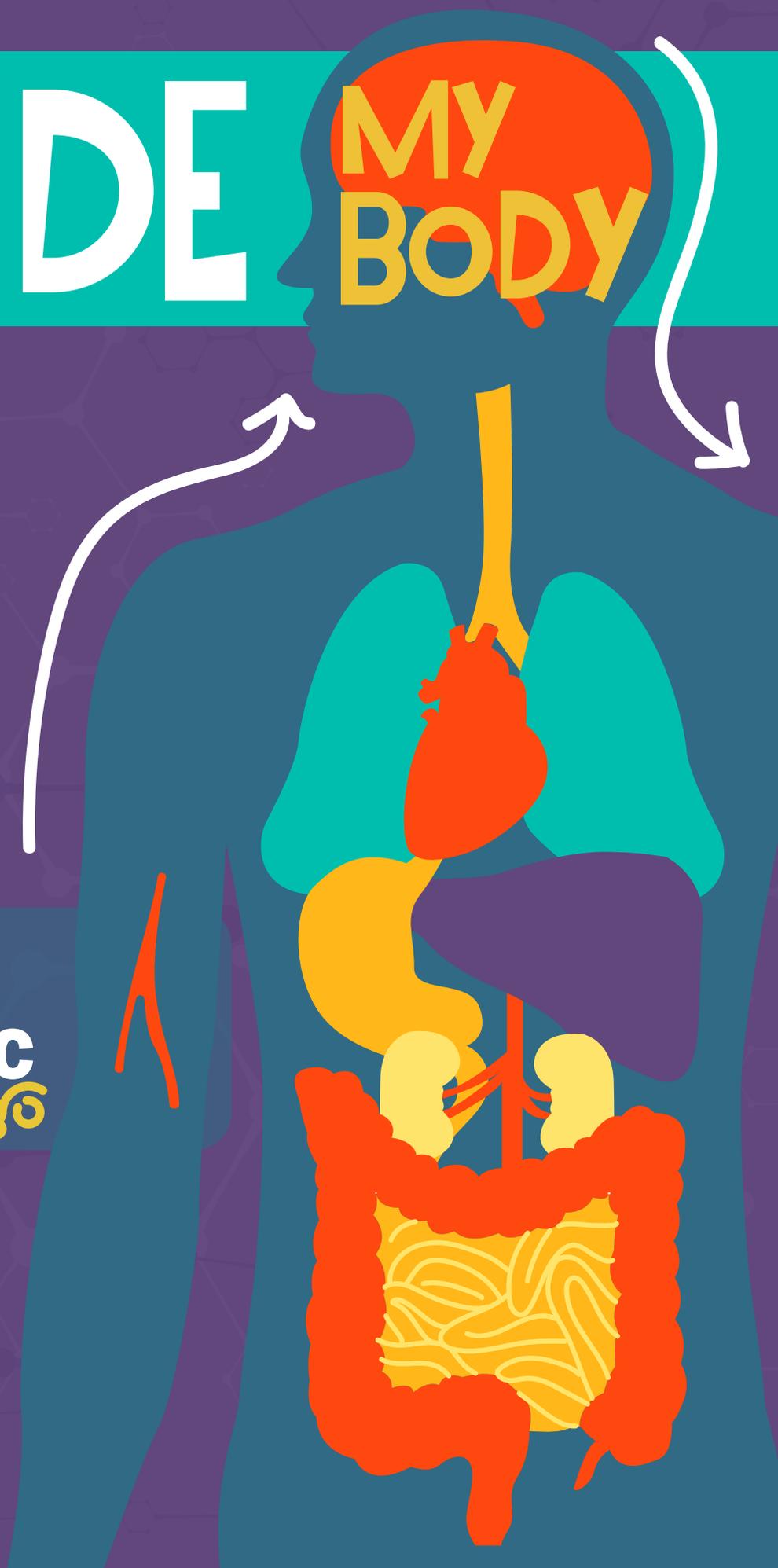
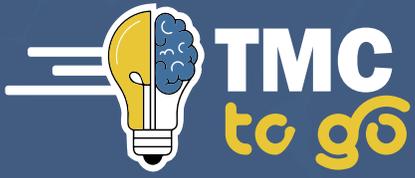


INSIDE

MY BODY



A STEM activity guide
provided by SDAN



Build A Functioning Heart Model

Activity Description: Students use basic materials to create a model to simulate the function of the heart.

Time: 30 - 45 minutes

Grade: 3 - 8

Introductory Video: [How the heart actually pumps blood - Edmond Hui - YouTube](#)

Lesson URL: [Build A Functioning Heart Model - Genius Heart STEM Activity & Printable \(steampoweredfamily.com\)](#)



Materials Needed:

- 3 x Pop bottles (710 mL) with caps, labels removed.
- 4 x Bendy straws
- 3 Cups of water
- Food colouring
- Tape
- Modeling clay or play dough
- Drill (or other sharp pokey for making holes in the caps)

This activity aligns with the following South Dakota Science Standards:

MS-LS1-3 Construct an argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. (SEP: 7 ; DCI: LS1.A; CCC: Systems)

Next Gen Science Standards:

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

Extensions:

- Provide your students with model hearts or print outs showing the heart. Go over the regions of the heart and begin learning its anatomy.

- Using a stethoscope over the heart or your fingers along the neck (carotid artery), determine your resting heart rate and that of your students. Discuss how the heart rate changes depending on factors such as stress or exercise.
- Go to your local meat processing facility and ask if they will save hearts for dissection. Often a local processor will be able to obtain a large number of hearts for a reasonable price and the fresh organ is best for dissection. Alternatively, conduct a heart dissection using a preserved specimen.

Investigating Blood Sugar

Activity Description: Students play the role of doctors as they attempt to diagnose a patient with diabetes. They learn that blood sugar is regulated by the kidneys with the help of the pancreas, and ultimately come to understand that the human body is a series of interconnected systems.

Time: Two 45 minute sessions

Grade: 5 - 8

Introductory Video: [Sugar: Hiding in plain sight - Robert Lustig - YouTube](#)

Lesson URL: [Investigating Blood Sugar | Sanford PROMISE \(sanfordhealth.org\)](#)



Materials Needed:

Per Class:

- 1 bottle of corn syrup
- 4 beakers
- 4 test tubes
- 2 liters of water
- 1 tablespoon (for measuring)
- Graduated Cylinders (1 Liter, 500 mL, and 100mL) - Labeled measuring cups can be used as a substitute

Per Group:

- 4 paper or plastic cups
- 4 straws

This activity aligns with the following South Dakota Science Standards:

MS-LS1-7 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. (SEP: 2; DCI: LS1.C, PS3.D; CCC: Energy/Matter)

MS-LS1-3 Construct an argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. (SEP: 7 ; DCI: LS1.A; CCC: Systems)

Extensions:

- Purchase [glucose monitoring test strips](#) and use them to test each sample. This can be done as a more scientifically accurate way of confirming a diagnosis.
- Explore the digestion of simple sugars with this [activity](#) that simulates sugar metabolism.

What Makes Me Unique? - DNA Extraction

Activity Description: Students use common household products and simple techniques to extract DNA from strawberries. This experiment leads to a discussion about the structure and function of DNA and a broader discussion about heredity.

Time: 40 minutes

Grade: 2 - 8

Introduction Video: [Can you Pull DNA From a Strawberry? | Video | Sanford PROMISE \(sanfordhealth.org\)](#)

Lesson URL: [What Makes Me Unique? | Sanford PROMISE \(sanfordhealth.org\)](#)

Printable Instructions: [strawberry-dna-pdf.pdf \(sanfordhealth.org\)](#)

Materials Needed:

For each group:

- Coffee Filter
- Strawberry
- 1 tsp Dish Soap
- Stir stick
- Sealable Bag
- ¼ Cup Ice Cold Rubbing Alcohol
- Funnel
- ½ tsp Salt
- ¼ cup Water
- 2 Clear Containers

*Note: To make a class volume (26 students) of extraction buffer use 6.5 cups water, ¼ cup salt, and ½ cup soap. Students will then only need the other items plus about ¼ cup of the extraction buffer mixture at their tables.

**If you have access to a freezer, store a bottle of rubbing alcohol there until the last step of the experiment. A cooler filled with ice is a good alternative.



This activity aligns with the following South Dakota Science Standards:

3-LS3-1 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variations of these traits exist in a group of similar organisms. (SEP: 4; DCI: LS3.A, 16 LS3.B; CCC: Patterns)

MS-LS1-2 Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. (SEP: 2; DCI: LS1.A; CCC: Structure/Function)

Extensions:

- **Elementary Students:** Have students consider that the white strands of DNA they extracted in this experiment help the strawberry make the parts of itself that they can see and feel. Use this to consider that the more closely related two organisms are, the more DNA they share in common. Have students research these similarities and share with the class their findings OR use this [article](#) or this [graphic](#) to help facilitate the discussion.
- **Middle School Students:** Ask students to compare the nucleus of the cell to a manufacturing plant that produces cars. Use this analogy to introduce the parts of the cell and have students create a model using paper and writing utensils, play doh or clay, or some other materials.