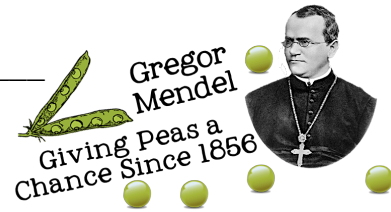


Name: \_\_\_\_\_ Date: \_\_\_\_\_

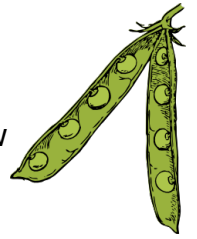


## MONOHYBRID CROSS PRACTICE: Give Peas a Chance

**Directions:** For EACH problem, **use a Punnett square to show your work**, and provide the following information:

- Show the parent's genotypes as a cross in the form of \_\_\_\_ x \_\_\_\_
  - Provide a Punnett Square to predict the outcome of the cross
  - List the possible genotypes produced from the cross AND the percentage of each.
  - List the possible phenotypes produced from the cross AND the percentage of each.  
(You may select any letter you wish to represent the alleles).
- In pea plants, purple flowers are dominant over white flowers, which are recessive. Cross two homozygous dominant (PP) parents.
  - In pea plants, short plants are recessive to tall plants. Cross two homozygous recessive individuals (tt).
  - In pea plants, yellow seeds are dominant and green seeds are recessive. Cross two heterozygous individuals (Yy).
  - In pea plants, inflated pea pods are dominant over flat pea pods, which are recessive. Cross a heterozygous parent with a homozygous recessive parent.
  - In pea plants, round peas are dominant and wrinkled peas are recessive. Cross a heterozygous parent with a homozygous round pea plant.

6. In pea plants, green pods are dominant over yellow pods. Cross a plant with yellow pods with a plant that is heterozygous for green pods.



7. In pea plants, flowers that bud on the top of the plant (terminal position) is dominant, and flowers that bud on the sides of the plant (axial position) is recessive. Cross a heterozygous terminal flowering plant with a homozygous terminal flowering plant.

8. In pea plants, the seed coat can be green or white. Green is dominant over white. Construct your own Punnett square that involves one heterozygous parent in which 50% of the offspring can be predicted to have green seed coats.

9. A pea plant that is pure for purple flowers mates with a pea plant that has white flowers. One of their offspring self-fertilizes and produces 100 offspring. How many would you predict turn out to have purple flowers and how many would you predict turn out to have white flowers?

10. Of those offspring, 70 are white and 30 are purple. How is this different than your prediction? Is this possible? Why or why not?



## MONOHYBRID CROSS PRACTICE: Give Peas a Chance

**Directions:** For Problems 1-7 provide the following information:

- Show the parent's genotypes as a cross in the form of \_\_\_\_ x \_\_\_\_
- Provide a Punnett Square to predict the outcome of the cross
- List the possible genotypes produced from the cross AND the percentage of each.
- List the possible phenotypes produced from the cross AND the percentage of each.  
(You may select any letter you wish to represent the alleles).

- In pea plants, purple flowers are dominant over white flowers, which are recessive.  
Cross two homozygous dominant parents.

Parental cross= PP X PP

Genotypes= 100% Homozygous dominant

Phenotypes= 100% purple

|   |    |    |
|---|----|----|
|   | P  | P  |
| P | PP | PP |
| P | PP | PP |

- In pea plants, short plants are recessive to tall plants. Cross two homozygous recessive individuals.

Parental cross= tt X tt

Genotypes= 100% Homozygous recessive

Phenotypes= 100% short

|   |    |    |
|---|----|----|
|   | t  | t  |
| t | tt | tt |
| t | tt | tt |

- In pea plants, yellow seeds are dominant and green seeds are recessive. Cross two heterozygous individuals.

Parental cross= Yy X Yy

Genotypes= 25% homozygous dominant;

50% heterozygous; 25% homozygous recessive (1:2:1)

Phenotypes= 75% yellow seeds, 25% green seeds

|   |    |    |
|---|----|----|
|   | Y  | y  |
| Y | YY | Yy |
| y | Yy | yy |

- In pea plants, inflated pea pods are dominant over flat pea pods, which are recessive. Cross a heterozygous parent with a homozygous recessive parent.

Parental cross= Ii X ii

Genotypes=50% heterozygous; 50% homozygous recessive

Phenotypes=50% inflated pods; 50% flat pods

|   |    |    |
|---|----|----|
|   | I  | i  |
| i | Ii | ii |
| i | Ii | ii |



5. In pea plants, round peas are dominant and wrinkled peas are recessive. Cross a heterozygous parent with a homozygous round pea plant.

Parental cross= Rr X RR  
 Genotypes= 50% Heterozygous;  
 50% homozygous dominant  
 Phenotypes= 100% round peas

|   |    |    |
|---|----|----|
|   | R  | r  |
| R | RR | Rr |
| R | RR | Rr |

6. In pea plants, green pods are dominant over yellow pods. Cross a plant with yellow pods with a plant that is heterozygous for green pods.

Parental cross= gg X Gg  
 Genotypes= 50% Heterozygous;  
 50% homozygous recessive  
 Phenotypes= 50% yellow pods; 50% green pods

|   |    |    |
|---|----|----|
|   | G  | g  |
| g | Gg | gg |
| g | Gg | gg |

7. In pea plants, flowers that bud on the top of the plant (terminal position) is dominant, and flowers that bud on the sides of the plant (axial position) is recessive. Cross a heterozygous terminal flowering plant with a homozygous terminal flowering plant.

Parental cross= Tt X TT  
 Genotypes= 50% Heterozygous;  
 50% homozygous dominant  
 Phenotypes= 100% terminal flowers

|   |    |    |
|---|----|----|
|   | T  | t  |
| T | TT | Tt |
| T | TT | Tt |

8. In pea plants, the seed coat can be green or white. Green is dominant over white. Construct your own Punnett square in which 50% of the offspring can be predicted to have green seed coats.

|   |    |    |
|---|----|----|
|   | G  | g  |
| g | Gg | gg |
| g | Gg | gg |

9. A pea plant that is pure for purple flowers mates with a pea plant that has white flowers. One of their offspring self-fertilizes and produces 100 offspring. How many would you predict turn out to have purple flowers and how many would you predict turn out to have white flowers?

F2 generation= 1:2:1 genotypic ratio and 3:1 phenotypic ratio  
 Students should predict that 25 pea plants have white flowers.

10. Of those offspring, 41 are white and 59 are purple. How is this different than your prediction? Is this possible? Why or why not?

There are more white flowers than the initial prediction based on the probability of 25%. However, it IS possible for this to happen because each time there is a 25% chance of two recessive gametes forming to build a white flower. Each time this happens, the chances do not increase or decrease. Hypothetically, there could be 100% white flowering pea plants, it unlikely, but possible.



# BIOLOGY ROOTS

Engaging Science Lessons



## Thank you!

Thank you so much for supporting [Biology Roots](#)!

I am so excited that you will be using one of my products in your classroom to benefit you and your students. Listed below are some general categories of products that I offer in my TpT store:

[Cells](#)

[Cellular Respiration](#)

[DNA and Protein Synthesis](#)

[Ecology](#)

[Genetics](#)

[Evolution](#)

[Interactive Notebook Supplements](#)

[Photosynthesis](#)

[Task Cards](#)

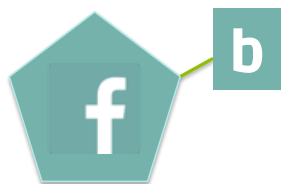
[Complete Units and Money Saving Bundles](#)

### Copyright Notice and Terms of Use:

© 2015 Vanessa Jason ("Biology Roots")

"All rights reserved by author. This product is to be used by the original purchaser only. Duplication for other classes or by other teachers or for use in school-wide distribution is strictly forbidden.

**Posting Biology Roots products on the internet in any form is strictly forbidden and violates the DMCA. Not for public display, including ANY websites. Violations are subject to the penalties of the Digital Millennium Copyright Act.**



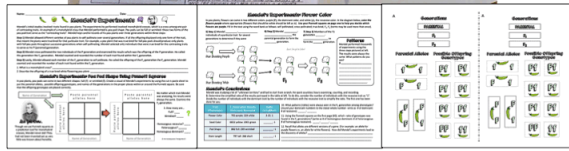
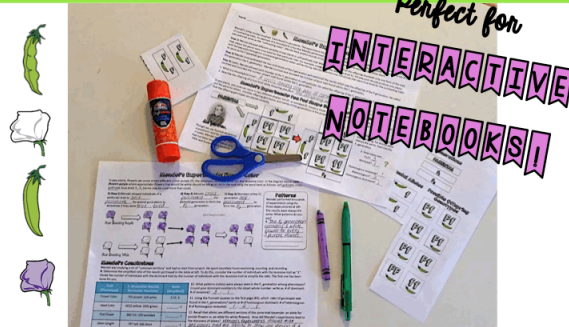
# GENETICS

# Activities

# MENDEL'S EXPERIMENT

Perfect for

**INTERACTIVE NOTEBOOKS!**




# INTRODUCTION TO PEDIGREES

## PowerPoint Presentation

### Types of Traits

We have a total of 23 pairs of homologous chromosomes. 22 of these pairs are autosomes (found in both body cells).


- 1 of these pairs are sex chromosomes (found in egg and sperm).
- Female pairs XX, Male pairs XY



**Autosomes** are autosomes, that is, they are not sex chromosomes. They are numbered 1-22, that is, they are not sex chromosomes. Autosomes X, Y


### Alleles

Homologous chromosomes separate during meiosis- the offspring receives one copy of a gene from each parent.




| Parental Genotypes: | T  | t  |
|---------------------|----|----|
| TT                  | TT | Tt |
| Tt                  | Tt | tt |

Receiving the letter that trait will not be expressed unless the genotype is **tt** (using the letter t as an example).



### Using Pedigrees

Genes are passed from parents to offspring. Genes are present



This particular pair had 4 offspring: 2 boys and 2 girls.

24 SLIDES

STUDENT NOTES INCLUDED

EDITABLE

Name: \_\_\_\_\_ Date: \_\_\_\_\_



## DRAGON FEATHERS

Some species of dragons, such *Regalus copperus*, have feathers instead of scales on their body. This is controlled by a genetic trait. Feathers (F) are dominant, whereas lack of feathers (f) is recessive.

|  |  |
|--|--|
|  |  |
|  |  |

In the square provided, perform a monohybrid cross among a male who is heterozygous for the trait and a female who is also heterozygous for the trait.

Parental Cross= \_\_\_\_\_ x \_\_\_\_\_

### Monohybrid Cross Punnett Square- Prediction Tool

PERCENTAGES

How many feathered dragons?

How many non-feathered dragons? \_\_\_\_\_ / 4 \_\_\_\_\_



The female dragon has laid 12 eggs. Using the dihybrid cross Punnett square, **predict** how many babies will have the following traits:

How many feathered dragons?

How many non-feathered dragons? \_\_\_\_\_

During the next portion of the lab, we are going to simulate how traits are passed down to offspring using popsicle sticks as chromosomes. Gather 4 popsicle sticks: if different colors are available choose 2 in one color and 2 in a different color. One color will be designated for the male, and the other color for the female.

Write the alleles for the feather gene on the popsicle sticks. Do this for both the male and female chromosomes.

Label one paper bag "male" and the other "female". Put the corresponding popsicle sticks into each bag. It does not matter which dragon you start with.

Shake the bag and choose a popsicle stick (no peeking!). Do this 12 times. Be sure to shake the bag and not to peek between each turn. Record your results in the table on the following page.

After you've finished recording, repeat the process for the other dragon. Record in the table on the following page.

Materials:

4 Popsicle Sticks

2 Paper Bags

© Vanessa Jason (Biology Roots)

# GENETICS UNIT


## TASK CARDS

### 1 GENETICS PROB

Different versions of a single gene (one can be over the other(s)).


### 11 GENETICS PROB

In *Escherichia coli* (E. coli), the palindromic allele is dominant to the non-palindromic allele.



### 10 GENETICS PROBLEMS


Two dragons are dominant to green and red dragons male, and produce offspring with the following hatchlings, one has green



### 4 GENETICS PROBLEMS


In Rabbits, the allele B for black hair is dominant over the allele b for brown hair.

Calculate the probability of homozygous dominant offspring resulting from a cross between two heterozygous parents.




### GENETICS PROBLEMS

For Mendelian inheritance, the alleles for a trait are passed on to the offspring. The alleles for a trait are passed on to the offspring.



### 5 GENETICS PROBLEMS

In horses, the allele C for a chestnut coat is dominant to the allele c for bay coat. Calculate the probability of heterozygous offspring resulting from a cross between a heterozygous parent and a homozygous recessive parent.



## Grades 7-10

## 35 Task Cards