**SpongeBob Genetics**

**Background**

(For more practice, follow up this activity with “Baby Alien” activity.)

This activity is meant to introduce students to some basic genetics terms and concepts. There are some assumptions to keep in mind with this activity:

1. The genes referenced in this activity are **diploid** genes. This means there are only **2 alleles** for each gene, dominant (represented by a capital letter) and recessive (represented by the same letter in lowercase. For example, the trait of body shape is affected by 1 gene with 2 alleles: squarepants (S) and roundpants (s). In reality, traits can by impacted by more than 1 gene and there can be 3 or more alleles for some genes, but that gets messy.
2. The traits referenced are **Mendelian Traits**. With Mendelian traits, offspring receiving a dominant allele from either parent will have the dominant form of the phenotypic trait or characteristic. Only those that received the recessive allele from both parents will have the recessive phenotype.
3. The organisms referenced in this activity reproduce **sexually**, each contributing 1 allele to a gene. For example, for body color (yellow dominant (Y) and blue recessive (y)) SpongeBob’s Mom has a heterozygous genotype (Yy) and his dad has a homozygous genotype (YY). His mom can contribute either a Y or a y and his dad can only contribute a Y to combine for a YY or Yy for a yellow SpongeBob.

**Vocabulary**

**Allele** - one of two or more alternative forms of a gene that arise by mutation and are found at the same place on a chromosome

**Dominant Allele** - a variation of a gene that will produce a certain phenotype, even in the presence of other alleles

**Gene** - a unit of heredity which is transferred from a parent to offspring and is held to determine some characteristic of the offspring

**Genotype** - the genetic constitution of an individual organism

**Heterozygous** - A diploid organism is heterozygous at a gene locus when its cells contain two different alleles of a gene

**Homozygous** - a particular gene that has identical alleles on both homologous chromosomes

**Phenotype** - the physical expression, or characteristics of a trait

**Punnett Square** - a square diagram that is used to predict the genotypes of a particular cross or breeding

**Recessive Allele** - a variety of genetic code that does not create a phenotype if a dominant allele is present

**Trait** - a distinguishing quality or characteristic, typically one belonging to a person

**Learning Objectives**

1. Students will understand the general process of heredity with Mendelian traits.
2. Students will understand the difference between **phenotype** and **genotype**.

**Materials**

SpongeBob Genetics Quiz worksheet

**Procedure**

The steps will offer a discussion for each question on the worksheet. The steps in the procedure will correspond to the question number on the worksheet.

1. Explain diploid genes and alleles and the difference between heterozygous and homozygous. Introduce the concept of recessive and dominant alleles.
2. Explain genotype and phenotype. Practice previous concepts.
3. In addition to the question, ask students which items are heterozygous vs homozygous.
4. Let students know there will be more than 1 answer for Tall eyeballs and only 1 answer for short eyeballs, if necessary.
5. Revisit the concepts of recessive and dominant alleles. Explain the concept of a Punnett square.
6. Allow students to attempt on their own.
7. Free response. Share out.