Tour the Basics Key

http://learn.genetics.utah.edu/content/basics/

-What is DNA

1. What is DNA?

The Instructions For Building Parts Of The Cell.

2. What does “DNA” stand for?

DeoxyriboNucleic Acid

3. What is the four-letter DNA alphabet and what are the special rules by which the alphabet pieces bond together?

A, C, T, And G. A Binds With T, C Binds With G.

-**What is a Gene?**

4. What is a Gene?

Genes Are Instruction Manuals For Our Bodies.

5. What are genes made of?

Genes Are Made Of DNA.

6. How many genes do humans have?

Humans Have 25,000 Genes.

7. For what molecule do genes contain the instructions for building?

Genes Contain The Instructions For Building Proteins.

-What is a chromosome?

8. What is a chromosome?

Chromosomes Are Packages Of Compact DNA.

9. How many chromosomes does a human cell hold?

Each Human Cell Holds 46 Chromosomes.

10. How are the human sex chromosomes labeled?

Sex Chromosomes Are Labeled "X" And "Y". For females you will need X,X chromosomes and for a male you will need a X, Y chromosome

-What is a protein?

11. How many different kinds of proteins does one cell contain?

Each Cell Contains Thousands Of Different Proteins.

12. Why do scientists use computer programs to model protein structure and function?

Proteins Are Very Small And Hard To See.

13. What provides the “blueprint” for making a protein?

22 amino acids

14. What organelle is responsible for actually making proteins?

ribosomes

-What is Heredity

15. What is heredity?

Heredity is the passing of genes from one generation to the next.

16. Why aren’t children identical to either one of their parents?

The genes that are passed down from each parent may be random.

17. In humans, how many chromosomes does each parent pass on to their offspring?

Each parent pass 23 chromosomes to their children.

18. Does the second baby in the “What is Heredity?” animation inherit the exact same chromosomes as the first? Do both babies have a complete set?

No. The second child is slightly different. This is called genetic variation in which you have some traits that are similar to your parents and your brother/sister. Both children will have a complete set of chromosomes.

- What is a trait

19. What is at trait?

a genetically determined characteristic.

20. List the type of traits that exist.

21. Give an example of how environmental factors can influence a trait.

Small differences in your genetic makeup mean that two people can respond differently to the same environmental exposure.
Some examples (you could have found others)

- **Mutagens** – Mutagens are pollutants in the environment that enter the body and directly change your DNA sequence. Example: The chemicals in cigarette smoke can cause cancer.
- **Gene-gene interactions** – Gene-gene interactions occur when pollutants in the environment do not change your DNA sequence, but rather cause a chain reaction that affects the functioning of one gene that then affects the functioning of another gene. Example: Regularly drinking way too much alcohol can cause a specific gene, TACE, not to produce enough of its protein. TACE protein is supposed to help the MTHFR gene make enough of its protein. Too little MTHFR protein changes the level of folate (another protein) in our blood, and low folate levels may cause depression.
- **Transcription factors** – Pollutants in the environment can indirectly affect the DNA sequence by altering transcription factors, which are responsible for starting the process of using genes to make proteins that are needed for different functions in the body. Example: Stress can change the amount of proteins made by genes involved in your immune system and therefore, you may get sick more easily when you're stressed.
- **Epigenetics** – The environment can alter your health by affecting the proteins that turn genes on or off. Continue reading for more information on epigenetics. Example: half the genes that cause familial or inherited cancer are turned off when pollutants in the environment affect these proteins. Because they are turned off, these genes cannot suppress tumor formation or repair DNA

22. What is an allele?

one of two or more alternative forms of a gene that arise by mutation and are found at the same place on a chromosome.

23. What does the term homozygous mean?

When an individual has two of the same allele, whether dominant or recessive, they are **homozygous**.

24. What does the term heterozygous mean?

Heterozygous means having one each of two different alleles.

25. How are traits inherited?

In humans and other animals, traits are passed on from parents to their offspring through DNA. When an egg is fertilized with sperm, the resulting offspring takes 50 percent of its DNA from each parent, and its traits are determined by which parts of its parents' DNA are passed on.