

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

Interactions



ENGLISH LANGUAGE ARTS

Picture books combine illustrations and words to tell a story. Interactions between the words and the pictures are important to our understanding of the story.

Choose your favorite or a new to you picture book. Read it!

- If there were no pictures, how would that change the story?
- If there were no words, how would that change the story?
- How do the illustrations and words interact to make the story more interesting?

Challenge: Create your own picture book; use words and illustrations to tell your story.



SOCIAL STUDIES

How do people interact with the environment? Choose two places in North Carolina from the "360cities" website: <https://bit.ly/3fGAxY1>

Examine the pictures of the places you selected. Consider how these places have been impacted by people.

- What do you see in the pictures that is natural?
- What do you see that is man-made?
- How do people help and harm the environment?

Consider your own neighborhood. Draw a picture or make a list of ways people interact with the environment where you live. Some examples are planting, cutting trees, constructing buildings, and feeding birds.



SCIENCE

How do substances interact? Ask your parents to help you with the activity to explore this question.

1. Collect two empty plastic water bottles. Fill one with $\frac{1}{4}$ cup water. Fill the other with $\frac{1}{4}$ cup vinegar.
2. Gather two balloons. Put two tablespoons of baking soda into one and two tablespoons of sugar into the other.
3. Carefully attach the balloons around the mouth of each bottle - baking soda with vinegar, sugar with water. Don't let the baking soda or sugar drop into the liquids, yet.
4. Make a prediction about what will happen when you lift the balloons to pour out the contents.
5. Lift the balloons so the baking soda and sugar drop into the liquids.
6. Record your observations in your science notebook.

Use your senses to describe the properties of each substance: water, vinegar, sugar, and baking soda.

Which interaction caused a chemical reaction?



MINDFULNESS

How do your senses help you interact with your environment?

Take a walk in your backyard or neighborhood. Use your senses to help you explore.

- What do you see?
- What do you hear?
- What do you smell?
- How does the ground feel beneath your feet?

When you return inside, draw a picture or write in a journal about your walk. Show how your senses helped you interact with the things you encountered. How does your body feel after your walk?

Interactions



LOGIC PUZZLE

Even numbers can be divided into two equal groups. Odd numbers have one left over. For example, can 5 be split into equal groups? No, it cannot. This means 5 is an odd number! Which numbers between 1 and 10 are even? Which are odd?

After you have determined which numbers are odd and which are even, think about how they interact.

- If all the odd numbers are silly and all the even numbers are serious, will an odd number plus an even number be silly or serious?
- What happens when you have an even plus an even?
- What happens when you have an odd plus an odd?
- What big statement can you make about how odd and even numbers interact?



FIELD STUDIES

Humans interact with animals in many ways. How do people interact with their pets? One type of special relationship a dog can have with a human is as a service animal. Watch this video to learn about service animals: <https://www.youtube.com/watch?v=aXTX88WKHaE>

- What is something you learned in this video?
- What do you wonder about after watching it?
- Why are service animals important in our world?
- How can interactions between humans and animals affect humans?
- How can interactions between humans and animals affect animals?

Design a cause and effect chart that illustrates the interactions between animals and humans. Use illustrations and words. Share and discuss your chart with a friend or family member.

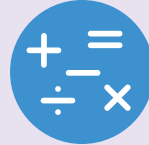


RESEARCH EXPLORATIONS

Code interacts with a computer and tells it what to do. Play this game with your family interacting like a computer and a coder.

1. Select a room in your home to be the starting room. Blindfold Player 1 (the computer). Both players know where the game starts.
2. Player 2 (the coder) gives Player 1 clear, detailed directions to lead Player 1 to a new room.
3. Player 1 goes to the new room (the end of the code) and makes a guess where in the house they are located.

What is the fewest number of directions that can be given to arrive at a certain destination? What did you learn about how a coder interacts with a computer? Do you prefer being the computer or the coder?



MATH

Katie has a number machine which allows numbers to enter, interact, and change.

- When she enters the number 2 in the machine, the number 4 comes out.
- When she enters the number 5 in the machine, the number 10 comes out.
- When she enters the number 10 in the machine, the number 20 comes out.
- When she enters the number 100 in the machine, the number 200 comes out.

What happens to numbers when they enter the machine? How do you know? Choose a few more numbers and determine what happens after they enter the machine.

Create a rule about patterns, based on what you learned from Katie's number machine.



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GRADES

2–3

Interactions



ENGLISH LANGUAGE ARTS

“Sliding Door Moments” are seemingly inconsequential moments or interactions that end up having a much bigger impact than anticipated. For example, you choose one park to play in over another, and you end up meeting your new best friend at that park.

Illustrate two different seven-panel storyboards with the same beginning panel(s). Have the main character make a different decision at the “sliding door moment” and conclude each storyboard with a different ending.



SOCIAL STUDIES

North Carolina has three distinct geographic regions: the coastal region, the piedmont region, and the mountains. People have to interact with their environment to be able to settle and live in an area.

Create a cartoon strip that illustrates how people interact with their regions. Write a two or three sentence caption for each cartoon illustration.

Use the following link as a resource on the three regions: https://www.sosnc.gov/divisions/publications/kids_page_geography



SCIENCE

Baking can be very similar to a science experiment. You monitor and adjust your ingredients based on how they may react while cooking. Cake batter recipes often include water or milk.

Explain what happens to the liquid when you bake the cake. Where did it go? Is it possible to cool the cake down and get the liquid back? Why or why not?

How could you test your prediction?



MINDFULNESS

When our interactions with others are limited, what are ways that you can interact with others when you cannot meet with them face to face?

A few examples might be:

- Write a letter to a loved one and mail it to them.
- Color a picture for a neighbor and place it in that person’s mailbox with a friendly note.
- Make an effort to be kind to the people with whom you live (ex: tell your sister that you like her hair, thank your mom for making dinner, offer to let your brother play with your toy, etc.).

Interactions



LOGIC PUZZLE

Polybius Square Cipher!

A Polybius Square was a method of encryption invented by the Ancient Greek historian Polybius.

See if you can uncover the hidden quote!

Link: <https://bit.ly/3cbhGSg>



FIELD STUDIES

Historians and archaeologists work every day so that we can interact with people of the past.

Watch this video that explains what archaeology is: <https://www.youtube.com/watch?v=qMzpA5oCGNY>

Next, watch a short clip that explains how an archaeologist conducts a dig on a site:

<https://www.youtube.com/watch?v=PcT1vGyJzyg>

What do you think we can learn about people from the past during a site excavation? Why do you think it's important to learn about people from the past?



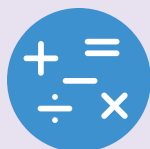
RESEARCH EXPLORATIONS

Sociologists study how people interact in groups. Click on this link to learn more about sociology: <https://kids.britannica.com/kids/article/sociology/433123>

How each person behaves can change how the group interacts. Each day for the next five days, perform a random act of kindness for someone in your home.

Observe how they interact with you after the random act of kindness and record it with pictures or words.

After you changed your behavior by performing a random act of kindness for five days, how did the family interactions change?



MATH

A fractal is an object made of smaller versions of itself - a pattern within a pattern. Interactions with nature reveal many fractals - snowflakes, lightning bolts, leaves, and more.

Walk with an adult to collect leaves. Choose 1 leaf. Measure 4 fractal levels: stem, large veins branching off the stem, medium veins branching off the large, small veins branching off the medium.

Order the measurements using $>$, $<$, or $=$. Using fractions, describe how the level lengths compare. Using your measurements, draw the leaf showing all 4 levels.

Repeat with another leaf. How do your measurements compare? What do you observe about leaf fractals?

Source: <http://mathengaged.org/resources/activities/art-projects/fractal-leaf-art/>



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GRADES

4–5

Interactions



ENGLISH LANGUAGE ARTS

“Sliding Door Moments” are seemingly inconsequential moments or interactions that end up having a much bigger impact than anticipated. For example, you choose one park to play in over another, and you end up meeting your new best friend at that park.

Compose a short story that includes a “sliding door moment” showing how the main character makes a different choice at that moment. Include how the story ends in different ways, OR Include how the choice the character makes impacts the different endings of the story.



SOCIAL STUDIES

Cultural diffusion is the spread of culture. We can see cultural diffusion happen as different societies and groups of people interact with each other. What is an example of cultural diffusion that influenced a commonly celebrated holiday?

Create a 5-8 panel storyboard depicting how that tradition spread as different groups of people interacted with another culture.

For more information and examples of cultural diffusion, visit <http://wvmsred6.weebly.com/uploads/8/6/9/3/8693332/culturaldiffusionexamples.pdf>



SCIENCE

Baking can be very similar to a science experiment! You monitor and adjust your ingredients based on how they may react while cooking. Put room temperature cake batter in the oven to bake at 350 degrees.

How does the heat get transferred to the batter? In what ways would increasing the oven temperature by 100 degrees bake the cake faster? Would you want to eat that cake? Explain your reasoning.

Design a way to test your predictions.



MINDFULNESS

Host your own dance party!

Have you ever noticed how your favorite songs can change your mood or how good you feel after dancing?

You're not alone! Science has proven that the interaction of music and dance can improve brain health. Click this link to read about it: <https://health.clevelandclinic.org/dancing-good-kid-infographic/>

Today, take time to arrange a playlist with 5-10 of your favorite songs. Then, find a space to move freely and get your groove on!

This may be a good opportunity to spend some time with yourself, or feel free to invite someone to join you, even virtually, such as family, friends, pets, etc.

Interactions



LOGIC PUZZLE

Polybius Square Cipher!

A Polybius Square was a method of encryption invented by the Ancient Greek historian Polybius.

See if you can uncover the hidden quote! Link to Week 7 Puzzle: <https://bit.ly/3d9HpvR>



FIELD STUDIES

Historians and Archaeologists work every day so that we are able to interact with societies of the past. Watch a video to explain how archaeologists excavate a site to learn about civilizations and people of the past:

<https://www.youtube.com/watch?v=qMzpA5oCGNY>

Watch this video that shows some of the notable discoveries from 2019:

<https://www.youtube.com/watch?v=PcT1vGyJzyg>

Which discovery do you think is the most important? Why is it important to examine how people lived in the past?



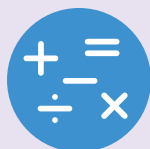
RESEARCH EXPLORATIONS

Sociologists study how people interact in groups. How each person behaves can change how the group interacts. Read more about sociology here:

<https://kids.kiddle.co/Sociology>

Each day for four days, choose a one-hour block of time and tally every time someone says something kind to someone else in your family. Then, for the next four days, perform a random act of kindness for someone in your home. For the hour after your random act of kindness, tally every time someone says something kind to someone.

How did your family interactions change when you added a random act of kindness to your day?



MATH

Interacting with nature, you can observe fractals. A fractal is an object made of smaller versions of itself - a pattern within a pattern, like a snowflake or lightning bolt.

With an adult's help, collect 3 leaves. For each leaf:

- Measure 4 fractal levels: stem, large veins branching from stem, medium veins branching from large, small veins branching from medium.
- Describe the relationships between fractal levels using fractions, ratios, or proportions. What do you observe about leaf fractals?
- Calculate measurements for smaller and larger sized leaf fractals. Describe the strategies you used.
- Use your original and new measurements to create fractal leaf art.



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6–7

Interactions



ENGLISH LANGUAGE ARTS

Choose a member of your house to participate with you.

Draw a triangle, a circle, and a line on a sheet of paper. Consider what attributes you would give each shape. Each of you picks which shape best fits the personality of the other person. Plan your explanation by creating a graphic organizer to determine, organize, and make connections between the attributes of the shape and those of the person.

Identify three to five attributes on paper and describe why they fit that person. Write a cohesive paragraph explaining what attributes the person and that shape have in common. Be sure to include relevant facts, concrete details, or quotations from the person in your explanation.

Read your paragraphs to each other, and enjoy the interaction.



SOCIAL STUDIES

Throughout history as technology has advanced, different countries and societies have begun to interact and share ideas more frequently.

Watch the video linked below to review Globalization and some of the positives and negatives associated with the increased interactions between societies.

Link: <https://www.youtube.com/watch?v=JJ0nFD19eT8>

What role do you think everyday citizens have in mitigating the effects of globalization? As groups of people look towards more socially conscious brands, how do you think that will affect large corporations?

Compose an op-ed article using evidence to support your opinion to explain your answer.



SCIENCE

Baking can be very similar to a science experiment! You monitor and adjust your ingredients based on how they may react while cooking, just like materials used in a science experiment.

Many families bake together. While the ingredients go into the oven a goopy mixture, the baked bread has a larger volume and a solid structure with air holes inside. Hypothesize what is happening to the molecules that give rise to the larger volume and the air holes. Explain your reasoning.

Predict the possible different sources for the gases inside the bread. How do you think you could increase or decrease the volume of the bread?



MINDFULNESS

Choreograph a signature dance! Science has proven that the interaction of music and dance can improve health.

This week:

1. Decide on a motivating song.
2. Write down 3 inspiration sources (other dances, nature, etc).
3. Find a space to move freely.
4. Start moving! Get warmed up by trying different steps.
5. Piece moves together and don't be afraid to get silly!

Make this dance something you can do together and build on for years to come!

Link: <https://www.healthline.com/health/fitness-exercise/benefits-of-dance>

Interactions



LOGIC PUZZLE

I Scream, You Scream, We All Scream...for Logic Puzzles!

Place the Ben & Jerry offerings in the grid to solve the puzzle. Share with a friend or family member and see if they solve the puzzle quicker than you!

Link: <https://bit.ly/3gf8yPV>



FIELD STUDIES

Take a look at how we interact with space by virtually touring NASA's Simulated Lunar Operations Laboratory.

Link: <https://www.nasa.gov/specials/slope360/>

What part of space do you think NASA should explore next? How can non-space related businesses support and engage in space exploration?

Explain why interacting with space is important.



RESEARCH EXPLORATIONS

Sociologists study how people interact in groups. How each person behaves can change how the group interacts. Each day for four days, choose a one-hour block of time and tally every time someone gives a compliment to someone else in your family. Then, read how to give and receive compliments at this link:

<https://www.psychologytoday.com/us/articles/200403/the-art-the-compliment>

For two days, be intentional about giving as many genuine compliments as possible. Then, each day for four days, choose an hour and tally every time someone gives a compliment to someone else in your family.

How did your family interactions change after you gave a concentrated dose of compliments?



MATH

If you've interacted with nature, you've probably noticed some patterns! Much of nature is built by the Fibonacci sequence. Watch the video (part 1) for more information about Fibonacci numbers. Watch the video (part 2) for a look into how math and nature interact. At the end of the video, what anomaly does she discover?

Watch part 3 to learn more about other patterns in nature. What patterns can you find in nature? Can you find any anomalies?

Links:

Part 1: <https://youtu.be/ahXIMUkSXX0>

Part 2: https://youtu.be/IOIP_Z_-0Hs

Part 3: <https://youtu.be/14-NdQwKz9w>

If a plant started with 4, 9, or 15 leaves how would you expect patterns to develop? How would they be alike and different?



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8–9

Interactions



ENGLISH LANGUAGE ARTS

Writers often use specific writing styles to create clever interactions between the text and audience. Choose a technique below to use in a narrative text you create, such as a poem, short story, monologue, etc.:

- **Full Circle Ending** - The first sentence must also be the last sentence of the paragraph. Come "full circle" at the ending.
- **Repetition for Effect** - Choose a specific word or phrase to repeat to stress an idea. Ex. She knows I'm only allowed to drive on Sundays. She knows I'll have to pay for gas.
- **Hyphenated modifier** - Use a hyphenated adjective to add emphasis to your descriptions. Ex: When I saw the look on my mom's face, I had one of those this-is-the-last-moment-of-your-life feelings.



SOCIAL STUDIES

The Founding Fathers created a system of federalism through the Constitution. The United States has shared powers between the federal, state, and local governments.

Look at how these groups interact and impact the daily lives of citizens. Watch the video that is linked below to review the basics of federalism.

Link: <https://constitutioncenter.org/learn/hall-pass/federalism>

Think about the ways each level of government affects educational policies. How do you think federal, state, and local governments should interact regarding education policy?



SCIENCE

Baking can be very similar to a science experiment! You monitor and adjust your ingredients based on how they may react while cooking, just like materials used in a science experiment.

Lots of people like to bake. In baking cakes, there are many changes from raw ingredients to the final baked product.

Describe the changes that have occurred, identifying them as chemical or physical. Deduce which ingredients you think are vital to those changes and what would happen if the amounts of those ingredients were increased, decreased, or even left completely out of the recipe.

Design a way to test your predictions.



MINDFULNESS

Find a positive way to interact with your teachers this week. Send a message of appreciation for their hard work.

Get creative and get your classmates involved, like combining video messages. Coordinate with classmates and before class is over, everyone holds up paper with hearts drawn on them and tell your teacher "ThankYou!"

Let's give teachers some positive interaction to show our appreciation!

Interactions



LOGIC PUZZLE

I Scream, You Scream, We All Scream... for Logic Puzzles!

Place the Ben & Jerry offerings in the grid to solve the puzzle. Share with a friend or family member and see if they solve the puzzle quicker than you!

Link: <https://bit.ly/3gf8yPV>



FIELD STUDIES

Look at how we interact with space, by virtually touring NASA's Electric Propulsion and Power Laboratory and the Simulated Lunar Operations Laboratory at the following links:

- <https://www.nasa.gov/specials/epl360/>
- <https://www.nasa.gov/specials/slope360/>

Click on the tags in the tour to learn more about the features in the lab. What did you notice and wonder about the equipment you saw?

What role do you think the US should have in continued space exploration? Justify whether or not we should continue to fund space exploration.



RESEARCH EXPLORATIONS

How we interact with each other matters. Researchers found that receiving compliments can cause people to perform better. Read about one such experiment at this link: <https://www.medicaldaily.com/science-explains-why-compliments-feel-so-good-243457>

Design your own experiment with family members or people you know to test the effects of receiving compliments. Use that study as inspiration, but do not replicate it. Be sure to include a control and experimental condition. The larger your sample size, the more reliable your results, so try to include several people in your experiment.

Based on your results, what were the effects of receiving compliments? How might you change your interactions as a result?



MATH

Is beauty really in the eye of the beholder?

Mathematics would argue no, saying that phi is the beauty indicator that shows up in our interactions with nature and humans.

Explore the links listed on this website to learn more about the Golden Ratio: <https://www.beautyanalysis.com/research/our-research/>

On the Beauty Code page, use the information to gather data from your environment in search of the beautiful phi. How do the things you consider beautiful align with the mathematics of the Golden Ratio? What unique creation can you make that displays math's definition of beauty?

How have your thoughts changed regarding the question: Is beauty really in the eye of the beholder?



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GRADES
10-12

Interactions



ENGLISH LANGUAGE ARTS

"I am lonely, yet not everybody will do. I don't know why, some people fill the gaps and others emphasize my loneliness." – Anaïs Nin

When people think about human interactions, very few pay attention to social isolation and loneliness. Imagine a friend or loved one writing the quote. Write a letter to him/her addressing loneliness and offer support. While you are composing your letter, consider the following questions:

- How do you explain the importance of social interactions?
- Does the person find comfort in his/her loneliness?
- How will the person feel about receiving the letter?
- What resources can you provide?

If you know someone personally who is experiencing loneliness, share the letter with him/her.



SOCIAL STUDIES

The United States has interactions with countries all over the world, forming bilateral relationships. A bilateral relationship is when two sovereign states agree to diplomacy to conduct various relations. Visit the archived (<https://bit.ly/32s9Anh>) and current (<https://bit.ly/30jQ9KF>) U.S. Bilateral Relations Fact Sheet.

Select a country and compare its relationship with the U.S. in 2016 and now. Make a two-column list to answer the following questions:

1. What was the nature of the relationship between the U.S. and your selected country (allies or adversaries)?
2. What were the U.S. objectives vis-a-vis this country in 2016 and now?
3. How have the countries impacted each other culturally and economically?
4. What was the role of the U.S. in offering assistance and national security?



SCIENCE

Viruses are the most common biological entities on Earth. Viruses contain nucleic acid, which can be either single- or double- stranded RNA or DNA. Viruses can only survive in the environment for a period of time, therefore they rely on the cells of other organisms to mutate and reproduce.

Select a viral disease from this website:

<https://www.healthline.com/health/viral-diseases>

Create a flowchart explaining how the virus interacts with the human body from initiation to vaccination. Include a description of each phase and the effects on the host.

- What part of the body does the virus interact with and what happens once it is infected?
- Is there a vaccine? If yes, how does it impact the virus? If not, why?
- How can we prevent contact with the virus?



MINDFULNESS

Being around people who make us happy is relatively easy. What about being around those who are a bit challenging? It's easy to get frustrated, but it's harder to calm down and forgive. Take a moment to practice some mindful meditation with this video, which includes an exercise to practice compassion with difficult people: <https://youtu.be/oEplqZYUUVk>

Reflect on a negative interaction you've had with someone. How could the exercise from the video have helped you handle it differently? In your journal, write 3 other scenarios that may occur during high school, solving them with mindful meditation.

How can you use this and other mindful meditation strategies to increase the odds of having more positive interactions with others?

Interactions



LOGIC PUZZLE

The Antisocial Club meets every week at Jim's Diner. Since they are so antisocial, however, everyone always sits as far as possible from each other, and no one ever sits right next to another member. Because of this, the 25-stool diner counter is almost always less than half full and unfortunately for Jim, the members who don't sit at the counter don't order any appetizers.

Jim, however, is pretty smart and makes up a new rule to maximize his profits:

The first person to sit at the counter has to sit at one of two particular stools. If this happens, then the maximum number of members will sit at the counter. Which stools must be chosen?

Assume the stools are numbered 1 to 25 and are arranged in a straight line.



FIELD STUDIES

Meet The BLT: The bear, lion, and tiger known affectionately as Baloo, Leo, and Shere Khan at Noah's Ark Sanctuary: <http://www.noahs-ark.org/animals/?category=1>

Discovered by Atlanta authorities during a raid in 2001, they continue to thrive together. Individually, they have an interesting story to tell. Baloo, Leo, and Shere Khan interact with each other as a family unit despite their differences, which is a relationship that doesn't happen in the wild.

After you visit the sanctuary, consider these questions:

1. What does this interspecies interaction say about wild animals versus domestic animals?
2. How did human interaction impact the animals' survival?
3. What can humans learn from this interaction?



RESEARCH EXPLORATIONS

Social distancing has become the norm to prevent the spread of COVID-19. The world is continuing to look for innovative ways to connect. What is your proposed solution (product, service, or combination) to improve human interaction while social distancing?

Research the CDC guidelines about social distancing: <https://bit.ly/2OSvrwe>

Propose a written plan that will allow people to safely interact. Your plan should include each of the following:

- Overview
- Purpose
- Targeted audience
- Design and development
- Financial factors

Present your plan to community officials.



MATH

The world runs on water for daily survival, but due to human interactions, water stress levels have become a national crisis. According to the World Resources Institute, "more than a billion people currently reside in water-scarce regions, and as many as 3.5 billion could experience water scarcity by 2025." Overpopulation, along with climate change, reduces the availability of freshwater and impacts once thriving ecosystems.

Examine the graph provided by The New York Times about water stress levels in populated areas around the world at this website: <https://bit.ly/3fEnwyf>

- What can you determine about the water stress levels from analyzing the graph?
- Predict water levels in 5 years. 10 years.
- What factors contribute to some countries having lower levels?

Identify 3 solutions for highly populated areas to lower their water stress levels. Explain the impact.



Interactions Reference Guide

K-1 English/Language Arts:

Ideas for great picture books:

Where the Wild Things Are- written and illustrated by Maurice Sendak Hair Love- written by Matthew A. Cherry illustrated by Vashti Harrison Miss Rumphius written and illustrated by Barbara Cooney

A Big Mooncake for Little Star written and illustrated by Grace Lin

K-1 Logic Puzzle:

Odd plus an even = odd (silly) Even plus an even = even (serious) Odd plus an odd = even (serious)

Works Cited- Math:

2-3 and 4-5 activity based on Fractal Leaf Art from Math Engaged -

<http://mathengaged.org/resources/activities/art-projects/fractal-leaf-art/>

Field Studies:

For more information about the future of spaceflight, read "Future of Spaceflight and NASA Missions Information" <https://www.nationalgeographic.com/science/space/space-exploration/future-spaceflight/>

8-9 English Language Arts:

May serve as mentor texts:

- "Did I Miss Anything?" by T. Wayman
- A&P by J. Updike

6-9 Logic Puzzle

Solution: <https://bit.ly/2ZuCpht>

10-12 English/Language Arts:

Additional information on loneliness: <https://www.healthline.com/health/how-to-deal-with-loneliness>

10-12 Logic Puzzle:

Solution: The first person must take either stool 9 or 17 (because of symmetry, it doesn't matter which). Assume they pick seat 9. The next person will pick seat 25, since it is the furthest from seat 9. The next two people will take Seats one and 17. The next three will occupy 5, 13, and 21. The next six will occupy 3, 7, 11, 15, 19, and 23. This seats the maximum of 13 people, and no one is sitting next to another person. If a seat other than 9 or 17 is chosen first, the total diner patrons will be less than 13.