

# 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

## Structure



### ENGLISH LANGUAGE ARTS

Did you know that buildings and stories have a lot in common? They both have different structures within that hold them together and contribute to their unique shape or characteristics. All stories have some of the same elements in their structure: characters, setting, and the plot or major events.

Think of one of your favorite stories and change an element in the structure. Change a character, the setting, or a major event.

Rewrite the story. Use key details to describe the characters, settings, and events.

- What makes your new version interesting?
- Which version do you think your friends would like the most?
- How did the change you made to the structure impact the meaning of the story?



### SOCIAL STUDIES

Rules, routines, and procedures provide a structure for our schools, communities, state and nation by defining the rights and responsibilities of the individual members. Think about the roles that authority figures play in maintaining structures.

Create a list of rules, routines, or procedures that you know. Who is responsible for enforcing them?

Interview someone about their role in helping to maintain structure. It might be a parent, a teacher, or someone else you know that maintains structure by monitoring processes that are in place. It might be a doctor, a policeman, or a principal.

- What did you learn from the conversation?
- How do authority figures help provide structure in society?



### SCIENCE

Earth is made of different structural materials such as rocks, minerals, soil, and ice. Soils from various places have different structural composition.

1. Find two separate places to dig up a small cup of soil. Place the soil from each cup on a piece of white paper.
2. Make observations and answer the following questions in your science notebook. Use words and diagrams.
  - What do you see in the soil?
  - How would you describe its color? Texture?
  - Which soil do you think is better for growing plants? Why?

Try this experiment: Grow a seed in each soil. Use the same amount of light and water. Record the daily growth in your science notebook. Which soil was better for your plant to grow?



### MINDFULNESS

Mindful transitions can provide a peaceful flow to the structure of your day. Our days typically begin by waking up and getting out of bed. What comes next for you, maybe brushing your teeth? What other activities make up your day? Eating breakfast? Chores? Exercise? Playtime?

Choose a day to practice a technique called STOP, which stands for: Stop, Take a Breath, Observe, Proceed. Use the STOP technique as you transition from one activity to another.

After practicing using STOP throughout the day, think about the following questions:

- How was the day different from a day when you don't use the STOP technique?
- What are the benefits of using the STOP technique throughout the day?

# Structure



## LOGIC PUZZLE

Four students each choose a number between 1 and 100. The numbers are fifty-six, ninety, forty-three, and twelve.

Use the clues below to determine which student chose which number:

- Kayla's number comes before 98 and after 20.
- Matt's number has a 4 in the tens spot and a three in the ones spot.
- Maria's number is the only number where the digit in the tens place is smaller than the digit in the ones place.
- The biggest number is Theo's. Which student picked which number?

*Hint: With this type of problem, it is helpful to read all the clues before attempting to solve it.*



## FIELD STUDIES

Engineers are people who use scientific thinking to design, construct, and maintain structures, engines, and machines.

Watch this video to learn about different kinds of engineers:

<https://www.youtube.com/watch?v=owHF9iLyxic>

- Which kind of engineering interests you the most? Why?
- What would you need to study and learn to become that kind of engineer?

Challenge: As you go about your day, make a list of all the things you see and use that engineers help create. Which kind of engineer helped create each item on your list?



## RESEARCH EXPLORATIONS

Design is very important in building structures.

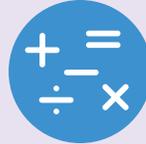
Watch this video to explore how basic shapes are in designs all around us:

<https://thekidshouldseethis.com/post/81593316828>

Design and build the tallest structure you can using only 20 strands of dry spaghetti and masking tape. Your structure must be built within 10 minutes, so be sure to plan your design first. Think about the design of your structure before you start building.

When 10 minutes has lapsed, measure the height of your structure.

Adjust your design to reach a taller height and try again. Challenge your family members to a competition. Who can build the tallest structure in 10 minutes?



## MATH

Place value provides a structure for creating numbers. It helps you understand the meaning of the number. Place value is also needed to understand number order. Because of place value many numbers with only 10 digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 can be created.

Answer the following questions thinking about place value as a structure:

- Add the number 16 and 7. What is your answer? How does the structure of place value help you add these numbers?
- Is it easier or harder to add 2-digit numbers when there is a zero in the ones place? Why?
- What is the largest 4-digit number you can create?
- What is the smallest 4-digit number? How did you figure this out?

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GRADES

2-3

## Structure



### ENGLISH LANGUAGE ARTS

Stories, dramas and poems all have different structural elements that writers choose purposefully, as each successive part builds on earlier sections to provide meaning.

Choose a story, drama/play or poem that you enjoy (an old favorite would be best). Break it down into the important elements or moments found in the various chapters, scenes or stanzas. Write each important moment on a block, paper cup, index card, or playing card. Build the structure of the story, drama or poem by stacking the chapters, scenes or stanzas in their original order.

Now create a different structure entirely, stacking the chapters, scenes or stanzas in new ways. How does this impact the progression of the story? The meaning? Which structure do you prefer? Why?



### SOCIAL STUDIES

Locations of regions and natural resources help to structure the economic development of an area. Water, land formations, soil, climate and location are important "calling cards" that attract different businesses to an area. Research environmental impact using these links:

- <https://bit.ly/3hjvw8A>
- <https://wonderopolis.org/wonder/how-does-earths-surface-affect-culture>

Become a business scout and research businesses influenced by water, land formations, soil, climate and location in NC. Create "business calling cards" to recommend areas based on what you discover. For example: "Have a business whose interests are camping, kayaking and other water sports? Come to the Dan River in Danbury, NC, the foothills of the Blue Ridge Mountains. Acquire the business of adventures on land or water!" Share the calling cards with friends and family.



### SCIENCE

How do the parts of the ear work together to process sound? How are the structures and functions of the outer, middle, and inner ear different? Read more about the structure of the ear:

- <https://www.britannica.com/science/ear>
- <https://www.stanfordchildrens.org/en/topic/default?id=anatomy-and-physiology-of-the-ear-90-P02025>

When certain parts of the ear's structure are damaged, hearing loss can occur. Cochlear implants can be an option for people with severe hearing loss.

What structures of the ear work with a cochlear implant to help people hear? Read more about cochlear implants on the following website:

<https://www.mayoclinic.org/tests-procedures/cochlear-implants/about/pac-20385021>

Share the information you have learned with a family member, and test your own hearing at the website below: <https://www.hear-it.org/Online-Hearing-Test>



### MINDFULNESS

Did you know that mindfulness is so powerful that it can change the structure of your brain?

Read the following article:

<https://blissfulkids.com/mindfulness-and-the-brain/>.

What are ways that mindfulness impacts the structure of the brain? What impact can this have on people's actions and choices?

The author of the article creates "alter-egos" for various parts of the brain to help explain their purpose. Create a comic strip with these characters in action during a time of stress, from the perspective of someone who does not practice mindfulness and the perspective of someone who does practice mindfulness regularly.

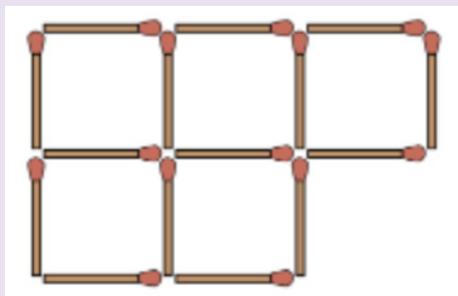
Use the two comic strips to teach a friend or family member about how mindfulness impacts the structure of the brain and our responses.

# Structure



## LOGIC PUZZLE

Remove matches to solve a, b, and c:



- Remove 3 sticks to leave 3 squares.
- Remove 3 sticks to leave 5 squares.
- Remove 5 sticks to leave 2 squares.



## FIELD STUDIES

Architecture is the art or practice of planning, designing and constructing buildings or other structures. Frank Lloyd Wright is a famous American architect. Take a virtual tour of at least three of Wright's famous buildings and structures at this website: <https://savewright.org/news/public-wright-sites-swap-virtual-visits/>

As you tour the buildings, take notes on structural elements you observe, such as columns, beams, tension, connections, etc. as well as location, materials, style, colors. Create a list of similar elements you notice in the structures.

Channel your inner Frank Lloyd Wright and design a structure inspired by his architectural style.



## RESEARCH EXPLORATIONS

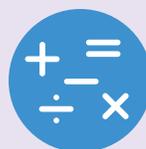
Learning through play is important in a child's early development. One popular toy for learning through play is LEGO. The name LEGO comes from abbreviating two Danish words, "leg godt," which mean "play well." Most people build small structures with LEGO and learn how the fit and design affects the stability of the structure they have created. Building and rebuilding through trial and error creates a structure that can stand on its own. There are some, LEGO structures however, that go beyond everyday play.

Use the link below and research some of the biggest structures made with LEGO. One man even made a whole house! Try the 30-Day LEGO Challenge at the link below and build a different LEGO structure each day:

Research LEGO Structures:

<https://bestlifeonline.com/lego-structures/>

LEGO Challenges: <https://thatbricklife.com/wp-content/uploads/2020/03/LEGO30daysofplay.pdf>



## MATH

Math problems with words are called "Story Problems." But what would you call a math problem that is told through silent video?

Graham Fletcher uses a unique structure to pose his math story problems. He calls them "3 Act Tasks" Take a look at the task, Dill 'er Up here: <https://gfletchy.com/dill-er-up/>

It takes 7 1/2 seconds to fill the small jar, but how long will it take to fill up all four? How could you break apart the size, or add up sizes multiple times to find the answer? Did you get the same answer shown in the video? Why or why not?

Is it possible to have more than one right answer? Why or why not?



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GRADES

4-5

## Structure



### ENGLISH LANGUAGE ARTS

The structure of stories, dramas and poems are chosen purposefully by the writer, as each successive part builds on previous sections and provides meaning.

Choose an important moment from a chapter of a book you've already read or are currently reading. A moment of action or dialogue would work best. Transform the moment into a poem or scene in a drama. Include the following in your dramatic scene: setting description, cast of characters involved, script of dialogue and stage directions. Your poem should include the following: title, verses, stanzas, rhythm and meter.

After completing your dramatic scene or poem, compare it to the actual moment from the book. How effective was the structure you chose in terms of capturing the moment?



### SOCIAL STUDIES

Research the areas that were first settled in the "New World" and the dwelling structures that were built by indigenous people and the European settlers.

- How were the structures influenced by the physical environment?
- How did the physical environment impact the location, design and materials used in the creation of the structures?

Compare and contrast the structures built by indigenous peoples and the colonists using the information provided on the following websites:

- <http://nationalhumanitiescenter.org/pds/amerbegin/settlement/settlement.htm>
- <https://bit.ly/3hg6o2a>
- <http://www.native-languages.org/houses.htm>

Examine the physical environment where you live and design a dwelling structure that utilizes the natural resources available in your area.



### SCIENCE

Through the years, the structure and engineering of the refrigerator has changed. Research the "history of the refrigerator" on the following website:

<http://www.historyofrefrigeration.com/>. Ask older family members what it was like to have a refrigerator in their home for the first time.

What improvements do refrigerators have now compared to ones they had in the past?

Try creating your own mini refrigerator. What materials will you need to keep cold in and heat out? How will the structure of your refrigerator mimic those of the past and present? How long does your refrigerator keep its temperature?

Use the information from the following websites for guidance on how to create your own mini refrigerator:

DIY Mini Fridge: [https://youtu.be/l4bo\\_aACbmY](https://youtu.be/l4bo_aACbmY)

DIY Mini Fridge with electricity:  
<https://youtu.be/8DYSj3cHyIU>



### MINDFULNESS

One way to make sure our brain has time to rest and recharge is to incorporate mindful moments into the structure of our day.

Create an organizational plan to structure mindfulness into your daily routine or schedule. Consider times during your day when practicing mindfulness techniques would be the most beneficial.

Read more about scheduling mindfulness techniques here:

<https://www.therapistaid.com/worksheets/family-mindfulness-schedule.pdf>

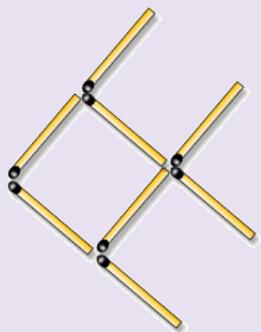
After creating your mindfulness organizational plan ask a family member or friend to join you in your daily practice of these techniques. Reflect with each other to determine if your approach is effective and if any adjustments or additions are needed to positively impact the structure.

# Structure



## LOGIC PUZZLE

Swimming Fish



Turn the fish around by moving only 3 matches, without overlapping.

Then try and turn the fish by moving only 2 matches, without overlapping.



## FIELD STUDIES

Architecture is the art or practice of planning, designing and constructing buildings or other structures. There are many famous architects throughout the world.

Take a virtual tour of at least three architecturally famous buildings or structures on the following website:

<https://brightnomad.net/virtual-travel-architecture/>

As you tour the buildings, take notes on structural elements you observe, such as columns, beams, tension, connections, etc., as well as location, materials, style, and colors. Compare and contrast the different styles. Choose your favorite structure and research the architectural elements that make it interesting or memorable.

Using your research, design a structure inspired by an architectural style you most enjoy.



## RESEARCH EXPLORATIONS

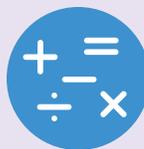
Primates' body structures have evolved to adapt to their environment and needs over time. One structural adaptation is the opposable thumb.

Humans are not the only ones to have a thumb. Chimpanzees, gorillas, some frogs, and many birds have opposable thumbs. For more information, visit:

<https://www.amnh.org/exhibitions/permanent/gems-minerals>

What if humans didn't have opposable thumbs? How would our daily lives be different? Consider how animals without thumbs eat, drink, and perform other necessary functions?

Try taping each of your thumbs down to the palm of your hand, then go about your normal daily activities. How well did you function? What adaptation would you need to function as efficiently as you do with thumbs?



## MATH

Graham Fletcher uses a unique structure to pose his math story problems, called "3 ActTasks."

- Act 1- introduces the "story" with a short video. Estimation.
- Act 2- provides information to help you solve the problem through pictures
- Act 3- shows a final video that helps to compare my answer.

Solve the problem of the Fish Tank at the website below: <https://gfletchy.com/the-fish-tank/>

Plan a "3 ActTask" of your own. For your plan, consider the following questions: What is the problem you want your audience to solve? What pieces of information will be provided, and what parts will the solver need to figure out? Include props to show the story. Share with others to see if they can solve it!

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GRADES

6-7

## Structure



### ENGLISH LANGUAGE ARTS

In 1865, the American author Samuel Clemens, under his pen name Mark Twain, published the short story "Jim Smiley and His Jumping Frog," which became his first success as a writer. One of the features that make this story so fascinating is how Twain structured the story.

Follow the link to read the story, which is also called "The Celebrated Jumping Frog of Calaveras County:"  
<https://twain.lib.virginia.edu/projects/price/frog.htm>

Create a diagram of the text's plot structure and annotate the diagram. How does the structure contribute to its meaning?

If the author had used a more linear structure, how would its meaning change?



### SOCIAL STUDIES

In 1776, when the United States was formed, its Founders relied heavily on past democracies to structure the government for this new nation.

Using the links provided, and other available sources, compare the structure of the U.S. government with the structure of the government of Ancient Greece.

- Under each government, who was considered a citizen?
- What obligations did citizens have in each structure?
- How were decisions made in each?

<https://www.nationalgeographic.org/encyclopedia/democracy-ancient-greece/>

<https://bit.ly/2CUnJPu>

Present the information you have collected about the structures of these governments in a visual representation of your choice.



### SCIENCE

The first skyscrapers were built in the late 1800s using structural steel, but how is it made? The process produces a mixture of iron and carbon fused together with one or more other metals or nonmetals to create a substance that is 1000 times stronger than the element iron.

Read about the different chemical compositions of structural steel today to determine how different elements impact the structure of the new mixture, steel on the website below:

<http://web.mit.edu/1.51/www/pdf/chemical.pdf>

Create a simple chart that lists each element that can be added to iron to produce steel. Include their physical properties, and the benefits of its use.



### MINDFULNESS

According to brain imaging research, practicing mindfulness can alter brain structure that improves reaction to stress. Thickening of the cerebral cortex, which is responsible for perception and reasoning, and blood flow to the brain are both physical changes that occur.

Read more about the impact of mindfulness on the structure of the brain at the following website:

<https://mindworks.org/blog/how-meditation-changes-the-brain/>

Your school is considering implementing mindfulness lessons. Create an infographic to inform school administrators about the benefits of learning mindfulness strategies.

Consider using the link below on Piktocharts to help create the infographic: <https://piktochart.com/blog/how-to-create-an-infographic-and-other-visual-projects-in-5-minutes/>

# Structure



## LOGIC PUZZLE

The Wheel of Math has twelve sections. Ten sections contain a different number from 1 to 10 and two sections contain stars. From the clues below, determine what is in each section of the wheel.

1. The five even numbers appear in order counterclockwise but not necessarily in consecutive sections.
2. The numbers 1 and 3 are adjacent to the section that is directly opposite from the number 2. The number 7 is directly between two sections with numbers totaling seven.
3. Two numbers are adjacent to, in a clockwise direction, their respective square roots (if the number is in one section, you go clockwise to get its square root).
4. No two adjacent sections have numbers totaling more than twelve.



## FIELD STUDIES

The United States Geological Survey (USGS) was created by Congress in 1879 to study and monitor all public lands, minerals, and resources in the country. With approximately 10,000 scientists and other staff, the USGS is structured around four areas of science: biology, geography, geology, and hydrology.

For an overview of how the USGS is structured, read the National Geographic article at this website: <https://www.nationalgeographic.org/encyclopedia/united-states-geological-survey/>

Learn more about the USGS at this website: <https://www.usgs.gov/>

As you read about the many different career opportunities with the USGS, choose one or two that you would like to explore further. Research the career(s) and determine educational requirements needed for that specific job(s).

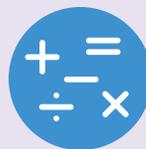


## RESEARCH EXPLORATIONS

Foundation type can determine the ability of a structure to withstand different kinds of loads. Use playdough or clay to create a foundation for toothpicks that will support a stack of books.

1. Flatten the clay to a depth of 1 cm.
2. Stand 10 toothpicks vertically in the clay.
3. Place a book on top of the toothpicks, then place some type of weight such as coins or metal washers on top.

How much weight did the structure hold? Now repeat the steps but make the clay 2 cm deep. What did you observe? What could you do to make your structure more stable?



## MATH

The structure of a math expression can help us better understand the meaning of the expression. The expression  $x + 0.6x$  is equivalent to  $1.6x$ . The first expression is structured to show that 60% of a number is being added back to the original number. Create a problem using taxes that might be better understood by using the first expression.

The structure of the expression  $3(r+t) - \frac{1}{2}(r+t) - 2.5(r+t)$  allowed Jenna to quickly determine that the expression is equivalent to zero.

- Is Jenna correct?
- How did the structure of the expression help Jenna?
- Can you write some expressions that are equivalent, but would not help Jenna?



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GRADES

8-9

## Structure



### ENGLISH LANGUAGE ARTS

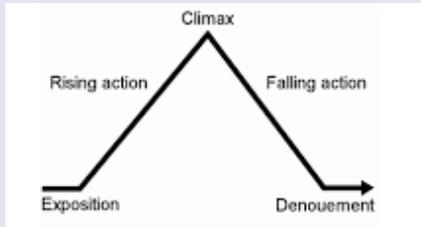
This illustration outlines the traditional plot structure for a story:

Some authors, however, choose to structure a story differently

by sequencing events in a non-linear format or by manipulating time to create effects such as mystery, tension, or surprise.

On the website below, read William Faulkner's short story "A Rose for Emily" several times and analyze the plot structure: <http://www.cje.ids.czest.pl/biblioteka/7117936-A-Rose-for-Emily.pdf>

Create a diagram that illustrates the plot structure and label the parts of the plot. In a paragraph, explain the effect the author's choice of sequencing has on the reader.



### SOCIAL STUDIES

A common phrase that is sometimes heard in movies is: "I will sue you!" What exactly does that mean in terms of how this might be addressed in the courts? In the United States, the judicial system is structured with separate criminal and civil courts, while in many countries these courts are combined.

Follow the link to the American Bar Association's How Court Works website and explore the topics on that page to analyze the structure of these two different courts: <https://bit.ly/2OIUmSC>

- What is the purpose of each court?
- How is each structured?
- What similarities and differences are there between the two systems?
- What are the advantages and disadvantages of having separate systems?

Use a format of your choice to present your analysis of the U.S. civil and criminal court systems.



### SCIENCE

The water crisis in Flint, Michigan began in 2014 when the city switched its drinking water supply as a cost-saving measure. Inadequate treatment and testing of the water led to water quality and health issues for the families that live in Flint.

In NC, many residents get their water from a community water system. Each community water system that provides year-round service to more than 15 households or more than 25 people, must make a water quality report available to customers by July 1 each year. Learn how a water quality report is structured and how to read it at this website:

<https://www.epa.gov/ground-water-and-drinking-water/drinking-water-data-and-reports>

Find two water quality reports online, including one from your community. Compare the water quality of the two communities. Structure the information in the form of an infographic so it is easily understood. Share with friends and family.



### MINDFULNESS

During 2020 and 2021, the structures or routines in our everyday lives changed dramatically. Getting up, going to school, and eating dinner with family are a few examples of structures that help keep our lives 'normal.' As you reflect on the time spent in distance learning, which structures did you miss the most? What new structures did you develop?

Use the link below and other internet resources to explore tips for successful distance learning:

<https://bit.ly/3ebTdx>

Create an infographic you can give other teens who might be struggling due to the lack of structure while in distance learning. The link below provides guidance on how to construct an infographic:

<https://piktochart.com/formats/infographics/>

# Structure



## LOGIC PUZZLE

Looking at the structure of a sequence helps us determine the pattern.

What number is missing from this sequence? Explain the pattern.

1, 3, 4, 3, 9, 5, 16, 4, 25, , 36, 3



## FIELD STUDIES

North Carolina has 100 counties. Each of these has its own county seat, which is considered the governmental center of the county. Some states, however, are not structured into counties. Do other countries have counties?

Read this article and learn how local governments are structured in other states and nations: <https://www.nationalgeographic.org/encyclopedia/county/>

After reading the article, research at least ten states and ten countries to discover how their local units of government are structured. Share this information with others in the format of your choice.



## RESEARCH EXPLORATIONS

The structure of our atmosphere consists of four main layers: troposphere, stratosphere, mesosphere and thermosphere. These layers are based on the range of temperatures within them. Learn more about the layers of Earth's atmosphere here:

<https://scied.ucar.edu/learning-zone/atmosphere/layers-earths-atmosphere>

Scientists launch balloons that collect data to learn more about the different layers of the atmosphere. Use the virtual ballooning tool on the website below to collect data about altitude, temperature, and air pressure: <https://scied.ucar.edu/virtual-ballooning>

Create a chart showing the layers of the atmosphere and a description of each layer. The chart should include the change in temperature and air pressure as the altitude changes for each layer.



## MATH

The Gateway Arch is a 630-foot monument in St. Louis, Missouri, United States. Read more about the Gateway Arch here: <https://www.gatewayarch.com/>

The Gateway Arch's curve is represented by the equation:  $H = -0.00635x^2 + 4.005x - 0.07875$ , where H is the height of the arch and x is the distance from one of the bases.

- Where would you stand if you wanted to stand under the highest part of the arch?
- How far would you be from the base?

You and your friend want to stand where the height of the arch is 10 feet. If you stand in two different spots, what is the distance between you and your friend? Explain your answer.

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GRADES  
10-12

## Structure



### ENGLISH LANGUAGE ARTS

In poetry, messages or meaning are communicated through the structure and the literary devices used in the poem. William Shakespeare's "Sonnet 18" begins with a comparison that leads to a conclusion; however, many sonnets are structured as problem/solution or question/answer.

On the link below, read Shakespeare's "Sonnet 18:"  
<https://www.poetryfoundation.org/poems/45087/sonnet-18-shall-i-compare-thee-to-a-summers-day>

- How does the structure communicate the poem's overall message?
- How is the structure - 3 quatrains and a rhyming couplet - important to theme development?

Write your own sonnet with a problem/solution structure, ensuring your points are clear, convincing, and engaging.



### SOCIAL STUDIES

When the Founding Fathers wrote and ratified the Constitution, they were careful to ensure that the government did not abuse its power. The Founders separated powers among three branches of government: the legislative (law-making), the executive (law-enforcing), and the judicial (law-interpreting) branches.

Take a tour of the Constitution Center website below and learn how the Founding Fathers divided our branches: <https://constitutioncenter.org/learn/hall-pass/separation-of-powers>

- What are the powers that each branch holds?
- How are checks and balances used to control power among the branches?

Create a graphic organizer that illustrates how the three branches keep the balance of power in check.



### SCIENCE

Did you realize a concrete driveway can shift and move based on temperature? More impressively, so can a bridge! Many structures we consider static have a dynamic nature.

What is the impact of thermal expansion on a stationary structure? Why is it important that civil engineers build structures to accommodate this sort of expansion?

Watch the video on the website below to see how civil engineers have tackled this issue:  
<https://www.youtube.com/watch?v=pH7VfJDq7f4>

Create a visual to explain thermal expansion. Consider a comic strip, a diagram, or even a video for others to view.



### MINDFULNESS

It is important to stay healthy mentally and physically. A structured day can help ease many of the stressors we all experience. Evaluate the way you structure your day, by reading the Tips for Success found in the article "Creating Healthy Routines" from the Mental Health America website below:

<https://mhanational.org/sites/default/files/Handout%20-%20Creating%20Healthy%20Routines.pdf>

Create a healthy routine to implement each day for two weeks. Then ask yourself these questions:

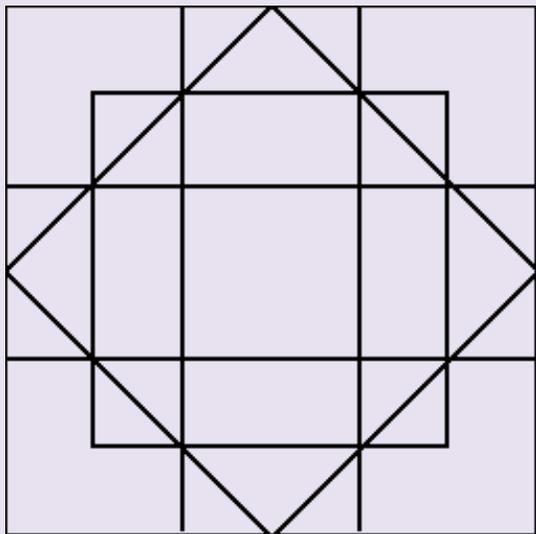
- Were you able to stick with your healthy routine? How did you feel?
- If not, what prevented you from accomplishing your goals?
- How can you address the barriers?

# Structure



## LOGIC PUZZLE

The diagram below shows a pattern made of squares. How many squares can be found in the pattern?



## FIELD STUDIES

The broad field of engineering encompasses an array of rewarding opportunities. Most engineers focus on a specialization, such as civil, aerospace or mechanical engineering. Regardless of the specialization, engineers are in demand in a variety of fields.

Are you interested in engineering? Take this quiz to determine what type of engineering might fit your personality: <https://spacefem.com/quizzes/engineer/>

What did the quiz results indicate about the branch of engineering that is best suited for your personality? Do you agree with this?

Research this field to determine specific jobs associated with this branch of engineering.

Find colleges that offer a degree in this field of engineering. Use this site to help with your search: <https://bigfuture.collegeboard.org>



## RESEARCH EXPLORATIONS

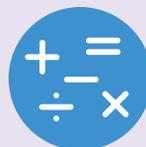
The Chunnel is a railway that lies underneath the choppy waters of the English Channel. It connects the island of Great Britain with mainland France. Completed in 1994, it is considered one of the world's most amazing engineering structures of the 20th century.

Watch the video at the link below and learn how this was accomplished:

- Consider the benefits of Great Britain being connected to mainland Europe.
- What are some potential negative impacts?
- Name additional locations where a similar structure would be beneficial.

<https://www.youtube.com/watch?v=qNS2jj2w-GI>

One of the most difficult tasks during this project was making sure that each side met in the middle. Create a skit describing how a conversation between Great Britain and France would have occurred, answering the questions above, and ensuring the tunnel would join in the center.



## MATH

Describe each of the following as a simple geometric shape or combination of shapes. Illustrate by sketching and labeling the dimensions that are important in describing the shape.

1. Pear
2. Thumb tack
3. Water bottle label
4. A shoe box

As an extension, find at least four shapes in the real world to sketch and label.



# 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

## Structure Reference Guide

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

Solution: Kayla 56, Matt 43, Maria 12, Theo 90

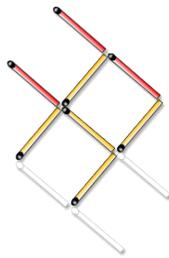
### **2-3 Logic Puzzle:**

Watch the video for a solution:

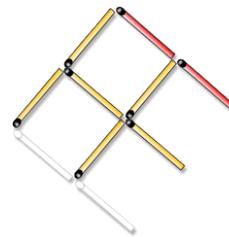
<https://mindyourdecisions.com/blog/2018/08/27/can-you-solve-these-matchstick-puzzles/>

### **4-5 Logic Puzzle:**

Turn the fish with 3 matches:

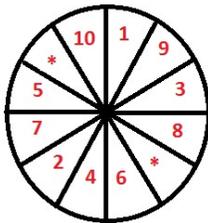


Turn the fish with 2 matches:



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

Solution:



WHEEL OF MATH

### **8-9 Science:**

Infographic Resource link:

<https://piktochart.com/blog/how-to-create-an-infographic-and-other-visual-projects-in-5-minutes/>

### **8-9 Logic Puzzle:**

Solution: 4

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

Solution: 24

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## STRUCTURE

### NC STANDARDS ALIGNMENT

Grade Span	English/ Language Arts	Social Studies	Science	Math
<b>K-1</b>	RL.1.3	K.C&G.1.1 1.C&G.1.4	1.E.2.2	NC.1.NBT.3 NC.1.NBT.4
<b>2-3</b>	RL.3.5	3.E.1.2	3.L.2.2	NC.3.OA.8
<b>4-5</b>	L.5.5	5.G.1.1 5.G.1.4	5.P.3.2	NC.4.OA.1
<b>6-7</b>	RL.7.5	6.C&G.1.1	6.P.2	NC.6.EE.2 NC.6.EE.3 NC.6.EE.4 NC.7.EE.2 NC.7.EE.3
<b>8-9</b>	RL.9-10.5	CL.C&G.4.1	8.E.1.4	NC.M1.A-CED.2
<b>10-12</b>	RI.11-12.5	FP.C&G.1	PSc.3.1	NC.M3.G-MG.1

