

Essential Question: How do living things inherit their genetic characteristics?

Activity 3: Show Me the Genes

Purpose: I can explain that information on how cells are to grow and function is contained in the cell nucleus, on chromosomes, coded on genes. Also each gene has at least two variations called alleles.

BACKGROUND: There are many reasons why an organism would reproduce either asexually or sexually. One of these reasons is to replace dead or dying cells. The other is to ensure that an organism's **genetic material** (Example: DNA), will continue into future generations. This information, contained in **genes**, is what tells an organism how to grow, function, and carry out tasks that allow it to survive. In this Activity, you will investigate how this information is stored and passed from generation to generation.

Instructions: 1. Watch these two vclips & take complete notes in your portfolio.

a. <https://www.youtube.com/watch?v=uXdzuz5Q-hs>

b. <https://www.youtube.com/watch?v=dEFSURrpdHM>

2. Next read activity 63 on page D-42 of your book. While reading, answer the following questions. Be sure to answer all analysis questions in complete, quality, and correct sentences.

Stopping to Think 1

| Data Table 1. Reasons for single and multi-celled organisms to perform cell division <i>(There may not be 3 for each!)</i> | |
|--|--|
| Single-celled organism (e.g., Amoeba, Paramecium) | Multi-celled organism (e.g., Human, Cat) |
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |

4. **Thought Question.** Look at the Figure on page D-43, step C. Explain why the nuclear membrane has to dissolve so that the cell can complete reproduction.

5. How many total chromosomes does each human cell have after each cell division?

6. How many pairs of chromosomes does each human cell have after cell division.

7. Explain why must the number of chromosomes in the sperm and in the egg be half the total number of chromosomes in the other cells of an organism?

8. Explain which parent determines the gender of the offspring **AND** tell how this occurs.

About 90-95% of cancers are due to environmental factors. The remaining 5-10% are inherited via genetics.

Student Review: 1-Below Standard, 2-Approaching Standard, 3-Standard, 4-Above Standard
Use the scale to evaluate completeness & correctness of the job. Put score, Initial & date in boxes.

Score

Initial/Date

9. The chromosomes of each pair carry two genes for the same characteristics (page D-45). However, the two gene can be different alleles, or “brands”, of that gene. Where does **each** of these two alleles of this gene originally come from?

10. Two siblings, Nolan & Kyla have the same two parents. Explain why one might not expect these siblings to have the exact same set of chromosomes.

11. Complete the following:

- i. Chromosomes are contained in a cell’s _____
- ii. Each chromosome is made up of _____.
- iii. The part of the chromosome that codes for a specific protein is called a _____.
- iv. Different “brands” of the same gene are called _____.

12. Which of the following IS/ARE made of DNA? (Circle all that apply)

- a. Genes
- b. Chromosomes
- c. Alleles
- d. Nuclear membrane

13. **(EC/Challenge needs all 3)** Tell at least 2 ways a mutation can occur in a human cell.

- a.
- b.
- c.

14. **Challenge/EC =** Tell why most mutations are harmful.

Write three questions w/answers you think might show up on a test about this activity:

Level 1 – Easy Piezy

Level 2 - Solid

Level 3 - Awesome