

Human Traits

Standards of Learning

Science LS.1, LS.13, LS.14

Math 6.2, 6.4, 6.6, 6.18, 7.1, 7.4, 7.17, 7.18

English 6.1, 6.2, 6.6, 7.1, 7.8

History CE.1

Objective

Students will:

- Attain a deeper understanding of genetic engineering as the newest form of agriculture
- Understand that genetic engineering is the perfect mix of biology and agriculture
- Demonstrate that when two plants, animals or humans cross paths they pass their traits onto new generations

Materials

- PTC strips
- 1 worksheet per student
- Overhead with major categories written

Background Knowledge

The genotype-phenotype distinction must be drawn when trying to understand the inheritance of traits and their evolution. The phenotype represents the appearance of an organism.

Phenotypes such as eye color, hair color, hair texture, hair curl, ear lobe attachment, hitching of the thumb, the ability to roll the tongue, the taste bud for bitterness, widow's peek, and arching of the sole of the foot, can be used to illustrate phenotype in humans. The genotype represents the genetic makeup of a living organism. The genotype is made up of two equal genetic materials from both parents. The dominant trait will be evident in the offspring. The dominant trait is characterized by a capital letter while the recessive is shown as a lower case.

Suggested Traits to Investigate:

- | | | |
|-------------------------|-------------------|---|
| • Widow's Peak | • Can roll tongue | • Allergies |
| • Eye color | • Dimples | • Top thumb when hands are clasp together |
| • Hair color | • Right-handed | • Colorblindness |
| • Hair texture or curl | • Freckles | • Arching of the sole of the foot |
| • Hitching of the thumb | • Cleft chin | |
| • Ear lobe attachment | • Taste buds | |

Procedure

1. Enlist class participation to create a list of 10 physical traits to compare and record traits on the front of the data sheet. Students may choose items as simple as how many are wearing tennis shoes or true phenotypes (listed above).
2. Have students predict how many people in the class will have each trait and record on the front of their data sheets.
3. Create teams of 2-4 for the students. (This will take less time on data collection and ensure it is all collected)



4. Provide students an opportunity to collect data with their team on the chart on the back of their data sheet to determine the number of students with each character trait.
5. At the end of the set time, the students must report the data that they collected. Select a spokesperson for each group to report.
6. Collect data on an overhead to provide a class record of the event.
7. Answer questions on the data sheet.
8. Have students construct a chart showing the prevalence in the classroom. Using the class data set find the ratio of the class possessing each phenotype. Convert each ratio to a percent. (Review dominance and recessive and see if they hold true in the classroom)
9. Discussion Questions:
 - What are some of the problems we have with plants and animals (ie.. disease, deformities etc..)?
 - What genetic traits would humans look for in plants and animals (e.g. Disease resistant, strong muscles, high milk producer etc.)?
 - How can genetic engineering help with those problems?
 - What are the controversies and debates about genetic engineering?

Extension

- Have students make a graph of matching traits.
- Get information from the parents, or extend the testing group by having the students get the said traits from at least 5 other people....does having more people change the validity of the information? How large should a testing group be?
- Have students come up with a list of traits that they are said to have inherited from their relatives.
- Complete a Punnet Square of each trait.
- Have a debate on biotechnology and cloning.
- Have students come up with ways that we have contact with biotechnology everyday.

Reference

<http://learn.genetics.utah.edu>



Name: _____

Investigating Human Traits

Traits and Predictions

As a class, develop a list of 10 traits to compare with the students in your class. Do you have the trait? Make predictions on how many students in your class will have each trait.

| Trait | Description / Phenotype | I have this trait. YES/NO | PREDICTION: # of Classmates with Trait |
|-------|-------------------------|---------------------------|--|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |

After the lesson:

1. How did your predictions compare with the actual results?
2. Which traits had the highest percentage or ratio of students with the trait?
3. Which traits had the lowest percentage or ratio of students with the trait?
4. Which traits do you have in common with most of your class?

Investigations

Meet with your group to see how many students in your class have each trait. Put a tally mark for YES or NO for each trait. What are the ratios and percentages for each trait? What traits do you have in common with other students in your class?



| Trait | Tally YES | Tally NO | Ratio with trait: | Ratio without trait: | Percent Who Match Me |
|-------|-----------|----------|---|--|----------------------|
| | | | $\frac{\# \text{ Yes}}{\text{Total \# Students}}$ | $\frac{\# \text{ No}}{\text{Total \# Students}}$ | |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |

