

ADVANCED LEARNING LABS

Collaboration between NC Department of Public Instruction and AIG Teachers across the state

TO ENGAGE, ACTIVATE, AND GROW OUR STUDENTS

GRADES

4-5

Systems



ENGLISH LANGUAGE ARTS

Like a system of roads connecting on a map to show a larger view of a location, words in books connect to tell a larger story. Determining the correct meaning of unknown or multiple-meaning words is best accomplished when using a system of strategies/routes to find the meaning, such as context clues, word parts, word relationships, and reference materials.

Using a piece of text that interests you, find a word that is unfamiliar to you or has multiple meanings. Create a "map" of the word and the strategies or "routes" of the system surrounding it that help to discern its meaning. For example: Circle the word and underline the context clue that gives a hint to its meaning, explain it and label it "Route 1." Highlight prefixes and or roots found in the word and give their meaning as "Route 2", etc.



SOCIAL STUDIES

A system is defined as a set of principles or procedures according to which something is done, an organized framework or method. The economic system in the United States (and world) relies upon production, specialization, technology and division of labor. How do these different elements impact the system and economic growth in the U.S.?

Using the site below, research these elements of the economic system in the U.S. After researching, choose one element of the system to eliminate. What is the impact on the system?

Create a cartoon strip or flip book to show the impact of removing that element of the economic system and give it a powerful title.

Use this site for resources: <https://bensguide.gpo.gov/parent-ed-u-s-government-web-sites-for-kids>



SCIENCE

When a disease or a disorder affects a major body system, often other body systems are also impacted. Osteogenesis Imperfecta (OI) is a rare disorder caused by a mutation in the gene responsible for bone formation. This causes bones to be fragile and break easily. There are 15 known types of OI, some so severe that babies have had broken bones as a result of a diaper change.

Using what you know about the major body systems, make predictions about effects that OI can have on the rest of the body. What effects do you think OI has on the daily lives of people with the disorder?

Create a T-Chart with body functions in one column, and as you review the following website, record how OI affects that system in the other column. Read more here: <https://oif.org/>



MINDFULNESS

The nervous system is known by many as the "control center" of the body and the Vagus Nerve is called the "Meditation Highway" by some.

Read the following articles on mindfulness and the nervous system:

- <https://eocinstitute.org/meditation/meditation-relaxes-your-nervous-system/>
- <https://buddhaweekly.com/science-center-vagus-nerve-meditation-highway-parasympathetic-nervous-system-meditation-works-body/>

After reading, create an infographic that capitalizes upon these metaphors for the parts of the nervous system and the impact of mindfulness on this system. Share your infographic with a friend or family member to explain the relationship between the two.



LOGIC PUZZLE

A cipher is a systematic way of writing in code. Julius Caesar used a substitution type of writing to encode military messages. One system Caesar used was to shift alphabet letters 3 to the right, meaning an "A" would become a "D" when he was writing. This would mean to decode (or decrypt) a person would see a "D" and then shift 3 letters to the left to decode the "D" as representing an "A".

Try to solve this encrypted message, using the Caesar Cipher system:

Travhf jvgubhg rqhpngvba vf yvyr fvyire va gur
zvar

This tool allows you to adjust the shift of letters and will help you encrypt and decrypt messages: <https://www.xarg.org/tools/caesar-cipher/>

Now, try to create encrypted codes on your own!



FIELD STUDIES

A coding system is a system of signals used to represent letters or numbers in transmitting messages. There have been all kinds of codes used for communication throughout history.

Check out the codes at Braingle here: <https://www.braingle.com/brainteasers/codes/>

- What are the different systems used to create codes?
- Are there patterns you notice?

Choose one of the code systems described on the website, and write a message using that system. What happens to the systems if you were to combine two codes? Continue to try two more coding systems, writing messages for family and friends to decipher.



RESEARCH EXPLORATIONS

Bionic body parts? Science Fiction or real? While sci-fi is, by definition, a mix of science and fiction, there are real bionic body parts that have been developed and are in use today.

When a major body system is affected by injury or disorder, other body systems and the quality of life for the person can be impacted. Investigate the real-life bionic body parts described in this blog post: <https://assistivetechologyblog.com/2017/10/bionic-body.html>

It's time to think like a prosthetic designer. Brainstorm and create an illustrated description of a bionic body part that would help improve the life of someone with an injury or disorder.



MATH

Ancient measurements were often based on body parts, which posed problems because not everyone's "foot" is the same length. Over time, standard ways of measuring were developed, meaning units of measurement were the same everywhere (a foot=12 inches). These days, most of the world (aside from the U.S., Liberia, and Myanmar) uses the metric system. Visit <https://usma.org> for more information on the metric system.

Solve these decimal and customary unit comparisons: <https://usma.org/decimal-nature-of-the-metric-system>

Using your knowledge of both systems, make an argument for metric measurements. Create your own "Top 10" list as seen here: <https://bit.ly/39eiGVR>. Make sure each reason is supported with a mathematical example. For instance, if you state, "It's easier to make conversions," create a math problem that supports this claim.



North Carolina Department of
PUBLIC INSTRUCTION



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K-12

Systems Reference Guide

For more information on creating infographics, visit this site: <https://www.canva.com/create/infographics/>

K-1 Logic Puzzle:

Solution: Erasers=\$.25; Stickers= \$1.50, Peppermints= \$.50

6-7 Logic Puzzle:

Solution: Adam must pull out 40 to guarantee he pulls out two black socks. He could pull out 21 blue plus 17 red plus 2 black.

8-9 Logic Puzzle:

Solutions can be found at the Brainzilla site: <https://www.brainzilla.com/logic/logic-grid/>

10-12 Logic Puzzle:

Solutions:

1. The answer is three rotations in total. Two because of the ratio 10:5, one more because of the movement of the smaller cogwheel. <https://www.puzzleprime.com/brain-teasers/insight/cogwheels/>

2. After 18 rotations of the smaller gear and 11 rotations of the bigger gear, the marked teeth will be together again. <https://aplusclick.org/t.htm?level=12;q=3938>

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Systems NC Standards Alignment

Grade Span	English/ Language Arts	Social Studies	Science	Math
K-1	L.1.5	K.C&G.1.1 1.C&G.1 1.C&G.1.1 K.C&G.1 1.C&G.1.1	1.E.1	NC.1.NBT.7
2-3	RI.3.5	3.C&G.1.3 3.C&G.1.1	3.L.2.2	NC.3.NBT.2
4-5	L.5.4	5.E.1.2 5.E.1.3	5.L.1.2	NC.4.MD.1
6-7	W.6.2	6.C.1.3 6.B.1.2	7.L.1.4	NC.7.SP.3 NC.7.SP.4
8-9	RI.9-10.8	8.E.1.3 EPF.MCM.1.1	8.P.1	NC.M1.A-REI.6 NC.M1.A-REI.12
10-12	W.9-10.3 W.11-12.3	FPC&G.3.4	Phy.2.3.3	NC.M1.S-ID.1