**Chapter 26: The Stuff of Life**

**Directions:** Read Ch.26 from the book *A Short History of Nearly*

 *Everything* by Bill Bryson and then answer the questions below.

 ***Analogy 1:***  *DNA is an instruction manual for the body.*

 ***Analogy 2:*** *The human genome is a parts list of what we are made of which says nothing about how we work.*

***Statement to Consider 1:*** *“There are two yards of DNA coiled inside each nucleus of your cells.”*

***Statement to Consider 2:*** *“We are all uncannily alike. You share 99.9 % of the same genes with any other human being.”*

**1.** What are the odds against you being here?

**2.** Bryson states, “In the most literal and fundamental sense we are all family.”

 What does he mean by this statement?

**3.** What makes us a species?

**4.** What is the human genome?

 Why does Bryson say there no such thing as a human genome?

**5.** Why does DNA exist?

**6.** How much DNA is contained in a human being?

**7.** Why does Bryson say DNA is “a molecule that is not itself alive and for the most part doesn’t do anything at all”?

**8.** DNA is one of the “most non-reactive, chemically inert molecules in the living world”.

 Why does Bryson say this?

**9.** Why did scientists think DNA was “too simple” to be important to life?

 What does the principle of Occam's razor state? GOOGLE IT!

**10.** How is DNA like Morse code?

**11.** What function does RNA serve?

**12.** What did Thomas Morgan Hunt discover?

**13.** What are the advantages of working with fruit flies for genetic studies?

**14.** What did Oswald Avery’s experiments prove?

**15.** Who is Linus Pauling and what did his structure of DNA look like?

**16.** What did Maurice Wilkins spend much of the WWII doing?

**17.** What assumption did Watson and crick make?

**18.** Which scientists had the best X-ray crystallography images of DNA?

 Why was this scientist not forthcoming with her findings?

**19.** Why was the discovery of the structure of DNA mostly overlooked?

**20.** Why did Rosalind Franklin not receive a Nobel Prize?

**21.** What percentage of your DNA is “meaningless non-coding DNA?”

**22.** What is a gene?

**23.** How are genes like keys on a piano?

**24.** What is guano?

**25.** Describe the shape (structure) of DNA.

**26.** Briefly describe DNA replication.

**27.** What is a “Snip?”

**28.** Why is the balance between accuracy and errors in DNA replication a fine one?

**29.** How are “all organisms are in some sense slaves to their genes?”

**30.** Briefly describe the experiments that took place in Germany and Switzerland involving mice and fruit flies.

**31.** What are Hox genes?

**32.** What does the statement, “it is not the number of genes you have, but what you do with them” mean?

**33.** Why were the results of the Human Genome Project both a surprise and a disappointment?

**34.** Why is cracking the human genome only the beginning?

**35.** What is the “human proteome”?

**36.** What is required for a protein to function properly?

**37.** Why does Bryson include the most profound true statement there is: “All life is one.”

 Why do you think he feels this is so important? Do you agree?

**Central Dogma of Biology**