



What is a Math Lab? (Part 1)

INTRODUCTION TO THINKLAW MATH LABS

Description

Thinkers will complete a mindset assessment to get a baseline understanding of their math mindsets. Students will be introduced to Math Labs.

Indiana Academic Standards



3.CA.2 Solve real-world problems involving addition and subtraction of multi-digit whole numbers. (E)

3.CA.7 Solve real-world problems involving whole number multiplication and division within 100 in situations involving equal groups, arrays, and measurement quantities. (E)

4.CA.5 Solve real-world problems with whole numbers involving multiplicative comparison (e.g., by using drawings and equations with a symbol for the unknown number to represent the problem), distinguishing multiplicative comparison from additive comparison. (E)

4.NS.4 Compare two fractions with different numerators and different denominators. Explain why comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions (e.g., by using a visual fraction model). (E)

5.CA.2: Solve real-world problems involving multiplication and division of whole numbers (e.g., by using equations to represent the problem). In division problems that involve a remainder, explain how the remainder affects the solution to the problem. (E)

5.CA.4 Solve real-world problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators. Use benchmark fractions and number sense of fractions to estimate mentally and assess whether the answer is reasonable. (E)

5.CA.10 Solve real-world problems involving addition, subtraction, multiplication, and division with decimals to hundredths including problems that involve money in decimal notation. (E)

5.NS.2 Explain different interpretations of fractions, including as parts of a whole, parts of a set, and division of whole numbers by whole numbers.

5.NS.4 Model percents as parts of 100 using pictures or diagrams and identify the equivalent fraction.

E: Essential IDOE standards

Standards for Mathematical Practice



PS.1 Make sense of problems and persevere in solving them.	PS.2 Reason abstractly and quantitatively.	PS.3 Construct viable arguments and critique the reasoning of others.	PS.4 Model with mathematics.
PS.5 Use appropriate tools strategically.	PS.6 Attend to precision.	PS.7 Look for and make use of structure.	PS.8 Look for and express regularity in repeating reasoning.

Lesson Materials



- Mindset Assessment student pages
- thinkLaw Student Work pages
- Writing Utensils

A decorative banner with colorful triangular flags in shades of blue, green, orange, and white.

What is a Math Lab?

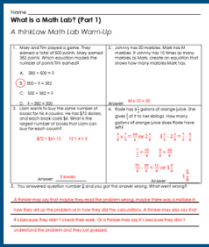
HI-FIVE
CULTURAL CURRICULUM

(Part 1)

THINK LAW

thinkWarm-Up

Before we begin...



Instructor's Note:

thinkLaw Math Labs have been created with 5 warm-up problems designed to serve multiple purposes: pre-assessment tool, a review tool, an activation of learning, or a readiness tool.

The purpose of the warm-up section is to offer students a brief but effective practice session lasting approximately 5-10 minutes. If students encounter difficulties with any of the problems, it's perfectly fine to proceed, as the Math Lab is structured to provide support and scaffold their learning.

In the slides provided, you'll find a designated prompt indicating where to incorporate the warm-up section with your students. The slide can also serve as an opportunity to review the answers to the warm-up problems together with your students before continuing with the math lab.

For convenience, we recommend printing the warm-up and cool-down sections front to back on a single sheet of paper, facilitating easy access and organization during the Math Lab session.

A critical thinker doesn't just know things, they are also able to have the right dispositions or attitude.

This assessment is designed to help you gauge your critical thinking skills. By honestly answering these questions, you can track the changes in your critical thinking mindset over the course of the year.



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Teacher Note:

This mindset assessment and lesson are meant to be completed within 1 math class.



You will begin by solving 5 math problems. Try your best.



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Teacher Note:

The 5 math questions featured on the assessment are based on IDOE 5th grade standards. These math problems can be switched out if you feel that they don't

align with your current pacing.

We encourage the problems to stay the same during the beginning, middle, and end of year assessment.

Answer Key for the first 5 math questions:

Part I: Math Problem Solving

Directions: Circle the face that represents how you feel about each statement.

1. An equation is shown. What is the missing number?

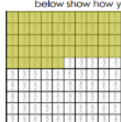
$$2\frac{3}{12} + \frac{3}{7} = 2\frac{5}{8}$$

The missing number: 8

2. You go to the basketball game with your family. There you buy 4 bottles of water for \$1.30 each and a large bag of popcorn for \$3.75. How much more money did you spend on water than popcorn?

- A. \$2.20
 B. \$1.45
 C. \$4.50
 D. \$5.20

3. 45% of all the households in the United States own dogs. In the space below show how you can represent the number in different ways:



- Picture- Shade in the squares to represent 45%. 45
- Fraction- Write 45% as a fraction. 100
- Decimal- Write 45% as a decimal. .45
- Ratio (in a sentence)- 45 out of every 100 people in the United States own dogs.

Which do you think is the easiest for most people to understand?
 Picture Fraction Decimal Percent Ratio

4. Jack bought 3 umbrellas and 4 hats. The umbrellas cost \$15 each, and the hats cost \$5 each. Write an equation to show the total cost in dollars, of the items Jack bought.

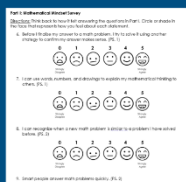
- A. 75
 B. 180
 C. 65
 D. 55

Below is the work that two different students did to solve the problem. Both answers are wrong.

Student A	Student B
$(3 \times 5) + (4 \times 15) = C$	$(3 + 15) \times (4 + 5) = C$
$15 + 40 = C$	$20 \times 9 = C$
$75 = C$	$180 = C$

- What mistake did student A make?
 Student answers will vary. The student may say that student A chose the wrong numbers. To multiply, it should be 3×15 and 4×5 .
 - What mistake did student B make?
 Student answers will vary. Students may say that Student B used the wrong operations. They added where they should have multiplied and multiplied where they should have added.
 - In your opinion, which wrong answer is more right? Why?
 Student answers will vary. Students may say that Student A is more right because they performed all of the correct operations. Also, the answer is closer to the correct answer. While other student may feel that Student B is more right because they understood how the numbers in the problem were related.
5. Janet has $\frac{1}{2}$ cup of flour in a mixing bowl. She adds more flour. Janet claims that she now has $\frac{3}{7}$ cup of flour in the mixing bowl. Which statement explains why Janet's claim is incorrect?
- A. $\frac{1}{2}$ is not a multiple of 2
 B. $\frac{3}{7}$ is less than $\frac{1}{2}$

Next, you will complete the mindset section. There are 15 questions where you will reflect on their feelings immediately after solving the first 5 math questions.



Please follow these 4 instructions carefully.

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Teacher Note:

The mindset assessment questions can also be completed after any other end of unit assessment that's already embedded into your curriculum.

As thinkers complete the mindset section, encourage them to be honest and pick a number that represents their feelings. If the thinker is confused or not sure what a question means, they can score it as a 0.



Honesty is Key

Be honest with yourself when answering these questions. There are no right or wrong answers. Your responses will help you measure your growth.



THINK
LAW

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Self-Reflection



Take a moment to reflect on each question before answering. Think about your thoughts, actions, and experiences at this moment in time.

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Selecting the Best-Fit Response

For each question, select the response that best represents your current thoughts or behaviors.

- 0-Strongly Disagree
- 1-Disagree
- 2-Somewhat Disagree
- 3-Somewhat Agree
- 4-Agree
- 5-Strongly Agree



THINK
LAW

Selecting the Best-Fit Response

For each question, select the response that best represents your current thoughts or behaviors.

- 0-Strongly Disagree
- 1-Disagree
- 2-Somewhat Disagree

- 3-Somewhat Agree
- 4-Agree
- 5-Strongly Agree

Take Your Time



There's no need to rush! Take your time to think about each question and provide thoughtful answers.

THINK
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Take Your Time

There's no need to rush! Take your time to think about each question and provide thoughtful answers.

Now, let's get started!

Please proceed to answer each of the questions honestly and remember that this assessment is a valuable tool for your personal growth in critical thinking.

THINK
LAW

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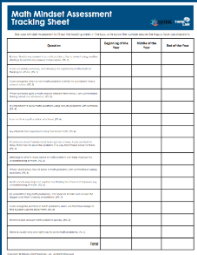
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Teacher Note:

- On the slides, you'll find each question (math problems and the mindset questions) on a slide if you need them to pace your class or if they need a guide to follow along. Feel free to erase if you don't need them.
- The beginning assessment should be completed before attempting any Math Lab.
- After completing 8-10 Math Labs, students can complete the assessment again as a middle-of-the-year assessment.
- After completing 20 or more Math Labs, thinkers can repeat this assessment as an end-of-the-year math lab.
- The End-of-year assessment is built into the scope and sequence; the middle-of-the-year assessment is optional if you'd like to gather additional data.

Use your assessment to fill in the end-of-year part of your tracking sheet.

To complete the tracking sheet, look at each question and write the number above the happy face you shaded in. Don't forget to add up the total in the last row.



THINK LAW

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Teacher Note:

Teachers should keep and store these tracking sheets in a safe space as they will help teachers and thinkers evaluate their progress throughout the beginning, middle, and end of year assessments.

Math Lab = Real Life

Why do we call them math labs? Just like a science lab is an opportunity for you to try what you're learning in science, our math labs let you use math with real-life legal cases and issues!



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Five boys were walking home along a railroad track in New Jersey. The youngest boy found an old sock that was tied shut and contained something heavy.

He picked the sock up and swung it. The oldest boy took it from the youngest boys and started hitting the others with the sock. The sock then passed from boy to boy to boy, and every boy played with the sock for a short period of time.

As the boys were playing with the sock, the sock broke open and \$775 in cash spilled out.

Who should own this money? Why?



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and started hitting the others with the sock. The sock then passed from boy to boy to boy, and every boy played with the sock for a short period of time.

As the boys were playing with the sock, the sock broke open and \$775 in cash spilled out. Who should own this money? Why?

Allow thinkers to share their ideas. Sample responses may include:

- The youngest boy found the sock.
- The older boy took the sock from the younger boy, so it should belong to him.
- All the boys held the sock at some point, so the money should be split evenly between all of them.
- They should try to find the original owner.

Probing Questions:

- Who out of these five boys has the best reason to keep the money among the youngest, oldest, and the other three? Why?
- Why do you think someone kept their money in a dirty sock?
- Do you think it would be possible for the sock to be returned to its original owner? Why or why not?

What's the best argument for each of these to keep all of the money?



	Supporting Arguments
The money should belong to the youngest boy.	
The money should belong to the oldest boy.	
The money should be split between the boys.	
The money should be held at the police station until the original owner can be found.	

What's the best argument for each of these to keep all of the money?

What did the court decide?

The Court ordered that the boys needed to split the money.



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Probing Questions



- How do you think all the boys were feeling? How would you feel in this situation?
- Do you think the boys will want to split the money? Would you fight your friends to get to keep the full \$775? Why or why not? Why might another person be willing to fight their friends to be able to keep the full amount of the money?

The total was \$775.
How much money will each of the 5 boys receive?



Use a visual representation to describe it.



The total was \$775. How much money will each of the 5 boys receive? Use a visual representation to describe it. (Ex: fractions, percents, picture, etc...) **Have students share out the different ways they represented their thinking.**

Probing Questions:

- Which is the easiest way to represent how the money should be divided? Why?



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thinkLaw will help you learn to think critically using real-life legal cases. You will learn how to argue both sides of a case, conduct investigations, settle disputes, make difficult decisions, and write persuasively.



thinkLaw Math Labs will help you learn to think critically using real-life legal cases and real-life events just like lawyers do. You will learn how to argue both sides of a case, conduct investigations, settle disputes, make difficult decisions, and write persuasively.

How does that connect to math?




How does that connect to math? **Allow thinkers to share their ideas. Sample responses may include:**

- Lawyers use critical thinking to solve problems. We need to use critical thinking in math to solve problems.
- When you approach a problem, you


need to collect important information.

Probing Questions:


- How does math connect to real-life legal cases?




Why is it important to practice math with real life math examples?



Why is it important to practice math with real-life examples?


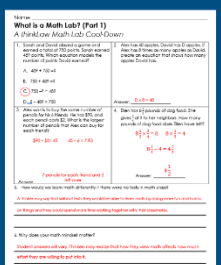


In part 2 of this lesson, we will look at some tips to master math labs!



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thinkCool-down
Before we finish...



Instructor's Note:

Within thinkLaw Math Labs, you'll find 5 cool-down problems strategically integrated to serve as a demonstration of learning or a post-activity assessment.

The goal of a math lab is to help thinkers redefine their math identity – reshaping how they perceive and interact with math.