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

Click on “What is DNA?” at the top and go through the animation. Answer the questions.

1) What is DNA? Deoxyribo Nucleic Acid
2) The complete set of instructions for making a human being is found where? DNA
3) What do genes tell the cell to make? Other molecules called proteins.

Click on “What is a gene?” at the top and go through the animation. Answer the questions.

4) How many genes do humans have? 25,000
5) What is the function of the protein hemoglobin? Capture and carry oxygen
6) How is sickle-cell anemia caused? A cell is mutated
7) What are some other proteins that genes code for? Pigment in your eyes and keratin responsible for growing hair and nails

Click on “What is a chromosome?” at the top and go through the animation. Answer the questions.

8) How long would the DNA in one human cell be? 3 meters long
9) How is DNA packaged to fit into the small space of a cell nucleus? They are packed into compact units called chromosomes
10) How many chromosomes are in a human cell? 46
11) Why are there “pairs” of chromosomes? Where do they come from? One from each parent make up a pair
12) Describe the sex chromosomes. There are 2 sex chromosomes that determine if you are male or female. They are labeled X and Y. Females have 2 X Chromosomes and Males have an X and a Y

Click on “What is a protein?” at the top and go through the animation. Answer the questions.

13) What is the role of proteins in transmitting pain messages? Receptor proteins are responsible for picking up the (pain) signal and pass it along to the next cell through the nerve network.
14) Describe structural proteins. They are like bricks stacking together forming column like supports giving the cell its shape.
15) “There are proteins involved in the making of proteins.” Explain this sentence. Answer will vary…

Click on “What is heredity?” at the top and go through the animation. Answer the questions.

16) Give an example of the environment acting on the expression of a genetic trait. Hair color: exposure to chemicals and or sunlight can change the color.
17) Where do we get our traits? We get our traits from our parents
18) Explain how each child born to the same parents will have a different combination of chromosomes. Each parent has 2 sets of chromosomes, since parents contribute chromosomes randomly to each new child.
Click on “What is a trait?” at the top and go through the animation. Answer the questions.

19) What is a trait? It is a notable feature or quality in a person.
20) List the types of traits that exist. Physical, Behavioral, Predisposition to a medical condition.
21) Give an example of how an environmental factor can influence a trait. Training a dog to roll over and play dead.
22) Briefly explain how the Hitchhiker’s Thumb trait is determined using the following words: allele, dominant, recessive, homozygous, heterozygous. This answer can vary.

Go to: [http://nobelprize.org/educational_games/medicine/dna_double_helix/](http://nobelprize.org/educational_games/medicine/dna_double_helix/)

Click on “Play DNA Game”; Click “next” and reading each page, continue to click next until you come to the game.; Click on organism #1 and match the base pairs as fast as you can! It is hard! Click Next and then click on each organism until you identify the one that belongs to chromosome #1; continue playing the game with the other two chromosomes, filling in the chart below. The Chromosomes change here so there is no definitive answer, please do your best.

<table>
<thead>
<tr>
<th>Chromosome #</th>
<th>How many chromosomes?</th>
<th>How many base pairs?</th>
<th>How many genes?</th>
<th>What is the organism?</th>
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<tbody>
<tr>
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Adapted in part from Genetic Science Learning Center Tour of the Basics, Learn Genetics, from http://learn.genetics.utah.edu/content/begin/tour/