# Answers pg 274 #1,2,3

### 11-3 Section Assessment

- During gamete formation, pairs of alleles for different traits segregate, or separate, independently of each other.
- Answers include descriptions for any two: incomplete dominance, codominance, multiple alleles, or polygenic traits.
- In incomplete dominance, two alleles combine their effects to produce a single in-between phenotype, such as pink flowers from red and white parents. In codominance,

each allele is expressed separately, as when erminette chickens have both black and white feathers.

### Section 11-3 Exploring Mendelian Genetics (pages 270-274)

Ir	dependent Assortment (	pages 270–271)			
1.	In a two-factor cross, Mendel fe	ollowedtWO	dif	ferent genes as they	
	passed from one generation to	the next.			
2.	Write the genotypes of the true cross.	-breeding plants that !	Mendel use	d in his two-factor	
	Phenotype	Genotype			
	a. round yellow peas	RRYY			
	, ,	rr\/\/			
•	b. wrinkled green peas	rryy	Mandalla t	6t	
3.	Circle the letter that best descri		Mendel s t	wo-ractor cross.	
	a. Homozygous dominant with				
	b. Homozygous recessive with				
(	c. Heterozygous dominant wi	, ,			
	d. Heterozygous recessive with	h wrinkled green peas			
4.	Is the following sentence true of Mendel that genes assort indep		s of the F <sub>1</sub> o	ffspring indicated to	
5.	How did Mendel produce the He C	$F_2$ offspring? $F_1$ pla	ants w	ith each othe	r
6.	Circle the letter of the phenot independently.	types that Mendel wo	uld expect	to see if genes segrega	ted
	a. round and yellow				
	b. wrinkled and green				
1	c.) round and green				
	d. wrinkled and yellow				
7.	What did Mendel observe in	the F <sub>2</sub> offspring that s	showed hir	n that the alleles for se	ed
	shape segregate independent e observed F <sub>2</sub> offspr	ly of those for seed co	olor?		
tł	nerefore combination	ns of alleles-no	t found	in either parent	t
8.	What were the phenotypes of He observed seeds	f the F <sub>2</sub> generation than that were rol	at Mendel o	observed? d yellow, wrinkl	ed
9.	and green, round a What was the ratio of Mende 9:3			ed and yellow. tor cross?	

### 11-4 Meiosis (Answers to Exploring Mendelian Genetics Worksheets, info on Weischsits), n200te50ook

11. State Mendel's principle of independent assortment.

Genes for different traits can segregate

independently during the formation of gametes.

### A Summary of Mendel's Principles (page 272)

- 12. Circle the letter of each sentence that is true about Mendel's principles.
  - (a) The inheritance of biological characteristics is determined by genes that are passed from parents to their offspring.
  - b. Two or more forms of the gene for a single trait can never exist.
  - c.) The copies of genes are segregated from each other when gametes are formed.
  - d. The alleles for different genes usually segregate independently of one another.
- 13. When two or more forms of the gene for a single trait exist, some forms of the gene may be \_\_\_\_\_\_ recessive

### Beyond Dominant and Recessive Alleles (pages 272-273)

**14.** Is the following sentence true or false? All genes show simple patterns of dominant and recessive alleles. \_\_\_\_\_

### PATTERNS OF INHERITANCE

Туре	Description	Examples
incomplete dominance	One allele is not completely dominant over another. The heterozygous phenotype is somewhere in between the two homozygous phenotypes.	flower color in sweet peas or four o'clock plants
codominance	Both alleles contribute to the phenotype of the organism.	black and white feather color in certain varieties of chickens
multiple alleles	Genes have more than two alleles.	coat color in rabbits, blood type in humans, eye color in humans
polygenic traits	Two or more genes control a trait.	eye color in fruit flies, skin color in humans

- List three criteria Thomas Hunt Morgan was looking for in a model organism for genetic studies.
  - small in size
  - b. easy to keep in the laboratory
  - able to produce large numbers of offspring in a short time
- 17. Is the following sentence true or false? Mendel's principles apply not just to pea plants but to other organisms as well. **true**

### Genetics and the Environment (page 274)

 Characteristics are determined by interaction between genes and the environment

### Section Review 11-3

segregate 2. multiple alleles, multiple genes 3. b
 c 5. d 6. a

			FfJj		
		FJ	Fj	fJ	fj
	FJ	FFJJ	FFJj	FfJJ	FfJj
FFJj	Fj	FFJj	FFjj	FfJj	<i>Ffjj</i>
	FJ	FFJJ	FFJj	FfJJ	FfJj
	Fj	FFJj	FFjj	FfJj	<i>Ffjj</i>

**8.** In incomplete dominance, the heterozygous phenotype is somewhere in between the two homozygous phenotypes. In codominance, the heterozygous phenotype shows both traits. **9.** Polygenic traits have more variation in phenotypes because different combinations of alleles for these genes produce many different phenotypes. **10.** Morgan chose fruit flies because fruit flies are easy to keep in the lab and they reproduce quickly, producing a great number of offspring.

# Complete dominance =

one allele is dominant over the other and whenever it is present the recessive allele is not expressed.

# Incomplete dominance =

both alleles are partially dominant so they blend or mix together in how they are expressed.

## Codominance =

both alleles can be expressed at the same time.

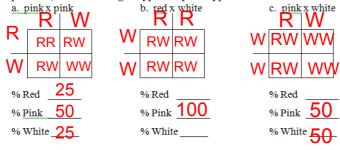
# 11-4 Meiosis (Answers to Exploring Mendelian Genetics Worksheets, info on Weischsits), n200te5book

### Practice Problems

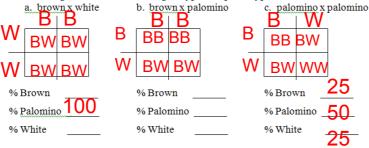
1. Snapdragons are incompletely dominant for color; they have phenotypes red, pink, or white. The red and white flowers are homozygous, and the pink flowers are heterozygous. Give the genotypes for each of the phenotypes, using the letters "R" and "W" for alleles:



Show genetic crosses between the following snapdragon parents, using the <u>punnett</u> squares provided, and record the genotypic and phenotypic ratios below:



3. In horses, some of the genes for hair color are incompletely dominant. Genotypes are as follows: brown horses are BB, white horses are WW and a BW genotype creates a yellow-tannish colored horse with a white mane and tail, which is called "palomino". Show the genetic crosses between the following horses and record the genotypic and phenotypic ratios:



4. Can palominos be considered a purebred line of horses? Why or why not?

palomino is a color and not a breed and palomino does not always breed true because it is a blending of colors.

5. Which two colors of horse would you want to breed if you wanted to produce the maximum numbers of palominos in the shortest amount of time?

brown and white

# 11-4 Meiosis (Answers to Exploring Mendelian Genetics Worksheets, info on Weischsits), n2001e5book

6. In mice, there is a lethal mutation that causes embryos with the homozygous dominant genotype YY to die before birth. Baby mice with the genotype YG appear yellow, and GG mice are gray.

a. If 2 gray parent mice mate, what % of their offspring would be expected to die before birth?

0%

b. If 1 gray mouse and 1 yellow mouse mate, what % of their offspring would be expected to die before birth?

0%

c. If 2 yellow parent mice mate, what percent of their offspring would be expected to die before birth?

25%

### Multiple Alleles (Blood types)

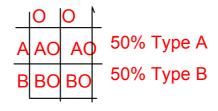
Human blood types are determined by genes with multiple alleles. Each person can have two of the four possible alleles. These alleles will specify if there is a type of molecule on the surface of blood cells (A, B, AB), or none (O).

Blood Type (Phenotype)	Genotype	Can donate blood to:	Can receive blood from:
О	IoIo	A,B,AB and O (universal donor)	0
AB	I <sub>V</sub> I <sub>B</sub>	O, AB	A,B,AB and O (universal receiver)
A	I <sub>V</sub> I <sub>O</sub>	AB, A	O,A
В	I <sub>B</sub> I <sub>B</sub> or	AB,B	O,B

1. Write the genotype for each person based on the description:

	Homozygous for the "B" allele	IRIR
	• •	AO
В.	Heterozygous for the "A" allele	
c.	TypeO	00
d.	Type "A" and had a type "O" parent	<del>- UA-</del>
e.	Type"AB"	TAID
f.	Blood can be donated to anybody	AB
g.	Can only get blood from a type "O" donor	00
		lolo

2. Draw a <u>Punnett</u> square showing all the possible blood types for the offspring produced by a type "O" mother and an a Type "AB" father



# 11-4 Meiosis (Answers to Exploring Mendelian Genetics Worksheets, info on Weischsits), n2016/5000k

3.	Two parents think their baby was switched at the hospital. It's 1968, so DNA
	fingerprinting technology does not exist yet. The mother has blood type "O," the
	father has blood type "AB," and the baby has blood type "B."

a. Mother's genotype: AB

b. Father's genotype: BB or BO

d. Punnett square showing all possible genotypes for children produced by this couple:



e. Was the baby switched?



4. Two other parents think their baby was switched at the hospital. The mother has blood type "A," the father has blood type "B," and the baby has blood type "AB."

a. Mother's genotype: AA or AO

b. Father's genotype: BB or BO

c. Baby's genotype: AB

 $\begin{tabular}{ll} \bf d. & \underline{\bf Punnett} \ square \ showing all \ possible \ genotypes \ for \ children \ produced \ by \\ this \ couple: \end{tabular}$ 

e. Was the baby switched?

No

Meiosis.wmv