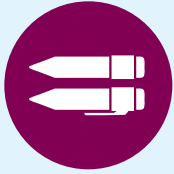


# ADVANCED LEARNING LABS

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

GRADES  
10-12

## Lab 2 • Exploration



### ELA

Currently, 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 while home? 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 2019 using these links:

- [https://flowcharts.llnl.gov/content/assets/docs/2019\\_United-States\\_Energy.pdf](https://flowcharts.llnl.gov/content/assets/docs/2019_United-States_Energy.pdf)
- [https://flowcharts.llnl.gov/content/assets/docs/2018\\_United-States\\_Energy.pdf](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 might the graphic change? 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 (on taped pieces of paper or post-its) for others to respond and discuss!



## LOGIC PUZZLE

### Zed Talks

From A to Z, this twisted 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 zstraight!

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://tgreduexplore.org/sites/default/files/module/>

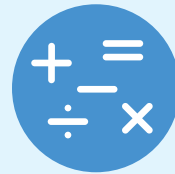


## RESEARCH EXPLORATIONS

Engineers use different designs to achieve different goals. Visit the link below and create a paper hovercraft. 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.

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



## 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=Se2gfFKp1lw>

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/1JCDvFsd4dLeMbRkHyTEFYsdLWWtRXu9/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?



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.

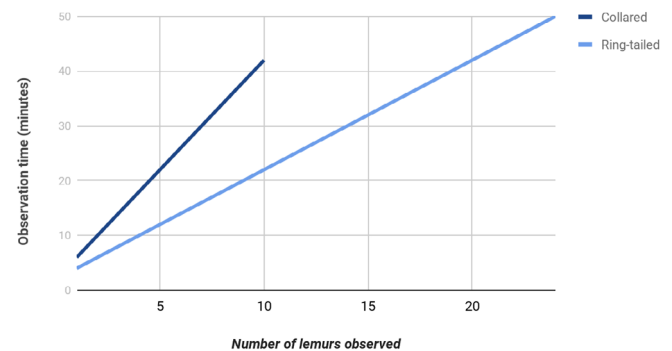
##### Math 2-3 Solution:

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/>