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

Innovation

ENGLISH LANGUAGE ARTS

"A picture is worth a thousand words."

Choose a personal photograph (one from your family) or find a picture online with at least 2 people in the photograph. Identify the key details - setting, relationship, and situation by speaking clearly and using complete sentences.

Draw a picture or write a letter from one person in the photo to the other.

SOCIAL STUDIES

Maps help us locate the places we live, work and play.

Let's be innovative!

Draw a detailed map of where you live, including all the things that are important to you. You might want to draw your bedroom, including bed, shelves, toys, doors, and windows. An alternative would be to map your entire home, including all of the furniture and appliances.

You can also map the route from home to your school, labeling streets, buildings, and all of the important points.

SCIENCE

Over several days draw what the moon looks like. Observe the changes and differences.

Based on your drawings from observations, make a prediction on when the moon will be full. Explain your prediction.

If someone lived in another place (maybe somewhere like Australia) what would their drawings look like? How would they be similar or different from your drawings? Explain why.

MINDFULNESS

On a sheet of paper, draw a large cloud. Then, draw another cloud inside of the first cloud.

Think of something that recently frustrated you or caused you to worry. Write a few words or sentences about that inside of the smaller cloud.

Try to think of three things that can help you to see the bright side of the situation.

Ask a loved one for help if you are having trouble. Write or draw these ideas in the space between the two clouds – it becomes the silver lining!

Innovation

LOGIC PUZZLE

I am a 3-digit number.

My hundredths digit is odd, but I am an even number. I am more than 6 hundreds.

My tens digit is one less than my hundreds digit.

Who am I?

387	765	572	986
874	628	729	1320

Answers: https://bit.ly/2yemUPn

FIELD STUDIES

How can recycling help our environment? Tour the Materials Recovery Facility (MRF).

Link: https://youtu.be/zgLW9CSvpRw

After you watch, complete the sentences below using the information from the video.

- I already knew...
- I now know...
- I want to know more about...

Share your responses with a friend or family member.

RESEARCH EXPLORATIONS

Architects design innovative buildings using many different shapes. A tangram is a puzzle made of seven flat shapes which are put together to form other shapes.

If you want to design a rectangular building, how many different designs can you create using two sets of Tangram pieces? Use the link below to create them.

Link: https://www.abcteach.com/free/t/tangram_howto.pdf

What about a building that is trapezoid-shaped? Be sure to draw each design so that you have a record to count how many you can do. See if a friend or family member can create other designs you did not.

MATH

North Carolina farms grow many delicious fruits and vegetables.

- Ask 5 people which fruit - strawberries, cantaloupe, or watermelon - is their favorite.
- Ask 5 people which vegetable - cucumbers, sweet potatoes, or squash - is their favorite.

Draw a picture graph or use tallies to show the answers. Which fruit and vegetable is the most and least popular? Write a number sentence about each fruit or vegetable using what you learned.

What kind of innovative, new fruit or vegetable could you grow from the favorites - a melonberry? A cuquash? Draw them and describe how they taste.

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GRADES 2–3

Innovation

ENGLISH LANGUAGE ARTS

"A picture is worth a thousand words."

Choose a personal photograph (one from your family) or find a picture online with at least 2 people in the photograph. Identify the key details - setting (when and where the story may take place), the relationship between the two (or more) characters, and key events that may be taking place.

Let's innovate!

Write a narrative short story that starts 30 minutes before the photo is taken and ends with the moment depicted in the photo. Use dialogue, temporal transition words (tomorrow, often, suddenly, after, soon, yesterday), and descriptive details to make the narrative compelling.

SOCIAL STUDIES

Oh, the places you'll go! Play "Where am I?" with a friend.

Using a map of the United States, first name a state where the friend is to start. Once the friend has found that state, give directions so the friend can guess where you are. For example, I start in North Carolina and go three states south, where am I? (Florida!). If I go one state west and two states north, where am I?

You can start in any state, and use directions North, South, East, West, Northeast, Southeast, Northwest and Southwest. Start with two or three directions, and then add more.

SCIENCE

Place a 1 Liter soda bottle, or another object that is at least 10 inches tall, outside in the sun.

Measure the length of the shadow it casts at 5 different times that same day, recording the time and length of the shadow.

As you review your data, when was the shadow the longest and when was it the shortest? Why?

Invent a way to keep the length of the shadow the same all 5 times you measure it. Explain why you think this would work. If possible, test your idea.

MINDFULNESS

On a sheet of paper, draw a large cloud. Then, draw another cloud inside of the first cloud.

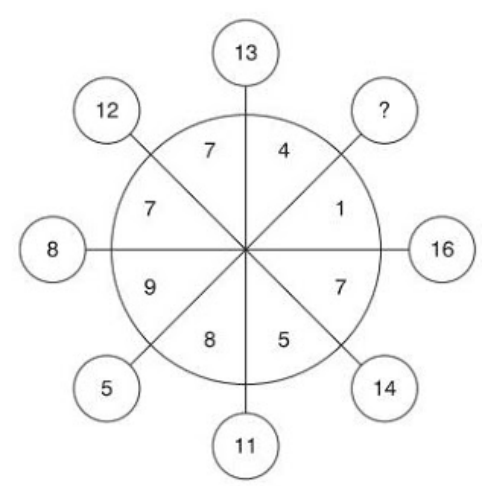
Think of something that recently frustrated you or caused you to worry. Write a few words or sentences about that inside of the smaller cloud. What are three good things that can come from this frustration or worry? Write those in the larger cloud.

Now that you have the silver lining, create a routine that you can use to help you overcome your frustrations. The first one can be 'think of the bright side.' Write the steps to your routine around the clouds and post the sheet in a place you can see often as a reminder to think positively when frustrated.

Innovation

LOGIC PUZZLE

Solve the pattern puzzle below. Find the missing number to replace the question mark.



Answers: https://bit.ly/2yemUPn

FIELD STUDIES

How can recycling help our environment? Tour the Materials Recovery Facility (MRF) using this link: https://youtu.be/zgLW9CSvpRw. After you watch, complete the sentences below using the information from the video.

- I already knew...
- I now know...
- I want to know more about...

How could the MRF improve their recycling process to save time and energy?

Share your responses with a friend or family member.

RESEARCH EXPLORATIONS

Pretend you are an architect who designs innovative buildings (see https://careerkids.com/pages/architect). A company came to you requesting that you design a building with the same perimeter as the Pentagon. Research why the Pentagon is pentagon-shaped, and research what the length of each side of the Pentagon is to determine what the perimeter is.

Next, create drawings of 3 buildings of different shapes with the same perimeter as the Pentagon. How will the buildings you designed be used?

How does the shape you chose make it good for that use?

MATH

The Duke Lemur Center is home to 14 different lemur species. Watch the video "What is a Lemur?" using this link: https://youtu.be/3BMqbqp9T5s

Choose 3 species. Count how many of each you observe. Graph your observations in a bar- or pictograph. Which did you observe most and least frequently? Show the differences in 2 number sentences.

Re-watch the video; recount the same species. Compare your observations. Did they change? How and why? How could you be more accurate?

Based on your observations, design an innovative enclosure for ring-tailed lemurs. Describe what is in your enclosure and why.

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GRADES 4–5

Innovation

ENGLISH LANGUAGE ARTS

"A picture is worth a thousand words."

Choose a personal photograph (one from your family) or find a picture online and imagine that photo is being used to sell a product in a magazine.

Write a paragraph that would accompany that photo to explain the product for sale. Citing relevant details from the photograph, use persuasive techniques to promote the product.

Finally, come up with an innovative product name and a "catch-phrase" for your product.

SOCIAL STUDIES

Finding your location anywhere in the world is possible when you know how to use the imaginary grid lines called latitude and longitude to find out where you are.

Take an imaginary tour around the world to some famous landmarks. You will travel there by using Google Earth using the list of destinations you will find on this travel guide: **https://drive.google.com/file/d/1df2aXCGHn6_bawmaJ8Qsl3PxlA1S8Wtn/view**

After you have returned, you can develop your own itinerary of your favorite places to share with your family and friends.

SCIENCE

Draw a picture of what the moon looks like. Draw a picture showing the possible positions of the sun, earth, and moon relative to each other that would match your view of the moon.

Now, imagine that you traveled to Antarctica, how might any of these pictures change? Explain why. Use a picture if that helps your explanation.

MINDFULNESS

What do you see in your reflection?

Reflective writing is a process where a writer records and communicates their thoughts about something in their life (ex. an experience or a feeling). Reflective writing is also an opportunity for a writer to be innovative, explore their learning, and develop self-knowledge.

Write a 15- line poem reflecting on your life. Be sure to address these 3 things:

1. How have you changed in the last 3 years?
2. What makes you unique and special?
3. How do you want to grow and change in the next 3 years?

Illustrate your poem, showing the journey you wrote about.

Innovation

LOGIC PUZZLE

Solve the following if C, A, and T are different numbers

CAT = (C + A + T) × C × A × T

Can you think of another solution if A=T?

Answers: https://bit.ly/2yemUPn

FIELD STUDIES

Imagine your class takes an annual trip to the San Diego Zoo. However, this year it will have to be a virtual trip.

You have been tasked with creating this innovative trip and serving as the virtual tour guide. Visit and explore the San Diego Zoo online, see link below.

Link: https://zoo.sandiegozoo.org/animals-plants

Create an agenda for your virtual tour detailing what plant and animals exhibits/attractions your class should visit during a 2-hour "visit." Add details and facts about the plants and animals you want to highlight during the trip.

Turn it into a scavenger hunt to share with friends and family.

RESEARCH EXPLORATIONS

Pretend you are an architect who designs innovative buildings (see https://careerkids.com/pages/architect).

Your task is to design a treehouse, following these steps:

- Conduct market research – ask at least 5 people what they would want in a treehouse.
- Research hardwood varieties and choose a type of tree for the treehouse.
- Draw a floor plan of your treehouse, incorporating the tree you chose and what people want.

Present your design and explain your decisions to a family member or friend.

MATH

Most lemurs are herbivores. Scientists offered different fruits and vegetables to lemurs - corn, zucchini, cauliflower, squash, yams, red peppers, green beans, and eggplant.

Link: https://docs.google.com/document/d/1-GvnCtFqrHOimUZoncWWtHFwBPQKuOixFa0n-ETKPgU/edit?usp=sharing

From the graph in the link above, what 3 foods were most and least popular with all lemurs? How might scientists studying lemurs use this information? What do you observe about the species' favorites? How can you balance foods lemurs prefer with those they don't?

Using each food twice, design a 7-meal menu that a primatologist could use to feed all lemurs.

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GRADES 6–7

Innovation

ENGLISH LANGUAGE ARTS

Select a recent science or technology innovation or current event in the news. Find 3 different media sources. Read/watch stories on the topic from each source. Note the main idea(s) in each story and supporting arguments. Separate facts from opinions, but record both.

Based on your results, which news source do you find most accurate and trustworthy? Which seemed biased? Create a rubric that defines the characteristics of accurate and unbiased sources.

Rate each media source on your rubric. Use this link if you need help creating a rubric: **https://www.rubric-maker.com**

Prepare an oral presentation that summarizes your findings. Publish the presentation using a media tool if available. Share it with your family.

SOCIAL STUDIES

Quality of Life is a subjective standard that economists have used quantitative data to evaluate people across the world. One of the indicators that is used to judge Quality of Life is the material well-being. Every citizen can save, invest, and use credit responsibly to help improve one's quality of life.

Use the link to learn more about stocks, bonds, investment funds, and bank products for investing. After you read about a few different options, create a brochure that you can share with friends or family on what is the best option for saving.

Link: **https://www.finra.org/investors/learn-to-invest/types-investments**

SCIENCE

Review these 2 NASA graphics demonstrating the changes in Nitrogen Dioxide (NO_2) emissions over NC, SC, and GA.

- Average NO_2 in the atmosphere 2005-2019: **https://go.nasa.gov/2WD4O1I**
- Average NO_2 in the atmosphere 2020: **https://go.nasa.gov/2yvoCw4**

Review this short explanation from the Environmental Protection Agency about NO_2 emissions: **https://bit.ly/2SJQcMM**

Identify what human behavior changes led to an improvement in air quality. Propose an innovative way to maintain improved levels of NO_2 in the area where you live as the state begins to open again. Identify obstacles for families and businesses implementing these behaviors and propose some ways to address them.

MINDFULNESS

What do you see in your reflection?

Reflective writing is a process where a writer records and communicates their thoughts about something in their life (ex. an experience or a feeling). Reflective writing is also an opportunity for a writer to be innovative and explore their learning and develop self-knowledge.

Write a haiku poem. Address these 3 things:

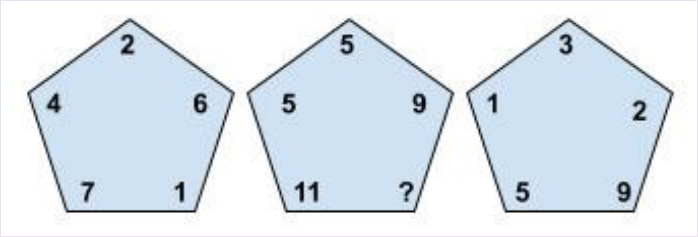
1. How have you changed in the last 5 years?
2. What makes you unique and special?
3. How do you want to grow and change in the next 5 years?

Illustrate your poem, showing the journey you describe.

Innovation

LOGIC PUZZLE

Can you figure out how all of the numbers are related and fill in the missing one?



Answers: https://bit.ly/2yemUPn

FIELD STUDIES

Innovations in nuclear energy have evolved from being housed at large, expensive reactors, to smaller, more mobile nuclear energy facilities.

Learn more about Isotopes and the Reactors of Tomorrow at the Idaho National Laboratory.

Link: https://www.navigatingnuclear.com/nuclear-reimagined-vft/

What differences did you notice between the Advanced Testing Reactors (ATR) and the Small Modular Reactors (SMR) shown? What are the environmental and financial benefits of investing in SMR research? Why do you think we still need ATRs?

For more information about the largest ATR in the world, visit https://bit.ly/3bh4JWw.

RESEARCH EXPLORATIONS

You are an architect tasked with designing an innovative office space for someone working from home.

Conduct some background research using the internet and interviews to find answers to the following questions:

- What is a reasonable size for a home office?
- What are the key features people want/need in a home office?
- What are the critical design features that can increase work efficiency?

After you do the research, design the office and create a visual or multimedia display. Present your plans to a family member or friend.

MATH

Review probability by watching this TED-Ed video: https://youtu.be/Kgudt4PXs28

Now use what you've learned to design a new game that involves probability.

- What are the risks a player has to take to be successful in your game?
- How likely are they to win based on the requirements of the game?

Create the game itself, along with a series of directions, and play with someone you live with. Did your hypothesis prove true? How can you increase or decrease your risk as a player?

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GRADES 8–9

Innovation

ENGLISH LANGUAGE ARTS

Very often, popular books become blockbuster movies. Choose a novel you have read that has also been made into a film. Compare and contrast the two to discern where the production remains true to the story and where it departs. Create a chart to track and evaluate your results.

How did the variations affect the characters, plotline, and outcome of the film? Draw some conclusions as to why the director made those specific choices.

Determine if the filmmaker was/was not innovative in his/her adaptation of the film based on your analysis. Provide suggestions for further innovations that could be made to enhance key aspects for the story.

SOCIAL STUDIES

The short and long-term effects on personal and global finances during and after a pandemic are immense. Read about how inequality within populations deepens economic disparities and watch how North Carolina was impacted by COVID-19.

- Article Link: https://nyti.ms/3duPY4c
- Video Link: https://bit.ly/3bbw5xj

What was the economic impact of the pandemic on your local community? On your state?

Write a letter to Governor Cooper suggesting two economic policies that could be implemented now to support economic growth in North Carolina.

SCIENCE

NASA data has shown the short-term changes in NO2 emissions over NC due to changes in human behavior. What behavior changes led to the improvement in air quality?

Review the EPA's national and regional rules to reduce emissions long term. Considering both the recent changes to human behavior and the EPA's rules, identify some obstacles to low NO2 emissions data.

Create an innovative plan to overcome those obstacles. Write your response as if you were addressing Governor Roy Cooper.

Link: https://www.epa.gov/no2-pollution/basic-information-about-no2#Reduce

MINDFULNESS

Think about your favorite song and how it connects to Mindfulness- the practice of being in the present moment.

- How does the music make you feel when you hear it?
- How do the melodies come together?
- What instruments do you hear that you have not noticed before?

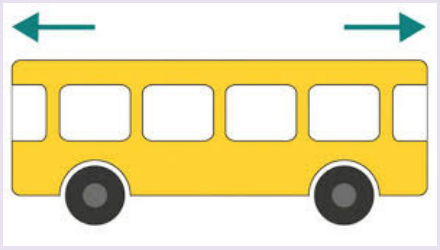
Listen with lyrics.

- How does the music match with lyrics?
- How does the song change your mood when you hear it?

Take this time to clear your mind and enjoy the sounds and connect with the emotions the music gives you. Lead your friends and family through this exercise.

Innovation

LOGIC PUZZLE



In which direction is the bus moving?

What is the next number in the sequence:

1, 11, 21, 1211, 111221, 312211, 13112221, ?

Answers: https://bit.ly/2yemUPn

FIELD STUDIES

Learn more about the innovative ways researchers at the Idaho National Laboratory are using nuclear energy: https://vimeo.com/390572856

What are some practical applications of nuclear energy?

Imagine you have received a two-year grant that will cover expenses for research of innovative nuclear energy practices.

- What would be the focus of your research?
- Why would this be an important focus?
- Who would this research benefit?
- What is missing from current knowledge on this topic?

Write an introduction to a research proposal answering these questions.

RESEARCH EXPLORATIONS

What makes American architect Frank Lloyd Wright's designs innovative and unique? What might a treehouse designed by him look like?

Research Wright's architectural designs and do "market research" on what is desired in a treehouse by reading information online and interviewing people.

Design a treehouse in Wright's style that would meet the market need.

Create a presentation for a potential business partner explaining what makes Wright's architecture unique, what the market wants in a treehouse, and how you integrated the two.

MATH

Read an article summarizing the 2017 World Economic Forum's Global Shapers Survey identifies climate change as the most serious issue facing the world today: https://www.businessinsider.com/world-economic-forum-world-biggest-problems-concerning-millennials-2016-8

Search the internet to find at least two sets of data that can represent this global issue, or another

of your choosing, in a scatterplot. What sort of relationship would you describe? Does the data represent a correlation or a causation? What types of solutions might mitigate this problem?

Create a public service announcement that uses the data you have collected to advocate for a change.

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GRADES 10-12

Innovation

ENGLISH LANGUAGE ARTS

Numerous important inventions have occurred in the last 50 years. Choose one that you think has had the biggest impact on society (positive or negative). What problem or issue was intended to be addressed by this invention? Has this invention caused any unintended effects?

Locate at least three different sources to help you answer the driving questions above. As you read, collect 2-3 pieces of detailed evidence from each text that supports your answers. Evidence can be: examples, quotes, statistics, graphs, etc.

Using the driving questions, collected evidence, and your conclusions, create an infographic (digital or on paper) that visually represents your knowledge of the subject and aids in others' understanding of the subject. Share with a family member or friend.

SOCIAL STUDIES

The short and long-term effects on personal and global finances during and after a pandemic are immense. Read about how inequality within populations deepens economic disparities and watch how North Carolina was impacted by COVID-19.

- Article Link: https://nyti.ms/3duPY4c
- Video Link: https://bit.ly/3bbw5xj

What do you know about the fiscal policies the federal government implemented in response to COVID-19? What was the economic impact of the pandemic on your local community?

Use what you know and what you have learned to come up with an innovative, five-step action plan that your state could implement to lessen the financial impact of COVID-19 on North Carolina residents.

SCIENCE

The world experienced environmental benefits due to recent changes in human behavior. Read these NASA articles on NO2 emissions in China and particulate matter in India.

- Link: https://go.nasa.gov/2YKCc9j
- Link: https://go.nasa.gov/2WFwWB7

How could such environmental gains made during this time be maintained as parts of the world establish a new normal in human activity? Consider both the US and the global community. Who would need to be involved in implementing these changes in the US?

Target your proposal for that audience and include arguments that would help persuade them.

MINDFULNESS

Think about your favorite song and how it connects to Mindfulness- the practice of being in the present moment.

- How does the music make you feel when you hear it?
- How do the melodies come together?
- What instruments do you hear that you have not noticed before?

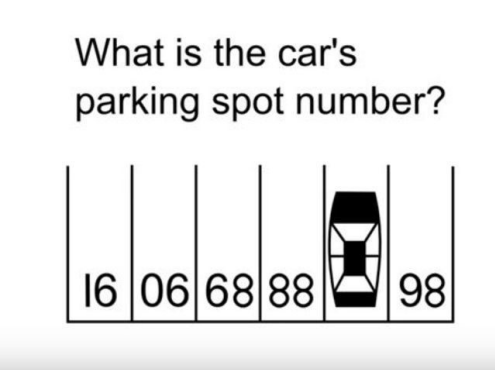
Listen with lyrics.

- How does the music match with lyrics?
- How does the song change your mood when you hear it?

Take this time to clear your mind and enjoy the sounds and connect with the emotions the music gives you. Lead your friends and family through this exercise.

Innovation

LOGIC PUZZLE



What is the next number in the sequence:

1, 11, 21, 1211, 111221, 312211, 13112221, ?

Answers: https://bit.ly/2yemUPn

FIELD STUDIES

Nuclear energy is made possible by people in an array of careers working every day to innovate the way we create and use energy. Learn about the Surprising Careers in Nuclear Science in the video at this link: https://www.navigatingnuclear.com/nuclear-reimagined-vft/

Review the career profiles of other professionals working with nuclear energy.

Link: https://www.navigatingnuclear.com/explore-careers

Use the internet to continue your research for at least one career in nuclear energy. Create a revised career profile that includes the salary range, college or universities that offer degree programs required for that career, and companies that are hiring for that career.

RESEARCH EXPLORATIONS

You are an architect tasked with designing an innovative stand-alone home office (a small building behind the home). The client requests the home office be as energy efficient as possible.

Research ways a small building can be energy efficient and the cost to implement the energy efficient features. Develop a plan based on your research and sketch what the space would look like.

Create a presentation of your plan, integrating your research.

MATH

Observe the people around you. What can you hypothesize about their happiness?

Create questions and collect data to verify your hypothesis. Overall, is your observational data good? Why or why not? How does sample size affect your outcomes? What might you suggest as a strategy for increasing happiness during high school, throughout college, once you get a job, etc.?

Develop 2-3 implementable strategies for boosting happiness while at home this week.

As an extension, explore the Lab 2 activity - How does your data compare or contrast to those statistics?

Innovation

Reference Guide

Math K-1 Solution:

986

Math 2-3 Solution:

The missing number is 17. Each number in the circle is the sum of the numbers in the opposite quadrant. In this case, the numbers are eight and nine — added together makes 17.

Math 4-5 Solution:

135 = (1 + 3 + 5) × 1 × 3 × 5

If you allow A=T, then another solution is:

144 = (1 + 4 + 4) × 1 × 4 × 4

6-7 Solution:

From left to right, let's label the pentagons A, B, and C. The difference between the numbers in pentagons A and B can be found in Pentagon C in the same location across the board.

B - A = C B - 1 = 9

B = 10

The answer is 10

8-9 Solution:

The doors are positioned on the other side, since you can't see them. For people in the U.S. and other countries where they drive on the right side of the road, the bus would be traveling left.

1113213211. This is a "Look and Say" sequence. Each number describes the previous number. Saying the second sequence number out loud ("one-1") describes the first number. Saying the third sequence number out loud ("two-1") describes the second number. And so goes the pattern.

10-12 Solution:

87. Flip the picture upside down.

1113213211. This is a "Look and Say" sequence. Each number describes the previous number. Saying the second sequence number out loud ("one-1") describes the first number. Saying the third sequence number out loud ("two-1") describes the second number. And so goes the pattern.

References

K-1 https://www.math-salamanders.com/image-files/2nd-grade-place-value-riddles-2a.gif

2-3 https://www.prodigygame.com/blog/brain-teasers-for-kids/#pattern

4-5 https://www.mathsisfun.com/puzzles/algebra-cat-solution.html

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INNOVATION

NC STANDARDS ALIGNMENT

Grade Span	English/ Language Arts	Social Studies	Science	Math
K-1	SL 1.4	1.G.1.2	1.E.1	NC.K.MD.2, NC.K.MD.3, NC.1.MD.4
2-3	W3.3	3.G.1	3.E.1	NC.2.MD.10, NC.3.MD.3
4-5	W.5.2	EX5.G.1.4	4.E.1	NC.4.MD.4, NC.5.MD.2
6-7	SL.7.2 SL.8.4		7.E.1	NC.7.SP.8
8-9	RL.9-10.7 RL.8.7	AH1.H.8.1	8.P.2	NC.M1.S-ID.8 NC.M1.S-ID.9
10-12	W.11-12.5	CE.E.3.2	Bio.2.1 Bio.2.2	NC.M3.S-IC.3