WHAT IS DNA?

1. Where, in the cell, is DNA found?

2. What does “DNA” stand for?

3. What is the term used to describe the twisted ladder shape of a DNA molecule?

4. DNA’s information is encoded by combinations of just four nitrogen bases, Adenine, Guanine, Cytosine, and Thymine. How do these bases always pair up across the “rungs” of the molecule?

5. What kind of bond holds the pairs of bases together?

WHAT IS A GENE?

6. Genes are instructions for building all the ________________ that make our bodies function.

7. What protein is in our red blood cells captures and carries oxygen?

8. What is the approximate total number of genes encoded in our DNA?

9. A change in a gene’s instructions is called a ________________ . One such disorder in the hemoglobin gene changes the overall shape of red blood cells. This causes a disease called __________ __________ ____________ .

10. What are TWO other specific examples of proteins that genes code for?

WHAT IS A CHROMOSOME?

11. If all of the DNA in a single one of your cells was stretched out, how long would it be?

12. A ________________ is a compact “package” of DNA.

13. Do all species of organisms have the same number of chromosomes per cell?

14. Briefly explain why humans have 23 pairs of chromosomes? Why “pairs”?

15. Explain how (and which) chromosomes determine your sex.
16. OK, so now we know how many chromosomes YOU have. How many chromosomes are in each cell of: Mosquito? Onion? Carp?

WHAT IS A PROTEIN?

Watch what happens when an unfortunate individual drops a bowling ball on his foot!

17. What kind of proteins, located on the cell surface, are responsible for picking up nerve signals (ex: PAIN) and passing it along to the next nerve cell?

18. Another type of protein, called ________________ protein, gives cells shape and holds them in place.

19. Most proteins are too small to see, so how do scientists know what they look like?

20. What does each individual gene encode?

21. What molecule, similar to DNA, is produced by the cell to move the genetic information out of the nucleus?

22. What organelles, located in the cell cytoplasm, contain the cell’s “protein-making machinery”?

WHAT IS HEREDITY?

23. Does the environment have any effect on our genetic traits?

24. How many chromosomes are contained in each parent’s egg and sperm cells?

25. When a sperm and egg join they create the first cell of a new offspring, called a ____________ .

Watch the animations as you click through the frames. Can you see how the same two parents can conceive many children and yet not pass on the exact same combination of traits?

WHAT IS A TRAIT?

26. In the case of having a straight thumb or a “hitchhiker’s thumb”, which trait will you have if you inherit an “H” from one parent and an “h” from the other (so you are “Hh”)? Explain why.

27. What is meant by a “complex trait”?

28. How much of our DNA do all humans have in common?