**Introduction to Genetic Crosses**

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

For this activity we will be using pea pods as the genetic trait.  Pea pods are either green or yellow in color.

**Materials:**

2 paper bags

Green slides – Green represents a dominant trait (a trait that is always expressed when present) (G represents – a capital letter is always used to represent a dominant trait) (a single slide is an allele which is a form of a gene)

Yellow slides – yellow represents a recessive trait (a trait that is only expressed when 2 copies are present) (g represents – a lower case letter is always used to represent a recessive trait)

**Part 1: Crossing 2 heterozygous** (an individual with 2 different alleles making up the gene or trait) parents for pea pod color

1. Into Bag #1 (father parent genes) – place one green slide (allele) (G) and one yellow slide (allele) (g)
2. Into Bag #2 (mother parent genes)- place one green slide (G) and one yellow slide (g)
3. **Predict** the possible color combinations if you remove 1 slide from each bag if all slides are in the bag.

|  |  |  |
| --- | --- | --- |
| Bag 1 -color of slide | Bag 2 – color of slide | Color of offspring |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

1. **TEST** - Remove one slide from bag 1 and one slide from bag 2. Each slide represents an allele the offspring inherit from each parent.
2. Record the color combination (genotype) and resulting color of the pod (phenotype). Return slides to bag. Repeat 3 more times for a total of 4.

|  |  |
| --- | --- |
| Genotype (genetic combination of a gene represented by letters– GG, Gg, gg) | Phenotype (physical make up of an organism –green, yellow) |
|  |  |
|  |  |
|  |  |
|  |  |

**Part 2: Crossing 2 Homozygous** (an individual with 2 identical alleles making up the gene or trait) Parents for pea pod color

1. Into Bag #1 – place 2 green slides (G)
2. Into Bag #2 – Place 2 yellow slides (g).
3. Predict the possible color combination if you remove 1 slide from each bag when all slides are in the bag.

|  |  |  |
| --- | --- | --- |
| Bag 1 -color of slide | Bag 2 -color of slide | Color of offspring |
|  |  |  |

1. Remove one slide from bag 1 and one slide from bag 2. Each slide represents an allele the offspring inherit from each parent.
2. Record the color combination (genotype) and resulting color of the pod (phenotype). Return slides to bag. Repeat 3 more times for a total of 4.

|  |  |
| --- | --- |
| Genotype ( letter combination – GG, Gg, gg) | Phenotype (color of organism –green, yellow) |
|  |  |
|  |  |
|  |  |
|  |  |

**Part 3: Crossing 1 homozygous parent and one heterozygous parent** for pea pod color

1. Into Bag #1 – place 2 green slides (G)
2. Into Bag #2 – place one green slide (G) and one yellow slide (g)
3. Predict the possible color combination if you remove 1 slide from each bag when all slides are in the bag.

|  |  |  |
| --- | --- | --- |
| Bag 1 -color of slide | Bag 2 -color of slide | Color of offspring |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

1. Remove one slide from bag 1 and one slide from bag 2. Each slide represents an allele the offspring inherit from each parent.
2. Record the color combination (genotype) and resulting color of the pod (phenotype). Return slides to bag. Repeat 3 more times for a total of 4.

|  |  |
| --- | --- |
| Genotype ( letter combination – GG, Gg, gg) | Phenotype (color of organism –green, yellow) |
|  |  |
|  |  |
|  |  |
|  |  |

Answer the following questions:

1. What does the bag represent?
2. What do the slides in the each genetic cross represent? (A genetic cross occurred when you pulled one slide from each bag.)
3. In humans, how does each parent contribute their allele or trait to the offspring?
4. What does GG in the offspring represent?
5. What does “yellow” in the offspring represent?
6. What is the difference between homozygous and heterozygous parents?
7. How were homozygous and heterozygous genotypes represented in our genetic crosses?