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

Exploration

ENGLISH LANGUAGE ARTS

An "Origin Story," is a made-up story that explains why something is the way it is. For example, an origin story may explain why a tiger has stripes or why a snake has no legs.

Think about something that interests you. Explore your imagination. Decide on your object and think about its origin.

Using a combination of drawing and writing, create your own story about why something is the way it is.

Share it with a friend or perform it for a family member.

SOCIAL STUDIES

Inventions give us new ways of doing things. Draw a picture that shows the five most important inventions you can think of that have changed people's lives.

These inventions could affect travel, health, communication, or anything else people have or do. You can also show what the invention first looked like and how it has changed over time.

Discuss these inventions with a friend or family member. Explore their ideas of the most important inventions.

SCIENCE

Exploring Magnetism!

Find 2-3 things in your kitchen that a magnet sticks to and find 2-3 things in your kitchen that the magnet will not stick to.

- How are the objects of each group similar?
- What makes the two groups of objects different?

Make a list of three facts about magnets and share with a family member.

MINDFULNESS

Let's blow bubbles!

While blowing bubbles, focus on taking deep, slow breaths, and exhaling slowly to fill each bubble.

Notice the bubbles. Relax, breathe slowly, and watch the bubbles float away. What are the different things you notice about the bubbles?

Draw and color a picture of your bubbles and share it with a friend or family member.

Look at the link below to make your own bubble solution: https://www.homesciencetools.com/article/how-to-make-super-bubbles-science-project/

Exploration

LOGIC PUZZLE

Favorite Subject

From Shakespeare to Newton to Galileo, everyone has a favorite subject. Use the grid puzzle and the clues you are given to figure out each student's favorite subject.

Link: https://bit.ly/2KL4fNy

FIELD STUDIES

Take a trip to Mars!

Explore the red planet using the Curiosity rover in the Access Mars virtual experiment link: https://accessmars.withgoogle.com/

Why do we explore other planets? What differences did you notice between the land on Mars and our land on Earth? What do you wonder about the planet Mars?

Share what you notice and wonder with a friend or family member.

RESEARCH EXPLORATIONS

Engineers experiment with different materials to find what works best for any given situation.

Visit this link to learn more about paper hovercrafts: http://www.sciencefun.org/kidszone/experiments/paper-hovercrafts/

Find four different materials such as paper, cardboard, aluminum foil, and newspaper to create a hovercraft.

First, predict which will travel the farthest. Second, make the hovercraft out of each of the four materials. Test them to see which hovercraft travels the farthest.

MATH

Let's explore numbers by playing a number game! Write numbers 1 to 5 on small sheets of papers. Place in a container.

Create a second set of numbers, 1 to 5, in a different container. Pull one number from each container. If the numbers match, add them. If the numbers don't match, subtract them.

Write down the number sentence and your total (for example, 3+3=6 or 5-2=3). Put the numbers back. Pull again. Repeat 10 times. Add the totals to find your score.

Add numbers 6 to 10 to the containers. Play again. Which total score from the two matches was higher? Why? Explain your results.

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GRADES 2–3

Exploration

ENGLISH LANGUAGE ARTS

An "Origin Story," is a fictional story that explains why something is the way it is. For example, an origin story might explain why a tiger has stripes or why a snake has no legs.

Explore your imagination or your environment to choose something that interests you. What is its origin? Create your own story about why something is the way it is.

Write out a play with 2-4 characters and dialogue between them to explain why something is the way it is. Be sure to include details to describe actions, thoughts, and feelings.

If possible, perform the play with friends and/or family members.

SOCIAL STUDIES

Demand is how much people want or need to buy something. ***Supply*** is how much of something there is available for sale. When supply is up, the price/cost decreases. When demand is up, the price increases.

Pretend to be a news reporter and write a newspaper article or a script for television news sharing what you have noticed about current gasoline prices.

Explain why you think the prices are changing and how that can affect the amount of gasoline people buy.

How do the principles of supply and demand work with goods other than gasoline? Explore other examples and discuss with a family member.

SCIENCE

Push a ball away from you, so it hits another ball. Observe what happens and draw a diagram of the collision with arrows. Use arrows to show how the balls were moving before and after the balls hit each other.

Predict what would happen if you rolled the ball faster or slower. Explain the reason for your prediction.

How would your results change if the ball were heavier or lighter? Test your predictions to see if your hypothesis is correct.

MINDFULNESS

Let's blow bubbles!

While blowing bubbles, focus on taking deep, slow breaths and exhaling slowly to fill each bubble. Explore the bubbles. Relax, breathe slowly, and watch the bubbles float away.

What is something you notice?

Imagine yourself riding on the bubbles as they float. Would you sit calmly and ride, or would you bounce from bubble to bubble?

Draw and color a picture of yourself and the bubbles.

Follow directions at the link below to make your own bubble solution.

Link: **https://www.homesciencetools.com/article/how-to-make-super-bubbles-science-project/**

Exploration

LOGIC PUZZLE

It's musical mayhem!

Use the grid puzzle and the clues you are given to figure out the musical instrument each student is learning to play.

Link: https://bit.ly/3bMhee1

FIELD STUDIES

Take a trip to Mars!

Explore the red planet using the Curiosity rover using the Access Mars virtual experiment link: https://accessmars.withgoogle.com/

Why do we explore other planets? Investigate the differences you noticed between the land on Mars and our land on Earth.

Draw and label a picture or create a model of a new rover that could be used to explore both the terrain of Mars and Earth, using materials you find in your home.

Explain your rover and the reasons behind its design features to a friend or family member.

RESEARCH EXPLORATIONS

Engineers experiment with different materials to find what works best in a situation. Visit this link to learn more about paper hovercrafts: http://www.sciencefun.org/kidszone/experiments/paper-hovercrafts/

Find four different materials such as paper, cardboard, aluminum foil, and newspaper to create a hovercraft.

First, predict which will travel the farthest. Then make a hovercraft out of each material. Test them to see which travels farthest.

Experiment to see how you can change the one that traveled farthest to make it go even farther. Why does the change you make cause it to go farther?

MATH

You feed one colony of 5 collared lemurs and one colony of twice as many ring-tailed lemurs. All lemurs receive the same lunch.

You prepare 24 bananas, 48 thistles, and 100 poplar leaves.

- What does each lemur eat?
- What does each colony eat?

Only use whole pieces of food. Each lemur needs at least one of each food. With the remainder, how many more lemurs could you feed?

Visit this link for solutions: https://tinyurl.com/ybht3hxj

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GRADES 4–5

Exploration

ENGLISH LANGUAGE ARTS

An "Origin Story," is a fictional narrative that explains why something is the way it is (why a tiger has stripes or why a snake has no legs, for example).

Origin stories often come in the form of fables or fairy tales. They can even be about characters that have superpowers and describe how a person became a superhero, like Spider-Man or Superman.

Explore your imagination to create a story about why something is the way it is. It could be something in nature or a superhero.

Write a fable, fairy tale, or comic strip detailing your origin story.

SOCIAL STUDIES

Draw a map of North Carolina and label the three regions of the state. Add illustrations within each region showing what makes it distinct from the other two.

Beneath your map write a short story about a person who lives in one region but must travel to the other two. Write a diary entry from this person's perspective.

Be sure to include the geographic distinctions you illustrated and how geography impacted the story or diary entry.

SCIENCE

Explore Magnetism!

How does magnetic force pass through materials that are not magnetic?

Find a paper plate (or something of similar thickness), a paperclip, and a magnet. With the paperclip on one side of the plate and the magnet on the other, try moving the paperclip by moving the magnet around on one side.

How many paper plates can you stack that allows the magnet to still work? Can you feel the magnetic force in the air? What if you removed the paper plate? Test the magnetism with materials of different types and thicknesses?

Share your results with a friend or family member.

MINDFULNESS

A "mandala" is a circular structure with radial symmetry. It can also be a tool for focusing attention and expressing creativity.

Today:

1. Gather coloring supplies (markers, pens, crayons).
2. Print a mandala (or trace it onto blank paper) from this link: https://www.free-mandalas.net/
3. Find a quiet and comfortable spot to color without distractions.
4. Start coloring!

While coloring, try not to think too much about color choice or anything else. Make this time about you; maybe listen to a favorite song. Allow yourself to simply enjoy this time.

Exploration

LOGIC PUZZLE

Monopoly

Help this group of friends put their gameboard back together after some of their pieces were knocked off!

Use the grid puzzle and the clues you are given to figure out with which pawn each friend is playing and which contract they own.

Link: https://bit.ly/2xg84r4

FIELD STUDIES

Join NASA Commander Suni Williams to tour her office: The International Space Station!

Start with the "Harmony, Tranquility, Unity" tour at this link: https://www.nasa.gov/mission_pages/station/main/suni_iss_tour.html

Observe the hygiene and sleeping stations, laboratories, different modules, and command central. Connect life on the International Space Station with your life at home by considering how things are similar and what challenges are presented in space.

Write a detailed description, draw a blueprint of, or create a model of your own space station. Explain why you added each feature and the purpose each will serve during your time in space.

RESEARCH EXPLORATIONS

Engineers experiment with different materials to find what works best in a situation. Visit this link to learn more about paper hovercrafts: http://www.sciencefun.org/kidszone/experiments/paper-hovercrafts/

Find four different materials such as paper, cardboard, aluminum foil, and newspaper to create a hovercraft.

First, predict which will travel the farthest. Then make a hovercraft out of each material. Test them to see which hovercraft vehicle travels farthest.

Experiment to see if you can combine different materials to create one that travels even farther. Which parts of the hovercraft are better with lighter materials and which parts with heavier materials? Why do you think that is?

MATH

Colony	Max. Size	Minutes to observe 1st lemur	Minutes per additional lemur
Collared (CL)	10	6	4
Ring-tailed (RT)	24	4	2

You observe lemur colonies; observation times vary by the number of lemurs present. Graph each colony's observation times. How many lemurs would you observe in 35 minutes? How much time would you need to observe all lemurs?

Describe the relationship between CL and RT observations.

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GRADES 6–7

Exploration

ENGLISH LANGUAGE ARTS

Choose a favorite song or artist that has had a positive influence on you. Pretend a friend has never heard this song/artist. Brainstorm and organize 4-5 reasons why this song or artist is unique and important to you.

Provide supporting evidence that illustrates each of your points. Craft an opening statement that defines your position and uses appropriate persuasive language. Make sure to explore opposing claims to prove your credibility on the topic. Your goal is to convince others of the positive impact of this song or artist. Conclude by summarizing your argument.

Find a suitable audience and see how many people you can persuade!

SOCIAL STUDIES

Every 10 years the US completes the census to help apportion funding and seats for the legislature. Demographers use the data to analyze trends in the population like urbanization.

Explore this link from the United States Census Bureau for more information about the census: **https://www.census.gov/programs-surveys/decennial-census/about/why.html**

Create your own census of 10 or more questions to identify population and patterns that may be helpful for demographers to study your local community.

Survey your family, friends, and neighbors with your census.

SCIENCE

Compare these graphs from the U.S. Energy Information Administration: **https://www.eia.gov/todayinenergy/images/2018.05.29/chart2.png**

In harnessing energy from fossil fuels to create electricity, not all of the potential energy is converted into electricity but is instead lost to the environment as heat.

Given that the graph at this link shows projections for future US fuel use for electricity, **https://www.eia.gov/todayinenergy/images/2020.01.29/chart3.svg**, predict what the lines of heat rate would look like based on the future electricity fuel graph projections. Explain why.

MINDFULNESS

A "mandala" is a circular structure with radial symmetry. It can also be a tool for focusing attention and expressing creativity.

Let's explore mandalas today:

1. Gather coloring supplies (markers, pens, crayons).
2. Print a mandala (or trace it onto blank paper) from this link: **https://www.free-mandalas.net/**
3. Find a quiet and comfortable spot to color without distractions.
4. Start coloring!

While coloring, try not to think too much about color choice or anything else. Make this time about you; maybe listen to a favorite song. Allow yourself to simply enjoy this time.

Exploration

LOGIC PUZZLE

Which University?

Let's figure out where each student is going to college!

Use the grid puzzle and the clues you are given at this link to find out: https://bit.ly/35bcyvN

Have you thought about where you'll go?

FIELD STUDIES

Join NASA Commander Suni Williams to tour her office: the International Space Station!

Start with the "Harmony, Tranquility, Unity" tour to explore sleeping and hygiene stations. Then tour the laboratories, observation, exercise, and multi-purpose modules, and command central at this link: https://www.nasa.gov/mission_pages/station/main/suni_iss_tour.html

Design your own space station and explain why you included each feature.

Consider the following questions: How would you modify your interior and exterior design for optimal mission achievement? What features would you add to ensure astronauts can stay mentally and physically healthy?

Explain each and compare to the current features of the ISS.

RESEARCH EXPLORATIONS

Engineers experiment with different materials to find what works best for a situation. Visit this link to learn more about paper hovercrafts: http://www.sciencefun.org/kidszone/experiments/paper-hovercrafts/

Find four different materials (e.g., paper, cardboard, aluminum foil, newspaper) to create a hovercraft out of each.

Predict which will travel the fastest. Test them. Illustrate the motion of the fastest hovercraft using a graph to show a change in position over a period of time.

Modify the hovercraft to try to make it faster. Test it and illustrate its motion. Reflect on the following questions: Was it faster? Why or why not?

Consider the next modification needed. Test again. Modify until you have engineered the fastest hovercraft.

MATH

Use a random number generator using the link at the bottom to generate five numbers or ask other people for random numbers.

Using those numbers, how many unique equations can you make that total to a number greater than 100?

Change at least three of the numbers to negative numbers. Can you still make an equation totaling over 100?

Which equations best showcase your use of mathematical operations?

Link: https://www.calculator.net/random-number-generator.html

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GRADES 8–9

Exploration

ENGLISH LANGUAGE ARTS

Social media has become very popular in the past decade and the go-to medium for communication while social distancing.

Explore this topic: should social media platforms like Facebook be allowed to collect and sell data from its users?

Take a stance on the issue and gather strong and relevant evidence from research to support it.

Create an introduction to a debate that explains your views on the issue. Include a thesis statement, 3 claims, and 2 counters. Conclude your introduction by emphasizing the importance of your stance.

See how many people you can persuade!

SOCIAL STUDIES

During the lockdown caused by the pandemic, we viewed news reports about many people asking the governors to re-open the businesses in their states.

Imagine you are the advisor on travel and tourism to the governor of North Carolina. Research to explore both sides of the issue of re-opening businesses following a pandemic.

Write a memorandum to the governor offering your best recommendation on how to boost businesses and tourism in North Carolina following a pandemic.

SCIENCE

These graphics from the U.S. Energy Information Administration show historical data and make projections for the future:

- US energy consumption **https://www.eia.gov/todayinenergy/images/2020.01.29/chart2.svg**
- US electricity generation **https://www.eia.gov/todayinenergy/images/2020.01.29/chart3.svg**
- US energy-related CO2 emissions **https://www.eia.gov/todayinenergy/images/2020.01.29/chart5.svg**

Given the changes in human behavior due to COVID-19, predict how the actual values for each might differ, and explain why. Consider how the values might change over time.

MINDFULNESS

Take some time to consider what you are grateful for.

Write the following sentence stems on a sheet of paper and your response to complete these statements:

1. A strength of mine I am grateful for is…
2. Something that comforts me is…
3. A moment that made me smile today is…
4. A loved one I am grateful for is…
5. An accomplishment I'm proud of is…

Share your responses with a friend or family members.

Get creative and post these around your house or classroom on taped pieces of paper or post-it notes for others to respond and discuss!

Exploration

LOGIC PUZZLE

Monopoly Management

It's all fun and games until you need to use deductive reasoning to solve this logic problem. Using the clues provided, determine what properties each player owns.

Link: https://bit.ly/2yaV1rt

FIELD STUDIES

Explore Son Doong Cave, the largest cave in the world, located in Vietnam. The cave was first opened to the public in 2013, and public access is very limited.

Write a review to the creators of this virtual tour. Include the benefits and limitations of exploring the cave in a virtual format, as well as what could be done to improve this virtual tour.

Link for virtual tour: https://www.nationalgeographic.com/news-features/son-doong-cave/2/#s=pano66

RESEARCH EXPLORATIONS

Engineers use different designs to achieve different goals. Visit this link to follow instructions for creating a paper hovercraft: http://www.sciencefun.org/kidszone/experiments/paper-hovercrafts/

Using the same type of paper, create a paper airplane of your design choice.

Determine the distance that they each will travel.

Use the internet to research the types of forces that make the paper airplanes go and use that information to modify each model to try to make it travel farther.

Which one traveled farther when you increased the distance? How would changing the material, such as cardboard, aluminum foil, or newspaper instead of the paper you used, affect each design?

Make modifications to your models and continue to test.

MATH

While jogging around a lake, you notice different exercise strategies. Some people run steadily while others speed up, peak, and then slow down. A few speed up the entire lap, and one person constantly gets faster as he goes.

Represent these observations mathematically as both tables and graphs. What inferences can you make based on the data?

How would your data be impacted if people were biking, walking, skipping, etc.? What types of actions would drastically change the graphs?

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GRADES 10-12

Exploration

ENGLISH LANGUAGE ARTS

Vast numbers of people are dependent on the internet to do their jobs, attend school, stay informed, or just socialize.

Explore this topic: Should the state government invest more money to build faster, more reliable internet networks in response to its citizens needing more bandwidth?

Take a stance on the issue. Gather strong and relevant evidence from research to support your position. Using your evidence and research, create an introduction to a debate that explains your views on the issue and includes a thesis statement, 3 claims, and 2 counterclaims.

Conclude your introduction by emphasizing the importance of your stance. Find a suitable audience and see if you can engage them in a debate!

SOCIAL STUDIES

Over time and through exploration, cartographers' projections have changed in the hopes of projecting the earth more accurately.

Watch the linked video that discusses why the map that many people imagine is not the most accurate: **https://youtu.be/P6oqEEbDrXE**

Draw a map of the world in the projection that you think is the best option. Write your own speech that details why this projection is the best.

SCIENCE

Compare the US estimated energy consumption graphics from 2018 and 2020 using these links:

- **https://flowcharts.llnl.gov/content/assets/images/energy/us/Energy_US_2020.png**
- **https://flowcharts.llnl.gov/content/assets/docs/2018_United-States_Energy.pdf**

While overall energy consumption is down slightly, what changes do you notice in fuels? What conclusions could you draw about the efficiencies of those fuels?

Thinking about US energy usage for 2020, predict how the graphic might be different in 2021? Why?

Note: Rejected energy is wasted energy of using the fuel, such as heat released to the environment.

MINDFULNESS

Take some time to think about what you are grateful for. Write on a sheet of paper the sentence starters and complete each with your answer.

1. A strength of mine I am grateful for is...
2. Something that comforts me is...
3. A moment that made me smile today is...
4. A loved one I am grateful for is...
5. An accomplishment I'm proud of is...
6. A challenge that taught me a lesson is...
7. A memory I am fond of is...

Share your responses with a friend or family member.

Get creative and post these around your house or classroom on taped pieces of paper or post-it notes for others to respond and discuss!

Exploration

LOGIC PUZZLE

Zed Talks

From A to Z, this twizted logic problem will keep your head zpinning. The popular lecture series Zed Talks involves people with the initials ZZ talking about subjects starting with Z. It's a whole Z fest.

Using the clues, try to keep it all ztraight!

Link: https://bit.ly/2SgfOkd

FIELD STUDIES

Take a virtual campus tour and explore all aspects of the college process, including the Student Center, Admissions, and Financial Aid offices.

Participate in the brief quizzes throughout the tour. Apply what you have learned from the tour and research the resources for students at a college or university of your choice.

Create a chart or a spreadsheet to help you track the contact information, relevant information, and features of each school's resources.

Include links to other virtual tours you were able to explore.

Link: https://www.weareteachers.com/virutal-college-campus-tours/

RESEARCH EXPLORATIONS

Engineers use different designs to achieve different goals. Visit this link and follow instructions to create a paper hovercraft: http://www.sciencefun.org/kidszone/experiments/paper-hovercrafts/

Using the same type of paper, create a paper airplane of your design choice.

Determine the distance they each will travel. Use the internet to research the types of forces that make the paper airplanes go and use that information to modify each model to make it travel farther.

Which one traveled farther when you increased the distance? Model the forces in action and simulate what would happen if you made additional changes?

Make modifications and continue to test.

MATH

What indicators do you think contribute the most to a society's happiness? The World Happiness Report is an international survey which ranks nations on the happiness of their citizens based on 7 key indicators.

View the 2017 World Happiness Report and compare your indicators with the ones in the video: https://www.youtube.com/watch?v=Se2gfFKp1Iw

Use the Gapminder (https://www.gapminder.org/data/) data to choose 5 metrics that will help measure your indicators and assign each a weight towards achieving happiness. Use Weighted (https://drive.google.com/file/d/1JCDvFsda4dLeMbRkHyTEFYSdLWWtRXu9/view) averages for 6-8 countries to determine relative happiness based on your metrics.

In the processes of quantification and ranking, what is gained, and what is lost?

Exploration
Reference Guide

Answers

Math K-1 Solution:

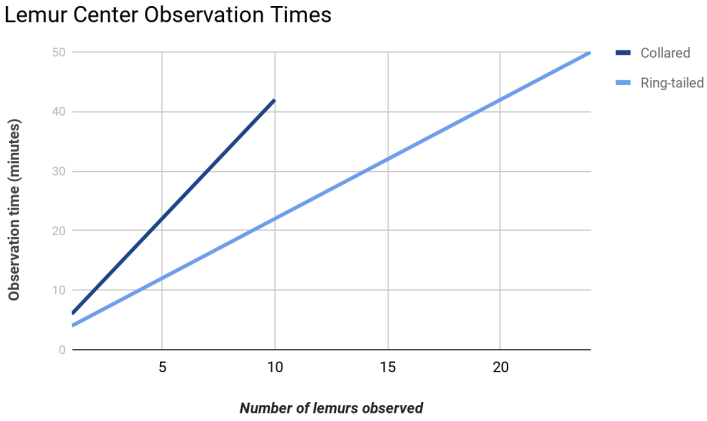
Scores will vary. When discussing if it is easier or harder to pull doubles with 1-5 or 1-10, you can talk with your student about the chance of getting doubles - higher with only 5 numbers in each container - and the higher scores - you could score 20 if you pull 2 10s or 10 if you pull two 5s. You also have a greater chance in each game of having to subtract compared to when you add, with larger integers in the second round. In each game, you will likely see different interactions between probability and score.

Math 2-3 Solution:

Ring-tailed lemur colony: 10 lemurs. Each lemur eats: 1 carrot, 3 broccoli stems, 6 poplar leaves. Ring-tailed colony eats: 10 bananas, 30 thistles, 60 poplar leaves. Collared lemur colony eats: 5 bananas, 15 thistles, 30 poplar leaves. Leftovers: 9 bananas, 3 thistles, 10 poplar leaves. With leftovers, you could feed 1 more lemur since you need 3 thistles per lemur.

Math 4-5 Solution:

If you spend 35 minutes with each colony, you observe 8 CL or 16 RT. If all lemurs are present, you spend 92 minutes (1 hour, 32 minutes) observing. If you spend the same time observing, you see twice as many ring-tailed lemurs as collared lemurs (RT= 2 x CL).



References

Math K-1:

Math K-1 activity is adapted from "Double Down" in "7 Games for Practicing Math Facts" at https://www.scholastic.com/teachers/articles/teaching-content/7-games-practice-math-facts/

Math 2-3 & 4-5 links:

- Lemur diet information from https://lemur.duke.edu/discover/meet-the-lemurs/
- Lemur colony information from https://lemur.duke.edu/discover/meet-the-lemurs/
- Ring-Tailed Lemur: https://lemur.duke.edu/discover/meet-the-lemurs/ring-tailed-lemur/
- Red Collared Lemur: https://lemur.duke.edu/discover/meet-the-lemurs/red-collared-lemur/

Math 6-7 link:

- Random Number Generator: https://www.calculator.net/random-number-generator.html

Math 8-9

Math 8-9 activity is adapted from "Comparing Linear, Quadratic & Exponential Models" at https://study.com/academy/lesson/comparing-linear-quadratic-exponential-models.html

Math 10-12 links:

- 2017 World Happiness Report: https://www.youtube.com/watch?v=Se2gfFKp1Iw
- Weighted Averages Example: https://drive.google.com/file/d/1JCDvFsda4dLeMbRkHyTEFYSdLWWtRXu9/view
- Gapminder Indicator Selector: https://www.gapminder.org/data/
- See the "Happiness" Full Lesson Plan for other guiding questions and examples: https://blogs.tip.duke.edu/teachersworkshop/how-do-we-quantify-happiness/