

Name _____

Form A

Dust bears are tiny macroscopic creatures which live primarily in genetics problems.

- They have a generation time of exactly one day.
- Each female produces exactly 128 progeny from a single mating. (64 males and 64 females).
- They are inexpensive to rear. The cost is \$0.25 per cross (128 progeny).

You are given five strains of homozygous dust bears:

Strain 1 is wildtype. Its phenotype is **Purple eye, striped, green pellicle** and **two terminal claws**.

The wildtype strain has the genotype **AABBCCDD** (see below).

Strain 2 has **blue eyes** instead of **purple eyes**.

Strain 3 has a **solid pellicle** instead of a **striped pellicle**.

Strain 4 has **four terminal claws** instead of **two terminal claws**.

Strain 5 has a **white pellicle** instead of a **green pellicle**.

Genetically:

Purple eye is dominant to *blue eye* ($A > a$)

Striped pellicle is dominant to *solid pellicle* ($B > b$)

Two terminal claws is dominant to *four terminal claws* ($C > c$)

Green pellicle is dominant to *white pellicle* ($D > d$)

All four genes are autosomal and on different chromosomes. The dominant phenotypes are the default conditions. That is, a **blue-eyed** dust bear will have a **green, striped pellicle** and **two terminal claws**. A **four-clawed** dust bear will have a **green, striped pellicle** and **purple eyes**.

Your professor gives you an assignment to produce a homozygous stock of **purple-eyed, solid, white** dust bears with **four terminal claws**. You must hand your professor at least 20 parents (10 males and 10 females) for the triply homozygous strain.

A. What are the genotypes of the 5 homozygous strains?

Strain 1	<u>AABBCCDD</u>	Strain 2	<u>aaBBCCDD</u>
Strain 3	_____	Strain 4	_____
Strain 5	_____		

- B. What is the **genotype** of the homozygous line that you are expected to make?
- C. Diagram the crosses need to make this line. *Hint: Start with producing one strain that is homozygous for two recessive traits and continue from there.* (Use the back side of this page if necessary).

Extra credit. How much money did you have to spend to accomplish your goal? How long did it take?

Name _____

Form B

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Strain 1 is wildtype. Its phenotype is **Purple eye, striped, green pellicle** and **two terminal claws**.

The wildtype strain has the genotype **AABBCCDD** (see below).

Strain 2 has **blue eyes** instead of **purple eyes**.

Strain 3 has a **solid pellicle** instead of a **striped pellicle**.

Strain 4 has **four terminal claws** instead of **two terminal claws**.

Strain 5 has a **white pellicle** instead of a **green pellicle**.

Genetically:

Purple eye is dominant to *blue eye* ($A > a$)

Striped pellicle is dominant to *solid pellicle* ($B > b$)

Two terminal claws is dominant to *four terminal claws* ($C > c$)

Green pellicle is dominant to *white pellicle* ($D > d$)

All four genes are autosomal and on different chromosomes. The dominant phenotypes are the default conditions. That is, a **blue-eyed** dust bear will have a **green, striped pellicle** and **two terminal claws**. A **four-clawed** dust bear will have a **green, striped pellicle** and **purple eyes**.

Your professor gives you an assignment to produce a homozygous stock of **blue-eyed, solid, white** dust bears with **two terminal claws**. You must hand your professor at least 20 parents (10 males and 10 females) for the triply homozygous strain.

A: What are the genotypes of the 5 homozygous strains?

Strain 1	<u>AABBCCDD</u>	Strain 2	<u>aaBBCCDD</u>
Strain 3	_____	Strain 4	_____
Strain 5	_____		

- B. What is the **genotype** of the homozygous line that you are expected to make?
- C. Diagram the crosses need to make this line. *Hint: Start with producing one strain that is homozygous for two recessive traits and continue from there.* (Use the back side of this page if necessary)..

Extra credit. How much money did you have to spend to accomplish your goal? How long did it take?

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Form C

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Strain 1 is wildtype. Its phenotype is **Purple eye, striped, green pellicle** and **two terminal claws**.

The wildtype strain has the genotype **AABBCCDD** (see below).

Strain 2 has **blue eyes** instead of **purple eyes**.

Strain 3 has a **solid pellicle** instead of a **striped pellicle**.

Strain 4 has **four terminal claws** instead of **two terminal claws**.

Strain 5 has a **white pellicle** instead of a **green pellicle**.

Genetically:

Purple eye is dominant to *blue eye* ($A > a$)

Striped pellicle is dominant to *solid pellicle* ($B > b$)

Two terminal claws is dominant to *four terminal claws* ($C > c$)

Green pellicle is dominant to *white pellicle* ($D > d$)

All four genes are autosomal and on different chromosomes. The dominant phenotypes are the default conditions. That is, a **blue-eyed** dust bear will have a **green, striped pellicle** and **two terminal claws**. A **four-clawed** dust bear will have a **green, striped pellicle** and **purple eyes**.

Your professor gives you an assignment to produce a homozygous stock of **blue-eyed, solid, green** dust bears with **four terminal claws**. You must hand your professor at least 20 parents (10 males and 10 females) for the triply homozygous strain.

A. What are the genotypes of the 5 homozygous strains?

Strain 1	<u>AABBCCDD</u>	Strain 2	<u>aaBBCCDD</u>
Strain 3	_____	Strain 4	_____
Strain 5	_____		

- B. What is the **genotype** of the homozygous line that you are expected to make?
- C. Diagram the crosses need to make this line. *Hint: Start with producing one strain that is homozygous for two recessive traits and continue from there.* (Use the back side of this page if necessary).

Extra credit. How much money did you have to spend to accomplish your goal? How long did it take?

Name _____

Form D

Dust bears are tiny macroscopic creatures which live primarily in genetics problems.

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You are given five strains of homozygous dust bears:

Strain 1 is wildtype. Its phenotype is **Purple eye, striped, green pellicle** and **two terminal claws**.

The wildtype strain has the genotype **AABBCCDD** (see below).

Strain 2 has **blue eyes** instead of **purple eyes**.

Strain 3 has a **solid pellicle** instead of a **striped pellicle**.

Strain 4 has **four terminal claws** instead of **two terminal claws**.

Strain 5 has a **white pellicle** instead of a **green pellicle**.

Genetically:

Purple eye is dominant to *blue eye* ($A > a$)

Striped pellicle is dominant to *solid pellicle* ($B > b$)

Two terminal claws is dominant to *four terminal claws* ($C > c$)

Green pellicle is dominant to *white pellicle* ($D > d$)

All four genes are autosomal and on different chromosomes. The dominant phenotypes are the default conditions. That is, a **blue-eyed** dust bear will have a **green, striped pellicle** and **two terminal claws**. A **four-clawed** dust bear will have a **green, striped pellicle** and **purple eyes**.

Your professor gives you an assignment to produce a homozygous stock of **blue-eyed, striped, green** dust bears with **four terminal claws**. You must hand your professor at least 20 parents (10 males and 10 females) for the triply homozygous strain.

A. What are the genotypes of the 5 homozygous strains?

Strain 1	<u>AABBCCDD</u>	Strain 2	<u>aaBBCCDD</u>
Strain 3	_____	Strain 4	_____
Strain 5	_____		

- B. What is the **genotype** of the homozygous line that you are expected to make?
- C. Diagram the crosses need to make this line. *Hint: Start with producing one strain that is homozygous for two recessive traits and continue from there.* (Use the back side of this page if necessary).

Extra credit: How much money did you have to spend to accomplish your goal? How long did it take?