

# **DNA Sequence Bracelet**

Create a colorful bracelet to discover the unique DNA sequence of a butterfly, chimpanzee, trout, or human. Learn about complementary base pairing, the genetic process that allows us to inherit traits, like hair color, freckles, or even if you can roll your tongue, from one generation to another.

### **TEKS:**

4.10B Demonstrate that some likenesses between parents and offspring are inherited and passed from generation to generation, such as eye color in humans or shapes of leaves in plants. Other likenesses are learned, such as table manners, reading a book, or seals balancing balls on their noses.

7.14A Define heredity as the passage of genetic instructions from one generation to the next generation.

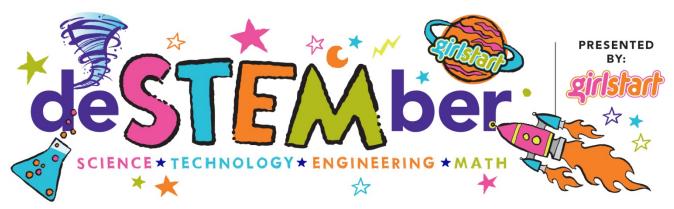
7.14C(ss) Recognize that inherited traits of individuals are governed in the genetic material found in the genes within chromosomes in the nucleus.

## **Materials (per bracelet):**

- An organism sequence of your choice (look at different organisms' DNA sequences here:
  - http://www.yourgenome.org/downloads /pdf/teachers/seg/FT sequence bracele ts.pdf)
- 44 colored round beads (four different colors: ideally red, yellow, green and blue)
  - Can purchase plastic pony beads online here: LINK
- Two pieces of elastic string (approximately 1' long each)
  - Can purchase elastic string online here: LINK

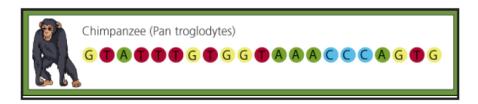


rys of STEM FUN!



## **How To:**

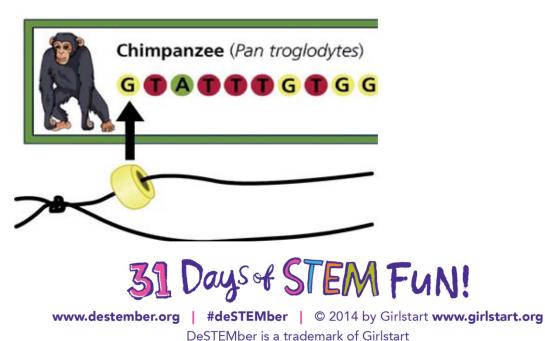
1. Go to <a href="http://www.yourgenome.org/downloads/pdf/teachers/seq/FT">http://www.yourgenome.org/downloads/pdf/teachers/seq/FT</a> sequence bracelets.pdf (pages 3 and 4) to pick out an organism you want to make a bracelet of the genetic code of, such as a person, trout, chimpanzee or butterfly. Choose one DNA sequence to make.

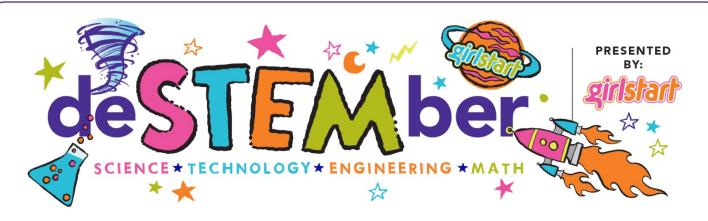


2. Find or cut two pieces of elastic each about 1'(30 cm) long. Tie a knot about 5 cm from one end of each string; then tie the two strings together at the knots.

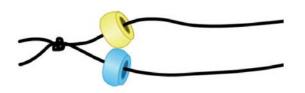


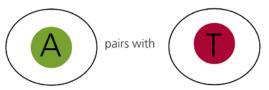
3. Look at the first letter in your sequence and find the right color bead to thread. Each bead represents one letter of your organism's genetic code.



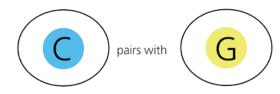


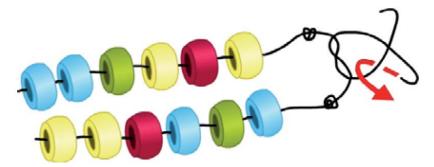
4. Thread that bead onto string 1 and thread the bead for the matching base onto string 2 (see the Pairing Rules picture to the right for guidance). Keep threading beads according to your sequence until you've finished the sequence on your card.





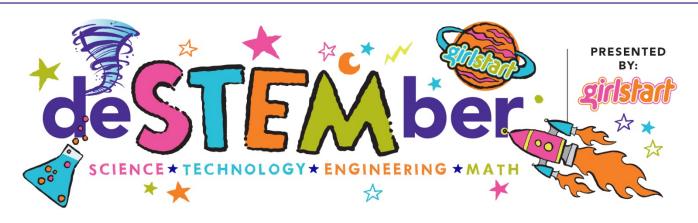
5. Knot each string after the last bead, and then tie the two new knots together. Just like in DNA, there are four different kinds of units that make up the sequence - red, green, yellow and blue.





- 6. Your bracelet will contain two strands of beads that match up the same way the units (or bases) in DNA do. That means if you know the sequence of one strand, you can work out the sequence of the other.
- 7. Now tie the ends of your double-stranded sequence bracelet together and enjoy your new DNA sequence bracelet!





## Why Does It Work?

Follow this link to learn about the basics of genetics:

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

Play this fun game to learn the process of complementary base pairing:

http://learn.genetics.utah.edu/content/molecules/builddna/

## **Career Connection:**

Synthetic biologist: "Synthetic biology takes genetic engineering one step further. Instead of changing or modifying living things by using only genes that exist in nature, synthetic biology involves redesigning sequences of DNA for new purposes or new opportunities."

-- http://www.wonderville.ca/asset/whatissyntheticbiology

#### **Resources:**

- Wellcome Trust Sanger Institute's yourgenome.org-- Sequence Bracelets, Courtesy of Genome Research Limited, Used under CC BY 3.0, reformatted for DeSTEMber activity directory.
- Genetic Science Learning Center, University of Utah Health Sciences.

## **Additional Resources:**

• Introduction To DNA, Genes & Genomes: http://www.yourgenome.org/downloads/dgg\_basic.pdf

