



TRAIL GUIDE

Grades 3-4



teachinglearningcollaborative.org/math-camp-in



ABOUT TLC

The Teaching & Learning Collaborative (TLC) is a nonprofit organization focused on one goal: to ensure that all students have access to high-quality learning experiences in mathematics, science and computer science. While TLC focuses on the design and delivery of professional development programs for educators, we also create innovative resources such as Math Camp-In that can be used by teachers and families to engage students in mathematical thinking.

We are excited that you will be hiking the Math Camp-In Trail with us! Inside your Trail Guide, you will find tips and ideas that will help you implement a Math Camp-In. Information about each station included on the hike is outlined in the Trail Guide and additional information is included on our website.

Our goal is to allow students the opportunity to apply their mathematical knowledge using interesting and complex problems. We have taken that goal and combined it with an exciting theme to allow students the opportunity to experience mathematics in a fun setting!

teachinglearningcollaborative.org-math-camp-in

WHAT TO EXPECT

Getting ready for Math Camp-In is easy to do! Just follow a few simple steps and you'll be Camping In: Math Style in no time!



Math Camp-In will *fill your backpack* with great ideas! There are seven "Trail Posts" (activities) that can be used with students. This **Trail Guide** gives helpful hints for tasks and questions you can ask about each one.



Mathematical understanding will *multiply* as campers finish problems and earn their **camp badges**! Keep all the badges together in a safe place as they will be needed to earn the final Challenge Badge.



The **Camp Journal** can be printed off all at once or you can give out Trail Posts as you are ready to do them. Campers can collect them all and create their own camp journal or you can have it ready for them. The journal also has helpful reminders-be on the lookout for the compass...there are some *bright ideas* there for you and your campers!



THE COMPASS: When you see this icon, it usually helps give a direction or reminder about a trail post.



Our best tip? **HAVE FUN!** We believe math shouldn't be "in-tents" (get it?!). Make this an experience that let's kids feel like they're at camp! If you are at home, create an area that they can use for Math Camp-In and decorate it. Be sure the campers *pitch in* and get ready for camp to start!





SHARE YOUR MATHEMATICAL ADVENTURE!

We can't wait to hear your campfire stories! Below are just a few ways you can share your experiences as you hike the Mathematical Trail! We would love to see pictures of campers, solutions and even videos!!

TWITTER:

Please tweet out the solutions from your Camper! You can include pictures and share your experiences with your Trail Posts.

Please be sure to tag us [@Connect2TLC](#) and use [#MathCampIn](#)

FACEBOOK:

You can follow us on Facebook and include us in posts.

facebook.com/tlcpage

We can't see your personal info, but if you share a post with us, we can share it too.

EMAIL:

If you don't want to share on social media, but still want to share ideas, comments and solutions, please email us at

mathcampin@teachinglearningcollaborative.org

WHAT IS YOUR MATH CAMP-IN NAME?

(CAMPERS WILL WRITE THIS ON THEIR JOURNAL)

First Initial of First Name

A Adventure
B Binocular
C Canteen
D Day Pack
E Evergreen
F Flashlight
G Grilling
H Half Moon
I Itching
J Journey
K Kindling
L Lightning Bug
M Marshmallow
N Noseeums
O Owling
P Porcupine
Q Quiet
R Ribbiting
S Sleeping Bag
T Tracking
U Ultralight
V Vest
W Walking
X Xtreme
Y Yawning
Z Zip Line

First Initial of Last Name

A Algorithm
B Bar Graph
C Centimeter
D Digit
E Equivalent
F Factor
G Gallon
H Hexagon
I Inch
J Justify
K Kilometer
L Length
M Metric
N Number Grid
O Octagon
P Parallel
Q Quart
R Rhombus
S Sphere
T Tessellation
U Unit
V Vertex
W Whole Number
X X-Axis
Y Yard
Z Zero Facts

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Trail Post 1 - The Squirrel Solution

Campers create multiple ways to represent their thinking about this problem. Campers can approach this problem several ways, and you can adjust the numbers for bigger challenges!

Materials Needed:

- Journal pages
- Pencil
- Camp Badge



Helpful Hints for this Trail Post:

- When solving this problem, it is important that students are creating a visual model as the solve, not after the solving process. The visuals should be a tool for students to make sense of the problem. The visual will also be helpful for students when determining a pattern they notice. Visuals students may choose to use might include a picture, array, or an open number line to show their thinking.



Questions to Ask at this Trail Post:

- What patterns do you notice? How can you use number patterns to determine how many tries the squirrel makes?
- How might factors, multiples, or skip counting be used to solve for a tree that is a different height?
- Is there a rule? Does the rule change if the tree is a different height? Explain
- How can you represent what is happening with an equation?



DIG into Grade Level Content:

Grade 3: Students are expected to solve two step word problems using the four operations. Students may also represent problems using an equation with a letter or symbol to represent the unknown quantity. At this grade level, students are learning about multiplication and groups of objects. This understanding begins with skip counting patterns. Students are also expected to understand arithmetic patterns.

Grade 4: Students at this grade level are expected solve multi-step problems posed with whole numbers and having whole number answers using the four operations, including problems with a remainder. Students are also expected to represent these problems using an equation with a letter standing for the unknown quantity. Students should gain an understanding of factors and multiples, for whole number pairs. At this grade level, students should generate patterns that follow a given rule, while identifying apparent features of the pattern.

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Trail Post 2- We want s'more math!

S'mores are always better at camp! Campers use fractional parts to explore patterns at this Trail Post Station!

Materials Needed:

- Journal pages
- Pencil
- Camp Badge



Helpful Hints for this Trail Post:

- As students solve these problems, it is important that students create visuals to make sense of the problem. After creating visuals and making sense of the problem, students can then consider how they might represent their thinking with numbers. Students may choose to partition first or they may iterate a smaller unit and then compose those units. Encourage students to write a numerical representation of how they solved the problem. Students may choose to use additive or multiplicative thinking. In both grade levels, student learning should be grounded in visual representations for fraction models.



Questions to Ask at this Trail Post:

- How are the graham cracker and chocolate bar similar? Different?
- Can you explain how you made your s'more?
- What relationships do you notice to whole numbers?
- How might you count the equal parts? What happens to your count when you have more than a whole?
- How might you represent the total number of ingredients for campers needed with an operation? (multiplication, addition, etc.)



DIG into Grade Level Content:

Grade 3: Students at this grade level are building an understanding that a whole or quantity can be partitioned into equal parts, one of those parts is represented as a unit fraction. Students learn that wholes can be composed of iterated unit fractions. At this grade level, students are using whole number concepts to begin to make sense of fraction concepts.

Grade 4: Students at this grade level should be able to build fractions from unit fractions by applying an understanding of operations from whole numbers. Students can decompose a fraction into a sum of fractions in multiple ways. Students should solve problems involving addition and subtraction of fractions referring to the same whole with like denominators. Students should also solve problems involving multiplication of a fraction by a whole number.

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Trail Post 3- Gone Fishing!

Campers went fishing at Polygon Pond but can't remember the number of fish they caught! Campers will use some great thinking skills to determine the number of fish in each bucket.

Materials Needed:



- Journal pages
- Pencil
- Manipulative that can be used to represent three different fish
- Camp Badge



Helpful Hints for this Trail Post:

- Students may use any counter available as a manipulative to solve the problem. Be sure that they have at least 3 different objects or colors of the same object to represent each fish type. Manipulatives may include, buttons, goldfish crackers, crayons, LEGO, torn pieces of paper, etc. Students may also draw different fish and use these as a manipulative to solve.



Questions to Ask at this Trail Post:

- How can you prove that your solution for ___ camper is accurate? Justify how you know,
- How might you represent you thinking using visuals?
- What strategies did you use to determine how many fish were in your bucket?
- How might you use a fact you know to solve?



DIG into Grade Level Content:

Grade 3: Students use multiplication or division within 100 to solve words problems in situations involving equal groups and measurement quantities by using drawings and equations. Additionally, students solve two step word problems using the four operations and strategies. At this grade level, students also represent fractions on a number line diagram.

Grade 4: Students are expected to solve multistep word problems. In addition, students should be able to solve multiplicative comparison (i.e. times as many) problems and represent these problems with drawings and as multiplication equations. When working with fractions, students at this grade level are expected to solve problems involving multiplication of a fraction by a whole number using visual models.

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Trail Post 4- Lantern Puzzles

Puzzled? Not at this Trail Post!

Campers complete Lantern Puzzles using addition, subtraction, multiplication and division. Students work with number relationships as they solve and create their own Lantern Puzzle.

Materials Needed:



- Journal pages
- Pencil
- Camp Badge



Helpful Hints for this Trail Post:

- When solving the Lantern Puzzles, campers may need to try several different possibilities to find a solution. Allow campers to use a manipulative to solve. These could be LEGO, buttons, torn pieces of paper, etc. Encourage campers to think about what information they know and how can they use this to solve the problem.
- Campers may also choose to use the inverse operation to solve, which is a critical component to their mathematical understanding. If the lantern puzzle is addition, they may choose to subtract.
- Encouraging students to use trial and adjustment is an important aspect to their mathematical development. If students find a solution for part of the puzzle and need to make changes, guide them to use what they have solved or tried instead of starting over, this will build confidence and perseverance!



Questions to Ask at this Trail Post:

- How can you use number relationships to think about a solution?
- How can you think about numbers flexibly to determine the missing number?
- How can you represent your thinking with equations?
- What strategies did you use to determine the number missing number?



DIG into Grade Level Content:

Grade 3: Students at this grade level are expected to solve multiplication and division of whole numbers. Students should use multiplication and division within 100 to solve problems. When solving problems, students are expected to use a variety of strategies including the properties of operation, place value, and the relationship between addition and subtraction.

Grade 4: Students at this grade level are expected to solve multistep problems with whole numbers using the four operations. Students should be able to add and subtract multi digit whole numbers less than or equal to 1 million, using a strategy that makes sense and is efficient for the student. Students should also be able to multiply a whole number of up to four digits by a one digit whole number and multiply two two-digit numbers using strategies based on place value and properties of operations. When solving these problems students may illustrate and explain their reasoning with equations and visual models (arrays, area models, open number lines).

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Trail Post 5- GEAR UP!

Campers are getting ready to hit the trail! They need to lace up their "hiking boots" for this Trail Post as they explore the concept of area.

Materials Needed:



- Journal pages
- Pencil
- Camp Badge
- "Hiking Shoe" (see Helpful Hints)



Helpful Hints for this Trail Post:

- Campers can use any type of shoe to trace their foot.
- When calculating the area, students may not use a formula. Students may try to find rectangles within their footprint and use these to compose and calculate the area.
- Challenges may arise when calculating the area of their footprint as may not make an perfect rectangle. Students might consider reasoning about $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{1}{3}$ of a square unit. Allow students to grapple and make sense of the area of their footprint.
- When solving the race problems allow students to determine if they would like to use the area to the nearest whole number (Grade 3) or an area that contains a fraction, if there footprint had one (Grade 4).



Questions to Ask at this Trail Post:

- How could you decompose your footprint into shapes or regions in order to determine the total area?
- How did you count/calculate parts of your traced foot print that did not cover an entire square unit?
- How might you use the distributive property to show how you found the total area? What other strategies did you use? (skip count, equal groups of units)



DIG into Grade Level Content:

Grade 3: Students begin to develop the understanding of area. They are able to measure area by counting unit squares. Students are able to relate area to the operation of multiplication and addition. At this grade level students work with multiplication and division within 100 to solve problems.

Grade 4: Students at this grade level develop efficient strategies to determine the area of rectangles in real world situations. At this grade level students solve multistep word problems using the four operations. Students may also multiply two digit number using strategies based on place value and properties of operation.

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Trail Post 6- Map it Out!

Campers use clues to create a camp map for visitors. They will explore several different aspects of problem solving and content as they explore this Trail Post! Campers use clues to record different areas of camp on their map.

Materials Needed:

- Journal pages
- Pencil
- Camp Badge



Helpful Hints for this Trail Post:

- This trail post encompasses several areas of mathematical content for students to apply. There are multiple solutions that students could reason and justify.
- Give campers opportunities to think about different ways to represent their thinking.



Questions to Ask at this Trail Post:

- How did you use what you know about perimeter to determine the area? Could Rectangle River look differently?
- If the total number of trees in Fraction Forest increased, how might that change the quantity for each type of tree?
- What strategies did you use to determine your solution?
- How might you justify that your map meets all the constraints for each part?



DIG into Grade Level Content:

Grade 3: Students at this grade level are expected to understand a fraction quantity is formed by parts when the whole is partitioned into equal parts. Through this understanding, they should also understand the inverse relationship, that parts can be used to compose a whole. Grade 3 students should also solve real world problems involving perimeters. Through this learning, they should discover that shapes could have the same perimeter and different areas or the same area and different perimeter. When working with geometric shapes, students should be able to draw and describe quadrilaterals and polygons based on the number of sides and right angles.

Grade 4: When working with fractions, students at this grade level are expected to decompose a fraction into a sum of fractions with the same denominator in more than one way. Students should be able to solve word problems involving addition of fractions referring to the same whole with like denominators. When working with area and perimeter, Grade 4 students are developing efficient strategies to determine the area and perimeter of rectangles in a real world context. When working with geometric shapes, students should be able to classify shapes based on the presence or absence of parallel lines, perpendicular lines, and angles of a specific size.

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Trail Post 7 - Back to Base Camp

Campers create a camping scene using the pages included in their trail guide. They can color these and then tape or glue them to create a camp scene. Encourage campers to combine addition, subtraction, multiplication and division skills as they write/solve the problems.

Materials Needed:



- Journal pages
- Glue or tape (optional)
- Crayons/Colored pencils
- Camp Badge



Helpful Hints for this Trail Post:

- This Trail Post encourages campers to think critically about parts of a whole. As students work to solve for the missing stepping stone, they may need to draw visual representations to determine the missing whole.
- It is not expected at these grade levels for campers to reduce or simplify fractions. If they have difficulties, encourage them to count by a unit fraction to determine missing whole ($1/4$, $2/4$, $3/4$, $4/4$).
- Drawing visuals and relating to whole numbers (doubling and halving) are strategies that might help students understand these concepts. Students may also use what they know about multiplying and dividing whole numbers to make sense of fractional parts.

Questions to Ask at this Trail Post:

- What strategies did you use to determine the missing part of the whole? How might visuals support your thinking?
- How could you use whole numbers to determine the missing fraction?
- What relationships do you notice between fractions on each path?
- What new patterns do you notice when the paths are represented on a number line? When you compare the fractions?

DIG into Grade Level Content:

Grade 3: At this grade level students are working towards understanding a fraction is formed when one part of a whole is partitioned into an equal number of parts. Students learn to represent fractions on a number line, including fractions greater than a whole. Additionally, students should be able to explain and recognize fraction equivalence. As students work with fractions, they should be able to compare fractions by reasoning about their size as it relates to the same size whole.

Grade 4: Students should be able to explain why a fraction is equivalent to another fraction using visual models. When building an understanding of equivalence at this grade level, students should pay close attention to how the number and size of the parts differ even though the two fractions are equivalent. Grade 4 students compare fractions with different numerators and denominators to benchmark fractions ($1/2$, $1/4$, $1/3$, etc). When comparing fractions, they whole remains the same and students justify their thinking through visual models.



CAMP BADGES

As campers earn their badges, keep them together.
Below are the TWO things Campers need to do to earn the
Math Camp-In CHALLENGE BADGE!

TRAIL POST CELEBRATION:

First, have campers get out the badges from each Trail Post. In their Camp Journal, they should turn to the Camp Badges page. Share with campers that they need to use all seven pieces and arrange them so that they fit into the square.

During this time, campers could:

- share what they liked best about each Trail Post
- share attributes of the shapes they are placing
- explain what they are thinking about the arrangement and how the badges fit together.

CHALLENGE BADGE:

Once your camper(s) have all the pieces in the square, use the following prompt for the final challenge.

Campers LOVE displaying their badges in creative and unique ways. Sometimes campers like to arrange their badges to look like something they have seen at camp or their favorite animal from camp. To earn your Math Camp-In Challenge Badge, use ALL seven badge pieces to create an object from camp.

Choose your favorite one and add it to your journal and then DESIGN YOUR OWN CHALLENGE BADGE in your journal and CELEBRATE!

We would LOVE to see the objects you design and your Challenge Badge creations!

Share them on Twitter (@Connect2TLC #MathCampInChallengeBadge) or send your design via the website:
teachinglearningcollaborative.org-math-camp-in

TRAIL POST 3

I HOOKED the answer!



I didn't get lost in this problem!



Back to Base Camp!



I had s'more fun with this problem!



BRIGHT IDEAS!



TRAIL POST

5

I worked it out...step by step!



I climbed to the top of the challenge!



Cut out each camp badge before you begin. As you give them to campers keep them in a safe place!

For more information on professional development programs and resources please contact us.



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