

Jelly Beans & GloFish

Benchmarks

- B4.1c Differentiate between Dominant, recessive, co-dominant, polygenic and sex-linked traits.
- B4.1d - Explain the genetic basis for Mendel's laws of segregation and independent assortment.
- B4.1e - Determine the genotype and phenotype of monohybrid crosses using a Punnett Square.

Objectives

Students will:

- Distinguish between dominant and recessive traits.
- Differentiate between the phenotype and genotype of an organism.
- Predict the possible offspring from a crossing using a Punnett Square.

Materials Needed

- Smart Board
- 1 paper sack
- 12 white jelly beans, 6 red jelly beans, 2 green jelly beans (plus extra in case of casualties)
- GloFish Heredity worksheet (120 copies)

Development

- Students will begin with a "starter question" that is answered in their journal: Explain the difference between genotype and phenotype
- Students will conduct the Jelly Bean mini-lab (from page 181 in the Holt textbook) as an introduction activity.
- Teacher will provide direct instruction on probability and Punnett Squares.
- Students will complete the GloFish Heredity worksheet.

Introduction

Yesterday, students read an article regarding Gregor Mendel and the laws of inheritance to build background knowledge. They then received vocabulary words for the unit. Today, they will begin to apply the laws of inheritance after using a starter question (Explain the difference between genotype and phenotype) to re-engage their minds on the topic of inheritance.

Methods/Procedures

Students will pick up Guided Notes as they enter the room.

Jelly Bean mini-lab: (10 min)

1. Teacher will have a paper sack which contains 20 jelly beans of 3 different colors.
2. One student will pull out 1 jelly bean and record on the Smart Board what color it is.
3. Student will return the 1st jelly bean to the sack, shake the sack to mix them up, choose a 2nd jelly bean, and then record its color. Student will repeat until 5 jelly beans have been pulled from the sack, one at a time.
4. A second student is chosen to pull & 5 more jelly beans in the same way. A third and fourth student are also chosen, each pulling 5 jelly beans.
5. The result is 20 jelly beans which have been pulled from the sack, one at a time, and recorded.
6. Teacher will model how to determine probability.
7. The class will then determine the probability of getting a jelly bean of a specific color with a single draw.
8. Can the class determine how many jelly beans of each color there were in each sack

Direct Instruction: (20 min)

1. Teacher will provide direct instruction on the following topics. Students will use guided notes.
 - Probability
 - Punnett Squares

GloFish Heredity: (20 min)

1. Teacher will hand out GloFish Heredity worksheets.
2. Teacher will explain the instructions for Part A. Part B will not be provided to students at this time.
3. Together, Teacher and class will read through and complete Cross 1. Students will fill in the information on their worksheet.
4. Students will then complete Cross 2 and Cross 3 individually.
5. Source: <http://www.glofish.com/classroom/GloFish%20Heredity.pdf>

Closing:

1. Teacher will collect GloFish worksheets as students leave class.
2. Guided notes on probability should be put into Students' binders.

Accommodations/Adaptations

1. Students who have difficulty focusing and are distractions in class will be asked to be the "jelly bean" scientists. This will get them engaged in the activity, and provide them with an approved opportunity to move about the room and be seen.
2. Students may be allowed to finish the GloFish worksheet at home if more time is needed, provided they have been working quietly in class and have made some progress on their own (or with assistance from Teacher).

Practice

1. Students will work individually on the GloFish worksheet. These will be used by Teacher to determine the extent to which students have understood new information, and they will be graded.

Check for Understanding

1. Teacher will be looking for participation during the Jelly Bean mini-lab.
2. Teacher will be moving about the room checking for understanding and offering guidance and assistance during the GloFish worksheet.
3. Teacher will grade the GloFish worksheet to determine the extent to which students have understood new information.

Outcomes/Assessment/Evaluation

1. The GloFish worksheet will be collected and Crosses 2 and 3 graded as follows:
 - 12 points (6 per Square) for the Punnett Squares
 - 16 points (2 points per question) for follow up questions.
 - There is no room for variability in the answers – they are either right or wrong.

Teacher Reflection