

Conceptual Biology

Chapter 6: Inheritance

Comparing Mitosis and Meiosis

1. Give some examples of when organisms use mitosis.

Single-celled organisms use mitosis to reproduce. Multicellular organisms use mitosis to develop and grow, as well as to maintain their bodies.

2. a. When do organisms use meiosis?

Meiosis is used to make haploid cells.

- b. What kinds of cells are produced through meiosis?

Haploid cells such as eggs and sperm.

Circle the correct answers:

3. a. In meiosis, the number of cells produced is [one] [two] [three] [four].

In mitosis, the number of cells produced is [one] [two] [three] [four].

- b. During meiosis, cells produced are [haploid] [diploid].

During mitosis, cells produced are [haploid] [diploid].

- c. The cells produced are [different from one another] [identical] in meiosis.

The cells produced are [different from one another] [identical] in mitosis.

- d. Crossing over happens during [mitosis] [meiosis].

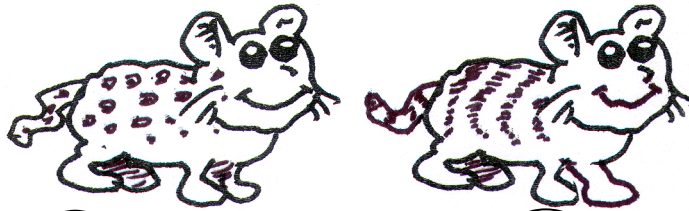
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Dominant and Recessive Traits

1. Some small woodland creatures have either spots or stripes. Fur pattern is determined by a single gene. The striped phenotype is **dominant** and the spotted phenotype is **recessive**.

Both the woodland creatures shown below are **homozygotes**.



Genotype is [aa] [AA]

Phenotype is [spotted] [striped]

[aa] [AA]

[spotted] [striped]

2. The woodland creature below is a **heterozygote**. Does it have spots or stripes?
Sketch the woodland creature's fur pattern and circle the genotype and phenotype.

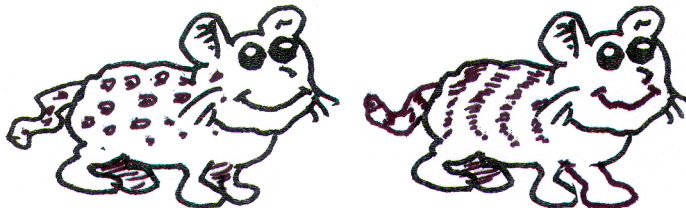


Genotype is [aa] [AA] [Aa]

Phenotype is [spotted] [striped]

Fill in the blanks:

3. Here are two more woodland creatures. Which of the following must be a **homozygote**?
Which could be either a **homozygote** or a **heterozygote**?



homozygote _____

heterozygote or homozygote _____

So we see that the spotted one must be a [homozygote] [heterozygote],

since you have to have two recessive alleles to have spots. The striped one is

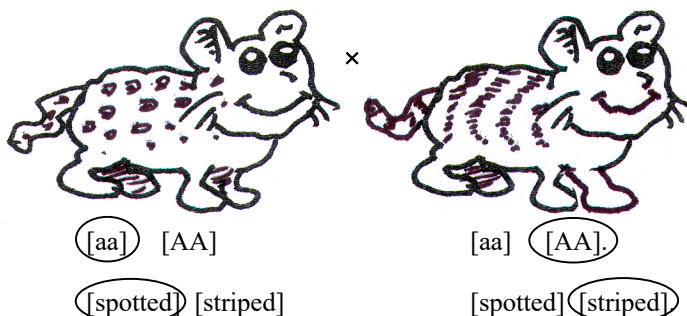
[a homozygote] [a heterozygote] [either a homozygote or heterozygote]

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Inheritance Patterns

1. Suppose you breed two woodland creatures together. One individual has genotype aa, and the other has genotype AA. Draw the cross below:



Genotype is

Phenotype is

2. What are the progeny like?



Genotype is

[aa] [AA] [Aa] and phenotype is [spotted] [striped].

Fill in the table below:

3. Now you breed two of the progeny from Question 2 together. What will their offspring look like?

		Allele received from father	
		A	a
Allele received from mother	A	 Genotype: AA Phenotype: striped	 Genotype: Aa Phenotype: striped
	a	 Genotype: Aa Phenotype: striped	 Genotype: aa Phenotype: spotted

So, the offspring include woodland creatures that are

[spotted] [striped] [both spotted and striped].

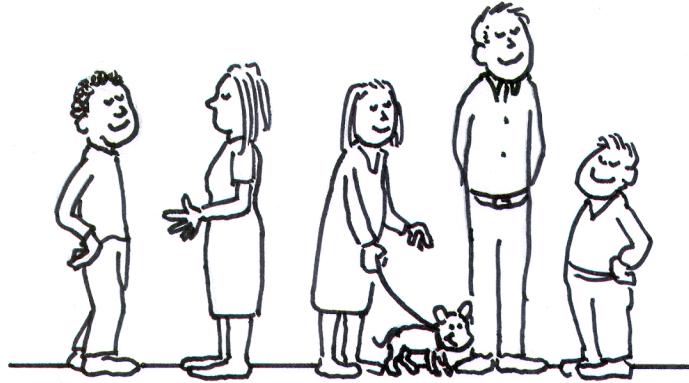
The offspring are found in a ratio of 3 striped: 1 spotted.

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Variable Traits, Heritable Traits

1. Of the human traits listed below, put a **V** for variable traits and put an **H** for heritable traits.
(Note: Some traits are both variable and heritable.)



- | | |
|--------------------------------------|----------------|
| a. age | <u>V</u> |
| b. eye color | <u>V and H</u> |
| c. number of toes | <u>H</u> |
| d. curliness or straightness of hair | <u>V and H</u> |
| e. presence or absence of dimples | <u>V and H</u> |
| f. upright posture | <u>H</u> |
| g. owning versus not owning a dog | <u>V</u> |
| h. height | <u>V and H</u> |

2. Which traits above have the potential of evolving via natural selection?

Traits that are both variable and heritable.