What are the chances of this pair producing a white furred offspring? *50%*
- What color fur would a homozygous recessive baby have? *white fur (bb)*

19) In a population of cows, the trait for spotted fur (S) is dominant over the trait for solid colored fur (s). Complete the Punnett square below for a mating pair of cows and answer the accompanying questions.

		MOTHER	
		S	s
FATHER	S	<i>SS</i>	<i>Ss</i>
	s	<i>Ss</i>	<i>ss</i>

- What are the chances this pair of cows will produce a spotted offspring? *75%*
- What are the chances this pair of cows will produce a solid colored offspring? *25%*
- What are the chances of this pair producing a heterozygous offspring? *50% (2/4 boxes are Ss)*
- What are the chances of this pair producing a homozygous dominant offspring? *25% (1/4 boxes is SS)*
- What phenotype is the offspring most likely to have in this scenario? *Spotted fur (75% vs 25%)*

20) In a population of rats, grey fur (G) is dominant over white fur (g). Use the completed Punnett square below to figure out the genotypes of the parent rats.

		MOTHER	
		<i>G</i>	<i>g</i>
FATHER	<i>g</i>	Gg	gg
	<i>g</i>	Gg	gg