# Amoeba Sisters Video Recap: DNA, Chromosomes, Genes, and Traits

## ANSWE KEY

The vocab below builds a foundation for understanding heredity! Complete the table using your own words and creativity.

<table>
<thead>
<tr>
<th>Name</th>
<th>Illustrate!</th>
<th>Explain it in Your Own Words</th>
<th>What’s its Significance? (Why does it matter?)</th>
<th>Real Life Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DNA</strong></td>
<td><strong>1. Illustrations may vary! Ours is below.</strong></td>
<td><strong>2. Genetic material arranged in a double helix shape which can code for traits.</strong></td>
<td><strong>3. DNA is an organism’s genetic code! It can code for traits that an organism has. Without a genetic code, an organism would not exist.</strong></td>
<td>DNA found in the body cell of a snake</td>
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<tr>
<td><strong>Chromosome</strong></td>
<td><strong>4. Illustrations may vary! Ours is below.</strong></td>
<td><strong>5. Compacted units of DNA and protein. Answer Key Note: The video does not mention specific types of proteins involved in chromosomal organization.</strong></td>
<td><strong>Chromosomes allow the large amount of DNA to be compacted. One reason this is significant is in cell division as it makes it much easier for the cells to put these units into the new cells.</strong></td>
<td><strong>6. A chromosome in a human. Humans have 46 found in most body cells.</strong></td>
</tr>
<tr>
<td><strong>Gene</strong></td>
<td><strong>7. Illustrations may vary! Ours is below. As mentioned in video, genes are typically made of more bases than able to be shown.</strong></td>
<td><strong>8. Made up of portions of DNA with the ability to code for proteins which can be involved in expressing a trait.</strong></td>
<td><strong>9. Genes can code for proteins, which can be involved in expressing traits. The proteins they code for can also be involved in transport, structure, in acting as enzymes that make all kinds of materials, protecting the body, and more!</strong></td>
<td><strong>One of many genes that can code for a protein involved in eye pigment</strong></td>
</tr>
<tr>
<td><strong>Trait</strong></td>
<td><strong>10. Illustrations may vary! Ours is below.</strong></td>
<td><strong>11. A characteristic that an organism has. Answer Key Note: You may wish to discuss that not all traits are externally visible. Blood type, for example, is a trait.</strong></td>
<td><strong>12. Traits are the characteristics that organisms have, and many can be important for survival. Example: a snake’s color pattern that helps it blend in with its environment.</strong></td>
<td><strong>13. Human eye color</strong></td>
</tr>
</tbody>
</table>

14. For the diagram at right, please label the following words on the diagram.
   
   (A) Deoxyribose (sugar), (B) Phosphate, and (C) Nitrogenous Base.
   
   **Answer Key Note: Labeled at right.**

15. Based on the definition, how many nucleotides do you see in this diagram? **6**

16. What are the four different types of bases in DNA and how do they pair?
   
   Adenine (A), Thymine (T), Cytosine (C), and Guanine (G). Adenine pairs with Thymine. Cytosine pairs with Guanine.

17. When studying heredity, what is the relationship of DNA bases and traits?
   
   The sequence of the DNA bases can actually code for traits.
A Picture Says It!

18. Explain what this image represents regarding where your entire DNA code can be found.

In eukaryotes, the entire DNA code can be found in [nearly] all of the body cells, which is what this image shows.

[Answer Key Note: The video mentions that genes are regulated. It may be helpful to emphasize that despite having the full DNA code, not all genes may be "turned on" in a cell. For example, a stomach cell may have genes activated that are involved in producing stomach acid. Skin cells may have those genes "turned off" in gene regulation]

19. Apply Your Understanding

Spike is not a clone of his father. He inherited DNA from both of his parents. Chromosomes are condensed units of DNA. If Spike has 36 chromosomes, you would expect that Spike would have inherited ___18___ chromosomes from his mother and ___18___ chromosomes from his father.

20. How did you determine the chromosome numbers and how does that relate to heredity?

Offspring receive half of their chromosomes from each parent. Since Spike has 36 chromosomes, he received \( \frac{1}{2} \) of that (18) from his mother and \( \frac{1}{2} \) of that (18) from his father. Heredity involves the passing of traits down from parent to offspring. DNA can code for those traits, and that DNA is condensed into chromosomes that the offspring inherits from its parents.

21. As mentioned in the video, the environment can also affect an organism’s traits. The example of nourishment was used in the case for Spike, as this could affect his growth and size. This can also occur in humans. UV light was not mentioned in the video. How could UV light potentially affect an organism’s trait? Provide one example.

Examples may vary, especially since the question allows it to be any organism. Here are a few examples:

- UV light can affect the size of plants, since plants require light for growth.
- UV light can affect human skin color as pigmentation can change with UV light exposure.
- UV light exposure can be involved in vitamin D synthesis in some organisms, and a severe deficiency could affect bone density (and more).

22. Recap the Vocab

Identify some of the vocabulary you worked with by labeling them on this illustration:

DNA
Gene – NOTE: Green portion of DNA. As mentioned in video, genes are typically made of more bases than able to be shown.
Chromosome
Nucleotide
Phosphate
Deoxyribose (sugar)
Nitrogenous Base