Plastic Egg Genetics

Introduction

In this lesson, students will determine the phenotype and genotype of imaginary parent organisms and predict their offspring using Punnett Squares

Grade Level: 6 -8
Time Needed: 30 to 40 minutes

Learning Objectives

After completing this lesson, students will be able to:

1. Determine the genotype of an imaginary parent organism
2. Determine the phenotype of an imaginary parent organism
3. Predict the genotypes and phenotypes of a set of offspring using a Punnett Square

Materials

- ☐ Jelly Beans of various colors
- ☐ Plastic Easter Eggs of various colors
- ☐ Student worksheet

Instructional Process

1. Obtain 8 packages of 6 different colors plastic Easter Eggs.
2. Use the following genotype and phenotype chart.

Chart
PP = purple
pp = pink
Pp = orange
BB = blue
bb = yellow
Bb = green

Next Generation Science Standards (NGSS)

As a result of activities in grades 6 - 8, all students should develop:

Topics

- **LS2**: Growth, Development, & Reproduction of Organisms
- **ETS1:** Engineering Design

Performance Expectations

- **MS-LS3-2:** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.

Dimensions

Practices:

- Developing and Using Models

Disciplinary Core Ideas:

- **LS3.A:** Inheritance of Traits
- **LS3.B:** Variation of Traits

Cross-Cutting Concepts:

- Patterns

3. Make all 12 color combinations of eggs per lab group of 4 students and place them in a basket.
   - purple x purple
   - purple x pink
   - pink x pink
   - orange x orange
   - orange x purple
   - orange x pink
   - blue x blue
   - blue x yellow
   - blue x green
   - yellow x yellow
   - green x yellow
   - green x green

4. Place colored jelly beans or skittles in the center of the table for each student group. There should be enough that they will be able to place the genotype in each egg.
5. From the basket at each table, each student will select 3 eggs, one at a time, and complete the Plastic Egg Genetics Chart on the student worksheet.
6. When students have completed their three charts, they should explain their reasoning with their table. When they are finished, they will verify their answers with the teacher.
7. Students will pick two different eggs.

Supplementary Instructional

This lesson is designed to let the students do most of thinking. They will decide the correct genotype for each egg, which will be verified by the teacher before cross of two different eggs.

Plastic Egg Genetics – Student Sheet

Introduction

On the lab table, there a variety of plastic eggs. Each egg represents the fertilized eggs from two parents. Each half of the colored egg represents the phenotype of one of the parents. For example, if the egg is half purple and half pink, the phenotype of one of the parent is purple and the other is pink.

Materials

- ☐ Basket of 12 different colored eggs
- ☐ Jelly beans
- ☐ Genotype and phenotype chart

Procedure

1. Use the following genotype and phenotype chart.

Chart
PP = purple
pp = pink
Pp = orange
BB = blue
bb = yellow
Bb = green

2. Each student in a group should pick 3 different eggs. One by one complete the phenotype and genotype for each egg.

3. After you have completed your 3 charts share your thinking and results with the whole group.

4. When all 12 eggs have been discussed, verify your answers with the teacher.

5. Complete the Punnett Squares for your egg and write your phenotype and genotype results.

6. Place the proper jelly beans that correspond with the offspring inside of the egg.

7. Complete the Group Results chart.

For Example Egg

Phenotype: My egg is ½ ___**Blue**__________and half _____**Yellow**_________.

Genotype: (__**B**___ __**B**___) x (__**b**___ __**b**___)

	b	b
B	**Bb**	**Bb**
B	**Bb**	**Bb**

Punnett Square

My Results: 4 (Bb) all green

Inside the Egg: 4 green pieces

First Egg

Phenotype: My egg is ½ ______________________ and half _______________________.

Genotype: (______ ______) x (______ ______)

Punnett Square

My Results: ______________________________

Inside the Egg: ____________________________

Second Egg

Phenotype: My egg is ½ ______________________ and half _______________________.

Genotype: **(______ ______)** x **(______ ______)**

Punnett Square

My Results: _____________________________ **Inside the Egg: __________________________**

Third Egg

Phenotype: My egg is ½ ______________________ and half _______________________.

Genotype: **(______ ______)** x **(______ ______)**

Punnett Square

My Results: _____________________________ **Inside the Egg: __________________________**

Group Results

Egg	½ Color	Genotype	½ Color	Genotype	Results #XX	 #Xx	 #xx
Example	Blue	BB	Yellow	Bb	2 BB - blue	2 Bb - green	0
1	Purple		Purple				
2	Purple		Pink				
3	Pink		Pink				
4	Orange		Orange				
5	Orange		Purple				
6	Orange		Pink				
7	Blue		Blue				
8	Blue		Yellow				
9	Blue		Green				
10	Yellow		Yellow				
11	Green		Yellow				
12	Green		Green				

Questions:

1. **Why are there genetic difference between parents and offspring?**

2. **Explain how a pink flower can be an offspring of parent plants with red flowers.**