DAY 44

Contrasting Cases: Dominant vs. Recessive Genes

This contrasting case will introduce dominant and recessive genes through a pair of cases. This activity will replace Chapter 3, Section 1, as it will cover the same material.

After warming up, you will begin today's lesson by introducing students to a Labrador Retriever puppy and his family. By looking more closely at the color coats of the puppy's parents and his siblings, students will begin to learn about dominant and recessive genes.

Big Ideas

- Offspring receive two sets of genes from parents. A gene can be dominant, meaning it will be expressed whether the other gene matches it or not, or recessive, meaning it will be expressed only if it's paired with an identical gene. These different forms of genes are called alleles.
- All organisms inherit their traits through the genes given to them by the parent organism(s).

Materials

Teacher:

1. Slides - day44.ppt
2. Warm-up Day 44 - Cells_warmups.ppt

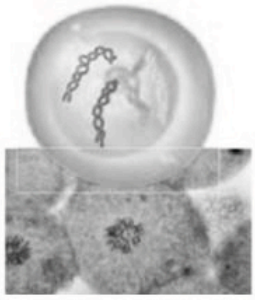
Students:

1. Puppy comparison worksheet (WS 41, student resource 60)

Activities and Allotted time

5 minutes - Warm-up
40 minutes - CC activity - Dominant vs. Recessive Puppy Coats

Day 44 - Warm-up



Review Chapter 2 if you need help answering the following questions.

1. What occurs in mitosis?
2. Mitosis is important because it allows organisms to do two things. What are they?

Answers:

1. A cell divides into two identical cells during mitosis.
2. Mitosis allows an organism to grow and to replace dead cells.

Purpose: This exercise reviews the process and purpose of mitosis to lay the foundation for the lessons ahead in Chapter 3.

Day 44 – Dominant vs. Recessive

Day 44 – Dominant vs. Recessive

Introduction (5 minutes):

Charlie is a black Labrador Retriever puppy.

His parents are a black Lab and a yellow Lab (shown in photo).

Today we are going to discuss patterns of trait inheritance in plants and animals.

Day 44 – Dominant vs. Recessive

Coat color in Labrador retrievers

- Over the past few years, a breeder of labrador retrievers has found loving homes for 80 labrador puppies, including Charlie. These puppies came from five "families":

Family	Parents
A	
B	
C	
D	
E	

If each set of parents had 16 puppies, how many do you think would be black? How many would be yellow? Write your predictions on your worksheet.

Hand out Labrador comparison worksheet (WS 41) or direct students to its place in the student resource book (p.60).

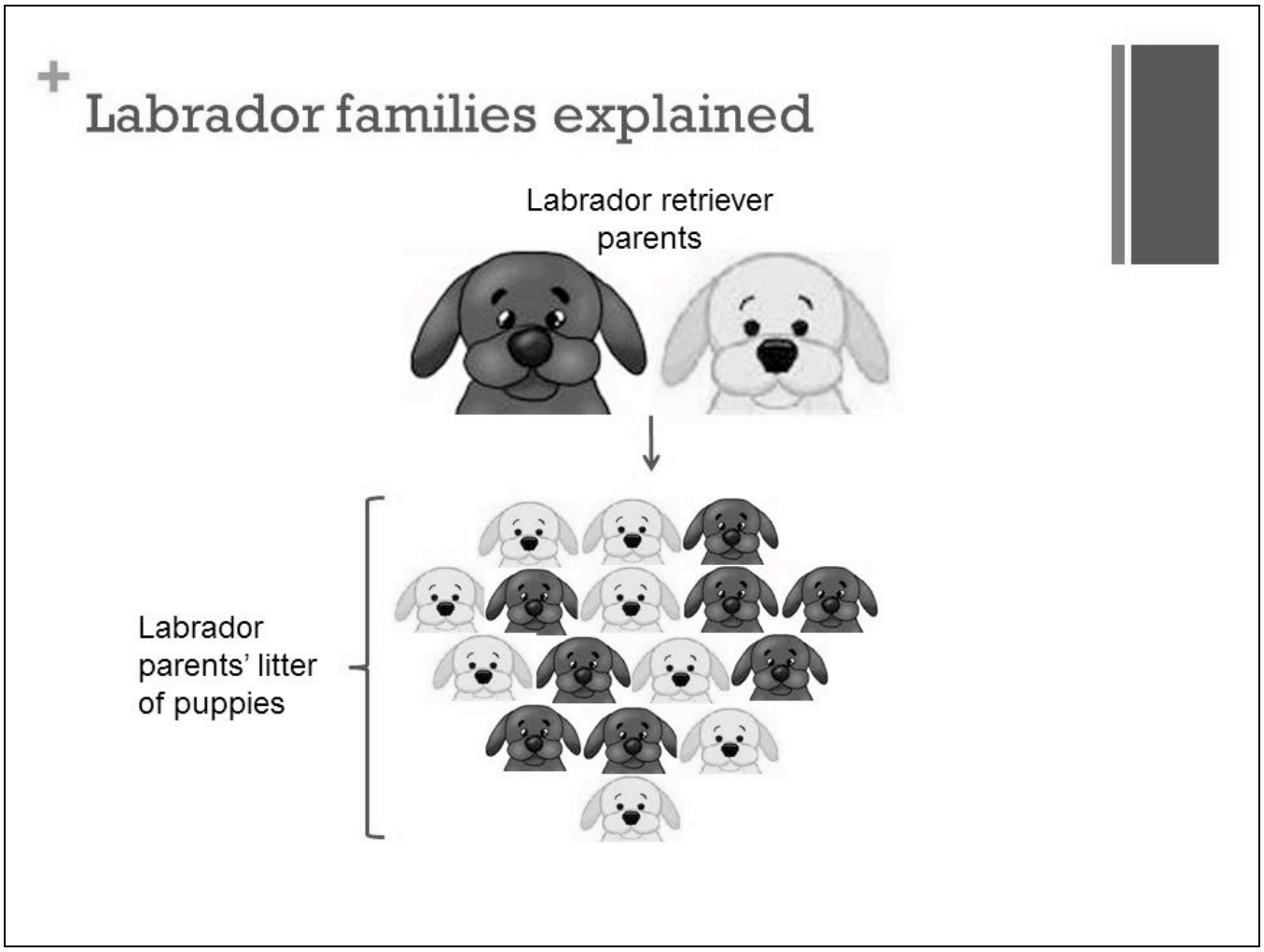
Within-category comparisons (25 minutes)

Dominant/recessive genes in animals: black Lab/yellow Lab

Breeders have found homes for 80 Labrador Retriever puppies

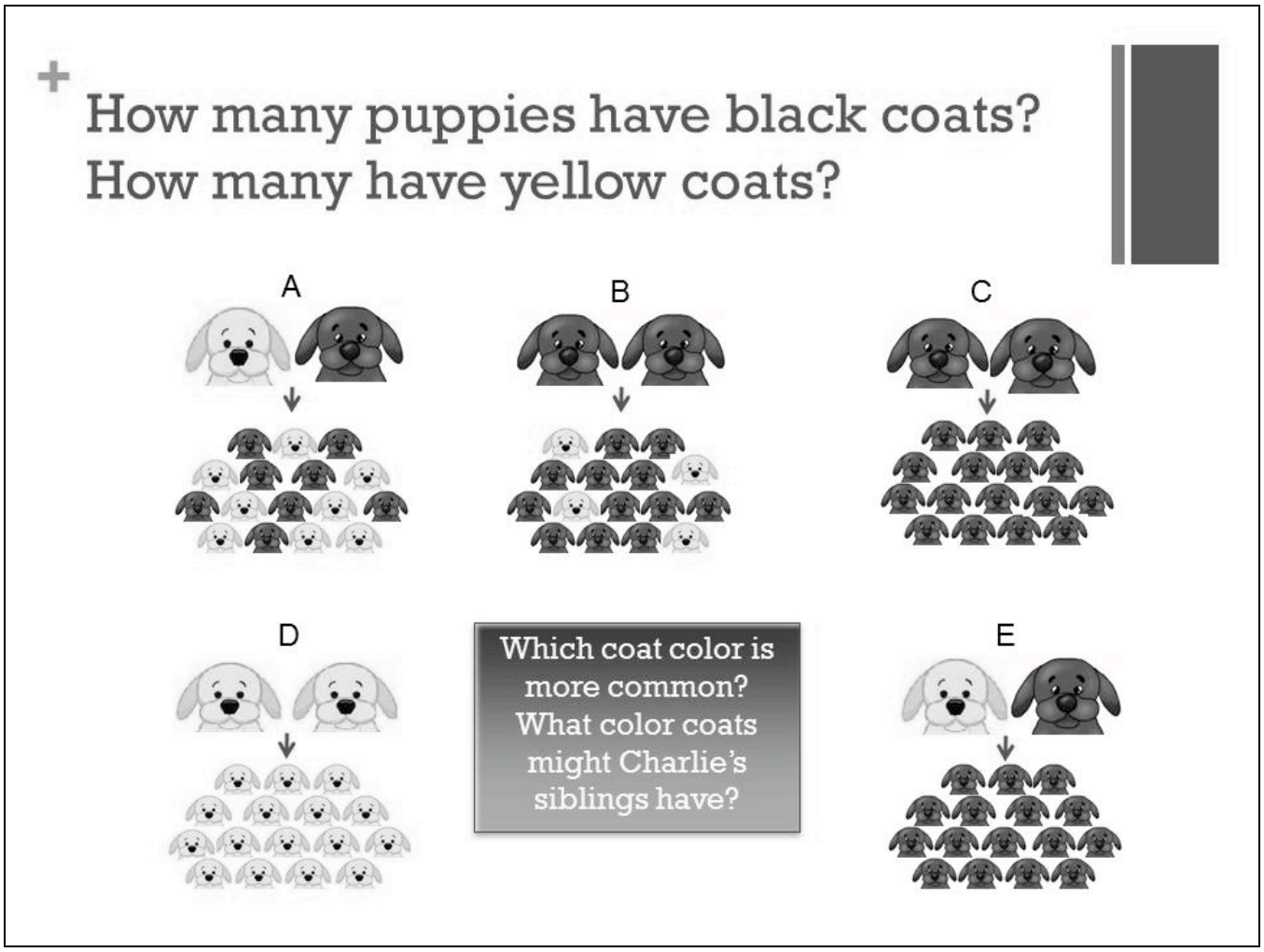
Assume half heterozygous and half homozygous for black Lab parents

Day 44 – Dominant vs. Recessive



Example of a Lab family, like those on next slide. The two dogs at top are the parents. The arrow indicates that they reproduced. The smaller dogs (puppies) are the offspring. (The "litter" of 16 puppies actually represents 4 litters of 4 puppies each in order to give a more realistic proportion of black and yellow coats across offspring.)

Day 44 – Dominant vs. Recessive



Explain that each puppy receives one hair color gene from each parent.

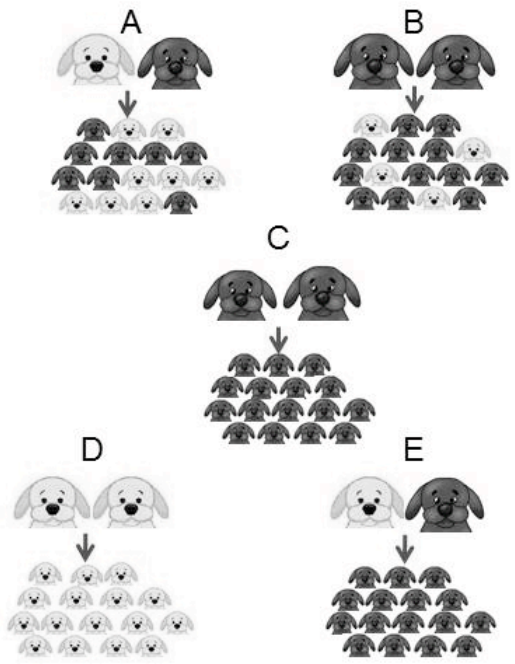
Graphical depiction of coat color inheritance

Ask students: Do more puppies have black coats or yellow coats? Students should be able to see that black coats are more common, and that Charlie may have some yellow siblings, but is more likely to have black siblings

Students should count the number of black and yellow puppies and copy the totals onto the worksheet in the "Actual" column

Day 44 – Dominant vs. Recessive

Why do more lab puppies have black coats than yellow coats?



- Each puppy receives a gene for coat color from each of his/her parents.
- What happens if a puppy has one black-coated parent and one yellow-coated parent?
  - Is he or she always equally likely to have a black coat or a yellow coat?
  - Is he or she more likely to have a black coat or a yellow coat?
- What if a puppy has 2 black coated parents?
  - Is he or she more likely to have a black coat or yellow coat?
- What if a puppy has 2 yellow coated parents?

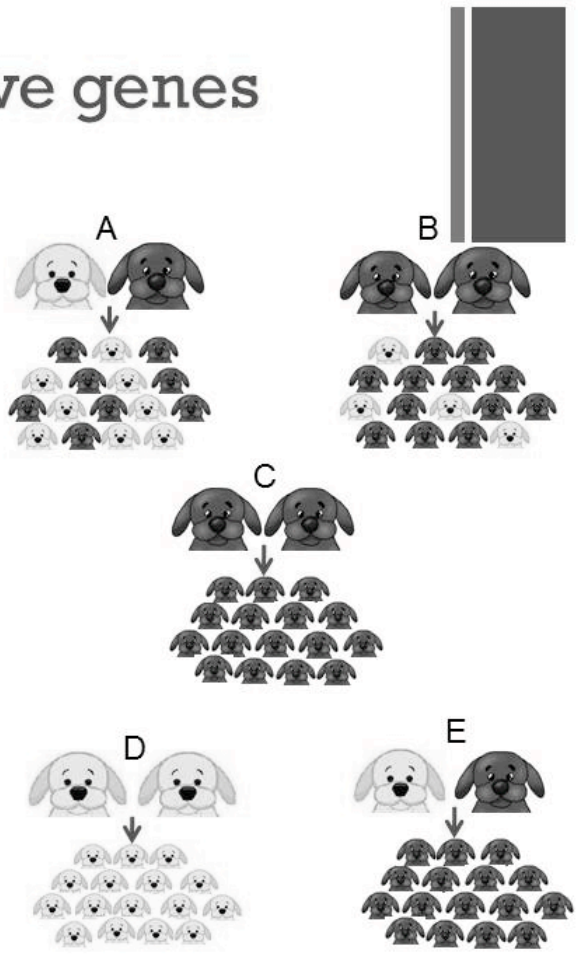
Discussion: What happens if a puppy has a black Lab parent and a yellow Lab parent? If the black Lab parent is heterozygous, it will result in half yellow puppies and half black puppies. However, if the black lab parent is homozygous, it will result in all black puppies

What if someone has two black Lab parents? (much more likely to have black coat, but may possibly have yellow coat) Two yellow parents? (always yellow)

Day 44 – Dominant vs. Recessive

Dominant vs. recessive genes

- The gene for a black coat is referred to as a "dominant" gene.
  - What do you think this means?
- The gene for a yellow coat is referred to as a "recessive" gene. What do you think this means?
- What do you think the word "dominant" means when it comes to patterns of inheritance of traits like coat color in labrador retrievers?
- Is a yellow coat a "dominant" or "recessive" gene?



Black coat is a dominant gene.

What does "dominant" mean?

The non-dominant choice is "recessive"

What does "recessive" mean?

Try to have students analogize to patterns of inheritance (e.g., dark hair vs. light hair in humans, coat color in Labs).

Student Worksheet 41: Puppy Comparison

Name _____ Team # _____

If each set of parent Labrador retrievers has 16 puppies, how many will have black coats? How many will have yellow coats? Fill in your predictions, and then the actual numbers.

		Predicted # (out of 16)		Actual # (out of 16)	
Family	**Parents**	Black	Yellow	Black	Yellow
A	Black-Yellow				
B	Black-Black				
C	Black-Black				
D	Yellow-Yellow				
E	Yellow-Black				

What do you think "dominant" means? _____

_____

What do you think "recessive" means? _____

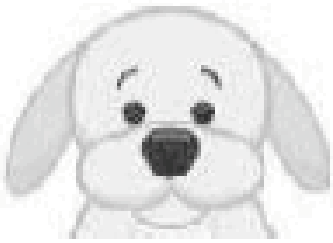
_____

Which color coat is dominant? _____

How do you know? _____

Which color coat is recessive? _____

How do you know? _____



DAY 45 Contrasting Cases: Dominant vs. Recessive Genes

After warming up, begin the second part of the Dominant vs. Recessive Genes contrasting case. Today you will introduce a family of pea plants with different colored flowers.

Big Ideas

- Offspring receive two sets of genes from parents. A gene can be dominant, meaning it will be expressed whether the other gene matches it or not, or recessive, meaning it will be expressed only if it's paired with an identical gene. These different forms of genes are called alleles.
- All organisms inherit their traits through the genes given to them by the parent organism(s).

Materials

Teacher:

1. Slides - day45.ppt
2. Warm-up Day 45 - Cells_warmups.ppt

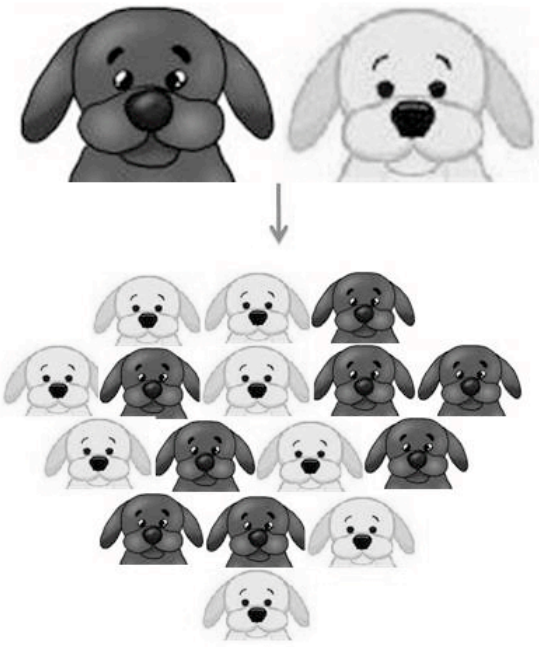
Students:

1. Plant comparison worksheet (WS 42, student resource 61)

Activities and Allotted time

5 minutes - Warm-up
40 minutes - CC activity - Dominant vs. Recessive Pea Plants

Day 45 - Warm-up



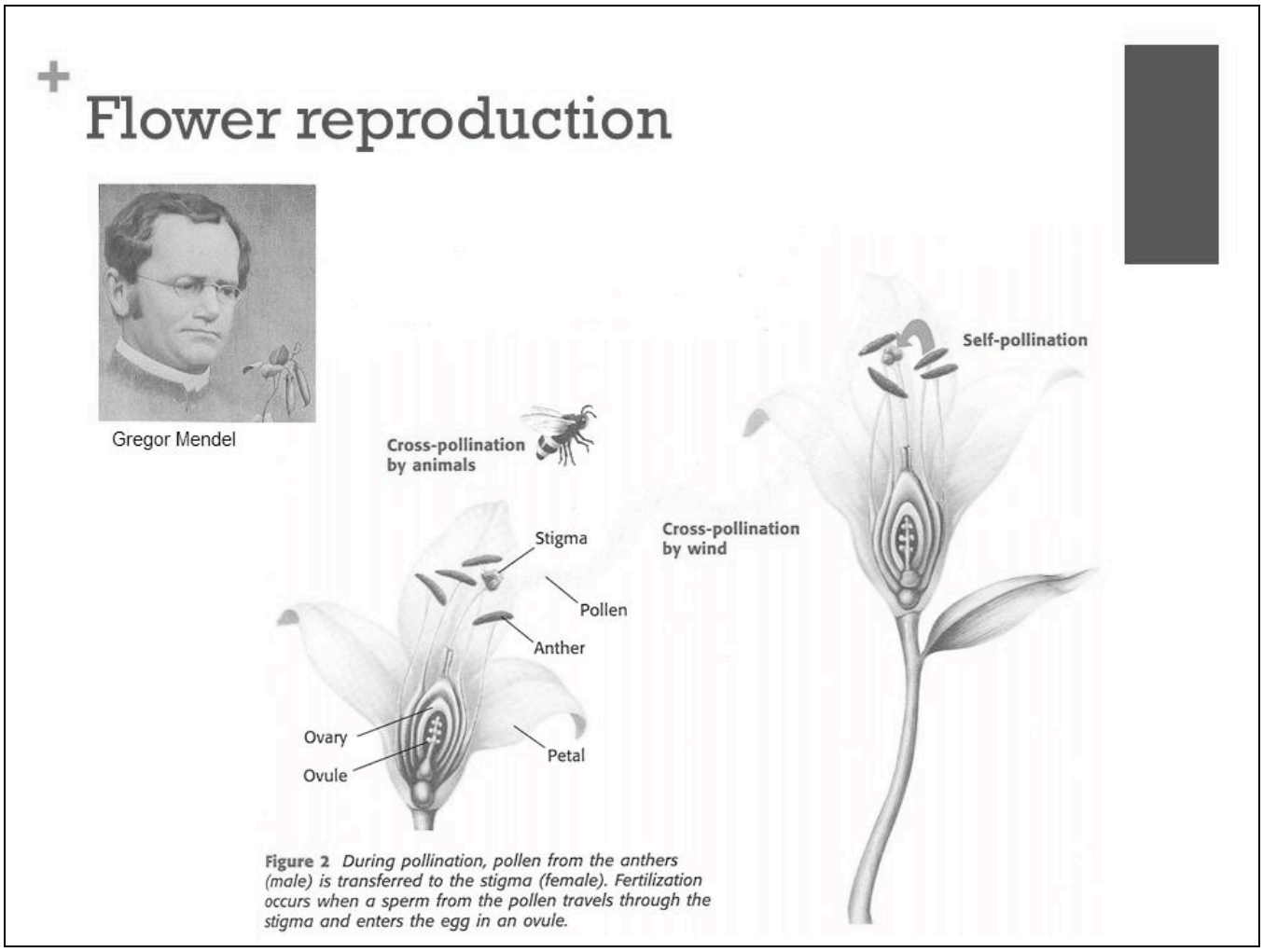
When a yellow lab and a black lab have a litter of puppies, they might have some black and some yellow puppies.

Imagine that both parents were black labs. Could they have any yellow lab puppies? Why or why not?

Answer: Yes, two black labs could have yellow puppies as long as they both had recessive yellow genes. If either of the parents had two black genes, they could not have yellow puppies.

Purpose: This exercise reviews the roles of dominant and recessive genes in predicting offspring and lays the foundation for a more thorough review of genotypes and phenotypes later in the chapter.

Day 45 – Dominant vs. Recessive



Brief recap of Section 1, Mendel and his peas: About 150 years ago, Gregor Mendel (pictured) performed important experiments that helped answer some questions about inheritance. He worked with garden pea plants (also pictured) to see patterns of inheritance such as flower color. Pea plants can reproduce by self-pollination (right side, point out that arrow indicates pollen being transferred from anther to stigma on same plant), because they contain both male and female reproductive structures (a true-breeding plant will produce offspring with the same traits), or cross-pollination (pollen can be carried from plant to plant, by the wind or animals such as birds and bees), to cross plants of different colors.

Day 45 – Dominant vs. Recessive

How many purple and white pea flowers?

Flower "Family"	Parent Generation
A	
B	
C	
D	
E	

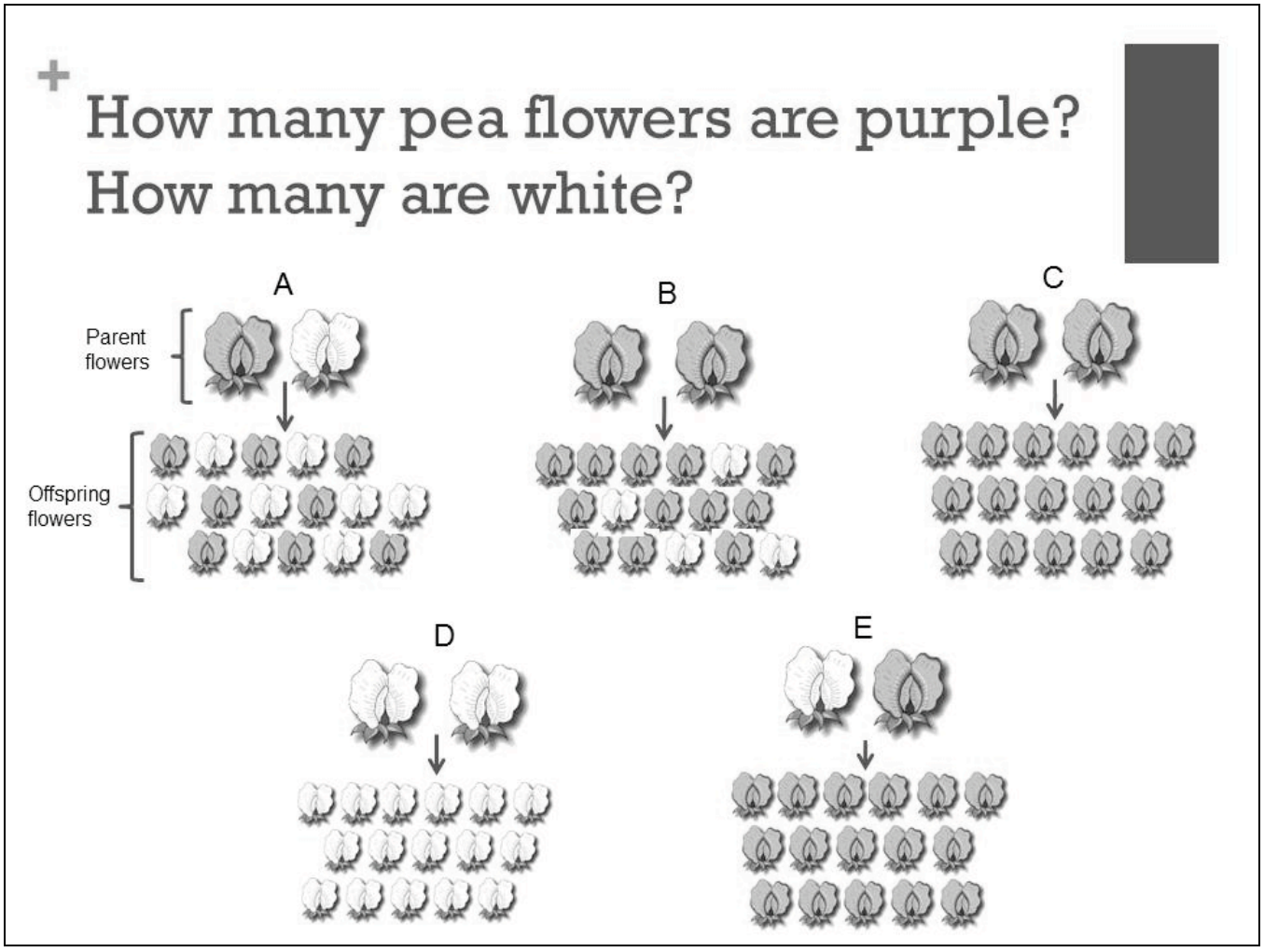
If Mendel made a cross of each pair of the above parent flowers, resulting in 16 offspring flowers per pair of parent flowers, how many would be purple? How many would be white? Use your worksheet to write down your predictions.

Hand out Plant comparison worksheet (WS 42) or direct students to its place in the student resource book (p.61).

Dominant/recessive genes in plants: purple and white pea flowers (Mendel)

graphical depiction of flower color

Day 45 – Dominant vs. Recessive



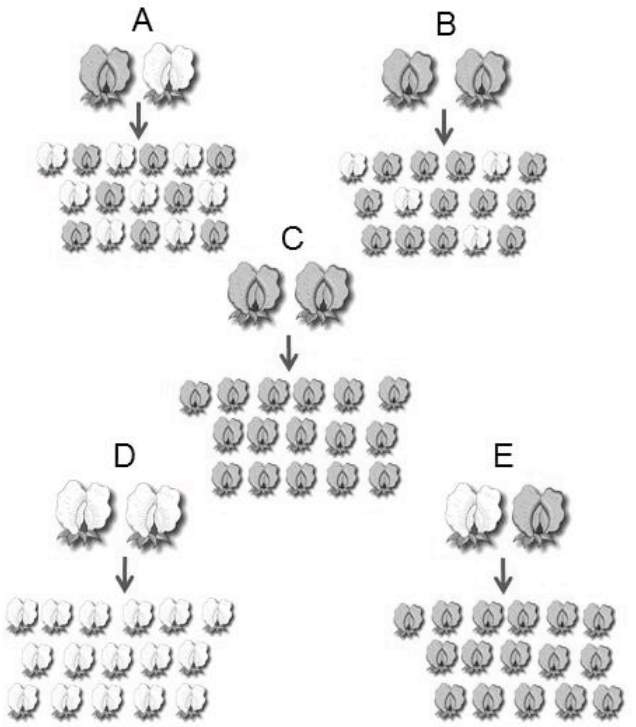
Dominant/recessive genes in plants: purple and white pea flowers (Mendel)

graphical depiction of flower color

Students should count and record the actual numbers of flowers.

Day 45 – Dominant vs. Recessive

Which flower color is dominant? Which is recessive?



- What happens when a purple pea flower is crossed with a white pea flower?
  - Are the offspring equally likely to be purple and/or white?
  - Are the offspring more likely to be purple or white?
- What happens when purple pea flowers are crossed with one another?
- What about white pea flowers?
- What does this tell us about the color genes of this particular plant?
- How is this similar and/or different to the labrador retriever example?

Between-category comparisons (10 minutes)

When a purple flower is crossed with a white flower, it results in 50% purple flowers and 50% white flowers.

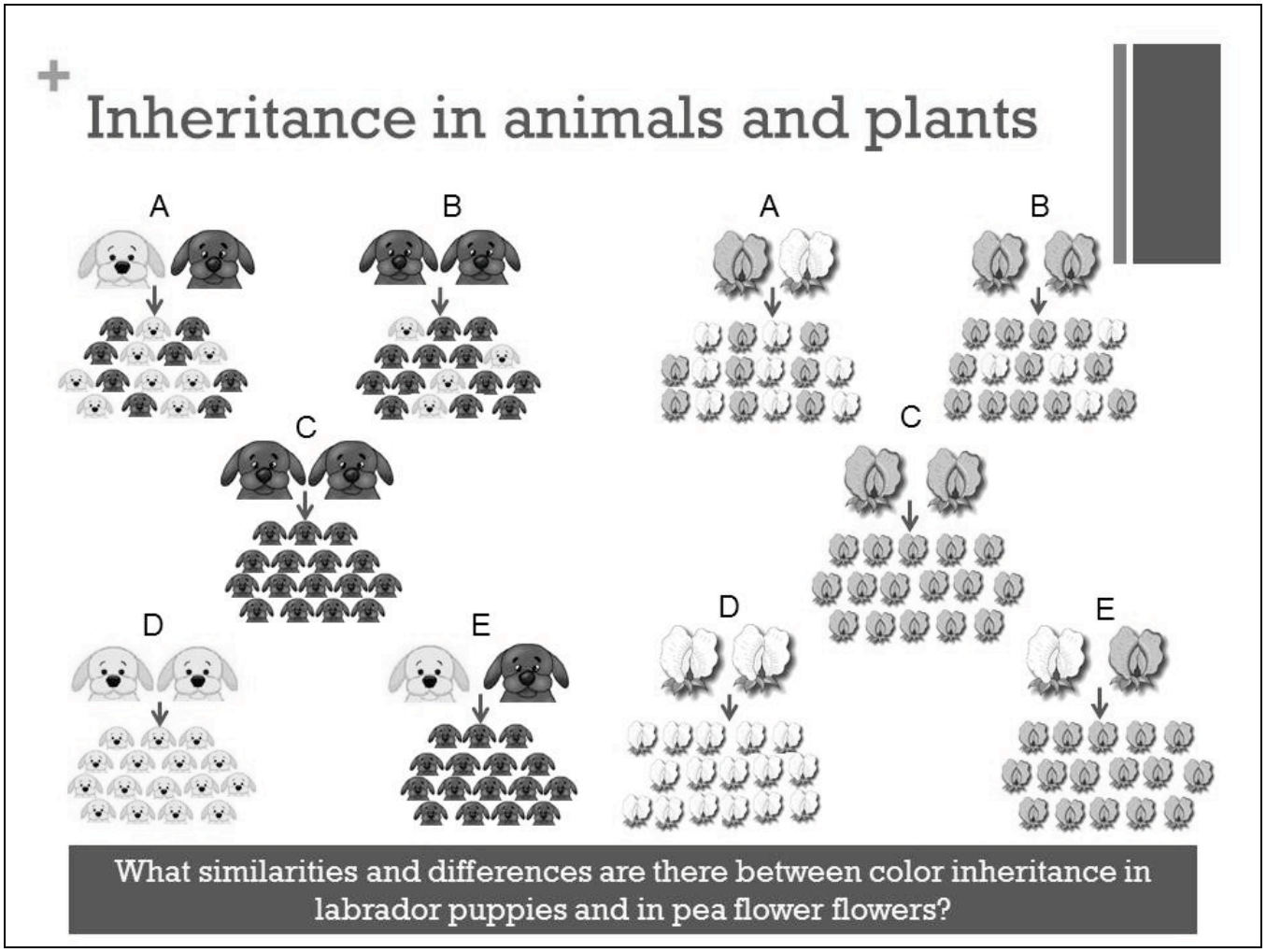
When 2 [second-generation] purple flowers are crossed, it results in 75% purple flowers and 25% white flowers.

Which color is dominant? (purple)

Which color is recessive? (white)

Discuss with students.

Day 45 – Dominant vs. Recessive



Students can discuss similarities/differences between patterns of inheritance in the prior two examples

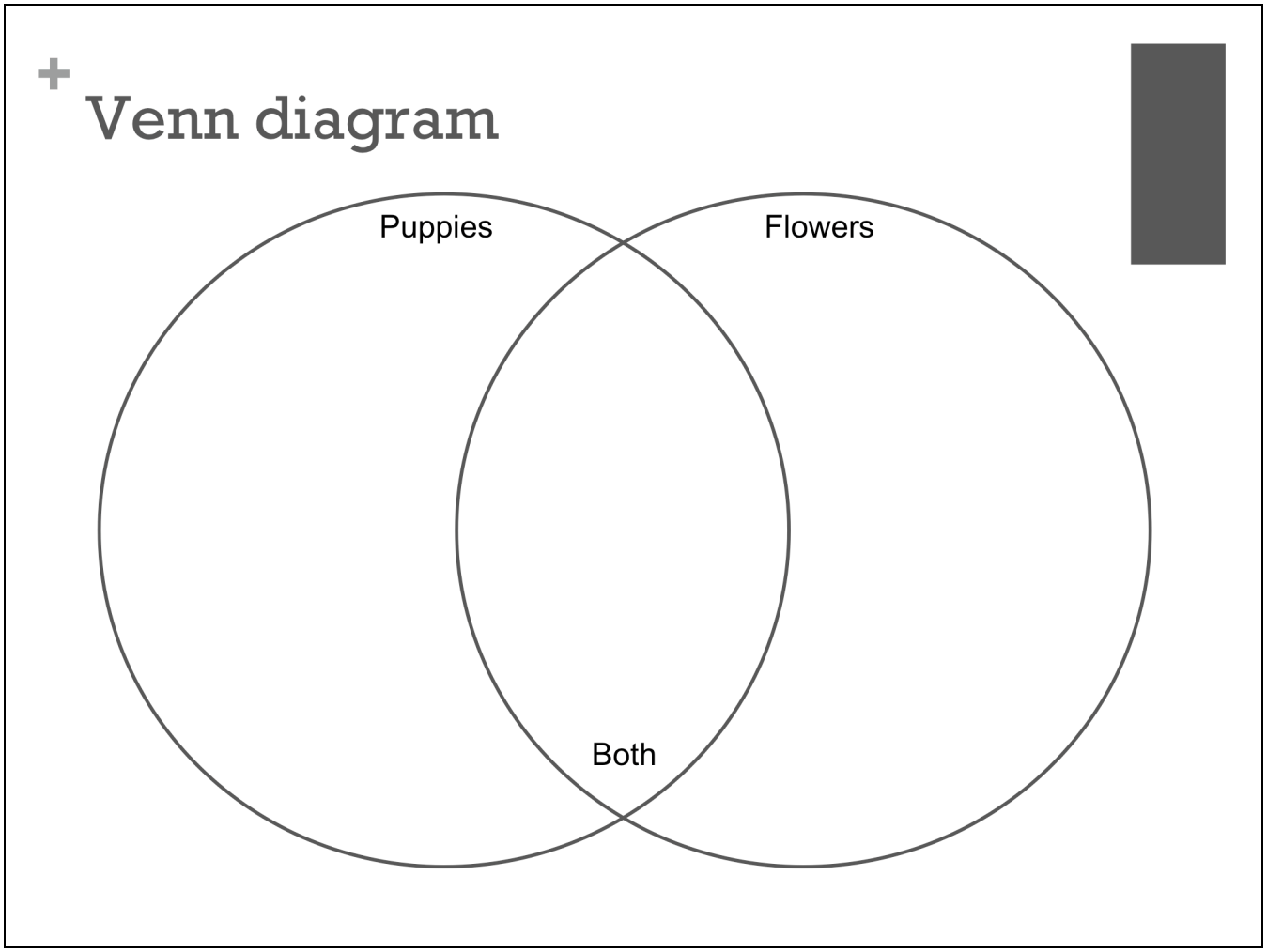
Labrador Retrievers vs. pea flowers

They should be able to say that purple and black are both dominant

White and yellow are both recessive

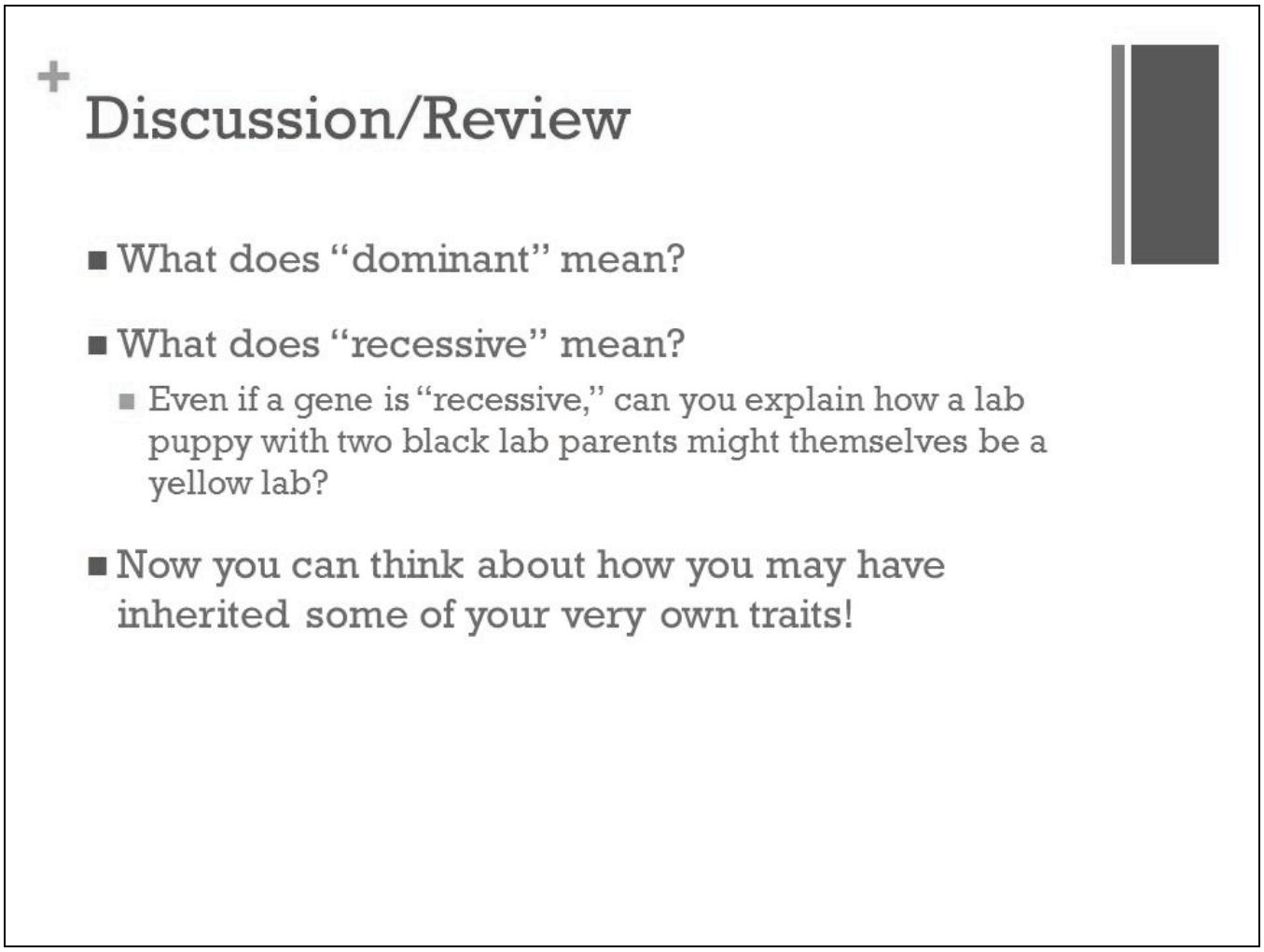
What does this mean in each population?

Day 45 – Dominant vs. Recessive



Can project/draw this on the board/overhead and have students fill in similarities and differences – there should really be no differences in the inheritance patterns between the puppies and the flowers.

Day 45 – Dominant vs. Recessive



Discussion (5 minutes)

Students should be able to define "dominance" in terms of everyday life as well as in the realm of inherited characteristics.

Students should be able to define what "recessive" means and understand that a recessive gene can be inherited (even if both parents do not exhibit the phenotype).

Tell students that not all genes are either dominant or recessive. Some genes can exhibit incomplete dominance. For example, if you breed a poodle that has curly fur with a maltese that has straight fur, the resulting 'maltipoo' has wavy fur.

Student Worksheet 42: Plant Comparison

If each set of pea blossom flowers are crossed to product 16 offspring flowers, how many will be purple? How many will be white? Fill in your predictions, and then the actual numbers.

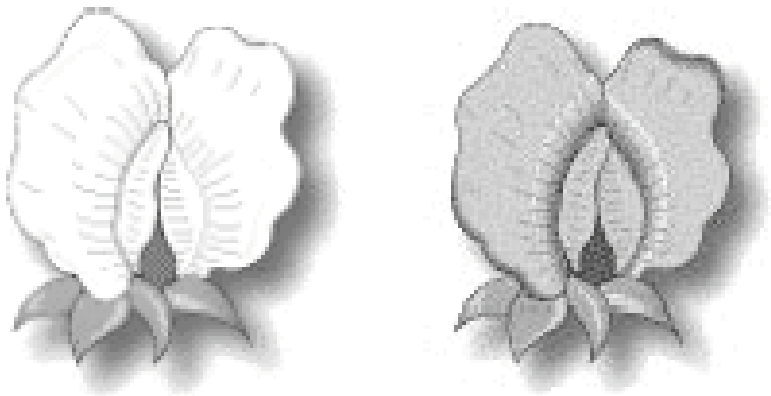
		Predicted # (out of 16)		Actual # (out of 16)	
Cross	**Parent Generation**	Purple	White	Purple	White
A	Purple-White				
B	Purple-Purple				
C	Purple-Purple				
D	White-White				
E	White-Purple				

Which flower color is dominant? _____

How do you know? _____

Which flower color is recessive?

How do you know? _____



DAY 46

Chapter 3, Section 2: Traits and Inheritance

After warming up, begin with visualization activities 3.1 and 3.2, which draw on material from Chapter 3, Section 1, which you will skip. After completing those visualization activities, begin teaching Chapter 3, Section 2 as you normally would. This section will explore in greater detail the role dominance plays in inheritance. Pause for visualization activity 3.3 when appropriate.

Big Ideas

- Instructions for an inherited trait are called genes. For each gene, there are two alleles, one inherited from each parent. Both alleles make up an organism's genotype.
- Punnett squares show all possible offspring genotypes.
- Probability can be used to describe possible outcomes in offspring and the likelihood of each outcome.
- Incomplete dominance occurs when one allele is not completely dominant over the other allele.
- Some genes influence more than one trait.

Materials

Teacher:

1. Warm-up Day 46 - Cells_warmups.ppt
2. Slides - day46.ppt

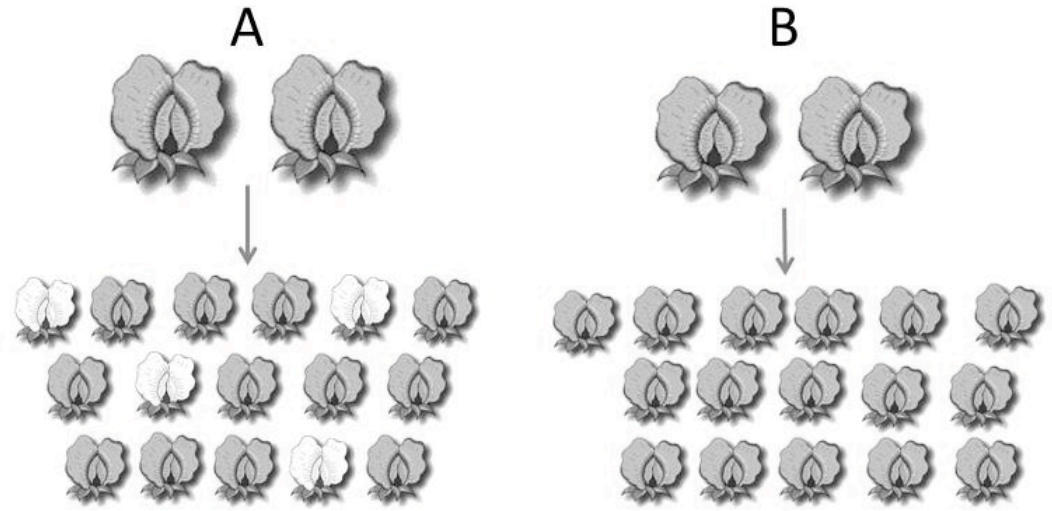
Students:

1. Holt textbook p62-67

Activities and Allotted time

5 minutes - Warm-up
5 minutes - Visualization activity 3.1, p58
5 minutes - Visualization activity 3.2, p59
25 minutes - Holt textbook Chapter 3, Section 2, p62-67
5 minutes - Visualization activity 3.3, p66

Day 46 – Warm-up



Images A and B represent the offspring of two different pairs of purple pea flowers.

1.Based on the color of the offspring, what do you know about the recessive color genes of the parents in A?

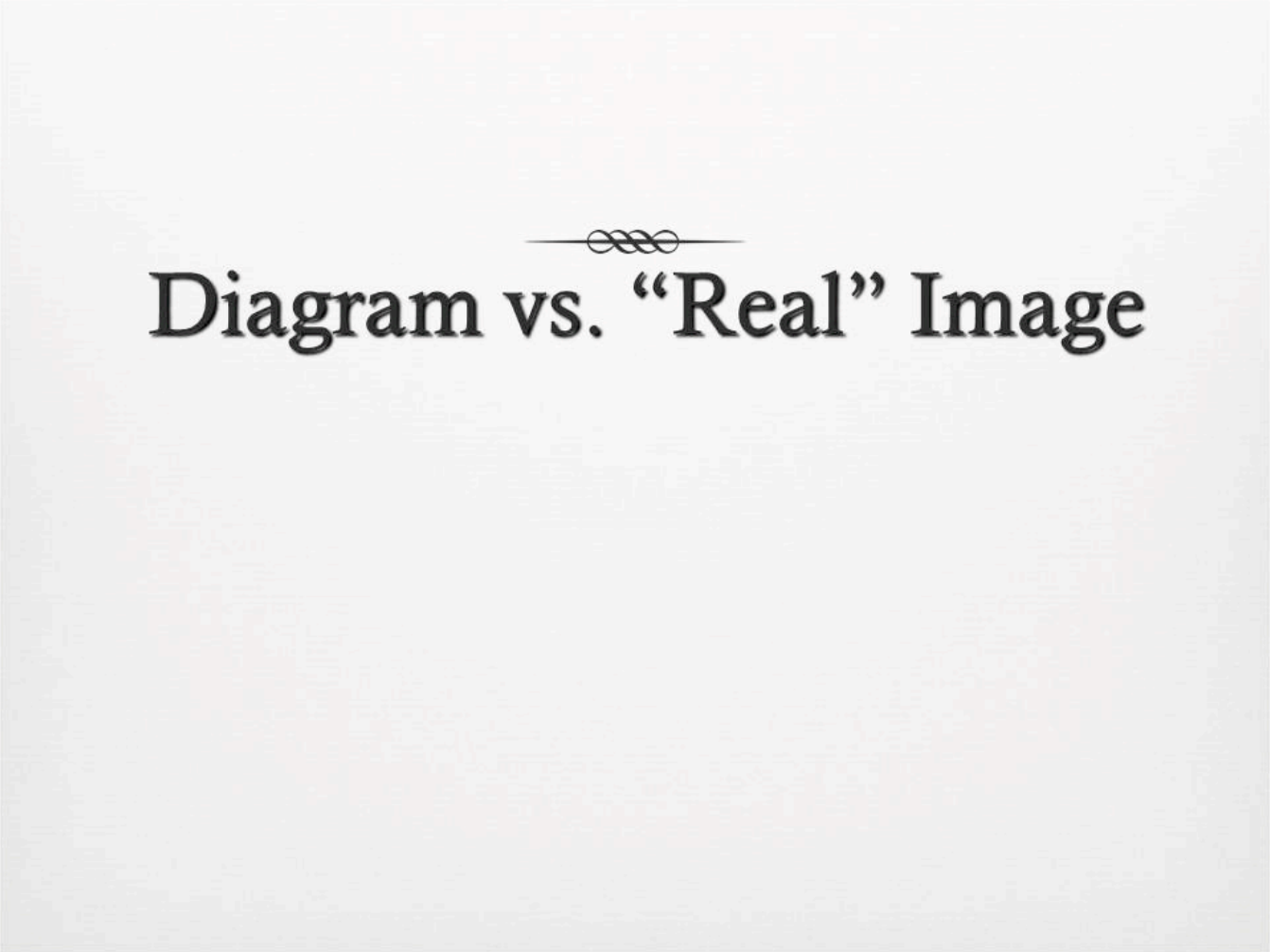
2.Based on the color of the offspring, what would you expect to be true about the recessive color genes of the parents in B?

Answers:

1. Both parents in A must have recessive white flower genes, or they could not have had white flower offspring.
2. At least one parent in B probably has two pink flower genes.

Purpose: This exercise helps students contrast potential offspring from parents with the same phenotype but different genotypes. It reinforces the role recessive genes can play in offspring's' phenotypes.

Day 46 – Traits and Inheritance



Exercise 3.1 (can either be done before or after introduction of the Punnett square with pea flowers)

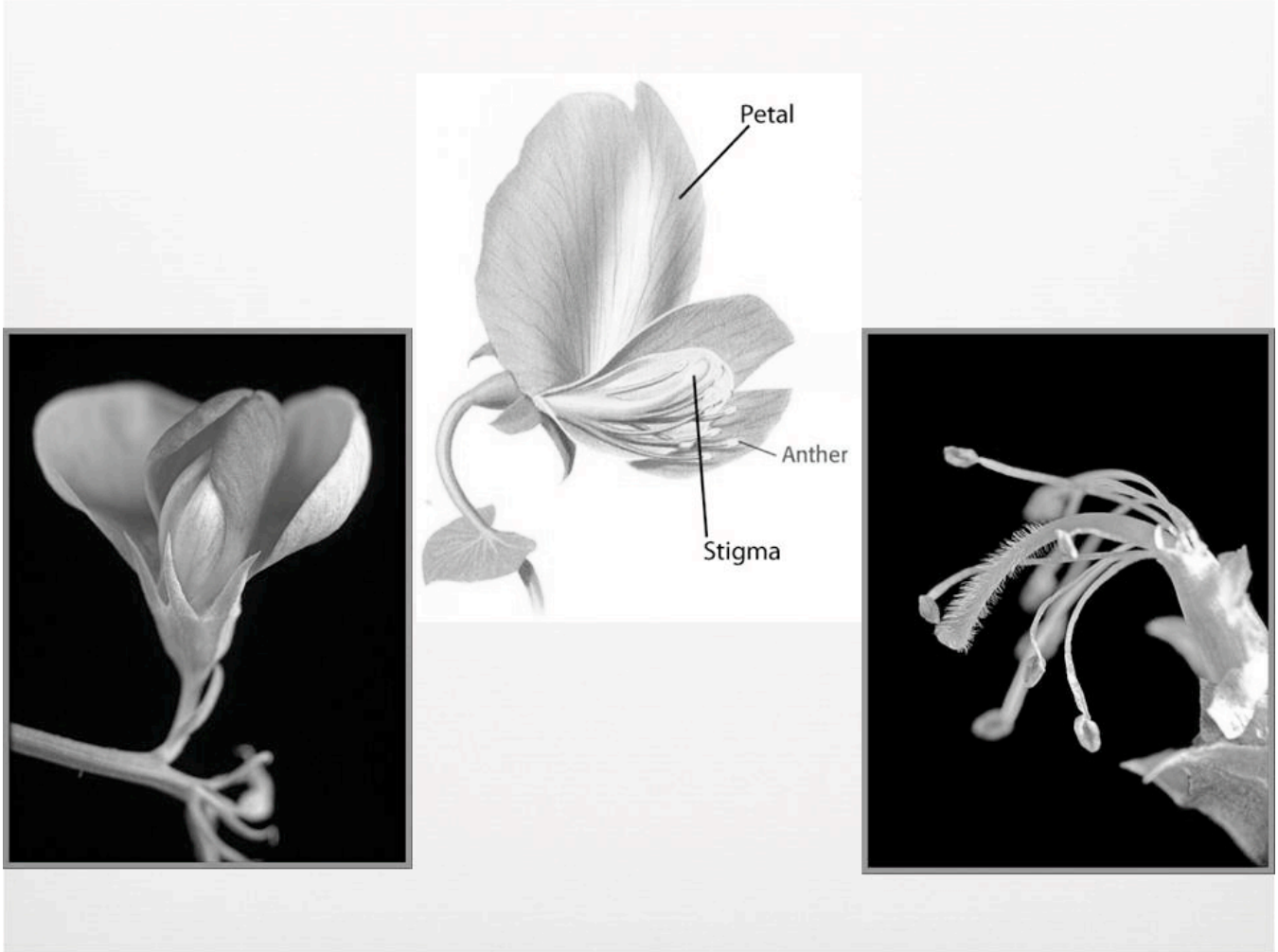
Image comprehension focus: Diagram vs. "Real" Image

Goal: To reinforce the ability to map a real image and a diagram

Type of Activity: Student Activity

Overview: In this activity, students will continue to practice making connections between features on real images and on diagrams to practice their diagram mapping skills. An understanding of how a diagram represents a real object is an important component of diagram comprehension.

Day 46 – Traits and Inheritance



Procedure: The teacher should show the students the modified version of p. 58/fig 4 and the photographs of the pea plant (shown above). The teacher should ask the students to identify or label the photographs using the labels provided in the diagram (petal, stigma, and anthers). The teacher should end the activity by emphasizing that diagrams are useful because they capture key features of an object. Care should be taken, however, not to assume that a diagram always conveys a realistic view of the appearance of an object.

Day 46 – Traits and Inheritance

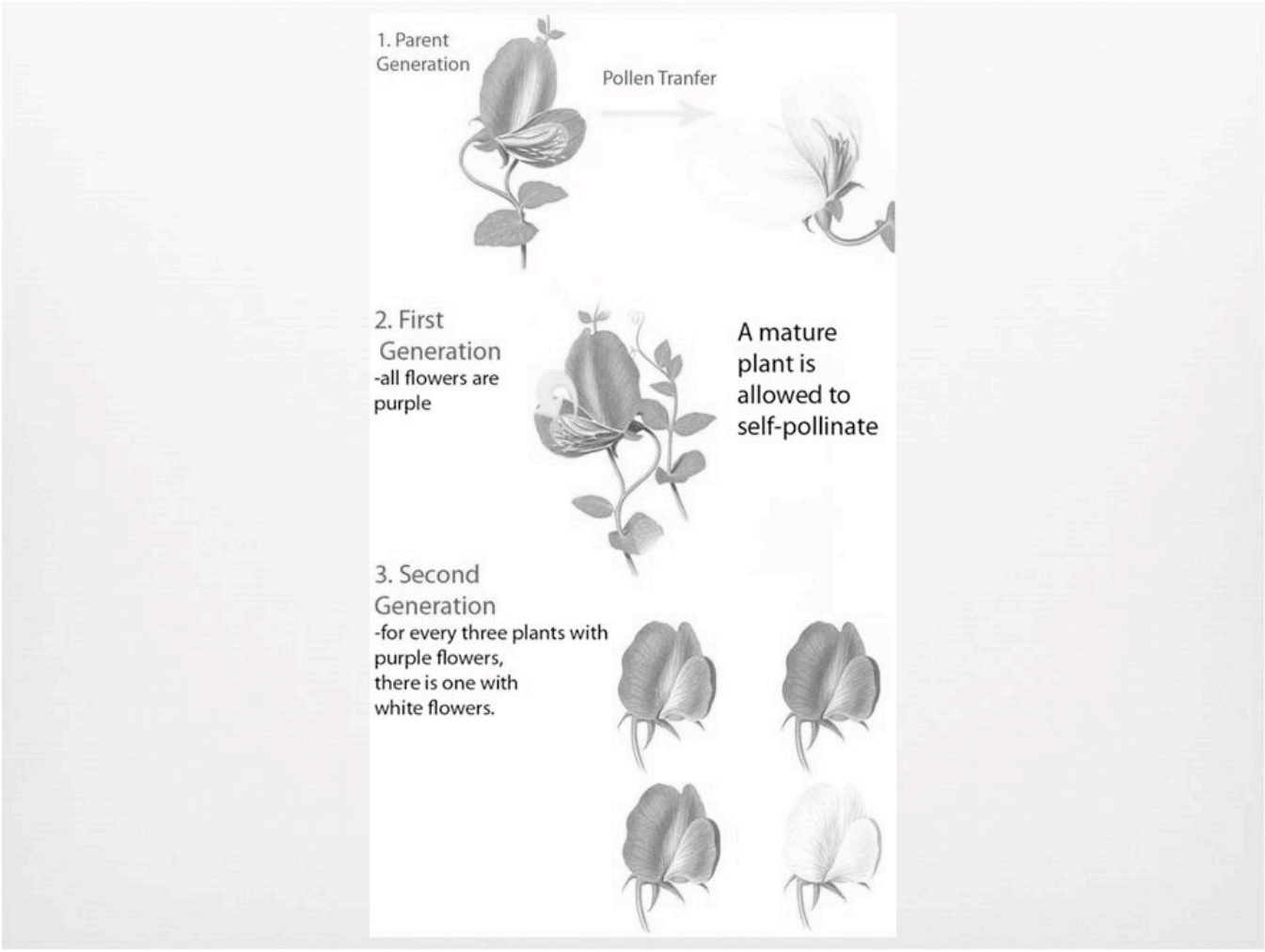
Exercise 3.2 (after the discussion of the Punnett square)

Image comprehension focus: labeling

Goal: Maintain understanding of the role of different types of labels and their importance in image comprehension.

Module Activity: Student Activity

Overview: This activity is designed to provide an additional opportunity for students to practice using labels to interpret a diagram. Periodic opportunities for students to focus on labels and the information that they provide is intended to reinforce the idea that labels are important as well as to develop the good habit of reading labels when looking at diagrams. This habit is important to strong image comprehension skills.



Procedure: First the teacher should show the students the modified p.59/fig5 (shown above) and ask them to identify the different types of labels in the diagram. [Naming labels (in purple) identify the various generations (parent, first, and second) and explanatory labels (in black) provide more details about each.] In addition, the teacher should ask the students to explain what the diagram is illustrating by using the information provided by the labels. [The diagram illustrates the process of cross-pollination as well as the colors of the flowers from the first and second generations.] This activity will provide students an opportunity to use a diagram (with a focus on the labels) to reinforce content from the chapter.

Exercise 3.3

Image comprehension focus: Captions

Goal: To reinforce the concept that captions are extremely important to consider when looking at an image since they often provide information that is crucial to understanding the diagram.

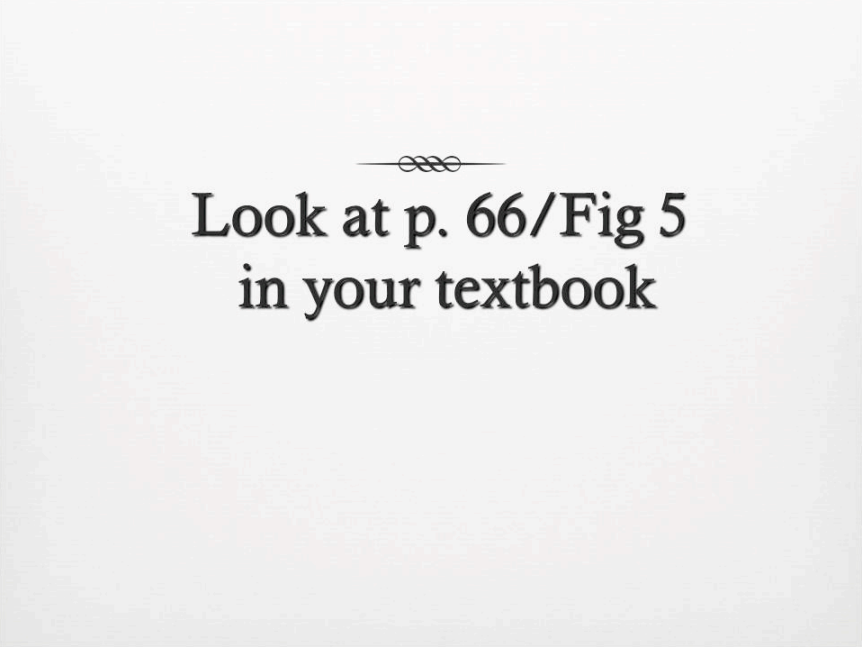
Module Activity: Student Activity

Overview: This activity is designed to further emphasize that captions are critical to read when viewing a diagram or image. The goal is to give the students another experience that reinforces the importance of captions to encourage them not to skip them when viewing images.

Procedure: The teacher should review the role of the caption and how critical it is. [Captions have several uses including indicating what is important in an image and what part of the image to pay attention to. They should always be read even if the reader thinks he/she knows what the image is illustrating.]

(proceed to the next slide)

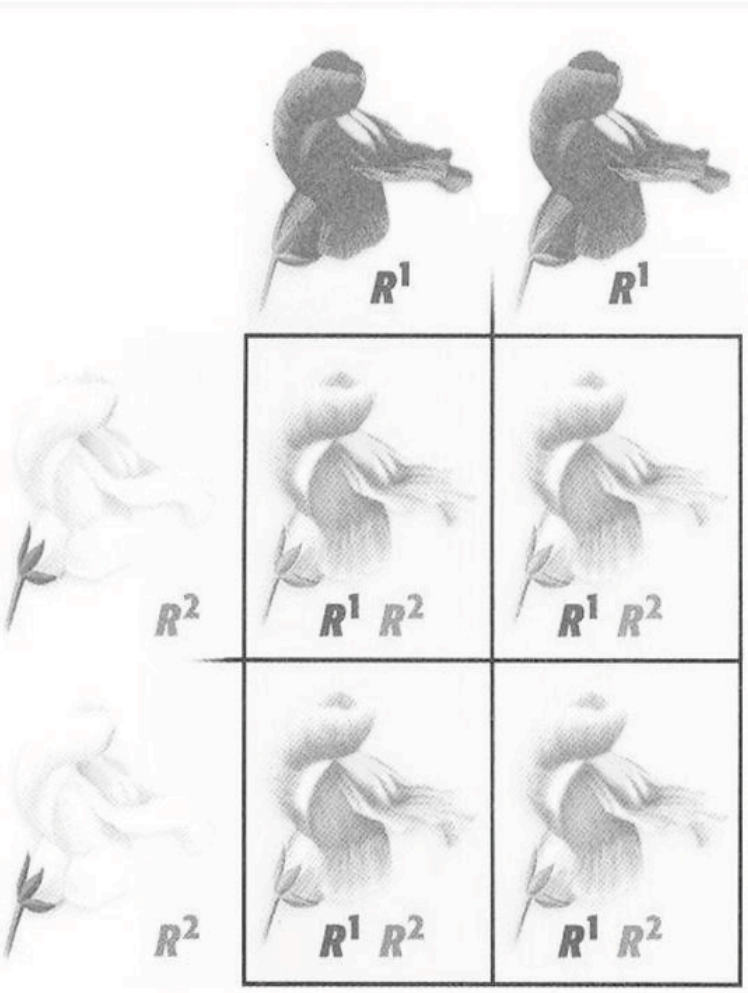
Day 46 – Traits and Inheritance



Procedure continued: The teacher should then have the students look at p. 66/Fig 5 while covering the caption (shown on the next slide if the teacher wants to project it). The teacher should instruct students to read the relevant section in the text and then try to write their own captions for this image. The teacher can then lead the class in a discussion where they share their ideas as well as critique each other. The teacher can conclude the activity by reminding the students to always read the captions when they are looking at diagrams or other images.

Alternate procedure: As an alternate, instead of reading the text, the teacher can do this activity after he/she has introduced the idea of incomplete dominance. The idea is that the students will have some idea of the content of the image and then will be asked to use that content to create a caption, thereby emphasizing the role of captions (to provide a context for an image as well as indicate important features of the image). The teacher can conclude the activity by reminding the students to always read the captions when they are looking at diagrams or other images.

Day 46 – Traits and Inheritance



DAY 47

Chapter 3, Section 2: Genotype-Phenotype Activity

After warming up, complete the genotype-phenotype activity included in today's presentation. This activity, as explained in the "Heads up on Student Learning" box on p359, will help address an especially challenging topic for students.

Allow at least 15 minutes at the end of class for the final embedded assessment; this will be a short assessment.

Big Ideas

- Phenotype refers to the way the gene pair is expressed – for example, a yellow coat on a puppy. Genotype refers to the actual gene pair – for example, two yellow coat genes.

Materials

Teacher:

1. Warm-up Day 47 - Cells_warmups.ppt
2. Slides - day47.ppt

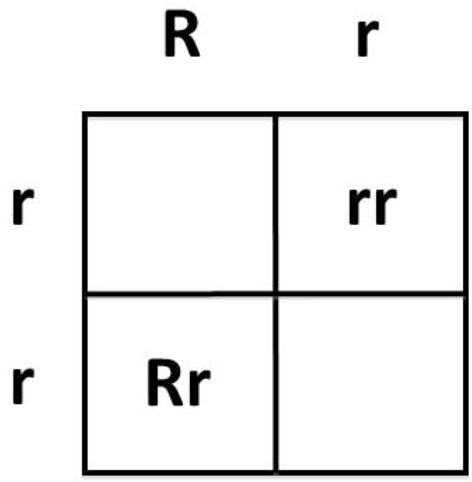
Students:

1. Thinking About Genotypes and Phenotypes (WS 43; student resource p62)
2. Embedded Assessment #5

Activities and Allotted time

5 minutes - Warm-up
25 minutes - Genotype-Phenotype Activity
15 minutes - Embedded Assessment #5

Day 47 – Warm-up



Use the Punnett square to the left to answer the following questions.

1. What is the genotype of the offspring represented in the upper left-hand box?
2. What is the genotype of the offspring represented in the lower right-hand box?

Answers:

1. Rr
2. rr

Purpose: This exercise gives students basic practice using a Punnett square to strengthen their grasp of genotypes.

Understanding genotypes and phenotypes

Heads up on student learning

Many students have difficulty distinguishing between genotypes and phenotypes. However, it is a very important distinction to understand because it is crucial to conceptualizing the mechanisms involved in evolution by natural selection and to resisting misconceptions. Chapter 3 introduces material that can help students begin to understand how genotypes and phenotypes are different and what role each one plays in evolutionary theory. The fundamental ideas of evolution by natural selection – variation in characteristics, differences in the likelihood of survival and reproduction, and heritability of characteristics – can all be more deeply understood if they are mapped to the concepts of genotypes and phenotypes.

The genotype is where random variations can arise, and it is the means by which characteristics can be transmitted across generations. Different alleles within the genotype for a given trait represent this variation. Phenotypes, in contrast, are what natural selection acts on. Characteristics expressed in an individual's phenotype may affect the likelihood that the individual will survive and reproduce.

For evolution by natural selection to occur, there must be variations in phenotypes that are related to variations in genotypes. If there is no variation in the phenotype for a particular trait, then there is no difference among individuals that could lead to an advantage in survival and reproduction. In other words, there is no difference for natural selection to act on. If there is no variation in the genotype, then there is no way for a more advantageous allele to get passed on to future generations.

For evolution by natural selection to occur, the characteristics that affect survival and reproduction must be heritable – in other words, the variations in the phenotype for that characteristic have to be related to variations in the genotype. Natural selection does not apply to traits that are acquired rather than passed on genetically.

This chapter includes an activity that asks students to revisit the contrasting case from Chapter 5 related to dominant and recessive genes in Labrador puppies, this time explicitly mapping their observations and inferences to the concepts of genotype and phenotype. If you think that your students need additional practice reasoning about evolutionary mechanisms using the language of genotypes and phenotypes, you may want to revisit the contrasting case about natural selection vs. selective breeding, with an emphasis on what is happening in each case at the level of genotypes and what is happening at the level of phenotypes.

Day 47 – Genotype and Phenotype

Genotypes and Phenotypes

Genotype refers to the genes that are passed from parents to offspring.

Different forms of a gene are called **alleles**. For a given characteristic, the offspring gets one allele from each parent.

Phenotype refers to how the characteristic appears in the individual.

This slide reviews some important ideas from pages 62-63 of the text. These terms and concepts will be used in this activity, which has an accompanying worksheet.

Day 47 – Genotype and Phenotype

Using Labrador coat color as an example:

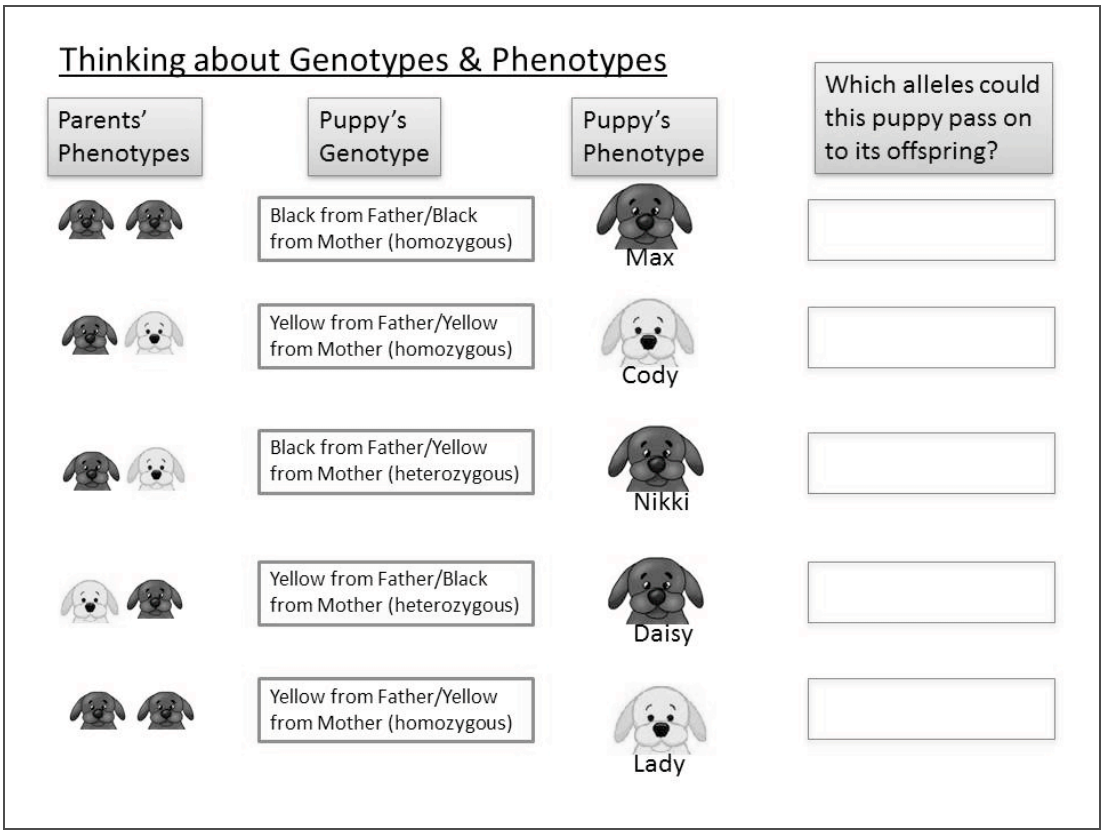
Each puppy receives an allele for coat color from each of his or her parents. These two alleles together make up the puppy's genotype.

If the puppy gets an allele for the SAME color from each parent, the puppy's genotype is called **homozygous** and the puppy's phenotype will be that color.

If the puppy gets an allele for DIFFERENT colors from each parent, the puppy's genotype is called **heterozygous** and the puppy's phenotype will be black because the black gene is dominant over the yellow gene.

Students connect terms like genotype, phenotype, allele, homozygous, and heterozygous to the by now familiar case of coat color in Labrador dogs.

Day 47 – Genotype and Phenotype



Use the student worksheet that accompanies this activity (WS 43, student resource p62).

This graphic is designed to help students trace the connections from genotype to phenotype and back to genotype over three generations.

Help students examine each column of this graphic. The first column, labeled "Parents' Phenotypes," shows the coat colors of the parents. The second column shows which alleles were passed on to a specific puppy from each parent. It also labels the puppy's genotype as heterozygous or homozygous. The third column shows the phenotype of the puppy that results from its particular genotype. The last column asks students to think about what alleles that puppy could pass on, once it grows up and has puppies of its own.

Have the students decide what should go in the blank boxes in the right-hand column. A given puppy might be able to pass on only the allele for black coat color, only the allele for yellow, or either allele. What the puppy can pass on to its offspring depends on what its own genotype includes.

Students can complete this part of the activity as a whole class, in small groups, or individually.

The next slide shows correct answers.

Thinking about It

Parents' Phenotypes	Puppy's Genotype	Puppy's Phenotype	Which alleles could this puppy pass on to its offspring?
	Black from Father/Black from Mother (homozygous)	 Max	Only Black alleles
	Yellow from Father/Yellow from Mother (homozygous)	 Cody	Only Yellow alleles
	Black from Father/Yellow from Mother (heterozygous)	 Nikki	Yellow or Black alleles
	Yellow from Father/Black from Mother (heterozygous)	 Daisy	Yellow or Black alleles
	Yellow from Father/Yellow from Mother (homozygous)	 Lady	Only Yellow alleles

Correct answers to Part 1 of student worksheet.

Day 47 – Genotype and Phenotype

Reasoning about Genotypes and Phenotypes

1. Give an example of how two puppies could have the same phenotype but different genotypes.
2. Can a puppy with a yellow phenotype have a black allele as part of its genotype? Why or why not?
3. Can a puppy with a black phenotype have a yellow allele as part of its genotype? Why or why not?
4. Use what you know about genotypes and phenotypes to explain how two parents who both have black coats could have a puppy with a yellow coat.
5. How come two black parents could have a puppy with a yellow phenotype but two yellow parents could not have a puppy with a black phenotype?

These questions correspond to Part 2 of the accompanying student worksheet.

Have students respond to the questions above, using information in the chart on the previous slide (which is also reproduced on the student worksheets). Students could do this in a whole class discussion, working in small groups, or working individually.

Day 47 – Genotype and Phenotype

1. Give an example of how two puppies could have the same phenotype but different genotypes. Puppies with a black phenotype can have either two black alleles, like Max, or they can have one black and one yellow allele, like Nikki and Daisy.

2. Can a puppy with a yellow phenotype have a black allele as part of its genotype? Why or why not? No. If it had a black allele, it would have to be black, because black is dominant over yellow. If its phenotype is yellow, both alleles in the genotype have to be yellow, like Cody and Lady.

3. Can a puppy with a black phenotype have a yellow allele as part of its genotype? Why or why not? Yes. It only has to have one black allele to be black, because black dominates over yellow. Its other allele could be yellow, but its phenotype will still be black. Nikki and Daisy are examples.

Examples of correct responses to questions 1 through 3.

4. Use what you know about genotypes and phenotypes to explain how two parents who both have black coats could have a puppy with a yellow coat. If both parents carry both a black and a yellow allele, they will both be black but each one of them could pass a yellow allele to a puppy. If the puppy got two yellow alleles (one from each parent), it would be yellow.

5. How come two black parents could have a puppy with a yellow phenotype but two yellow parents could not have a puppy with a black phenotype? If a parent has a yellow phenotype, then it must have two yellow alleles and no black ones, so it can't pass on a black allele. But a parent with a black phenotype could have both a yellow and a black allele if they are heterozygous. Two black parents could each give a puppy a yellow allele if both of the parents are heterozygous.

Examples of correct responses to questions 4 and 5.

Student Worksheet 43: Genotype and Phenotype Activity

Student Worksheet

Thinking about Genotypes & Phenotypes

Parents' Phenotypes	Puppy's Genotype	Puppy's Phenotype	Which alleles could this puppy pass on to its off spring?
	Black from Father/Black from Mother (homozygous)	 Max	
	Yellow from Father/Yellow from Mother (homozygous)	 Cody	
	Black from Father/Yellow from Mother (heterozygous)	 Nicci	
	Yellow from Father/Black from Mother (heterozygous)	 Daisy	
	Yellow from Father/Yellow from Mother (homozygous)	 Lady	

Part 1: Fill in the right-hand column in the chart above.

Part 2: Use the chart above to think about the following questions.

1. Give an example of how two puppies could have the same phenotype but different genotypes.
2. Can a puppy with a yellow phenotype have a black allele as part of its genotype? Why or why not?
3. Can a puppy with a black phenotype have a yellow allele as part of its genotype? Why or why not?
4. Use what you know about genotypes and phenotypes to explain how two parents who both have black coats could have a puppy with a yellow coat.
5. How come two black parents could have a puppy with a yellow phenotype but two yellow parents could not have a puppy with a black phenotype?

Embedded Assessment #5 – Answer Key

Embedded Assessment 5: Heredity

Please select the best answer to each question.

1. A puppy with two yellow Labrador retriever parents:
    a. always has a black coat.
    b. sometimes has a black coat.
    c. always has a yellow coat.*
2. How do particles move from areas of higher concentration to areas of lower concentration?
    a. by active transport
    b. by diffusion*
    c. by travel
3. Members of a species who live in the same place are a
    a. family.
    b. generation.
    c. population.*
4. Cells that are like each other and do the same job form a(n):
    a. organ.
    b. system.
    c. tissue.*
5. Organisms in Kingdom Fungi:
    a. are usually green.
    b. break down material outside their body and then absorb the nutrients.*
    c. do not have nuclei.

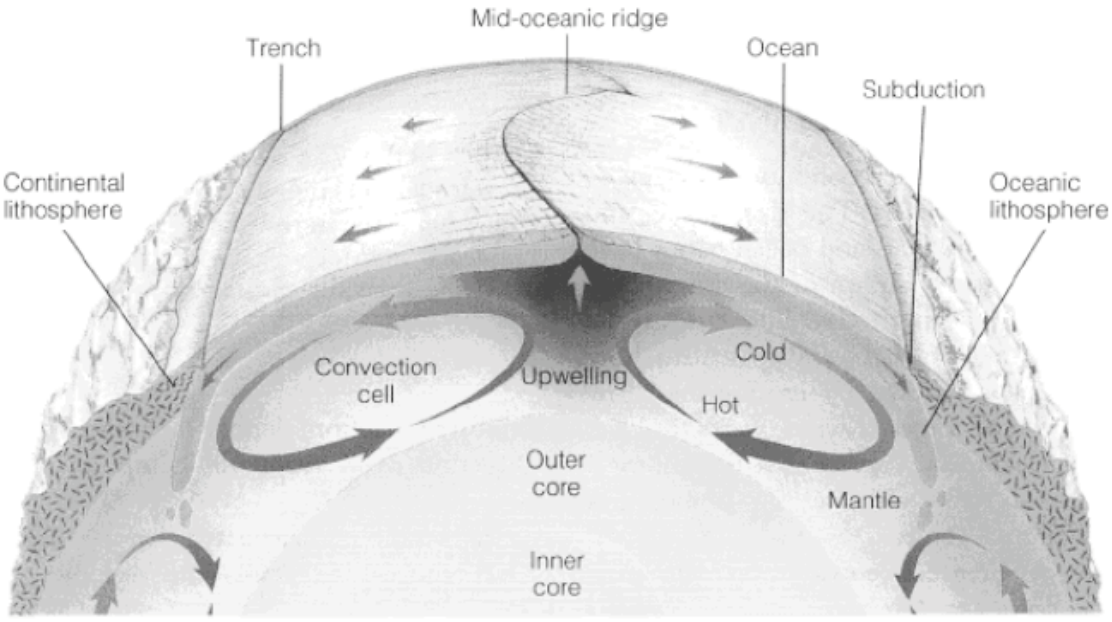
6. When a purple flower is crossed with a white flower, it results in four purple flowers. The gene for purple is almost certainly:

    a. cross-pollinated.

    b. dominant.*

    c. recessive.

7.



According to the diagram above, a convection cell:

a. is a rotating cycle of continental and oceanic lithosphere.

b. is a rotating cycle of hot and cold material.*

c. takes place in the outer core.

d. takes place in the inner core.

Day 47 – Embedded Assessment

Please answer the following question using complete sentences.

8. In cats, there are two types of ears: normal and curly. A curly eared cat mated with a normal eared cat and all of the kittens had curly ears. Are curly ears likely a dominant or recessive trait? Explain.

Sample answer: Curly ears are almost certainly dominant. The curly eared cat has at least one curly ear gene, and a normal eared cat has at least one normal ear gene; therefore, at least one of their offspring would likely have a curly gene and a normal gene for its genotype. For this genotype, the dominant gene is whichever shows up in the offspring's phenotype. Since all the kittens had curly phenotypes, the curly gene must be dominant.

DAY 48

End of Unit Assessment

There is no warm-up today, to allow as much time as possible for the final assessment. Please help students create a quiet, focused environment.

Materials

Teacher:

1. End of unit exams will be provided by the project at the appropriate time
2. Scantron sheets will also be provided by the project team

Students:

1. No. 2 Pencils
2. Erasers

Activities and Allotted time

Administer end of unit assessment to students.