

Sexual Reproduction and Genetics

Before You Read

Use the “What I Know” column to list the things you know about genetics. Then list the questions you have about genetics in the “What I Want to Find Out” column.

K What I Know	W What I Want to Find Out	L What I Learned

Science Journal

Genetics explains why you have inherited certain characteristics from your parents. Write about some characteristics that you have inherited from your own parents, or similarities in other families, animals, or plants that you think might have been inherited.

Sexual Reproduction and Genetics

Section 10.1 Meiosis

Main Idea

Details

Skim the headings and illustration captions in Section 1 of the chapter. Write three facts you discovered about meiosis as you scanned the section.

1. _____
2. _____
3. _____

Review Vocabulary

Use your book or dictionary to define chromosome.

chromosome

New Vocabulary

Use the terms in the left margin to complete the paragraph below.

diploid
gamete
gene
haploid
homologous chromosomes
meiosis
fertilization
crossing over

A segment of DNA on a chromosome that controls the production of a protein is called a _____. A _____ cell contains two copies of each chromosome. A sex cell, or _____, is _____, meaning it contains one copy of each chromosome. _____ are pairs of chromosomes, one from each parent.

Describe three processes that occur during sexual reproduction.

	Meiosis	Fertilization	Crossing Over
What happens?			
What is the product?			

Section 10.1 Meiosis (continued)

Main Idea

Chromosomes and Chromosome Numbers

I found this information on page _____.

Meiosis I, Meiosis II, and The Importance of Meiosis

I found this information on page _____.

Details

Identify *three characteristics that are the same in each member of a pair of homologous chromosomes. Name one thing that is different.*

Same	Different
1.	1.
2.	
3.	

Compare and contrast *the phases of Meiosis I and Meiosis II. Sketch each phase.*

Meiosis I	Prophase I	Metaphase I	Anaphase I	Telophase I
Description				
Sketch				
Meiosis II	Prophase II	Metaphase II	Anaphase II	Telophase II
Description				
Sketch				

Analyze *the chart above to determine the phase of meiosis when crossing over can occur. Mark a star on the correct phase.*

Section 10.1 Meiosis (continued)

Main Idea

**Sexual
Reproduction
v. Asexual
Reproduction**

I found this information
on page _____.

Details

Compare *meiosis and mitosis by filling in the chart below.*

	Mitosis	Meiosis
Number of DNA replications		
Number of cell divisions		
Number of daughter cells		
Chromosome number of daughter cells		

Organize *information on how meiosis produces genetic variation.*

Meiosis produces _____

Compare *sexual reproduction and asexual reproduction by completing the paragraph with the terms below.*

- sexual reproduction
- asexual reproduction
- protists
- mammals
- animals
- plants
- genes
- genetic diversity

In _____, an organism inherits its genetic material from a single parent. The new organism has the same _____ as its parent. In _____, an organism inherits genetic material from two different parents. Sexual reproduction increases _____, whereas asexual reproduction does not. _____, simple _____, and most _____ can reproduce sexually or asexually. _____ only reproduce sexually.

SUMMARIZE

Explain how meiosis and fertilization produce genetic variation during sexual reproduction.

Sexual Reproduction and Genetics

Section 10.2 Mendelian Genetics

Main Idea

Details

Skim Section 1 of the chapter, and then write two questions that come to mind from reading the headings and illustration captions.

1. _____
2. _____

Review Vocabulary

Use your book or dictionary to define segregation.

segregation

New Vocabulary

Use terms in the left margin to complete the paragraph below.

allele
genetics
hybrid
law of independent assortment
law of segregation

_____ is the branch of biology that studies how traits are inherited. _____ offspring result from parents that have different forms of _____ for certain traits. Mendel's _____ states that every individual has two alleles of each gene and when gametes are produced, each gamete receives one of these alleles. Mendel's _____ states that genes for different traits are inherited independently of each other.

Compare and contrast each pair of terms by defining them and/or noting their differences.

dominant
genotype
heterozygous
homozygous
phenotype
recessive

dominant trait	recessive trait
genotype	phenotype
homozygous	heterozygous

Section 10.2 Mendelian Genetics (continued)

Main Idea _____

Details _____

How Genetics Began

I found this information on page _____.

Describe *how a plant self-pollinates.*

Infer *why Mendel used cross-pollination to study inheritance.*

The Inheritance of Traits

I found this information on page _____.

Analyze *Mendel's experiment with green-seed and yellow-seed pea plants by completing this summary paragraph.*

Mendel used only _____ lines, which consistently produced the same trait in the offspring. He controlled variables by _____. When he crossed a green-seed plant with a yellow-seed plant, the F₁ offspring were _____ percent yellow and _____ percent green. He allowed the F₁ plants to _____ to produce _____ plants. The F₂ plants were _____ percent yellow and _____ percent green. Mendel concluded that each trait has two forms, called _____. Mendel called yellow seed color the _____ form and green seed color the _____ form of the trait.

Compare *genotypes and phenotypes for pea plants.*

Genotype	Homozygous or Heterozygous	Phenotype
	homozygous	
	heterozygous	
yy		

Section 10.2 Mendelian Genetics (continued)

Main Idea

I found this information on page _____.

Punnett Squares and Probability

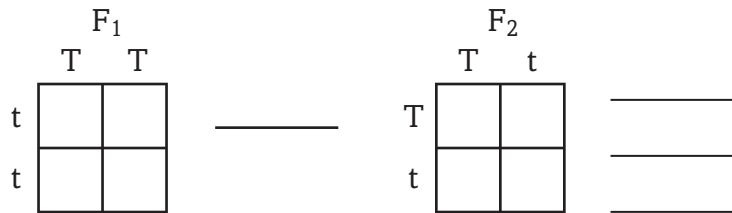
I found this information on page _____.

Details

Demonstrate the law of independent assortment by listing the 4 alleles that are produced when a pea plant with the genotype $RrYy$ produces gametes.

1. _____ 2. _____ 3. _____ 4. _____

Complete the Punnett squares for height in the F_1 and F_2 generations. Tall plants (T) are dominant over short plants (t). Write the expected genotypes and the probability for each.



Identify the genotypes within the Punnett square showing the dihybrid cross of seed color and seed texture. The first row has been done for you. Write the expected phenotypic ratio.

	YR	yR	Yr	yr
YR	YYRR	YyRR	YYRr	YyRr
yR				
Yr				
yr				

Phenotypic ratio: _____

SUMMARIZE

Discuss the effects of Mendel's two laws (segregation and independent assortment). Give an example.

Sexual Reproduction and Genetics

Section 10.3 Gene Linkage and Polyploidy

Main Idea

Details

Scan the headings, boldfaced words, pictures, figures, and captions in Section 3.

- Read all section titles.
- Read all boldfaced words.
- Look at all pictures and read the captions.
- Look at all figures.
- Read all captions.

Predict three things that you think will be discussed.

1. _____

2. _____

3. _____

Review Vocabulary

Use your book or dictionary to define protein.

protein

New Vocabulary

Use your book or dictionary to define each term.

genetic recombination

polyploidy

Section 10.3 Gene Linkage and Polyploidy (continued)

Main Idea

Details

Genetic Recombination

I found this information on page _____.

Calculate the number of chromosome combinations due to independent assortment by filling in the chart. Use the formula 2^n . The first one has been done for you.

Species	Chromosome Number (n)	Possible Combinations
Pea	7	$2^7 = 128$
Housefly	6	
Cabbage	9	
Fruit fly	4	
Frog	13	

Gene Linkage and Chromosome Maps

I found this information on page _____.

Summarize at least five pieces of information about genetic recombination by creating a concept map below.

Section 10.3 Gene Linkage and Polyploidy (continued)

Main Idea _____

I found this information on page _____.

Details _____

Complete the paragraph about gene linkage.

- chromosomes
- farther
- inherited
- sequence
- crossing over
- individual genes
- linked

Genes close together on the same chromosome are _____.
 Linked genes are usually _____ together. _____,
 not _____, follow Mendel’s law of independent
 assortment. Linked genes might become separated, as a result of
 _____. Crossing over is more likely to happen if
 genes are _____ apart on a chromosome.

Analyze whether the gene linkage is an exception to, or an example of, Mendel’s law of independent assortment. Use an example from your book.

Polyploidy

I found this information on page _____.

Identify four species that show polyploidy.

1. _____
2. _____
3. _____
4. _____

SUMMARIZE

Compare and contrast gene linkage to polyploidy and how they do not follow all of Mendel’s laws of inheritance.

Gene Linkage	Polyploidy