DNA Bracelet

Objective: Every living thing is composed of cells. Construct a 3-D model of a DNA Helix and investigate how are cells make look like we do.

Illinois Learning Standards: Assessment Frameworks:

Suggested Reading:
Illinois Ag in the Classroom's Biotechnology Ag Mag available online at *http://www.agintheclassroom.org*

Materials Needed:
Pony Beads in the following colors: Purple, Yellow, Green and Pink
Chenille sticks or bracelet string from a craft store.

Directions:
1. Choose one DNA code from the chart provided by your teacher. You will need this chart to follow the DNA pattern to make your bracelet.
2. Thread a bead onto your first Chenille stick. Then on the second Chenille stick thread the matching bead. Use the guide below to help. Example would be if your first bead on the first Chenille stick is Pink (**T**) then on your second Chenille stick the bead would be Green (**A**), because T always pairs with A.
3. Finish out both sides of your DNA strands following the pattern provided by your teacher.
4. One all you beads have been placed on their Chenille sticks twist them into the form of a Helix (sometimes referred to as the DNA ladder)
5. Tie the Chenille sticks together to form a bracelet to fit your wrist. See if your friends can figure out what plant or animal you are based on your DNA.

BASE PAIR CHART

A (green) pairs with T
T (pink) pairs with A
C (yellow) pairs with G
G (purple) pairs with C

A = adenine   C = cytosine

T = thymine   G = guanine
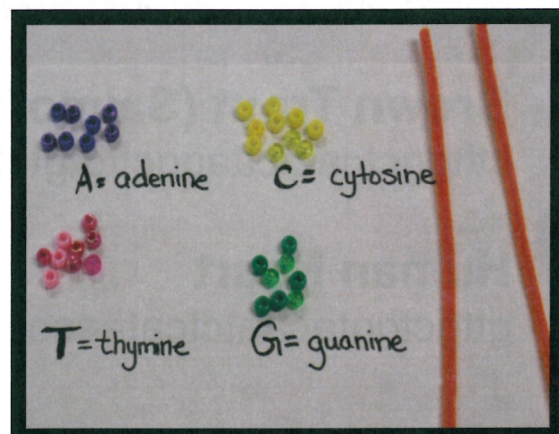
Monarch Butterfly (Danaus Plexippus)
gaggctaccaagtttccgatctgcaggagatgcattgaaagatcgtttcg

Grizzly Bear (Ursus Arctos)
atgaccaacatccgaaaaacccacccattagctaaaatcatcactacte

Sunflower (Helianthus Annuus)
tgagatgctagaaggtgcaaaatcaatagggcccggagctgctacaattg

Chimpanzee (Pan Troglodytes)
tgaccccgacacgcaaaattaacccactaataaaattaattaatcactca

Human (Homo Sapiens)
tgaccccaatacgcaaaattaaccccctaataaaattaattaaccgctca

African Elephant (Loxodonta Africana)
atcaccgacattcgaaaatctcatccttcactcaaaatgatgaataaatc

Apple Tree (Malus Domestica)
gaattcggcacgagaagaaacgaagagagagagagagag-
caaaaatggtt

Red Flour Beetle (Tribolium Castaneum)
cacaacctcgggggatcgccttcgccatcctctgcctggccgagaatccca

Brown Trout (Salmo Trutta)
ctttggctcactcttaggcttgtgtctagccacccaaatcttaccggac

Human Heart
gttgctggtacaatctcataaaatcgggctccagtgtttagagaaggacag

DNA Bracelet

There are 4 different nitrogen bases: Adenine (A), Thymine (T), Cytosine (C) and Guanine (G). These bases are often called after their first letter. The A in a strand can form bonds with the T in the opposite strand and the G can form bonds with the C. They form basepairs. This is why the strands are always each other's mirror image, each others complement. They are called complementary strands:

ATGCGTGCAATGTTTACGCGTAAAGCGTGCACGTTAGAGTACGTGCAGT
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
TACGCACGTTACAAATGCTCATTTCGCACGTGCAAGCTCATGCACGTCA

The order in which the bases are present in the DNA forms a code which determines genetic information. Like notes on a piece of music form a melody, the letters A, C, G and T form the foundation of genetic properties. So despite only having 4 code letters, the possible letter combinations of a piece of DNA of just hundred of these basepairs is very large. And when considering the fact that the human DNA consists of 6 million basepairs, DNA is very unique.

We are going to make a "Flat Andy DNA Helix" to demonstrate how DNA works.

CODE

Flat Andy (Flatus Andicus)

atcggctatcgcgactgac

BASE PAIR CHART

A (tan) pairs with T   A=adenine

T (blue) pairs with A   T=thymine

C (yellow) pairs with G   C=cytosine

G (green) pairs with C   G=guanine