

Parent/Instructor Page: PLASTIC Egg/CHICKEN PLUMAGE GENETICS GAME

NOTE: The material has been oversimplified! Purpose is to explain Punnett Squares. For more on chicken genetics, go to: <https://scratchcradle.wordpress.com/genetics-mini-series/>

Activity adapted from: <http://www.cosee-west.org/AprilLectureMaterials/Activities/PlasticEggGenetics.pdf>

This activity and blog: www.desertwind.us

Materials:

- 2 sets of 6 different colors plastic eggs (per 12 eggs). Suggested colors are given below.
- Student Key to put inside eggs: Corresponding colors of candy, buttons, centimeter cubes, or any colored manipulative that will fit, or a slip of sturdy paper with the 4 offspring color marked. If you use candy, you will have to restock each egg, if you use manipulatives or a paper key, you can use it from class to class and year to year.
- Worksheet copy for each child. If child is pre-reading, color in the phenotype boxes.

Instructor Preparation:

- Introduce age-appropriate concepts of recessive/dominant traits, genotypes/phenotypes, and Punnett squares.
- The egg shells represent the plumage color contributed by the parents – half the egg represents the Sire (father/rooster), half the egg represents the Dam (mother/hen). Use the genotype/phenotype chart to match plumage color to phenotype.

Simplified Sire/Dam and Offspring Chicken Plumage Genetics:

Genotype	Phenotype	Use:	Genotype	Phenotype	Use:
BB	Black Feathers	1/2 black egg	RR	Red Feathers	1/2 red egg
Bb	Blue Feathers	1/2 blue egg	Rr	Orange (champagne) Feathers	1/2 orange egg
bb	Brown (dun) Feathers	1/2 brown egg	rr	Yellow (blonde) Feathers	1/2 yellow egg

- Inside each egg, place the 4 corresponding colored pieces to show offspring. You can use candy, small manipulatives, or include an answer key (color dots on sturdy paper). Set them up as follows:

Sire/Dam	Genotype	Offspring	Sire/Dam	Genotype	Offspring
black x black	BB x BB	4 black	red x red	RR x RR	4 red
black x brown	BB x bb	4 blue	red x yellow	RR x rr	4 orange
brown x brown	bb x bb	4 brown	yellow x yellow	rr x rr	4 yellow
blue x blue	Bb x Bb	1black 2blue 1 brownn	orange x orange	Rr x Rr	1 red 2 orange 1 yellow
blue x black	Bb x BB	2 blue 2black	orange x red	Rr x RR	2 red 2 orange
blue x brown	Bb x bb	2 blue 2 brown	orange x yellow	Rr x rr	2 orange 2 yellow

- Complete 1-2 (or more, if necessary) Punnett Squares with the children, then let them do the rest alone or in groups. When they finish, let them open the eggs and check their answers!

This activity can be used to reinforce percentages, as well (ex: 25% of the chicks will have red feathers, 50% will have orange feathers, and 25% will have yellow feathers).

PLASTIC Egg/CHICKEN PLUMAGE GENETICS GAME

Phenotype	Genotype
Black Feathers	BB
Blue Feathers	Bb
Brown (khaki) Feathers	bb

Phenotype	Genotype
Red Feathers	RR
Orange Feathers	Rr
Yellow Feathers	rr

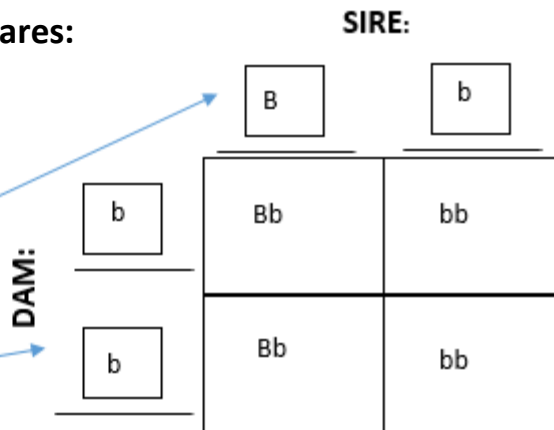
Directions:

1. Choose one egg, but do not open it yet.
2. One half of the egg represents the plumage (feather) color of the dam (mother/hen). The other half of the egg represents the plumage (feather) color of the sire (father/rooster).
3. Record the plumage color **phenotype** and **genotype** of your egg in the chart.
4. Place the genotype of your egg into the Punnett Square.
5. Determine the possible genotypes and phenotypes of the offspring.
6. When you are finished – open your egg! Do your answers match?
 - a. If yes, put the egg back together, and choose another.
 - b. If no, check your work, and make corrections

Example of how to fill in Punnett Squares:

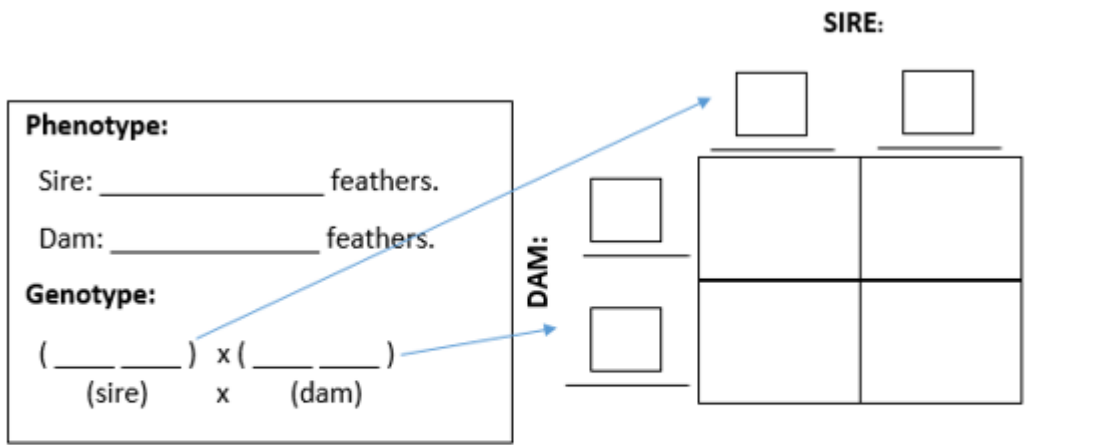
Phenotype:
 Sire: blue feathers.
 Dam: brown feathers.

Genotype:
 $(\underline{B} \underline{b})$ x $(\underline{b} \underline{b})$
 (sire) x (dam)

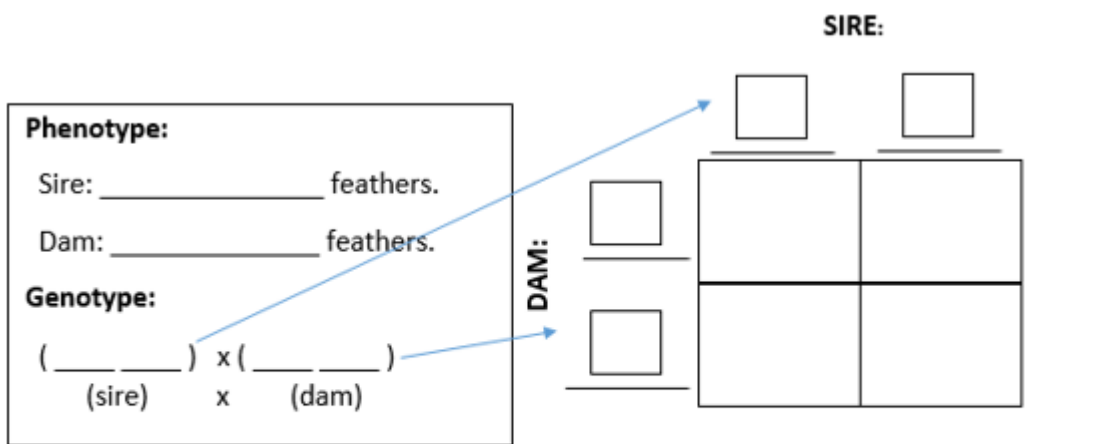


Results: 2 chicks have blue feathers

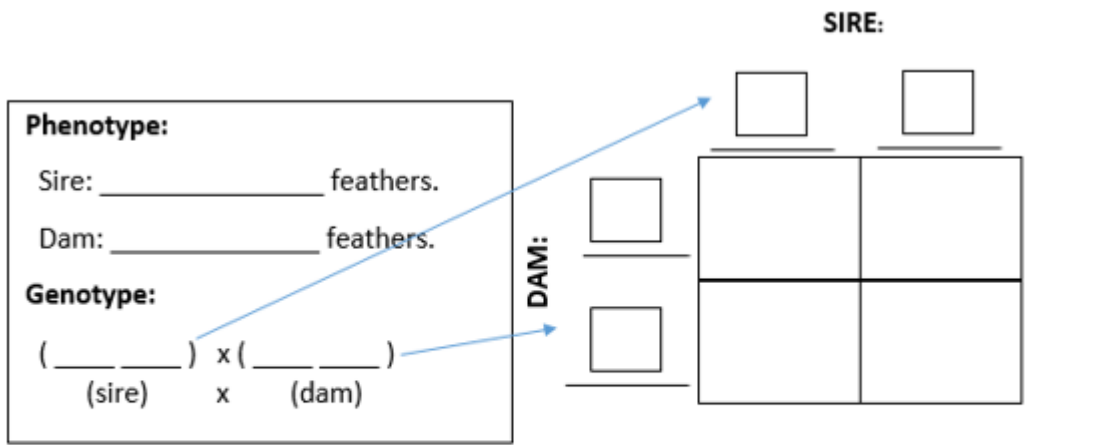
2 chicks have brown feathers



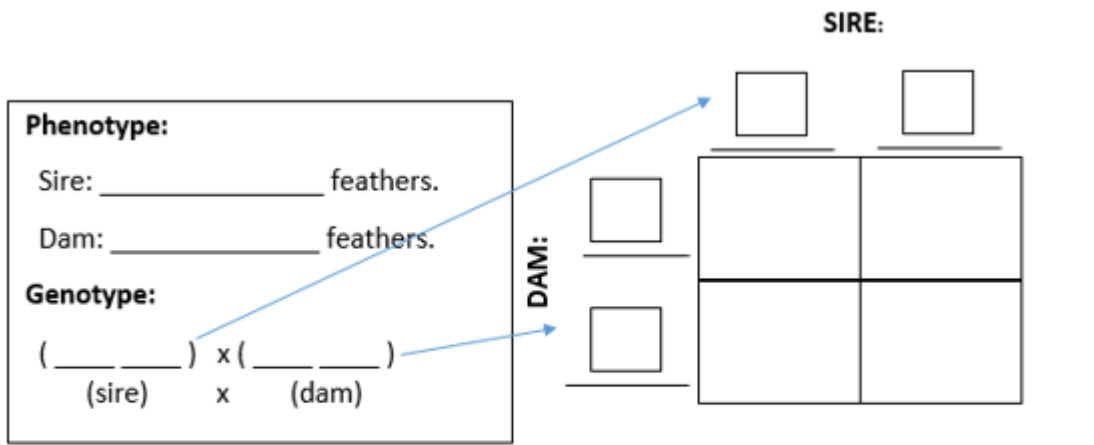
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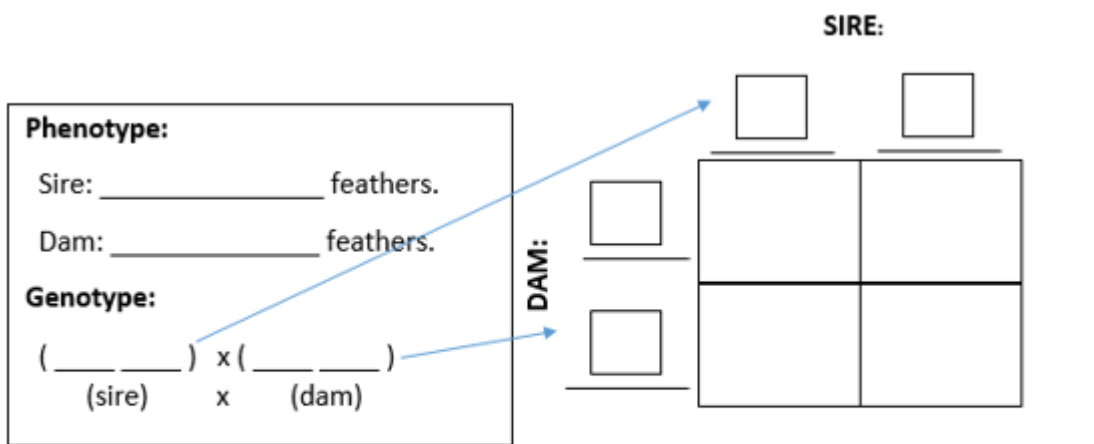
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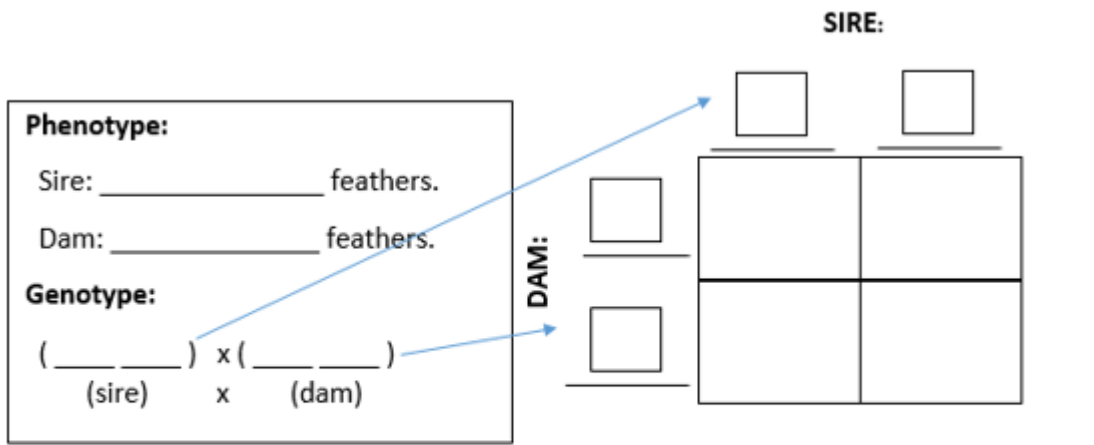
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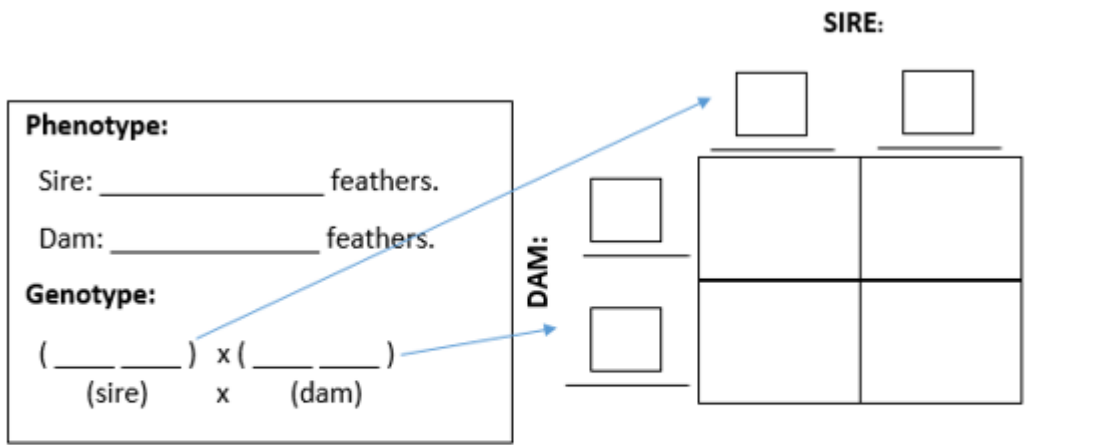
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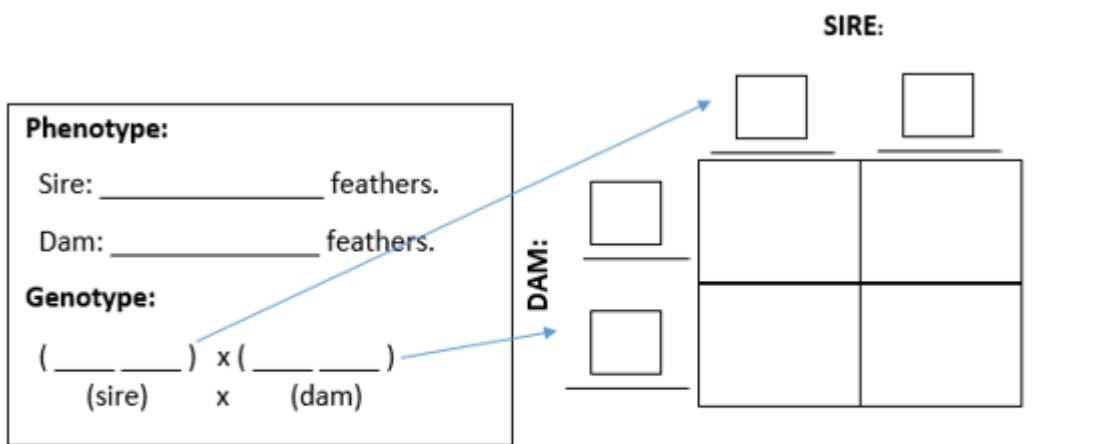
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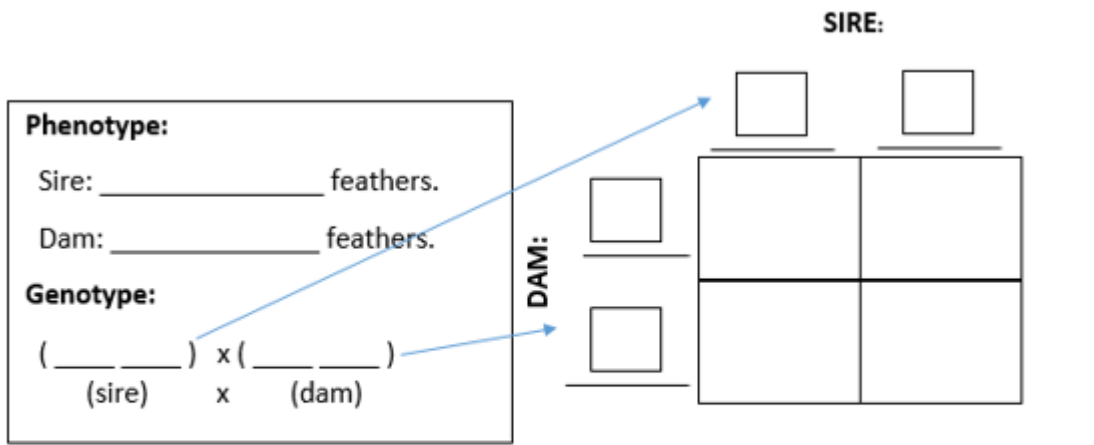
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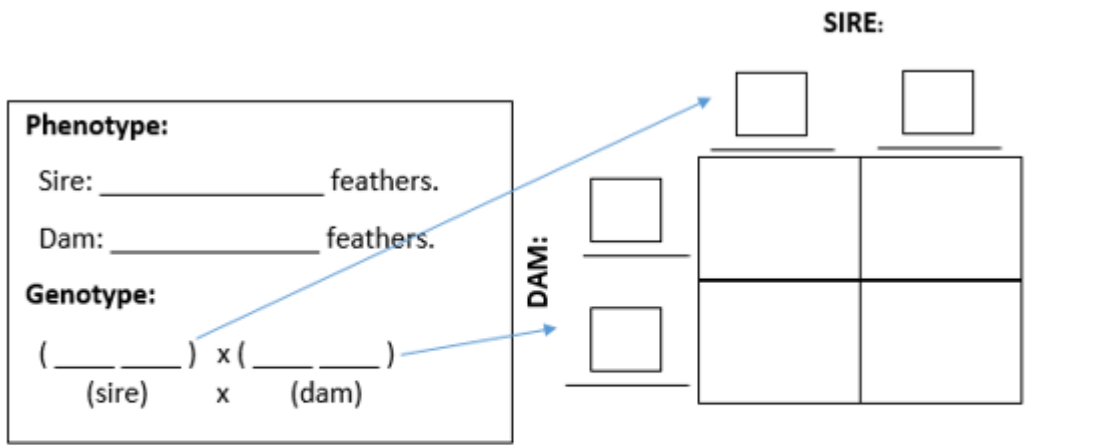
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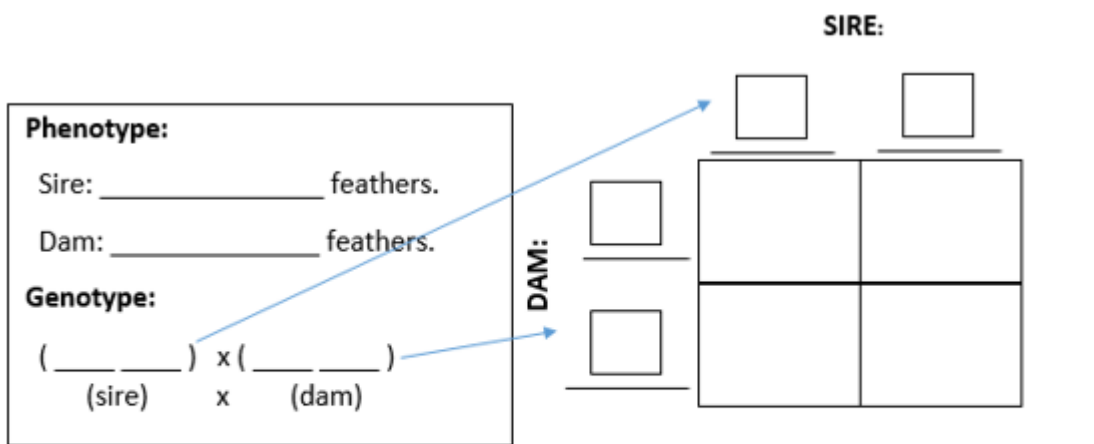
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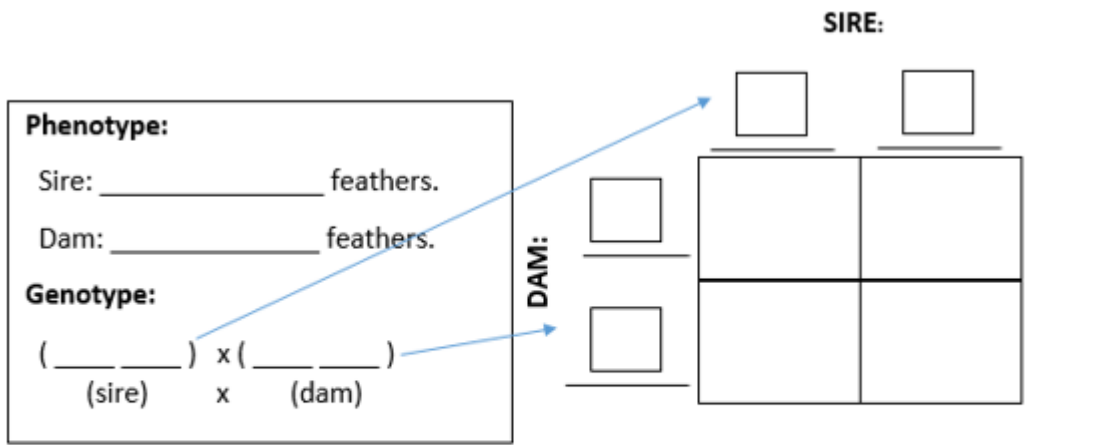
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