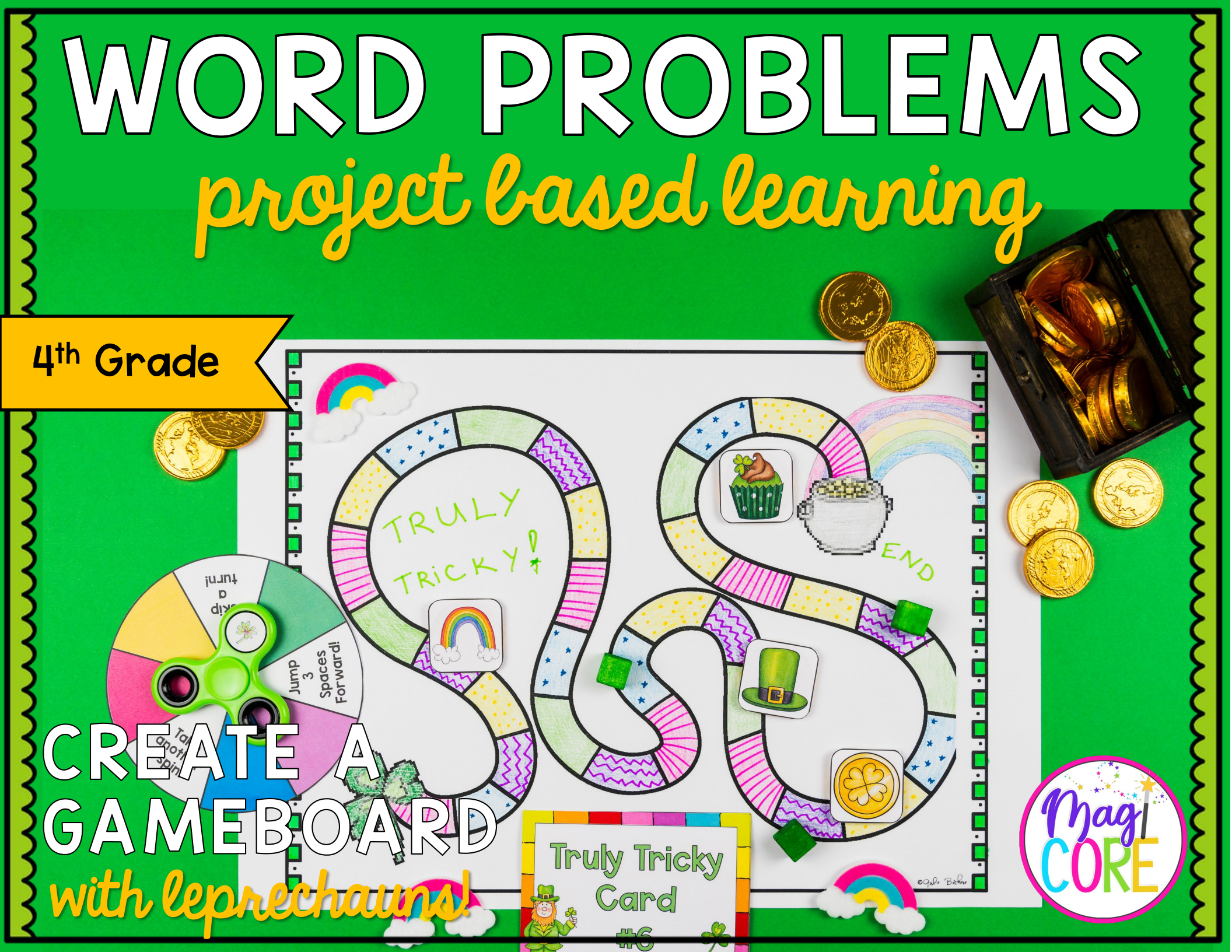
WORD PROBLEMS

project based learning

4th Grade



CREATE A GAMEBOARD

with leprechauns!

Magi CORE


#__
#__
#__
#__
Jump 3 Spaces Forward!
END
uly Tricky Card #4
uly Tricky


Truly Tricky
Card
#6


CREATE A BOARD GAME!
It's time to create your own board g
review one-step and two-step word problems!
Here are the elements of your game
GAMEBOARD
ame board has a trail for the
There is a
and
of
GOTCHA!
GAME PIECES
d coin, a cupcake, and a rainbow.
, or 4 players. Each player gets to choose their own
pieces to keep track of where they are on the trail.
Answer Key
You need to know the
you created! Use the
Card #
1
2
3
Game Rules
Use the space below to write your game rules.
• There must be 2,3 or
to play the game. The
must take turns in
• Each player gets one spin. If the
player lands on a color, they
must jump forward to the next
spot of that color. If the player
lands on a command, they must
follow it.
• If a player lands on a spot with
a leprechaun, they must pick a
"Truly Tricky Card" and solve
the word problem.

SELF-EVALUATION

Circle one box per row on the rubric that expresses how you rate yourself on this Project-Based Learning Activity.

+	✓
I felt very confident about the math in this project.	I felt pretty good ab ability to complet math in this pro
I understood all of the math and did not need help to complete the problems.	I understood most o but needed a little h some of the p
I easily used many strategies to solve the math problems efficiently.	I needed some the best stra solving the ma
I feel I am ready for a harder math project.	I feel I woul more time similar ma

SELF-REFLECTION

Write a reflection of your experience with this project. How did you feel about the math word problems and creating a game board? Explain what you found easy to do and any difficulties you had while working on this project. Did you enjoy this activity? Why or why not?

I enjoyed working on this project. Writing the word problems helped me understand how the key words help the solver know what to do.

RATE THIS PROJECT

Circle the statement you most agree with.

I am ready for something hard | This was just right. | I found this very challenging.

SELF-EVALUATION

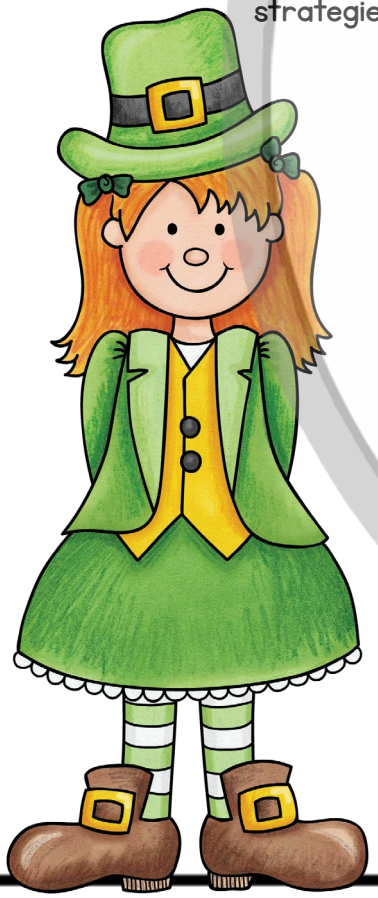
SELF-REFLECTION

TABLE OF CONTENTS

For The Teacher

This **Create a Board Game** Project Based Learning packet was created for 4th grade students. The activities included will provide your students with math practice in an engaging way. The standards addressed in this packet include:

- 4.OA.A.2 Multiply or divide to solve word problems 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.
- 4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.



Directions:

1. Decide if your class will complete the project as a whole group, in small groups, or independently.
2. Copy packets and provide students with materials necessary to complete the packet.
3. Students should complete the project over several days.
4. Preview the activity with your students.
5. Students will complete the self-evaluation reflection rubric.
6. Allow students an opportunity to share their completed projects.

Suggested Challenge Order & Teaching Notes:

1. Explain the project to students: They will be reviewing how to solve word problems with equations and multi-step word problems and creating their own to complete a game board!
    - NOTE: There are two versions of this PBL activity included in this packet. You can choose to have students use our designed game board, spinner, game pieces, and game rules. This option allows students to focus solely on the world problems they will create for the game cards to go with the game board. The second option is to use the blackline game board and related game components to have students create the entire game from scratch. Choose the option that is best for your students and the time you have allotted for this PBL activity.
2. Review the anchor charts and word problem examples provided. These can be printed for students, projected for the class to see, or displayed in your classroom for reference.
3. Allow students to practice solving word problems. Go over answers with the class and address any misconceptions before students work on creating their own word problems.
4. Explain the game board and the game rules (if you are using the pre-designed option). Allow students to work through the practice of creating their own word problems.
5. Give students time to create their word problems on their Truly Tricky Cards. Students should work on their answer keys simultaneously.
6. Allow students to play their games! Students can even swap games with each other and play their classmates' game board creations. ☺

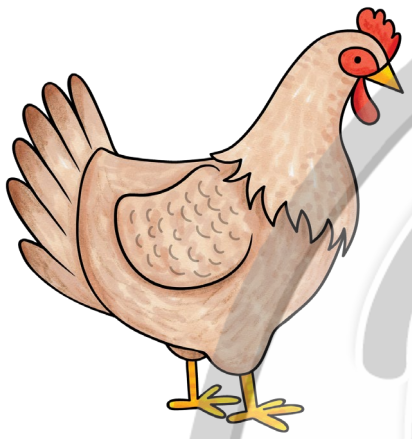
Word Problems Can Be Tricky!

Word problems can be tricky - that is why leprechauns love them! Practice solving and creating word problems with equations and multi-step word problems by making your very own board game.

Let's get started!

- Review word problems and key words.
- Solve some practice word problems.
- Review the game parts and rules.
- Make your own word problems for the game.
- Create an answer key for your word problems.
- Play your game! Have fun!

SOLVING WORD PROBLEMS *with equations*



Steph the chicken lays 4 eggs per week. Margot the chicken lays 12 eggs per week. How many times more eggs does Margot lay than Steph?

Key words

help determine what operation(s) to use.

"How many TIMES more" suggests multiplication will be needed to solve the word problem.

x

Writing an *equation*

helps find the answer.

$$4 \times C = 12$$

What number times 4 is equal to 12?

The *answer* to the

equation is the answer to the problem!

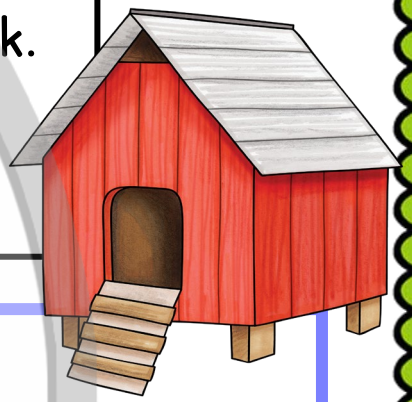
$$4 \times 3 = 12$$

Margot the chicken lays 3 times more eggs per week than Steph.

MULTI-STEP WORD PROBLEMS

solving with equations

Steph the chicken lays 7 eggs per week. Margot the chicken lays 4 times the number of eggs that Steph lays per week. If Steph lays an equal number of green and brown eggs, how many brown eggs does she lay each week?



step 1:

"TIMES the number" suggests multiplication will be needed to solve the 1st part of the problem.

$7 \times 4 = C$

$7 \times 4 = 28$

step 2:

"An EQUAL number" suggests division will be needed to solve the 2nd part of the problem.

$28 \div 2 = B$

$28 \div 2 = 14$

answer:

Steph lays 14 brown eggs each week!

After finding an answer, you can ask yourself:

- Does my answer make sense?
- Did I answer the question?

ADDITION AND SUBTRACTION

key words

- total
- in all
- and
- altogether
- together
- perimeter
- sum
- plus
- join

If you see any of these key words, use addition to solve the problem!

- fewer
- are not
- leftover
- difference
- how many more
- take away
- remain
- minus
- exceed

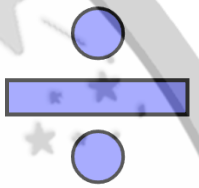
If you see any of these key words, use subtraction to solve the problem!

MULTIPLICATION AND DIVISION

key words

- times
- each
- in all
- multiple
- equal groups
- multiplied by
- per
- twice
- area
- total

If you see any of these key words, use multiplication to solve the problem!



- half
- split
- dividend
- difference
- how many more
- take away
- separate
- same

If you see any of these key words, use division to solve the problem!

Practice Solving Word Problems!

Let's practice solving word problems! You'll get to create your own, next. Be sure to show your work for each problem. Remember to work carefully... word problems can be tricky!

1. There are two lines at the post office. One line has 18 people waiting in it. That's twice as many people as the other line. How many people are waiting in the shorter line?

SHOW YOUR WORK:

ANSWER: _____

Word problems can be tricky!

Circle the <u>key words</u> in the word problems!

2. The blue rope measures about 54 inches long. If the blue rope is 9 times as long as the red rope, how long is the red rope?

SHOW YOUR WORK:

ANSWER: _____

3. On Friday, Hazel had a reading test and a social studies quiz. There were 30 words on the reading test, and that is 5 times as many questions as there were on the social studies quiz. How many questions were on the social studies quiz?

SHOW YOUR WORK:

ANSWER: _____

Word problems can be tricky!

Circle the key words in the word problems!

4. A candy bar at a convenience store costs 10 quarters. If a candy bar costs five times as much as a stick of gum costs, how many quarters does a stick of gum cost?

SHOW YOUR WORK:

ANSWER: _____

5. Rodrigo lives 6 miles away from school. His classmate Maria lives 4 times as many miles away from the school as Mateo. How far is Maria's house from school?

SHOW YOUR WORK:

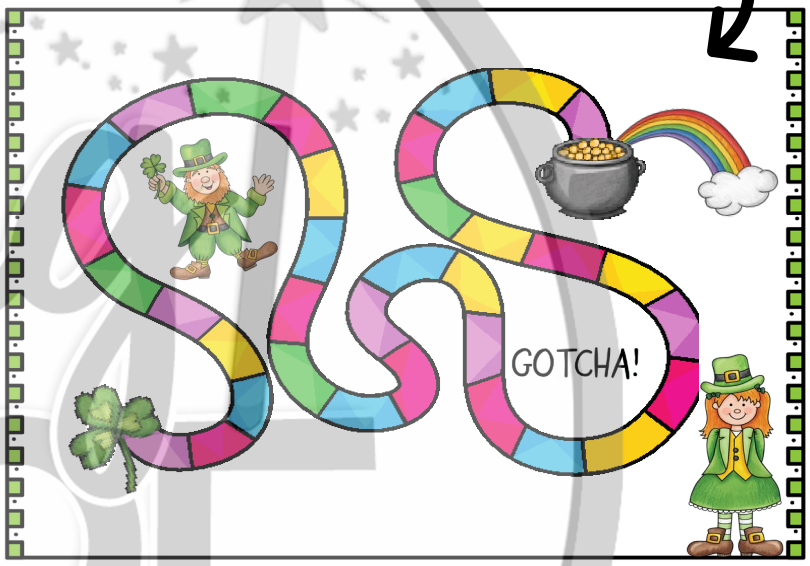
ANSWER: _____

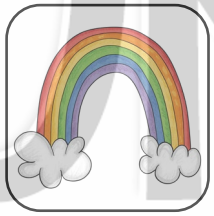
CREATE A BOARD GAME!

It's time to create your own board game to review word problems with equations and multi-step word problems! Here are the elements of your game:

GAMEBOARD

The game board has a trail for the players to follow. There is a starting place and an ending place. Whoever reaches the pot of gold first wins the game. The game should continue until everyone finishes!

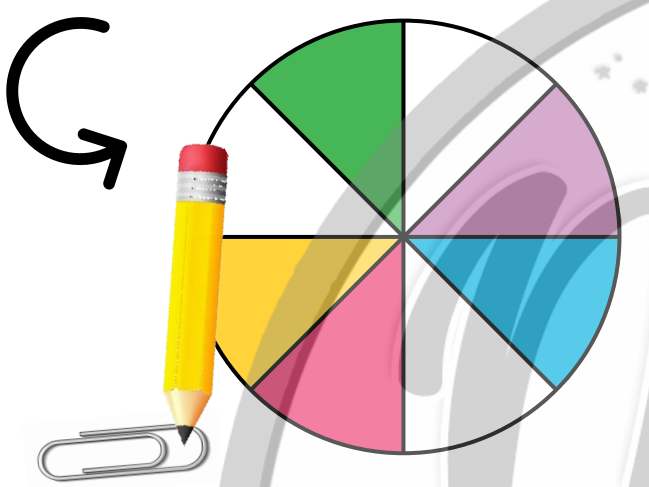




GAME PIECES

There are four game pieces: a leprechaun hat, a gold coin, a cupcake, and a rainbow. This game can be played with 2, 3, or 4 players. Each player gets to choose their own game piece. They will use the game pieces to keep track of where they are on the trail.

SPINNER



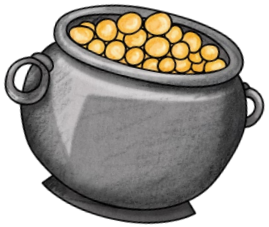
The spinner will let each player know where to advance to on the game board when it is their turn. When it is their turn, each player spins the spinner. A pencil can be used to anchor a paperclip to the center of the spinner. Holding the pencil, flick the paperclip to "spin" and see what color it lands on. The player moves their game piece to the color the spinner lands on. No skipping! Move the game piece to the next available spot that is the correct color... even if it is only one spot forward!

TRULY TRICKY GAME CARDS

If there is a leprechaun on the spot a player lands on, they must pick a "Truly Tricky Card!" and solve the word problem on it. Afterward, the game can continue with the next player. These cards are where you will write the word problem that you create for the board game!

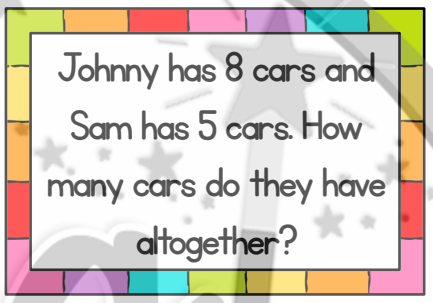
TRULY TRICKY!

game rules

- There must be 2, 3, or 4 players to play the game. The players must take turns in order. 
- Each player gets one spin. If the player lands on a color, they must jump forward to the next spot of that color. If the player lands on a command, they must follow it. 
- If a player lands on a spot with a leprechaun, they must pick a "Truly Tricky Card" and solve the word problem. If the word problem is too tricky for a player to solve by themself, they can ask for help from the other players. 
- The first person to reach the pot of gold wins the game!
  The game should continue until all players reach the pot of gold. 

TRULY TRICKY CARDS

example



There are 10 leprechauns scattered along the board game trail. If a player lands on a spot with a leprechaun, they must pick a Truly Tricky Card and solve the word problem.

The Truly Tricky Cards are blank. You must write 10 "tricky" word problems on the back of them! You will also need to make an answer sheet, so it is important that you know how to solve your word problems.

Let's practice!

CREATING WORD PROBLEMS *examples*

In the examples below, the first part of the word problems is given. There are two example story components and example questions that could be used to complete the word problem. Notice the key words used, which indicate what operations will be used to solve the final word problem.

addition and subtraction:

EXAMPLE 1:

Ahmad had 232 cinnamon squares in his cereal bowl. His sister grabbed 57 from his bowl.

ADDITIONAL STORY COMPONENT ⇨ Ahmad grabbed 78 back from her bowl.

QUESTION ⇨ How many cinnamon squares does Ahmad have?

EXAMPLE 2:

Ahmad had 232 cinnamon squares in his cereal bowl. His sister grabbed 57 from his bowl.

ADDITIONAL STORY COMPONENT ⇨ Then his brother grabbed 93 more.

QUESTION ⇨ How many cinnamon squares does he have left?

multiplication and division:

EXAMPLE 1:

Amelia has 41 toy trucks and Michael has 3 times as many.

ADDITIONAL STORY COMPONENT ⇨ Michael's cousin gave him 94 more toy cars.

QUESTION ⇨ How many toy cars does Michael have in total?

EXAMPLE 2:

Amelia has 41 toy trucks and Michael has 3 times as many.

ADDITIONAL STORY COMPONENT ⇨ Michael loses half of his toy cars.

QUESTION ⇨ How many toy cars does Michael have in total?

Practice Completing Word Problems

The first part of the word problems is given. Your task is to think of <u>one additional story component</u> and <u>a question</u> that will complete each word problem. Remember to use key words to indicate what operations to use.

ADDITION & SUBTRACTION:

Mika has 369 flowers and Jamal has 192.

STORY COMPONENT ⇨

?

Kate picked 113 raspberries and Jay picked 311.

STORY COMPONENT ⇨

?

MULTIPLICATION & DIVISION:

Harriet has 29 times the number of buttons on her jacket as Clare.

STORY COMPONENT ⇨

?

Julian has 4 times as many trading cards as Jerimiah, who has 33.

STORY COMPONENT ⇨

?

CREATE YOUR TRULY TRICKY CARDS

You are going to create ten Truly Tricky word problem game cards.
Cut out the cards and write one word problem on the back of each.

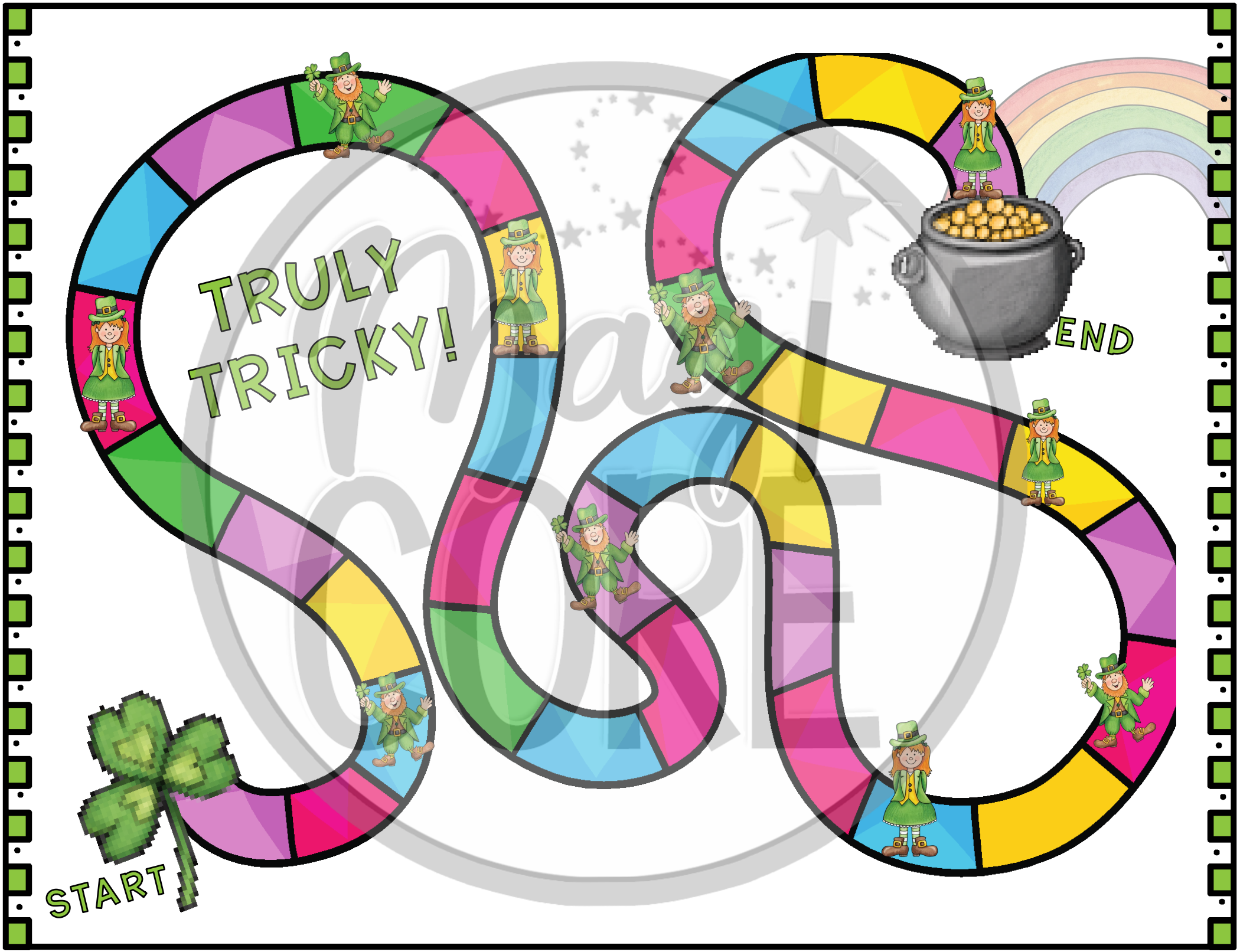
Your cards should have a mix of different word problems with multiple steps to solve. You must include each of the four operations (addition, subtraction, multiplication, and division) at least 2 times each.

Do not put the answers on the cards. They will be written on the answer key.

TRULY TRICKY ANSWER KEY

You need to know the answers to the problems you created. Use this chart as an answer key. Cut it out and use it while playing your game.

Card #	Show Your Work!	Answer
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		


TRULY TRICKY!
START
END

Jump 3 Spaces Forward!
Skip a turn!
Take another spin!

DESIGN YOUR OWN BOARD GAME

GAME BOARD (make sure to give your game board a title!)

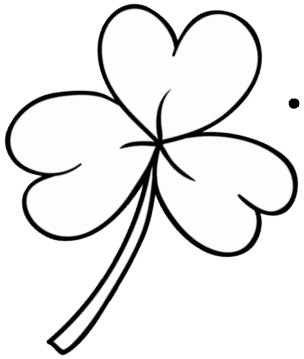
The game board has a trail for the players to follow. You will need a starting place and an ending place. What will you put on each of the spaces? You can use words, symbols, or colors. You need to think about how the players of this game will win the game. What is the main objective?

GAME PIECES

This game can be played with 2, 3, or 4 players. There are leprechaun-themed game pieces to choose from, or any small object can be used. You can also create your own game pieces! The game pieces are used to keep track of each player's spot along the trail.

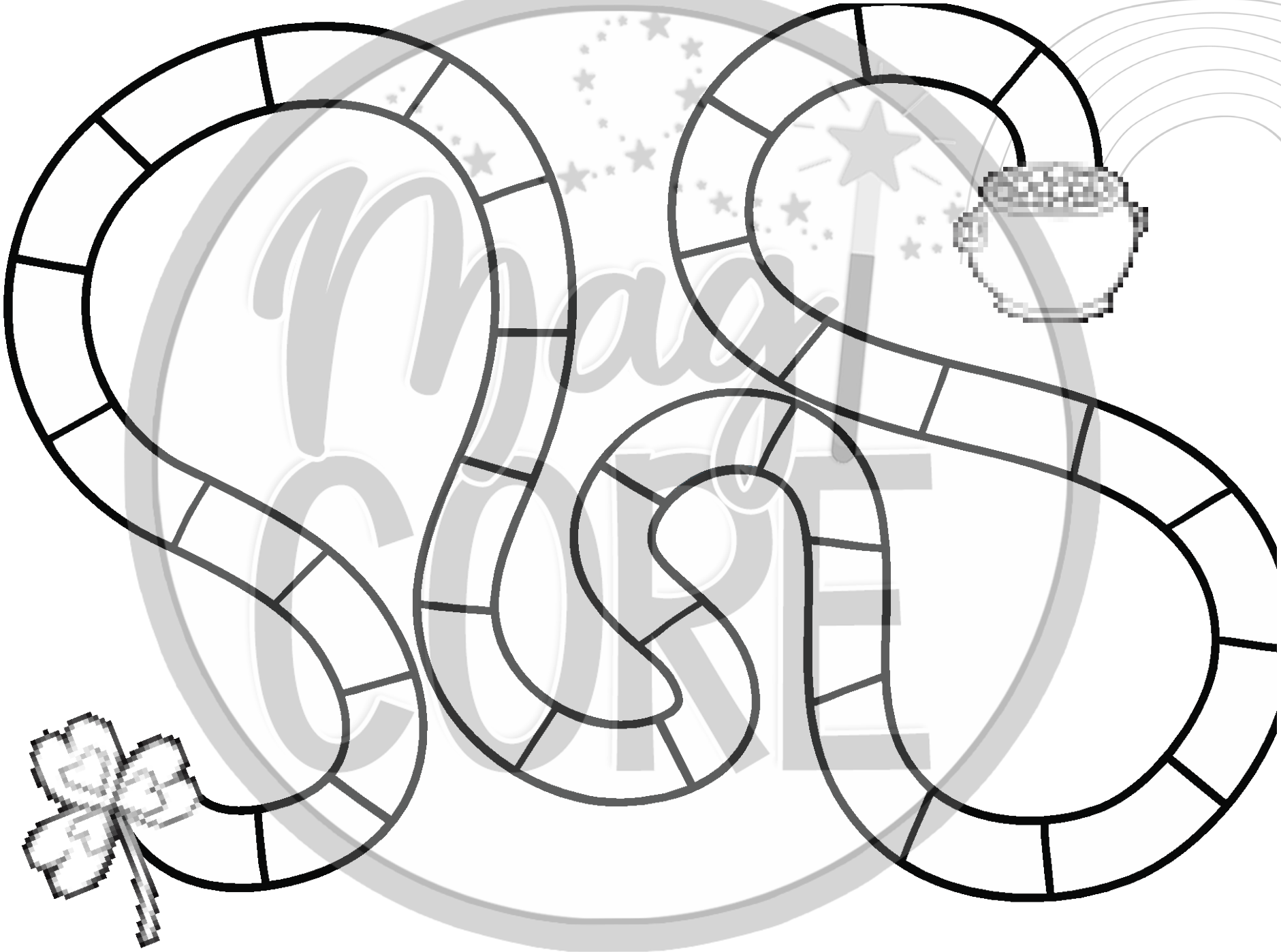
SPINNER

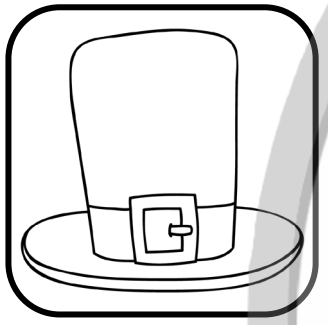
The blank spinner should be completed. It can have colors, numbers, or other commands that align with the game board you create. Taking turns, each player spins the spinner. A pencil can be used to anchor a paperclip to the center of the spinner. Holding the pencil, flick the paperclip to "spin" and see what it lands on.

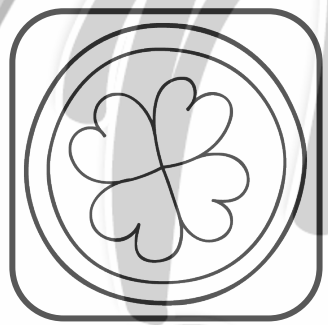


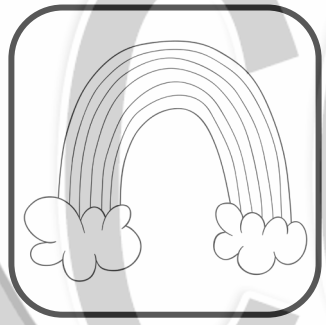
WORD PROBLEM CARDS

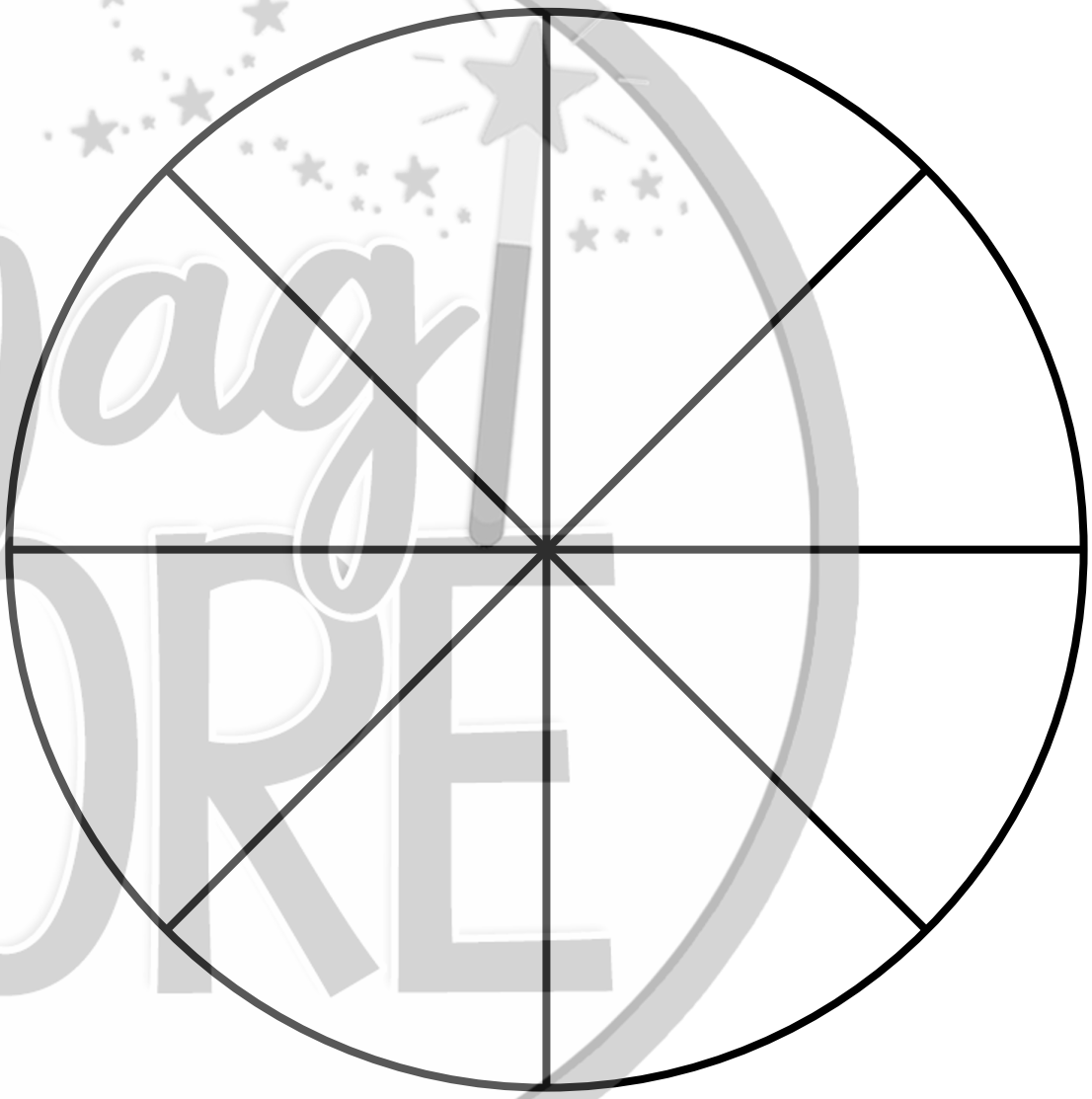
Upon completion, the word problems can be used to "trick" the players. Think of a way to indicate the use of the word problem cards on the board game and/or spinner somehow. Example idea: scatter leprechauns along the trail and every time a player lands on one, they need to pick a card. There should be at least 10 cards to make the game "tricky."











Answer Key

You need to know the answers to the word problems you created! Use the space to fill out the answers.

Card #	Answer

Game Rules

Use the space below to write your game rules.

CREATE YOUR GAME CARDS

Decide how many word problem cards will be needed for the game. Cut out the cards and decorate the front. Number the cards on the front and write the word problem on the back.

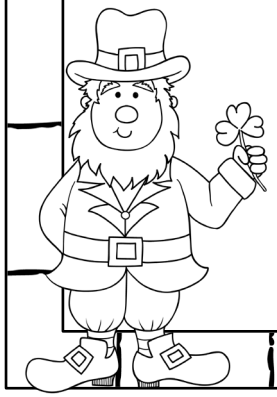
Be sure to create different types of word problems with multiple steps to solve. Also be sure to use a mix of all four operations (addition, subtraction, multiplication, and division).

Do not put the answers on the cards.
They will be written on the answer key.

EXAMPLE:

#1

Truly Tricky Card

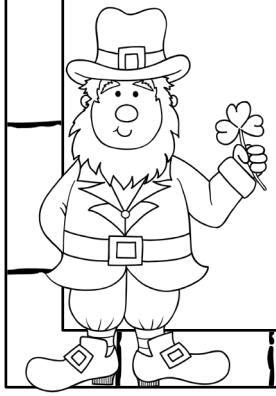


Johnny and Sam decide to share their cars. Johnny has 8 and Sam has 5. Then they give their friend Angie 2 cars for her birthday. How many cars do they have left?

#__

#__

#__



#__

SELF-REFLECTION

Write a reflection of your experience with this project. How did you feel about the math word problems and creating a game board? Explain what you found easy to do and any difficulties you had while working on this project. Did you enjoy this activity? Why or why not?

RATE THIS PROJECT

Circle the statement you most agree with.

I am ready for something harder. This was just right. I found this very challenging.

SELF-EVALUATION

Circle one box per row on the rubric that expresses how you rate yourself on this Project-Based Learning Activity.

+	✓	−
I felt very confident about the math in this project.	I felt pretty good about my ability to complete the math in this project.	I felt a lot of the math in this project was too hard for me to do alone.
I understood all of the math and did not need help to complete the problems.	I understood most of the math but needed a little help to solve some of the problems.	I understood some of the math but needed help to complete most of the problems.
I easily used many strategies to solve the math problems efficiently.	I needed some help to use the best strategies for solving the math problems.	I had trouble understanding the best way to solve many of the math problems.
I feel I am ready for a harder math project.	I feel I would like to spend more time practicing similar math problems.	I feel I need assistance to work on similar math problems.

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