STEAM Spotlight Figures

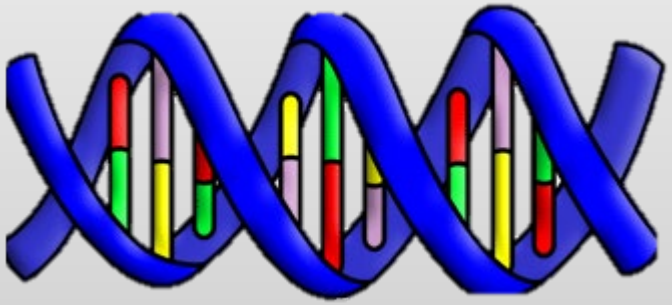
Nobel Prize winners Jennifer A. Doudna (left) and Emmanuelle Charpentier (right)

- On Wednesday, October 7, 2020, Jennifer Dounda and Emmanuelle Charpentier were jointly awarded the Noble Prize in Chemistry for their efforts working on a gene editing method called Crispr-Cas9. This award also celebrates the two as the 6th and 7th women in history to win a prize in chemistry.

- Their work together started in 2012 with a co-authored paper demonstrating the power of Crispr-Cas9. Since then, the technology surrounding this gene-editing method has led to its use testing cures for genetic disorders like hereditary blindness and sickle cell disease. It has also been used in genetic modification of crops to create new plants, as well as in research to bring extinct species back to life. A controversial development in science, Crispr has become a genetic tool with the potential to introduce limitless possibilities to science as we know it.

By Nkeiru Nkwocha

DESIGN YOUR OWN DNA



What You'll Need:

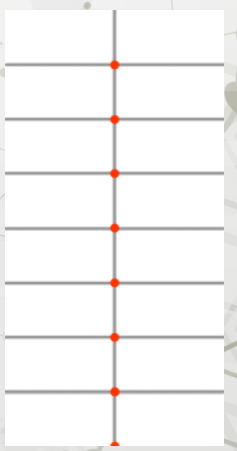
- A Ruler (as needed)
- A Pencil (for Step 12)
- A Pen
- Color Pencils, Crayons, or Markers

For the full pictures, see the original project here:
https://how-to-draw-cartoons-online.com/dna-sequencing.html

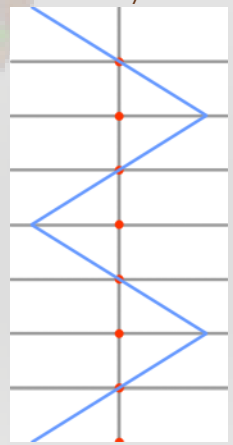
STEP 1: With your pencil, draw a vertical line as pictured.

STEP 2: Draw horizontal lines as shown. Use a ruler if needed.

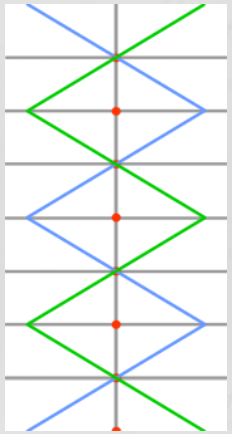
STEP 3: Mark the centers of each horizontal line.



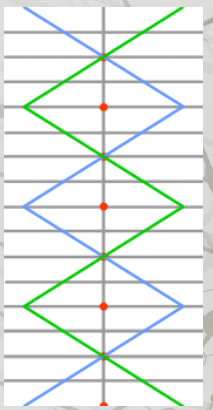
STEP 4: Draw diagonal lines through alternating dots as pictured. *Be sure to use a pencil. Colors in pictures are only used for clarity.



STEP 5: Draw more diagonal lines as pictured. *Continue to use pencil



STEP 6: (Optional) Add extra horizontal lines for guidance.



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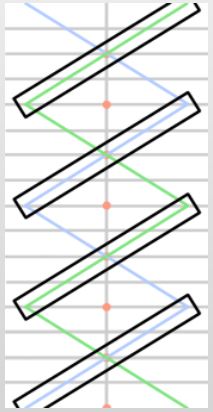
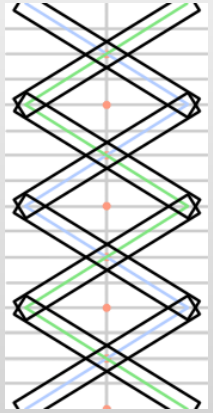
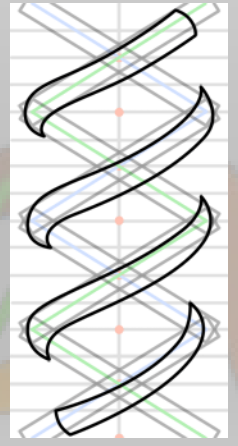
STEP 6: Draw rectangles around each line segment.



STEP 7: Continue rectangles for each segment.



STEP 8: Adjust each rectangle to curve edges, as shown in picture.



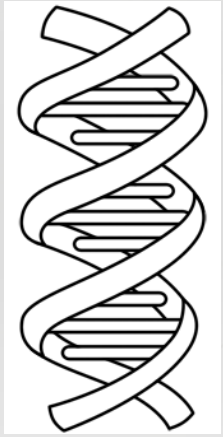
STEP 9: Draw bars connecting the curved rectangles as shown. Use the dots and central lines as guidance.

STEP 10: Add rounded bars to the top and bottom of the first bar, using horizontal lines as guidance.

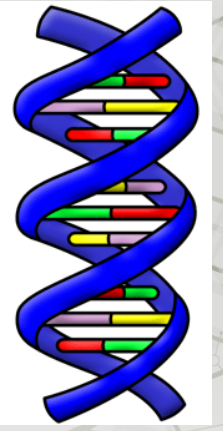
STEP 11: Draw the back of the curved helix, using the rectangle bars as guidance

STEP 12: You have now finished the double helix structure! Trace your outline with pen.

STEP 13: Erase the left-over pencil marks to reveal your double helix.



STEP 14: Use color pencils, crayons, or markers to color your DNA! Remember to match colors together to pair the nucleotide bases.



Adenine matches with Thymine

Guanine matches with Cytosine

By Nkeiru Nkwocha

BUILD YOURSELF A DELICIOUS DOUBLE HELIX

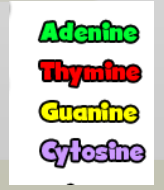
What You'll Need:

- Twizzlers (or red vines)
- Round Gummies (Gummy Bears, Jujubees, Fruit Gems, etc)
- Toothpicks

By Nkeiru Nkwocha

Step 1:

Using the round gummy candies, assign a color to each nucleotide base (Adenine, Tyrosine, Guanine, and Cytosine)



Step 2:

Add a round gummy candy to the end of each toothpick. Remember to pair the colors; Adenine with Thymine, and Guanine with Cytosine.

Step 3:

Connect one end of each toothpick to a Twizzler candy, and the other end of each toothpick to another Twizzler candy.

Step 4:

While holding the ends with each hand, slightly twist your creation to form a double helix.

Step 5:

Well Done. You've created your very own double-helix DNA. Feel free to enjoy the sweet fruits of your labor!

By Nkeiru Nkwocha

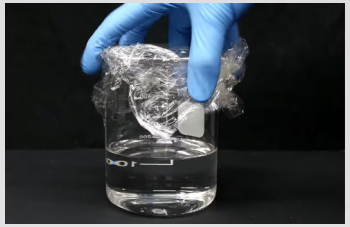
EXTRACT DNA FROM STRAWBERRIES

What You'll Need:

- Isopropyl Alcohol
- Plastic/Cling Wrap
- A Sieve/Straining Tool
- 4-5 Paper Coffee Filters
- 10 Strawberries
- Ziplock Bag (large enough to fit Strawberries)
- Salt (Non-Iodized Preferred)
- Dishwashing Soap
- Water
- 2 Medium Containers (preferably glass)
- 2 Large Container (preferably glass)
- Rubber Band

Prep:

- Pour about 200 ml of Isopropyl Alcohol into a medium container and cover with plastic wrap; set container in freezer until ice cold
- Pour 180 ml of water into another medium container; add 20 ml of dish soap and a tablespoon of salt; stir thoroughly and set aside; this is our extraction solution



By Nkeiru Nkwocha

Step 1:

Place 10 strawberries in Ziplock bag.

Step 2:

Squish and crunch the bag to crush the strawberries as much as possible. This damages the structure of the strawberries to allow the release of DNA and protein.

Step 3:

Add the extraction solution to the Ziplock bag and seal.

Step 4:

Continue scrunching the bag and crushing the strawberries to release the DNA.

Step 5:

Place the sieve over a large container. empty the contents of the Ziplock bag onto the sieve to strain the mixture. You can use a spoon to help the process along. Throw out particles.

Step 6:

Cover the top of another large container with a coffee filter and secure with rubber band. To strain the mixture a 2nd time, pour the contents over the coffee filter. It may take a little longer for this process to finish. If the filter gets jammed with particles, throw filter and particles away and replace with a new filter.

Step 7:

Now we can isolate our DNA. Retrieve the alcohol from the freezer. Remove the plastic wrap and pour the cold alcohol into the container. Watch the DNA begin to float to the top.

Step 8

Stir the container and wait for the DNA to clump up at the top.

Step 9:

Scoop out the white DNA substance and transfer to a coffee filter to drain excess liquid.

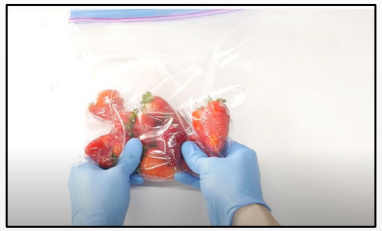
Step 10:

Lastly, wash the DNA by pouring alcohol over it several times and draining the excess liquid.

You've successfully extracted DNA from strawberries! Nice job!

For a more in-depth explanation on the science behind this project, check out the original video experiment here: https://www.youtube.com/watch?v=araeHtN_3Lk

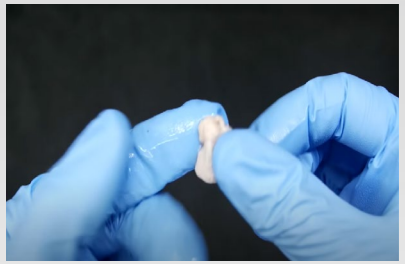
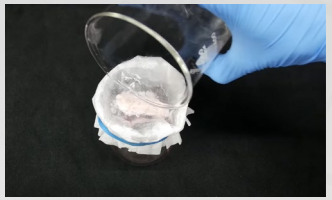
**Please be advised: The experimenter in this video attempts to eat the extracted DNA; we do not encourage anyone to try this







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