

ADVANCED LEARNING LABS

A partnership between the North Carolina Department of Public Instruction and Duke TIP
TO ENGAGE, ACTIVATE, AND GROW OUR STUDENTS

GRADES

6-7

Lab 2 • Exploration



ELA

Choose a favorite song or artist that has had a positive influence on you. Pretend your friend has never heard this song/artist. Brainstorm and organize 4-5 reasons why this 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 wording. Make sure to explore opposing claims in order 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 this graph 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 and 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).
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.

Link: <https://www.free-mandalas.net/>



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 to find out.

Have you thought about where you'll go?

Link: <https://bit.ly/35bcyvN>



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.

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

Link: https://www.nasa.gov/mission_pages/station/main/suni_iss_tour.html



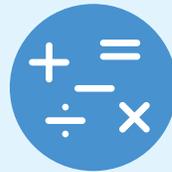
RESEARCH EXPLORATIONS

Engineers experiment with different materials to find what works best for a situation. Visit the link below to learn more about 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. Was it faster? Why or why not? Consider the next modification needed. Test again. Modify until you have engineered the fastest hovercraft.

Link: <http://www.sciencefun.org/kidszone/experiments/paper-hovercrafts/>



MATH

Use a random number generator 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>



North Carolina Department of
PUBLIC INSTRUCTION



DUKE UNIVERSITY
TALENT IDENTIFICATION PROGRAM

Lab 2 • Exploration

Works Cited and Answers

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.

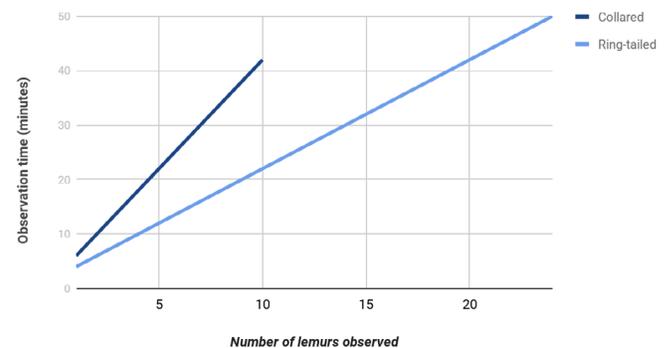
Math 2-3 Solution:

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 ($RT = 2 \times CL$).

Lemur Center Observation Times



References

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 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=Se2gfFKp1lw>
- Weighted Averages Example: <https://drive.google.com/file/d/1JCDvFsd4dLeMbRkHyTEFYsdlWWtRXu9/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/>