What's the Big Idea about Genetics?

This text is provided courtesy of OLogy, the American Museum of Natural History's website for kids.

llustrations Credit: Kelvin Chan/AMNH

Genetics Is Where It All Begins

Some scientists are curious about basic questions of life: Where did it come from? Why is it so varied? Why do children look like their parents?

To answer these questions, they study a type of biology called GENetics (juh-net-icks). "Gen" means beginning.

Genetics is the science of genes and how traits are passed on from one generation to the next.

People who study genes are geneticists (juh-net-i-sists).

Every Living Thing Has DNA

DNA is an amazing chemical present in every cell. It contains all the information cells need to make a fish a fish, or you YOU.

All humans start out as a single cell and grow into trillions of cells. DNA tells the single cell to divide into two cells, then four, then eight - until a whole body forms. It controls the growth of EVERYTHING, from your head to your toes.

DNA also influences many individual traits, such as whether you are a boy or a girl and whether you are tall or short.

Credit: courtesy of AMNH Department of Library Services K4508 [starfish], AMNH [ladybug], courtesy of AMNH Department of Library Services PK241 [perch fish] (top image); AMNH (bottom image)

Genes Are Made of DNA

Where do traits, such as eye color and shape, come from? Why do you look more like your relatives than other people? The parts of your cells that determine these traits are called genes.

In the past, no one knew what genes were. In the 20th century, scientists figured out that they were actually made of DNA.

Genes come in pairs. You get half of your genes from your mother and the other half from your father.

Photos Credit: AMNH

We Gather Clues about Life by Studying Genes

As we discover more about how genes work, we will be able to understand how cells build complex organisms - like humans.

Today, scientists are studying human genes to learn about traits and diseases. There are so many genes in humans - at least 30,000 of them - that it will take a long time to study every one in detail and find out what it does.

Illustration Credit: Kelvin Chan

A Genome Is All the DNA in a Cell, Including All the Genes

Recently, new technology has enabled scientists to look closely at the entire human genome.

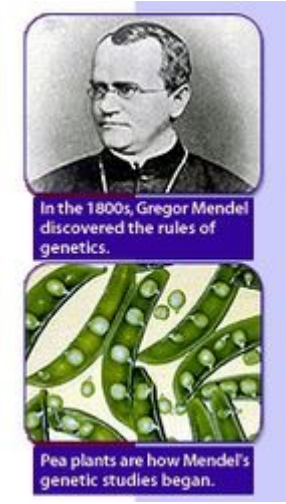
Credit: AMNH (top image); courtesy of Flybase (bottom image)

They have also been able to describe the whole genomes of other animals, including those of bacteria, worms, flies, and mice. The science of genomics asks questions about all of these genes at once. Scientists can also compare genomes of different animals and figure out how they are similar and different.

Why Isn't the Study of Genes Called Genealogy?

Well, the name was already taken.

Genealogy is the study of family origins. It is how people trace their ancestry and create a family tree. It's not a biological science. Genealogy has been around for a long, long time - before we discovered genes.



Photos Credit: AMNH

The science of genetics began in the 1800s when Gregor Mendel figured out how traits are inherited by studying peas. Since scientists identified genes in the mid-1900s, the field of genetics has grown by leaps and bounds.

Name: _____ **Date:** _____

1. What is the science of genes and how traits are passed on from one generation to the next?

2. How are traits passed on from one generation to the next?

Support your answer with evidence from the text and images.

3. What is the main idea of this text?