

# ADVANCED LEARNING LABS

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

TO ENGAGE, ACTIVATE, AND GROW OUR STUDENTS

GRADES

K-1

## Movement



### ENGLISH LANGUAGE ARTS

A variety of words in a language can be used to describe similar actions. Words have nuances that describe shades of meaning and help the reader or listener to better understand the action or description.

Read these words and act them out.

jump | hop | skip | leap | spring | bound

- How are these actions similar? different?
- Which word best describes a frog, a kangaroo, a gymnast, a basketball player?

Now, brainstorm a list of words that have similar meanings to each of these actions:

- dance
- run
- laugh

Pick one word from each list to use in a sentence and act out.



### SOCIAL STUDIES

Migration can be defined as movement from one place to another. Physical features, such as mountains, rivers, and roads affect the way people move.

Pretend you are moving to a new location.

Consider how each of the following might impact movement: a mountain, a river, a lake, a road.

- How might the feature slow down your travel?
- How might the feature assist you in your travel?
- What will you need to use the feature to your advantage?

Draw a map that includes a mountain, river, lake, and road. Mark a starting and ending point on the map. Describe the route you will travel, using cardinal directions (north, south, east, and west).



### SCIENCE

A force (push or pull) can be applied to an object without touching the object. With a friend or family member, make a rocket move without touching it:

1. Create a rocket using an empty toilet paper tube.
2. Cut two pieces of 5-foot yarn and put them through the rocket tube.
3. Each person holds one end of each piece of yarn so the yarn stretches between them. Start with hands together, then one person spreads their hands so that the two pieces of yarn separate.
4. Use various speeds (open your arms slowly, then quickly) and heights (raise and lower your arms).

What makes the rocket move? Describe the motions of the rocket. How did varying the speed and height impact the movement?



### MINDFULNESS

Sometimes our stressful energy can be hard to manage. Using our imaginations to focus on calming movements can help our bodies to feel more grounded. Use this short video to learn an exercise that can help calm stressful energy:

[https://www.youtube.com/watch?v=bRkLIoT\\_NA](https://www.youtube.com/watch?v=bRkLIoT_NA)

- How did you feel before practicing the activity in the video?
- How did you feel after the activity?
- Are there similar activities that might also help you to calm your body when you feel stressed?

Discuss with a friend or family member what you have learned and identify when you would use this technique. Make a poster or other visual to help remind you of this technique when you feel stressed.



## LOGIC PUZZLE

Six drinking glasses stand in a row; the first three are full of juice and the next three are empty.

By moving only one glass, how can you arrange them so that the empty and full glasses are alternating?



## FIELD STUDIES

Gravity is a force that affects movement on Earth and in space. Watch this video to learn more about gravity: <https://www.pbs.org/video/gravity-m3swlv/>

Experience gravity on Earth. Collect some items from around your house like pencils, balls, or books. Carefully release each one from above your head. What happens? That's gravity!

- What would life be like if gravity did not exist? How could we adapt to objects and ourselves floating?
- Would you like to experience weightlessness in space? Why or why not?

Record your information and thoughts in your science notebook.

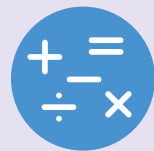


## RESEARCH EXPLORATIONS

Objects move when force is applied to them. Explore motion using a toy car and an inclined plane. Create a ramp (inclined plane) using a board and a stack of books or a long piece of cardboard and a box. Hold a toy car at the top of the ramp and release it. Record your data and conclusions in a science notebook:

- What do you notice?
- Describe the car's movement using words like zig-zag, fast, slow, and straight.
- Describe where the car stops using position words like below, beside, and between.
- How is the movement of the car affected if you push it before releasing it?

Extension: Use different materials (bubble wrap, foil, sticks, etc) on the ramp you built. How did adding these materials affect the movement of the car?



## MATH

Engineers consider how movement will impact things they build. For example, will a design withstand strong winds or a crash? Look at the slide show to learn about geometry and design: <https://bit.ly/30qcC8K>

Using toothpicks and gumdrops, create a structure that can hold a plastic egg. Use triangles, squares, rectangles, or hexagons in the design. There must be an opening large enough for the egg to enter and exit. The structure must contain the egg when dropped.

- Did your design protect the egg when it was in motion?
- Which geometric shape did you use in your design?
- Revise your design using fewer supplies.
- Make a new design with different shapes.



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GRADES

2-3

## Movement



### ENGLISH LANGUAGE ARTS

Movement is a word with multiple meanings. One definition of movement is a change or development. The actions of characters in a story help to create changes and developments that move the story along. It is their actions that help contribute to the sequence of events in a story.

Using a story you've already read or one you're reading currently, create a magazine cover for one of the novel's main characters. Include the following that contribute to important events in the novel:

- details about the character's external features, or physical appearance
- details about the character's internal characteristics, or personality traits
- titles for "articles" on the main character's thoughts and actions
- titles for "articles" on other characters' reactions to the main character



### SOCIAL STUDIES

One definition of movement is the act of changing physical location. Another definition is the moving parts of a system. Watch this video about Malcolm McLean, a small-town truck driver from North Carolina, and how he impacted the modern global economy: <https://bit.ly/3hgXG3T>

Using a multi-flow thinking map, analyze the causes of the change in movement of goods and its effect on people, ideas and communities. Use this link for reference: <https://www.thinkingmaps.com/why-thinking-maps-2/>

Research the movement of goods, people and ideas that have impacted the community in which you live. Create another multi-flow thinking map that illustrates the cause and effect relationship of movement of the above on your community.



### SCIENCE

A trebuchet is a type of catapult that uses a long arm to throw an object. The trebuchet uses simple machines and energy to create movement. Watch this video to learn more:

<https://youtu.be/W5RFoovvGkw>

Notice how the machines work together and how the mass of the object affects the distance it travels.

Follow these directions to build your own mini trebuchet: <https://bit.ly/3eFdtrh>

Experiment with objects of different weights to see how your objects move differently through the air. Record your results. Then, change another aspect of your trebuchet, perhaps the length of the sling, and record those observations. Document the changes you made to the design of the trebuchet in your science notebook.



### MINDFULNESS

There are many types and of mindful movement that have been around for ages. Qigong is one such practice; it is a Chinese health and wellness practice that focuses on a combination of movement, meditation and breathing.

Watch this Qigong video: <https://www.youtube.com/watch?v=eAQzFqdc7Hs>. Try these movement practices for a week and reflect upon any differences you see in terms of the connection between your mind and body.

Teach these movements to someone you know. Explore other movements that you could add to create your own mindful movement practice.



## LOGIC PUZZLE

Hungarian engineer, Endre Pap, is credited with creating an interlocking ring puzzle called "Hungarian Rings." Similar to a Rubik's cube, rings are moved to align colorful balls.

Try your skill at Hungarian Rings: <https://ruwix.com/online-puzzle-simulators/hungarian-rings/>

Another moving puzzle to try is the Color Wheel: <https://www.puzzleatomic.com/GAMES/colorwheels/colorwheels.html>



## FIELD STUDIES

One definition of a movement is a group of people working together to advance their shared political, social or artistic ideas. Movements are powerful ways to make change, but how do you do it?

Watch this TEDTalk on how to create a movement: <https://bit.ly/2E2ttHm>

After watching, think about if you agree with the speaker regarding his thinking of what the most important factor is in starting a movement. Are there things you would add? What about the idea? Timing? Risk? How do these three things factor into the making of a movement? Are there other important elements to consider?

Create a co-TEDTalk to build upon the one you viewed and the idea of elements necessary to create a movement. Think about a movement you'd like to start or be part of. Go for it!



## RESEARCH EXPLORATIONS

Migration is defined as the seasonal movement of animals from one region to another. At the end of every fall, millions of monarch butterflies embark on a journey that takes them over 2,000 miles.

Research more about where monarchs live, where they travel, and why. Add: Use this link to start your research: <https://kids.nationalgeographic.com/animals/invertebrates/insects/monarch-butterfly/>. Then, create a map to show the points from which their migration starts and ends.

Write and perform two episodes of a news report (like a weather report, but instead a "migration report") complete with a colorful map to announce the two times per year monarchs migrate.



## MATH

The "value" of a digit depends on which "place" it is in. Move the digit to a different place and the value changes. Play "Some Sum." The object is to find the largest sum that can be made by adding two 2-digit numbers. Make a stack of 10 cards: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

To play:

1. Draw a card. Decide if it goes in the ones or tens place.
2. Draw another card. Place it in the ones or tens place. (Cards cannot be moved once placed.)
3. Continue until you have drawn 4 cards and have two 2-digit numbers to add.

Play a few rounds. Afterwards, consider your strategy: Are there certain numbers you place easily? What are they? How would your strategy differ if you were aiming for the lowest sum OR subtracting?



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GRADES

4-5

## Movement



### ENGLISH LANGUAGE ARTS

What we say and how we say it is powerful and has the ability to move people-to make them think, feel and/or act, potentially creating a movement for change. Think about a topic that is important to you, possibly something you want people to do or stop doing.

Create a report or presentation on it - sequencing your ideas logically in a way that flows, making sure you have appropriate facts and relevant, descriptive details to support your main ideas.

Practice presenting your report in a way that moves your intended audience. Remember to connect with your audience by considering your voice level, tone, body language and eye contact to get your intended message across and hopefully, move them to learn, think and act on it.



### SOCIAL STUDIES

In *Understanding the Changing Planet: Strategic Directions for the Geographical Sciences*, the author states, "Without the movement of goods people and ideas cities falter, economies wane and societies wither."

- What do you think this statement means?
- How has the movement of goods, ideas and various cultural groups influenced the development of regions in the U.S.?

Choose a region of the U.S. and research the impact of the goods, ideas and cultural groups on the region. Create a map of the region and include symbols for the people, goods and ideas/innovations that are part of that region. Then reflect upon how the region might be different without the movement of one of those key elements. Who and/or where else might be impacted?



### SCIENCE

Moving your body is one way to keep it healthy. Exercising can help more than just your muscles. The Walking Classroom is used by thousands of students nationwide. Educational material is narrated like a podcast so that students and teachers can learn while they move. Read more on their webpage: <https://www.thewalkingclassroom.org/>

Listen to a sample podcast, read about student experiences, and see a few videos of students in action.

- How does movement affect learning?
- With which classes do you think this type of learning would work best?
- Why is exercise not only important for the muscles, but also your brain?

Write a letter to your teacher encouraging them to try the walking classroom. Explain the benefits and how this would work best in your schedule.



### MINDFULNESS

Mindful movement can help you align your mind and body, resetting your nervous system and clearing and calming your mind so that you are able to focus. Here are four practices that are designed for children your age: <https://www.healthykidslearnmore.com/Healthy-Kids-Learn-More/Educator-Resources/Take-5ive/Mindful-Movement-K4-8>

Each movement practice has a different focus or purpose. Read each description and choose the practice that best fits your needs or interests. Try these movement practices for a week and reflect upon any differences you see in terms of the connection between your mind and body. Are there movements that you learned about in your research that you see represented in these exercises? If not, are there movements you learned about that you could add or combine to create your own mindful movement practice?



## LOGIC PUZZLE

In 1974, a Hungarian architect named Erno Rubik, created a hands on cube with moveable pieces. He did this to explain 3 dimensional geometry and called it the "Magic Cube." Though he created it, it took him over a month to solve.

Try your skill at Rubik's Cube: [https://rubiks-cu.be/](https://rubiks-cube.com/)

Another moving puzzle to try is the Color Wheel: <https://www.puzzleatomic.com/GAMES/colorwheels/colorwheels.html>



## FIELD STUDIES

Let's take a tour through the legacy of Dr. Martin Luther King, Jr. and others during the Civil Rights Movement. We'll start our Virtual Learning Journey here, with "Marching Forward:"

Describe some of the major events that Dr. Martin Luther King Jr. attended. What was the overlying purpose for each event and how did he support that purpose?

What is the difference between human and civil rights? Provide examples of each.

How did the actions and beliefs of individual activists, such as Rosa Parks and John Lewis, drive the momentum of the Civil Rights Movement as a whole?

Create a reflective journal with your thoughts and feelings on the events that occurred during the Civil Rights Movement.



## RESEARCH EXPLORATIONS

Robotics or animatronics? It depends on the purpose. Robots are designed to be programmed to carry out specific tasks. Animatronics are a type of robot that combines puppetry and mechatronics (machines and electricity). Typically used for entertainment, the first animatronics to be viewed in public were debuted at the 1939 World's Fair, and in Disney's Mary Poppins (1964) the animatronic birds were the first animatronics shown in a movie.

Additional research resources:

- <http://www.theatrecrafts.com/pages/home/topics/animatronics/>
- <https://bit.ly/2E25IVk>

Create a working hand (the first step in animatronics, "puppetry" without the electricity): <https://www.greenkidcrafts.com/diy-robot-hand-steam-activity/>



## MATH

In any given number, moving the decimal point to the right, increases the value of the digits, and moving the decimal place to the left, decreases the value of the digits.

Example:  $12.45 < 124.5$  and  $12.45 > 1.245$

Create a "Rule Book" for a confused decimal point. In the book, provide guidance to the confused decimal as to where it should move when adding, subtracting, multiplying, and dividing. Include numerical examples, as well as visuals to aid the decimal point.

- Why does the decimal move at all?
- How will the decimal know when it has been moved to the correct place?
- What changes occur in decimal movement when performing the different operations?



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GRADES

6-7

## Movement



### ENGLISH LANGUAGE ARTS

A misplaced modifier (i.e., a word, phrase, or clause that gives additional meaning) can make a sentence confusing. Here is an example of a modifier that has been misplaced: I served cake to the children on paper plates. "On paper plates" was added to the sentence to help us know how the cake was served, but as written, it reads that the children were on the paper plates.

Try moving words in these sentences to make the meaning clearer: 1. He nearly stood in line at the store for four hours. 2. She saw a cat and pigeon on the way to the store. 3. Grandma bought a dog for my sister named Sparky. 4. He threw the ball to the man made of orange rubber.

Now write a sentence with a modifier purposely misplaced to make the sentence humorous. Illustrate it. Share with someone and have them correct it.



### SOCIAL STUDIES

The Silk Road was a network of trade routes that connected Asia to Europe for over seventeen centuries and increased cultural, political, and religious interactions. The Silk Road's most famous traveler was Marco Polo. Read and view these links: Video overview: <https://bit.ly/395XAJr> Silk Road defined: <https://bit.ly/2WuVvBH> Biography of Marco Polo: <https://bit.ly/2OzWex1> Heritage of the Silk Roads: <https://bit.ly/30pq4tJ>

After synthesizing the information, determine what effects this movement had on societies and regions over time. Think in terms of patterns of change and specific effects on particular cultures. Have other movements (e.g., colonization efforts, Triangular Trade, Trail of Tears) of people, ideas, or goods had any of the same effects? Why or why not? Develop a presentation to share with your classmates.



### SCIENCE

When someone mentions a wave, what do you visualize? An ocean wave? A microwave? A wave of light? A sound wave? What do all these waves have in common? Check out this explanation and demo of the difference in longitudinal, transverse, and surface waves: <https://scienceprimer.com/types-of-waves>

Now attempt to find in nature or create examples of each. Think about items that you can use to do this (e.g., rope, slinky, shoestring, water, etc.). Record your observations in a science notebook. Answer the question: what makes a wave a wave? Draw examples of the different kinds of waves. After your activity, follow this link to learn more about waves: <https://www.physicsclassroom.com/class/waves/Lesson-1/What-is-a-Wave>. Take the quiz at the end to check your understanding.



### MINDFULNESS

Place your pencil or other drawing utensil on a blank sheet of paper. Sit quietly and notice your breathing.

Visualize your breath as it moves from your nose and/or mouth. How does it move? Does it move in a straight line or does it curve? Draw the movement on your paper. Play with different lines as you breathe. Are your lines dark and wide or light and thin?

Change your breathing. Breathe faster or slower. How does this change what your drawing looks like? Draw lines on your paper and match your breathing to the lines. Try using different colors. What do the colors mean?

Place your art in a place that will remind you to take to be mindful of your breathing.



## LOGIC PUZZLE

Cori, the camel, is 1000 miles from the market. She has 3000 bananas. She can carry a maximum of 1000 bananas and eats one banana for each mile traveled.

What is the greatest number of bananas Cori can get to the market?

Create a diagram to show your thinking.



## FIELD STUDIES

Imagine that you can travel anywhere that you want in the world- one spot or a series of locations. Use the Internet and/or books available from the library to plan the trip.

Create a spreadsheet to calculate all costs and to keep up with links to important destinations. Consider cost of transportation methods (e.g., plane tickets, luggage fees, rental cars, fuel costs, subway fares, etc.). If there are places you want to visit that require a fee, include that in your spreadsheet. Include links to places you plan to visit or stay. Don't forget to include the cost for food and lodging. Also take into consideration how many people are going on the trip with you. How much will the trip cost in total? How much will it cost per person? After you have finished, share the information with an adult to see if they can review it to see what other expenses you may have missed.



## RESEARCH EXPLORATIONS

The International Space Station (ISS) orbits 250 miles above the Earth with an orbital inclination of 51 degrees, which means the path varies. Research the orbit of the ISS. How often does it travel around the Earth? How does Earth's gravity affect the path? Can you predict its path?

- Follow the directions at the ISS map link to see the shape of the orbit: <https://bit.ly/3jlb6xr>
- For live tracking of the ISS use this site: [https://spotthestation.nasa.gov/tracking\\_map.cfm](https://spotthestation.nasa.gov/tracking_map.cfm)

Plan a time you can see the ISS. Will you be able to spot it from your home? Where is the best place to spot it that is near you?

Create a public service announcement of 140 words or fewer making your friends, family, and neighbors aware of how to spot the ISS and the importance of the ISS.



## MATH

A pilgrim enters the town of Duonai and would like to visit the temple. Unfortunately, the pilgrim is penniless and the town charges a tax depending on the path taken. Moving in different directions can cause the tax to go up or down.

Can you get the pilgrim to the temple without paying any taxes? Watch the video for further details, but be sure to pause it at 1:51 to work out your problem: [https://www.youtube.com/watch?v=6sBB-gRhjE&disable\\_polymer=true](https://www.youtube.com/watch?v=6sBB-gRhjE&disable_polymer=true)

- Were you able to solve the problem mathematically?
- Give the problem to a friend or family member. Can they solve the problem?

Explain your solution to the problem to your friend or family member.



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GRADES

8–9

## Movement



### ENGLISH LANGUAGE ARTS

The Harlem Renaissance was a literary movement during the 1920s based out of the New York City neighborhood of Harlem. During this period, many African Americans who had relocated from the American South during the Great Migration, began to express themselves as poets, novelists, artists, and thinkers.

While Langston Hughes and Zora Neal Hurston are probably the authors most associated with the movement, there were many others. Explore the works of at least one author and one artist of the Harlem Renaissance. Keep in mind that the arts may include visual, musical and performing arts. In your journal make three columns: title, important learning, how does this add to previous learning. After each text or piece of art, stop and think about its "big learning." What did you learn that was new and important about the Harlem Renaissance from this resource? Complete the chart.



### SOCIAL STUDIES

In 1830, the United States passed the Indian Removal Act, which paved the way for President Andrew Jackson to force five nations of Native Americans, including the Cherokee, to move west of the Mississippi River. Along the way, a quarter of the Native Americans died. The Cherokee who ended up in Oklahoma are recognized as the Cherokee Nation, but those who hid out in the NC mountains eventually became recognized as the Eastern Band of the Cherokee. Investigate these links to learn more about the Trail of Tears:

- <https://bit.ly/3fFNWja>
- <http://www.nctrailoftears.org/about-the-trail/>
- <https://bit.ly/2WYkN1T>

After reviewing the links, create a visual that explains how the forced migration known as the Trail of Tears impacted the development of US history and the impact on both the Cherokee who remained and those who were forced to move.



### SCIENCE

What is the difference between an epidemic and a pandemic (*hint: the prefix pan means all*)? How do they relate to an outbreak? Check out this link to learn this and more about disease terminology:

<https://bit.ly/30um3Eb>

Create a chart that lists the terms epidemic, pandemic, endemic, and outbreak. Research to find at least five examples of each.

- Make sure to include the date, the location, and the number of individuals infected.
- How does the concept of movement relate to each one?
- Under the chart, in your own words, explain the difference between an epidemic and a pandemic.



### MINDFULNESS

Mindfulness is the act of being in the moment and to be aware of your surroundings. Take a mindful walk. You should walk at a slow pace and stay quiet.

Pay attention to what you see, hear, feel, and smell. Consider the following questions:

- Is the sun warming your skin?
- Can you hear children playing or birds chirping?
- Can you smell fresh cut grass?
- Can you hear your own breathing or your feet making contact with the ground?

When you return from your walk journal or draw a picture to document your walk. Will you do another mindful walk? Would you plan a mindful walk with a friend or family member?



## LOGIC PUZZLE

Shift your brain into gear with this challenging engineering puzzle! Put your problem-solving skills to the test as you try to determine the movement of multiple cogs and gears.

Try to determine what happens as the monkey turns the gears or check out an online version of the gear puzzle:

<http://www.engineering.com/gamespuzzles/connectit.aspx>



If the monkey rotates the first gear anti clockwise, the hand in last gear move towards 1 or 2?



## FIELD STUDIES

The fight for American civil rights spanned decades, cities, and states. Explore the Civil Rights Trail website - the articles, the photos, the maps- and learn more about the Civil Rights Movement: <https://civilrightstrail.com>

The website is designed to help us plan a visit to these historical sites, but it also can give us insight into how the leadership of the movement and the action of citizens influenced the outcome of key civil rights battles.

Design your own Civil Rights Trail based on at least five sites that interest you. Create a presentation about each site. Be sure to include how leadership and citizen action influenced the outcomes there.

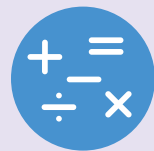


## RESEARCH EXPLORATIONS

Kinesiology is the scientific study of human or non-human body movement. In addition to the neurological system, muscles, bones, tendons, and ligaments are all required to create movement.

Research the movements in the human arm and hand. Design a working model. Several ideas can be found at this site: <https://www.scienceprojects.org/design-and-make-a-model-arm/>

- Take pictures and summarize what happened as you created the model arm.
- What did you use for bones, muscles, ligaments, and tendons?
- What difficulties did you encounter?
- What did you do to solve the problem?
- What would you do differently?



## MATH

Elton Brand was a number one draftpick into the NBA after playing for Duke University. Watch the video to see how he credits math for rapid improvement of his basketball skills: <https://to.pbs.org/3hcc90s>

Can you calculate the maximum height for Brand's perfect free throw? His average release velocity is 24 feet per second while the average release height is seven feet off the ground.

Create a graph that models the movement of Elton's perfect free throw using the Desmos Graphing Calculator. What happens if both height and initial velocity of the free throw is adjusted?

For more insight into how math is used to enhance the game of basketball check out this video: <https://bit.ly/2Cply5l>



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GRADES  
10-12

## Movement



### ENGLISH LANGUAGE ARTS

The annual migration of North America's monarch butterfly is a unique and amazing phenomenon. The monarch is the only butterfly known to make a two-way migration as birds do.

The "Monarch Highway" that runs north-south through America earned its name because of the habitat it provides. What/who are the key players on the highway?

Why do these butterflies migrate to South America? View this link to answer these questions and learn more about the Monarch's journey:

[https://www.fs.fed.us/wildflowers/pollinators/Monarch\\_Butterfly/migration/index.shtml](https://www.fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/migration/index.shtml)

Write a poem about the roles of the pollinators on the Monarch Highway. Include imagery and other examples of figurative language.



### SOCIAL STUDIES

The United States had many reasons for going to war in 1812: Britain's interference with its trade and impressment of its seamen; Americans' desire to move into Indian, British, and Spanish territories; aspirations to conquer Canada and end British influence in North America; and upholding the nation's sovereignty and vindicating its honor. Visit the "1812: A Nation Emerges" online exhibit here: <http://npg.si.edu/exhibit/1812/>

Analyze information about the War of 1812 in order to identify which people, events, terms, and concepts are most important to understanding the era.

Create a multimedia presentation on the War of 1812. Include visual images, list of key terms and people, and links to where your peers can find more information. Be sure your presentation reflects your complete understanding of the era.



### SCIENCE

The carbon cycle is vital to life here on Earth. Nature keeps our carbon levels balanced so our planet remains able to sustain life. By burning fossil fuels, humans have added more carbon to the atmosphere leading to climate change and global warming.

This video uses an animated machine to show how carbon moves around the Earth's surface – from the atmosphere to rocks: <https://www.youtube.com/watch?v=IWEvBLIUa2E&app=desktop>

Write a skit or journal entry from the point of view of a carbon atom. Tell about your journey over thousands of years on planet Earth. Include a monologue about why it is important for humans to respect and look after you.



### MINDFULNESS

Participating in physical activity is an important health maintenance strategy for people of all ages. According to the Mayo Clinic, "Exercise delivers oxygen and nutrients to your tissues and helps your cardiovascular system work more efficiently." Physical activity can be so much more than walking or running. This link provides many ways to move and become healthier: <https://www.healthlinkbc.ca/health-topics/aa165656>

Create a Personal Exercise Plan (PEP). Make sure your plan includes a variety of different types of exercise to keep you active a minimum of 30 minutes 5 days a week. After one month, analyze the benefits of your PEP. How do you feel - mentally and physically? Create a list of differences that you can see and feel.



## LOGIC PUZZLE

Plumbing can be traced back to 3,000 B.C. when the Indus River Valley civilization used earthen plumbing pipes to provide moving water. How much water is moved in our pipes today?

Use the following clues to solve the puzzle:

- The cold faucet in my bath lets the water in at the rate of 15 liters per minute.
- The hot faucet fills the bath at the rate of 10 liters per minute.
- The plug hole lets the water out of the bath at the rate of 12 liters per minute.
- The bath holds a maximum of 520 liters.
- I turn both faucets on, but forget to put the plug in.

How many minutes does it take for the bath to overflow?



## FIELD STUDIES

The ocean never stands still. Even in a quiet marina, you can see the water is slowly moving. What causes the coral to wave or the anemone to sway? Ocean currents.

Travel under the sea to learn more about currents, gravitational pull, and tides: <https://oceanservice.noaa.gov/podcast/apr14/mw123-currents.html>

What are some questions you still have about the movement of the ocean? Analyze what would happen to sea life if the ocean was stagnant.

Create an ocean scene that depicts the movements of the ocean.



## RESEARCH EXPLORATIONS

*"Nothing happens until something moves"*  
- Albert Einstein

From Volcanologists to Solar Physicists, there are careers in air and space that people don't know exist. Whether it is the movement of human invention or the explosion of a supernova light years away, many careers revolve around this concept.

Research careers in aviation and space using this link: <https://airandspace.si.edu/highlighted-topics/careers>

Create a visual representation of 10 careers that interest you and relate to air and space. What steps do you need to take now to ensure your future success within this field? What courses should you take at your high school, what research opportunities can you do now to explore the career you are interested in.



## MATH

Vehicles have kinetic energy (KE); as you increase your vehicle's speed, the KE increases. The greater the KE ( $KE = 0.5 \times mv^2$ ), the greater the effort required to stop. KE increases exponentially; if you double your vehicle's speed, your vehicle's KE increases by four times, therefore, stopping distance will be multiplied by four.

If you are traveling 60 mph your stopping distance is 180 feet. What is your stopping distance at 65 mph? 75 mph? How does the mass of a vehicle relate to the stopping distance?

Pick 5 vehicles and determine the KE of each when traveling at the same speed. Rank these from most safe to least - be sure to justify your order. What would you consider if you choose to buy the least safe car? What car would you recommend for an inexperienced driver and why?



North Carolina Department of  
**PUBLIC INSTRUCTION**



## Movement Reference Guide

### **K-1 Logic Puzzle:**

Solution: Pick up the 2nd glass and pour its contents into the 5th class and set it back down in its place empty.

### **6-7 Logic Puzzle:**

Solution example:

1. Start trip with 1000 bananas
2. Travel 200 miles and have 800 left. Leave 600 at 200 mile point, keep 200 for 200 mile trip back to start.
3. Pick up another 1000 bananas
4. Travel 200 miles and have 800 left. Pick up 200 from stashed and carry 1000 and have 400 more stashed.
5. Travel an additional  $333\frac{1}{3}$  miles, you're left with  $666\frac{2}{3}$ , stash  $333\frac{1}{3}$  there ( $533\frac{1}{3}$  mile point), you have  $333\frac{1}{3}$  left
6. Travel back  $333\frac{1}{3}$  miles to 200 mile point and pick up 200 stashed (leaving 200 still at 200 mile point), go back the other 200 miles.
7. Pick up another 1000
8. Travel to 200 mile point, leaving 800 bananas, pick up remaining 200 stashed
9. Pick up 1000 bananas travel  $333\frac{1}{3}$  miles to  $533\frac{1}{3}$  mile point, you're left with  $666\frac{2}{3}$  bananas.
10. Pick up all  $333\frac{1}{3}$  that were stashed
11. You are back at 10
12. Make remaining  $466\frac{2}{3}$  mile trip,

$1000 - 466\frac{2}{3} = 533\frac{1}{3}$  bananas left at the end.

### **10-12 Logic Puzzle:**

Solution: 40 minutes <https://www.mathsisfun.com/puzzles/baffling-bath-water-solution.html>

# ADVANCED LEARNING LABS

Collaboration between NC Department of Public Instruction and AIG Teachers across the state  
TO ENGAGE, ACTIVATE, AND GROW OUR STUDENTS

GRADES  
**K-12**

## Movement NC Standards Alignment

Grade Span	English/ Language Arts	Social Studies	Science	Math
<b>K-1</b>	L.1.5	K.G.1.3 K.G.1.2 1.G.1.3 K.G.2.2 K.G.2.2 1.G.1.2	1.P.1.2 1.P.1.3	NC.1.G.1
<b>2-3</b>	RL.3.3	3.G.1.4 3.G.1.3	3.P.1.1	NC.3.NBT.2
<b>4-5</b>	SL.5.4	5.C.1.3 5.B.1.2	4.L.2.2	NC.5.NBT.1
<b>6-7</b>	6-8 Grammar Skill	6.G.1.2 6.E.1.1	6.P.1	NC.6.NS.5 NC.6.NS.6
<b>8-9</b>	RL.9-10.10	8.H.3.1 8.G.1.4	8.L.1.2	NC.M1.F-IF.7 NC.M2.-CED.2 NC.M2.-CED.3 NC.M2.A-REI.1
<b>10-12</b>	W.9-10.2	AH1.H.6.2	EEn.2.5.5	NC.M1.A-REI.1