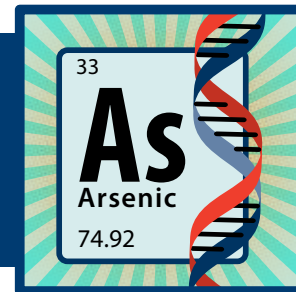


Teacher Directions

UNIT: DNA

LESSON 1: ARSENIC AND EPIGENETICS: A DNA STORY

ACTIVITY 1A: CONGA LINE



TEXAS BIOMEDICAL
RESEARCH INSTITUTE
HEALTH STARTS WITH SCIENCE

EDUCATION STANDARDS

TEKS: 8.12B, 8.13B, 7.6 A&B, 7.11A, 7.13B

NGSS: LS1-3; LS1-5; LS2-1

Activity Rationale

The Conga Line Activity engages students in critical thinking and evidence gathering as they use the transformed article to support their responses on the game board. The game and transformed article provide opportunity to connect classroom content to real-world applications and to demonstrate the interconnectedness of science disciplines and careers. In this case, some of the science careers include: *geneticists, microbiologists, environmental scientists, public health researchers, geologists, chemists, and physicians.*

In this activity, students will engage with a game to explore familiar and unfamiliar vocabulary terms from the transformed article: “**Arsenic: The Silent Toxin That Keeps On Giving**”. To play the game, students will read the definition in the “**START**” box. From the Conga Line Vocab Cards, students will select the vocabulary term which they believe best fits the definition in the start box. This new card will have another definition and the vocabulary chain continues until students reach the “**END**”.

PROCESSING OUT

My Evidence is to be completed as students play the Conga Line game to provide evidence for their vocab term placement on the game board. Students identify key words from the definition, locate the key words in the article, identify the page, paragraph, and sentence numbers to support their game piece placement. This increases student engagement with the article and provides opportunity for critical discussion within the group. The *Processing Out* may be completed individually or submitted as a group.

MIDDLE & HIGH SCHOOL LEVEL

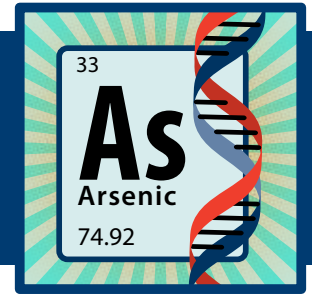
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NIH SEPA Project #1R25GM142021-01A1

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UNIT: DNA

LESSON 1: ARSENIC AND EPIGENETICS: A DNA STORY

ACTIVITY 1A: CONGA LINE



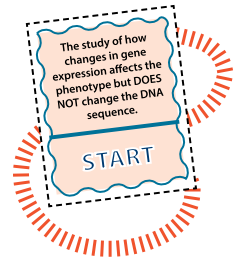
EXTENSION

This activity can be used as a pre/post assessment to introduce or reinforce concepts taught during an existing curricular unit on body systems or DNA or environmental science.

Activity Prep

Game Sets – print the Conga Line game board and vocabulary cards. If possible, laminate the game board and vocabulary cards for repeated use.

Transformed Article – provide students with electronic or hard copies of the transformed article. It is recommended to provide individual hard copies to increase student engagement with the article as they search for evidence. Another option is to laminate copies of the article for each group. Provide each group with a dry-erase marker to identify support for game piece placement. Encourage students to apply strategies used in reading or ELA to evaluate the article.



Conga Line Game

ANSWER KEY

START → Epigenetics → Gene Expression → Stem Cells → Tissue → Organs →

Body Systems → Skeletal System → Nervous System → Circulatory System →

Placenta → Toxins → Methylation → Phenotype → Metabolic Diseases →

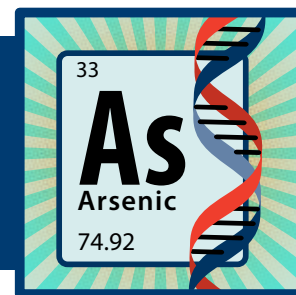
Pancreas → Insulin → Glucose → Type 2 Diabetes → Insulin Resistant → **END**

MIDDLE & HIGH SCHOOL LEVEL

UNIT: DNA

LESSON 1: ARSENIC AND EPIGENETICS: A DNA STORY

ACTIVITY 1A: CONGA LINE



Vocabulary Definitions

Body Systems A group of organs and tissues working together to perform important functions in the body. (page 2, paragraph 1, last sentence)

Body Mass Index (BMI) Height-to-weight ratio. Calculate by dividing weight in kilograms by height² in meters. (page 5, 1st paragraph, 1st sentence)

Circulatory System The heart and blood vessels move blood through the body bringing oxygen and nutrients and removing waste. (page 2, 1st paragraph, 3rd sentence OR page 3, last paragraph, sentence 7)

Stem Cells Cells that have the potential to develop into many different types of cells in the body. (page 2, 1st paragraph, 6th sentence)

Glucose A simple sugar molecule (C₆H₁₂O₆) the body uses as the primary source of energy in the body. (page 3, paragraph 3, 1st sentence)

Tissue A group of cells that work together to perform a specialized function. (page 2, paragraph 1, last sentence)

Skeletal System A collection of bones, tendons, and ligaments that form the body's framework. (page 2, paragraph 1, last sentence)

Type 2 Diabetes (T2D) High blood sugar levels in the blood caused by the body's inability to produce or use insulin correctly. (page 2, paragraph 2, last sentence)

Organs A group of different tissues that work together to perform a body function. (page 2, paragraph 1, last sentence)

Gene Expression The process when a gene is activated and performs a function, appearing as a phenotype. (page 1, paragraph 2, 2nd sentence)

Methylation The chemical bonding of methyl groups (CH₃) to DNA that changes when genes are active and not active. (page 4, last paragraph, 1st sentence)

Insulin Resistant Cell receptors unable to respond to insulin preventing glucose from entering the cell. Elevated glucose in the blood causes the pancreas to increase insulin production. (page 3, last paragraph, 6th sentence)

Epigenetics The study of how changes in gene expression affects the phenotype but DOES NOT change the DNA sequence. (page 1, paragraph 2, 1st sentence)

Phenotype Observable physical characteristics of an organism such as how they look and act. (page 4, paragraph 3, 3rd sentence)

Toxins Substances that are harmful or poisonous to humans such as arsenic. (page 1, paragraph 2 or 3, multiple sentence options)

Insulin Hormone produced by the pancreas that lowers the levels of glucose in the blood. (page 3, paragraph 2, sentence 2)

Metabolic Diseases An alteration of the body's biochemistry which results in cells, tissues, or body systems to function abnormally. (page 2, paragraph 2, last sentence)

Nervous System A network of specialized cells that carry messages to and from the brain to various parts of the body. (page 2, paragraph 1, last sentence)

Pancreas Endocrine system gland located in the abdomen that produces the hormone insulin to aid in digestion. (page 3, paragraph 2, sentence 1)

Placenta A temporary organ that forms in the uterus during pregnancy. Provides nutrients and oxygen to the offspring. (page 2, paragraph 1, 2nd sentence)