

# ADVANCED LEARNING LABS

Collaboration between NC Department of Public Instruction and AIG Teachers across the state

TO ENGAGE, ACTIVATE, AND GROW OUR STUDENTS

GRADES  
10-12

## Balance



### ENGLISH LANGUAGE ARTS

At some point in your educational career you will probably have to write a discussion essay. For a discussion essay, a balanced view is essential. This makes discussion essays distinct from persuasion essays, for which only one side of the argument is given. In a discussion essay the writer has to clearly present arguments for and against a topic before stating recommendations and opinion.

Write your own discussion essay. Be sure your information is balanced. You could use the topic of social implications:

Social implications of continued social media dependency or any others found on this link: <https://ieltsliz.com/discussion-essay-sample-questions/>



### SOCIAL STUDIES

*"A lie can travel halfway around the world while the truth is putting on its shoes."* - Mark Twain. Did he actually say that? The way news travels has changed throughout history from a few major newspapers to social media outlets. This brief Ted Ed video explains how our society is becoming inundated with unbalanced information: <https://ed.ted.com/lessons/how-false-news-can-spread-noah-tavlin>

Create a Ted Talk defending your position on this question: Does the media have a responsibility to publish the truth? Make sure your Ted Talk includes the following considerations:

- How does "fake news" circulate so quickly?
- Should writers be responsible for verifying the accuracy of information?
- Should the media be made responsible for the information they publish?



### SCIENCE

For a chemical equation to follow the Law of Conservation of Mass it must be balanced. An equation is balanced when the number of atoms of elements on the reactants side is equal to that of the products side.

What better way to enjoy balancing chemical equations than with a game? Check it out in the link below: [https://phet.colorado.edu/sims/html/balancing-chemical-equations/latest/balancing-chemical-equations\\_en.html](https://phet.colorado.edu/sims/html/balancing-chemical-equations/latest/balancing-chemical-equations_en.html)

Write your own balanced chemical equations.



### MINDFULNESS

According to Harvard Medical School, yoga reduces heart rate, lowers blood pressure, eases respiration, and even helps with depression and anxiety.

Research yoga and its health benefits. It is an activity you can do rain or shine from the comfort of your own home, for free.

Participate in the yoga session through the video link to focus on mental balance: <https://www.youtube.com/watch?v=Aak5arZOpc>

Don't forget to relax and breathe.



## LOGIC PUZZLE

You are given a set of scales and 12 marbles. The scales are of the old balance variety. That is, a small dish hangs from each end of a rod that is balanced in the middle. The device enables you to conclude either that the contents of the dishes weigh the same or that the dish that falls lower has heavier contents than the other.

The 12 marbles appear to be identical. In fact, 11 of them are identical, and one is of a different weight. Your task is to identify the unusual marble and discard it. You are allowed to use the scales three times if you wish, but no more than three.

Note that the unusual marble may be heavier or lighter than the others. You are asked to both identify it and determine whether it is heavy or light.



## FIELD STUDIES

What is keeping the Leaning Tower of Pisa from toppling over for the past 800 years? Gravity. The tower does not fall because its center of gravity has been kept within its base. Read about it here: <http://www.towerofpisa.org/leaning-tower-of-pisa-facts/>.

Watch the TED-Ed video on how it was created and remains standing today: <https://youtu.be/HFqf6aKdOC0>

Finding a safe spot, stand still with both feet planted firmly together and arms to your sides. Imitate the leaning tower. Did you feel your center of gravity shifting? Now try leaning to the other side. Did your feet move from their spot? Just like the Leaning Tower of Pisa, your center of gravity is maintaining your balance. How do engineers take center of gravity into account when designing structures today?



## RESEARCH EXPLORATIONS

What would the world do without social media? Do you find yourself checking Instagram and TikTok multiple times throughout the day? What about the members in your household? Everything needs a balance, even social media. Spending too much time on social media often causes us to lose sight of what reality truly is. <https://www.socialmedia.biz/how-to-balance-social-media-with-real-life/>

Spend a week recording the number of times you and 2 other family members checked into your social media accounts. Create a daily log and mark the number of times you sign in. Tally the days and analyze the information.

What would you consider an excessive amount? Is it consuming most of your time? What can you do to find a balance between real life and social media?



## MATH

Phoenix wants to start saving money to travel across the world. She puts \$100.00 into her new savings account. The account earns 9% interest, compounded continuously. She plans to fly in first-class and the tickets are \$975.

1. How long will it take for Phoenix to have enough money in her account to buy the tickets?
2. How much will be in the account after 5 years?

Use the formula  $A=Pe^{(rt)}$  where A is the balance (final amount), P is the principal (starting amount), e is the base of natural logarithms ( $\approx 2.71828$ ), r is the interest rate expressed as a decimal, and t is the time in years.



North Carolina Department of  
**PUBLIC INSTRUCTION**



## Balance Reference Guide

### **2-3 Logic Puzzle:**

Solution:

blue = 12; orange = 12

blue ball = 12; blue star = 4

blue = 12; orange = 6

blue = 12; green = 6

[https://drive.google.com/file/d/0B624p\\_lrRSi0QzU3bGpBOWw5S0U/view](https://drive.google.com/file/d/0B624p_lrRSi0QzU3bGpBOWw5S0U/view)

### **4-5 Logic Puzzle:**

Solution: The "balance" and "spend" columns do not have to match, and in most cases, will not match. They are not always equivalent because you cannot compare them in that way. The amount in the "balance" is what is left over and depending on how much you "spend," equals what is left (the "balance") and therefore, if you only spend \$1 at a time, you will always have large numbers left over. Whereas, if you spend all of it at one time, you will have \$0 in the "balance."

### **6-7 Logic Puzzle:**

Solution: If the coin picked by the warden is real then the scale would display 0 or an even number. If the coin is fake then the scale will display an odd number.

### **8-9 Logic Puzzle:**

Solution: If the coin picked by the warden is real then the scale would display 0 or an even number. If the coin is fake then the scale will display an odd number.

### **10-12:**

**Logic Puzzle Solution:** <http://www.bridbles.com/2011/10/hardest-balance-logic-puzzle.html>.

**Math Solution:** \$156.83

Work on more problems with IXL: <https://www.ixl.com/math/algebra-2/continuously-compounded-interest-word-problems>

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GRADES  
**K-12**

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### NC Standards Alignment

Grade Span	English/ Language Arts	Social Studies	Science	Math
<b>K-1</b>	W.1.1	1.E.1.3 1.E.1.2 1.E.1.3	K.P.2.1 science K.MD.2 -math	NC.1.OA.4 NC.1.OA.7 NC.1.OA.2
<b>2-3</b>	RI.3.2	3.E.1.2 3.E.1.4	3.L.2.2	Mathematical Practice Standard 2
<b>4-5</b>	RI.5.8	5.E.2.2 5.E.2.1 5.E.2.2	4.L.1.1	Mathematical Practice Standard 2
<b>6-7</b>	W.6.1	7.H.2.1 7.H.1	7.P.1.2	NC.6.EE.7 NC.7.EE.4
<b>8-9</b>	W.9-10.2	8.G.1.1 8.G.1.3	8.L.5.2	NC.M1.A-CED.1 NC.M1.A-CED.2
<b>10-12</b>	W.9-10.2	AH2.H.4	PSc 2.2.4	AFM 2.01