J. Peter Coppinger
CRS DNA presentation
for 4th and 5th grades

INTRODUCTIONS

- Who I am
  - plant biologist, in grade 20!
  - studying why and how plants get sick.
- My background in science
  - started in childhood, bug collecting, drawing nature, birdwatching, hikiing
  - used to study rainforests in Australia (but didn't like the poisonous snakes, killer ants, and leeches!)
  - decided to work with plants in the laboratory (no snakes)
  - studying DNA in plants (this will lead into a discussion of what DNA is...)

INSPIRATION AND INVOLVEMENT (learn what kids' know about DNA)

- Background questions for class (get to know class, group discussion)
  - ...but before I thell you more about DNA, let me first ask, "Have you ever wondered why different animals, plants, people, look different?"
    - For example: Why do I have brown straight hair while Mrs. "insert teacher's name here" has curly black hair? *Because we have differences in our "blueprints" that make us up. Every living thing has a blueprint, and differences in this blueprint is why living things look different.*
    - *We often refer to these blueprints as "genes."* (I will probably ask if anyone has ever heard of genes-- not the GAP kind!) *Genes are instructions for how the organism is going to look. For example, we have a genes for eye color, hair color, height, etc.*
    - *The blueprint, or genes, in all living organisms is made up of a substance called DNA.*
  - Have they heard of DNA?
  - Does anyone know what DNA is?
  - In what context have they heard about DNA?
  - Do they think DNA is good or bad?
  - Why is it important to study DNA? *(e.g. Many sickness are due to mistakes in our DNA)* (this topic may be posed at the end of the discussion of *what* DNA is)

BACKGROUND

Basic Concepts to be Explained:

- DNA is the stuff that makes up genes (the blueprint of life). It is found in every single living organism, in every single cell.

- DNA is an extremely small molecule (only the world's most powerful microscope can see it! *I might be able find a picture of this.*) If you could take DNA out of your cell, it would looks like a long, very thin hair.
    - Just like every living thing, our bodies are made up of cells. We have over 100 trillion cells in our bodies! (*hopefully they will already know about cells*) DNA is so thin and long, that each cell in our body has six feet of DNA in it! (*But it is tightly wound up*) Imagine that-- every single cell in your body has 6 feet of DNA in it! **That means that if you could stretch the DNA out of every single one of your cells and lay them end to end, your DNA would stretch from the earth to the sun and back over 50 times! That is 4.5 billion miles of DNA in each of us!!!**
- DNA is a code made up of only 4 tiny molecules repeated over and over again. (draw them on chalk board as circles, squares, triangles, and stars). It is the combination of these 4 molecules that make up our "genes"
    - For example: "KλσνσνK" might mean that you have blue eyes, where as "KλσKσλK" might mean that you have brown eyes.
    - These genes, made up of DNA, are all hook together in a really really long string of DNA, kind of llike "bead on a string." *(show them the pop-it beads of different colors, each color referring to a different gene.)*

Key Vocabulary to be Defined

- **Genes:** the blueprint for life. Made up of DNA.
- **DNA:** a code of 4 repeating molecules. Extremely long, thin. In every single cell.
- **Genetics:** the study of genes and DNA

LEARNING EXPERIENCES

- Every living thing has DNA in it. And yes, we eat DNA! And no, it is not harmful!
- Let's investigate! We will take some foods that we eat every day (and maybe some we don't) and extract DNA from it! *This is what I do in the lab in order to study DNA!*
    - Students will be broken up into groups for individual DNA extractions.
    - Sources of DNA:
        - tomatoes
        - mangoes / kiwi fruit *(which ever looks best in the supermarket)*
        - split peas / spinach *(ditto)*
        - chicken livers (eeewww!)
        - jelly fish!!! (this would be cool if I could get this!)
    - Protocol involves smashing up food with mortar and pestel (in case of tomatoes and kiwi) or grinding in a blender (in case of peas and livers), adding salt, soap, and alcohol.
    - Students will be able to pull out big clumps of stringy, white, DNA!

KEY TAKE-HOME MESSAGES (CONCLUSIONS)

- Every living thing has DNA in it.

- We eat DNA whenever we eat living matter-- and it is not harmful.
- DNA (genes) are the code for life.
    - Genetics (study of DNA and genes) is imporant to our everyday lives. Helps us understand why different organisms look and act different. Many diseases are due to mistakes in DNA. Knowing about our DNA may help us understand and prevent diseases.