**Genetians on Planet Mendel**

You are a scientist studying who has just discovered a race on a different planet, Mendel. Genetians are tentacled-organisms that look similar to Earth’s species of octopus. It is your job to determine the traits of these creatures, the genotypes based on the pictures you have taken in your field research.

By communicating with a local Genetian named Tentaclina, you have discovered what the dominant traits are in their race. You know that having six (6) tentacles is a dominant trait, and any number less than that is a recessive trait. Many of the Genetians have antennae on their heads, although some of them do not have any. Large antennae are considered a dominant trait and no antennae is the recessive trait. However, you notice that Tentaclina has small antennae, and she explains only one of her parents had antennae. From this you realize that small antennae are a heterozygous trait. The last phenotype you notice is that many of the Genetians have spots of green colour, yellow colour, or both colours. An alien with only green spots possesses the dominant allele over aliens with only yellow spots, which possesses the recessive allele.

Based on this information, work in pairs to complete the questions on the worksheet below.

Create genotypic shorthand that you will use in creating Punnett Squares.

The letter \_\_\_\_T/t\_\_\_\_ will represent the number of tentacles on an alien.

The letter \_\_\_\_A/a\_\_\_\_\_\_\_ will represent the size of the antennae on an alien.

The letter \_\_\_G\_\_\_\_\_\_\_\_ will represent the colour of green spots on an alien.

The letter \_\_\_\_\_Y\_\_\_\_\_\_ will represent the colour of yellow spots on an alien.

|  |  |  |  |
| --- | --- | --- | --- |
| **Phenotype** | Six Tentacles | Six Tentacles | Four Tentacles |
| **Genotype** | TT | Tt | tt |
|  | Homozygous Dominant | Heterozygous | Homozygous Recessive |

The number of tentacles is an example of \_\_\_Complete\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dominance.

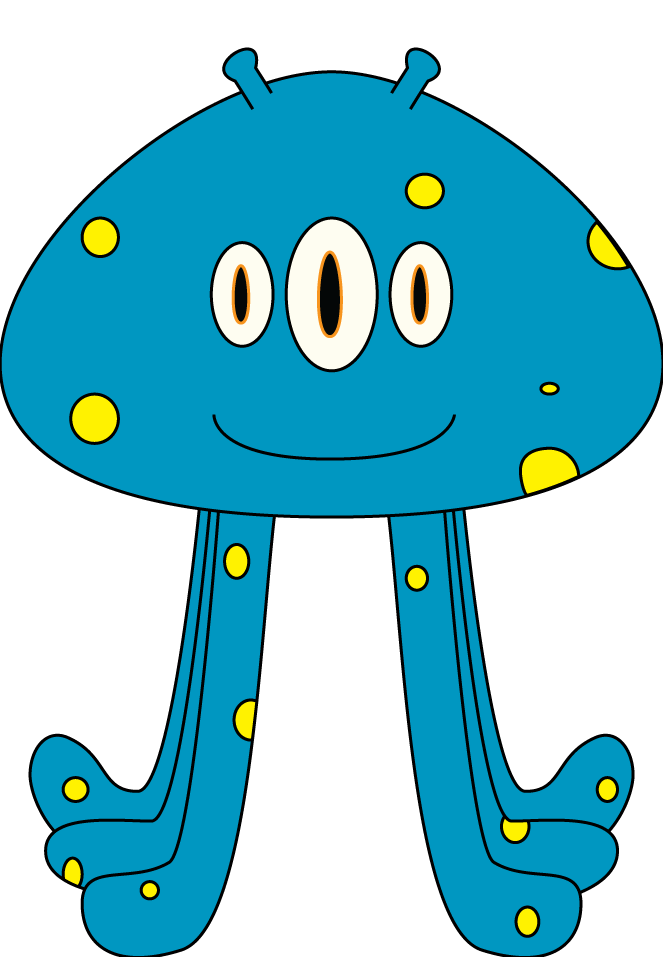
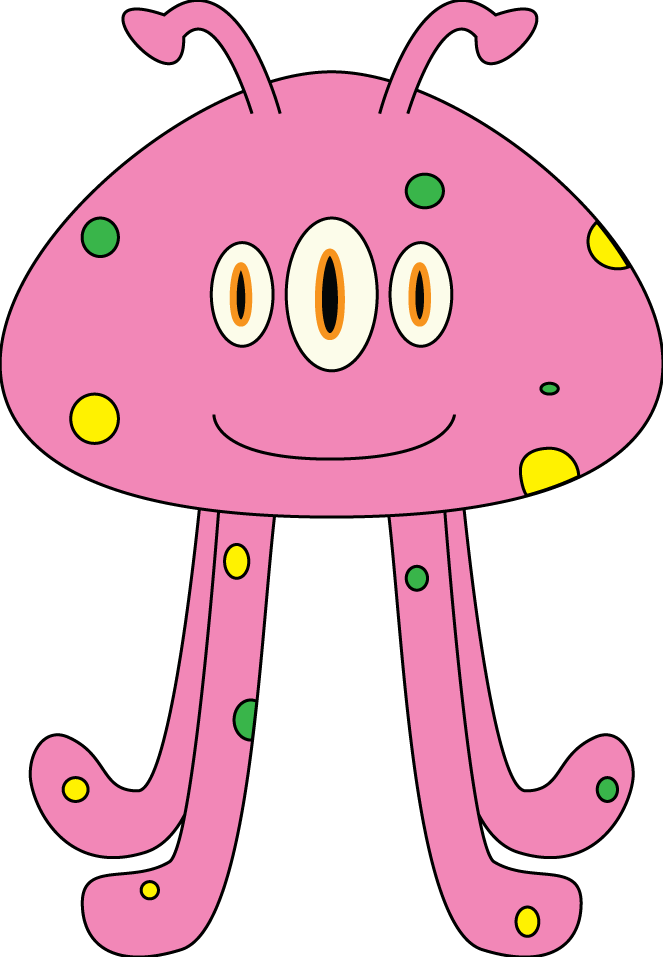
|  |  |  |  |
| --- | --- | --- | --- |
| **Phenotype** | Large Antennae | Small Antennae | No Antennae |
| **Genotype** | AA | Aa | aa |
|  | Homozygous Dominant | Heterozygous | Homozygous Recessive |

The size/presence of antennae is an example of \_\_\_Incomplete\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dominance.

|  |  |  |  |
| --- | --- | --- | --- |
| **Phenotype** | Green Spots | Green & Yellow Spots | Yellow Spots |
| **Genotype** | GG | GY | YY |
|  | Homozygous Dominant | Heterozygous | Homozygous Dominant |

The spot colour is an example of \_\_Co-dominance\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Determine the phenotype and genotype for the following aliens:

Subject 1 Subject 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phenotype** |  | **Genotype** | **Phenotype** |  | **Genotype** |
| **# of Tentacles** | 6 | TT ot Tt | **# of Tentacles** | 4 | tt |
| **Antennae** | Small | Aa | **Antennae** | Large | AA |
| **Spot Colour** | Yellow | YY | **Spot Colour** | Green and Yellow | GY |

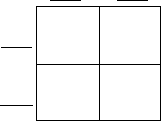
The two subjects are thinking of having a child. Construct a Punnett Square for each trait (3 separate Punnett squares) to predict the probability of what the child could inherit.

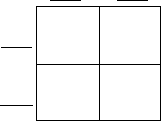
t

T

T

T





Tt

tt

Tt

t

Tt

t

tt

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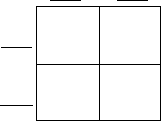
Tt

t

Tt

a

A



A

**Antennae**

Aa

AA

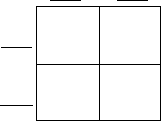
Aa

AA

A

Y

Y



G

GY

GY

**Spot Colour**

YY

YY

Y

You are given a bag of cutouts of Tentaclina and her friends. From the bag, you must determine which of the aliens is Tentaclina and her friend Antennio.

In this example:

|  |  |  |  |
| --- | --- | --- | --- |
| Appearance of Traits in Genetians | | | |
| Trait (shorthand) | Homozygous for Dominant Allele | Heterozygous | Homozygous for Recessive Allele |
| # of Tentacles (T/t) | Six Tentacles | Six Tentacles | Four Tentacles |
| Antenna (A/a) | Large Antenna | Small Antenna | No Antenna |
| Spot Colour (G/Y) | Green Only | Yellow and Green | Yellow Only |

Anntenio’s Genotype: TtGYAA

Tentaclina’s Genotype: TTGGAa

Write down the cutout number you’ve chosen for Tentaclina and Antennio. Once you’ve found Tentaclina and Antennio, determine the genotypes for the other Genetians in the bag.

1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Cutouts:

