



ST Math®

Teacher Guide to Supporting 5th Grade Students Learning From Home

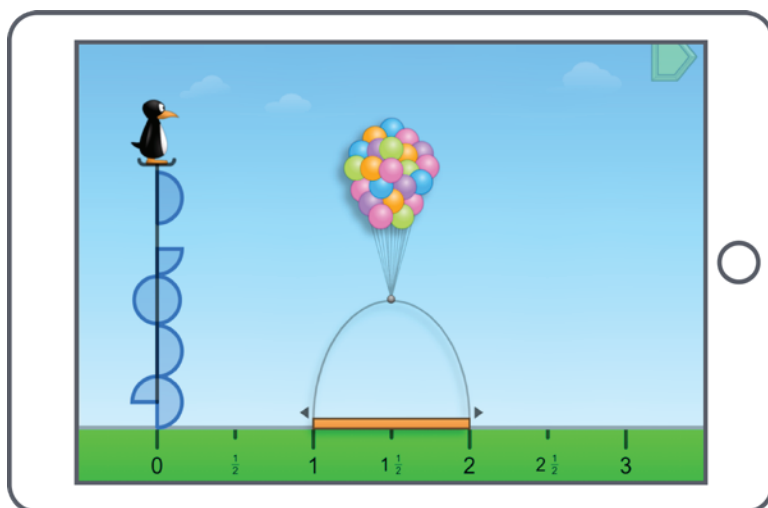


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With the spread of Coronavirus, COVID-19, schools across the country are temporarily closing. At [MIND Research Institute](#), our mission is to ensure that all students are mathematically equipped to solve the world's most challenging problems. That's why we stand ready to provide resources and no-cost access so the learning can keep on happening, even if school is temporarily closed.

This guide provides support and resources that teachers can use for remote learning. There's also a companion guide for parents. All resources in the parent guide are included here to support teachers as they plan their remote instruction. The three types of resources in this guide are outlined below.

ST Math Program: [ST Math](#) is a PreK-8 visual instructional program that leverages the brain's innate spatial-temporal reasoning ability to solve mathematical problems. Its unique, patented approach provides students with equitable access to learning through challenging puzzles, non-routine problem solving, and informative feedback. With ST Math, students build deep conceptual understanding, and schools see proven, repeatable results.



Hands-On Math Activities: These activities focus on specific math concepts within a grade level. Each activity is designed to engage students in learning that is hands-on and promotes understanding of the concept. These activities are meant to be done with a parent or guardian. It's a fun way for children and parents to do math at home. Each activity includes clear directions, vocabulary words, and questions parents can ask to support their children during the activity.

Number Sense Games: Number Sense is an area that is critical to mathematics learning. It includes mathematical concepts like counting, adding, subtraction, multiplication, division, fractions, place value, estimation, and many others. Included in this packet are activities that students can do at home with their families to build number sense and practice those critical skills in a fun and engaging way through gameplay.

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Resources to support, monitor, and assess student learning while they play ST Math.

Hands-On Math Activities 14-25

Planning strategy for creating virtual ST Math Lessons.

A collection of hands-on, grade-band activities focused on practicing and exploring math concepts. (Students will not get on ST Math for these activities.)

Virtual Math Talk/Number Sense Games 26-50

Use the ST Math Creature Board to do a virtual math talk with your students.

Hands-on games and math stories designed to support students in building number sense. (Students will not get on ST Math for these activities.)

Using These Resources

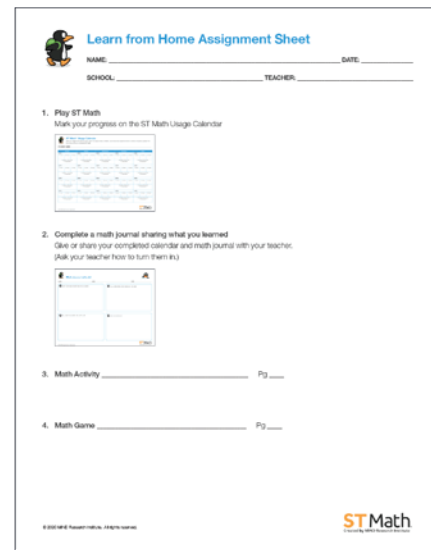
As you review this packet and prepare to use these resources to support you in planning your remote learning, here are some suggestions for you.

Provide your students with an assignment sheet.

- Download the assignment sheet from this packet and use it to communicate with your students the expectations for their work during the week.

Review the tips for parents.

- These are tips that are provided in the parent guide, but also are good reminders that you may want to include in your email communications.



The assignment sheet is titled "Learn from Home Assignment Sheet" and includes fields for NAME, DATE, SCHOOL, and TEACHER. It contains four numbered tasks: 1. Play ST Math (with a screenshot of the ST Math interface), 2. Complete a math journal (with a screenshot of a journal page), 3. Math Activity (with a line for the page number), and 4. Math Game (with a line for the page number). The ST Math logo is in the bottom right corner.



Visit stmath.com/coronavirus

for additional information and support.



Learn from Home Assignment Sheet

NAME: _____ DATE: _____

SCHOOL: _____ TEACHER: _____

1. Play ST Math.

Mark your progress on the ST Math Usage Calendar.

**ST Math® Usage Calendar**
Track and celebrate every time you use ST Math. You'll enjoy at least 30 minutes. Color the box each day that shows the number of minutes you played! When you mark 30 minutes you completed an ST Math.

STUDENT NAME: _____

DATE	MINUTES	DATE	MINUTES	DATE	MINUTES	DATE	MINUTES
4-10-20	30 min	4-11-20	30 min	4-12-20	30 min	4-13-20	30 min
4-14-20	30 min	4-15-20	30 min	4-16-20	30 min	4-17-20	30 min
4-18-20	30 min	4-19-20	30 min	4-20-20	30 min	4-21-20	30 min
4-22-20	30 min	4-23-20	30 min	4-24-20	30 min	4-25-20	30 min
4-26-20	30 min	4-27-20	30 min	4-28-20	30 min	4-29-20	30 min
4-30-20	30 min	5-1-20	30 min	5-2-20	30 min	5-3-20	30 min
5-4-20	30 min	5-5-20	30 min	5-6-20	30 min	5-7-20	30 min
5-8-20	30 min	5-9-20	30 min	5-10-20	30 min	5-11-20	30 min
5-12-20	30 min	5-13-20	30 min	5-14-20	30 min	5-15-20	30 min
5-16-20	30 min	5-17-20	30 min	5-18-20	30 min	5-19-20	30 min
5-20-20	30 min	5-21-20	30 min	5-22-20	30 min	5-23-20	30 min
5-24-20	30 min	5-25-20	30 min	5-26-20	30 min	5-27-20	30 min
5-28-20	30 min	5-29-20	30 min	5-30-20	30 min	5-31-20	30 min

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2. Complete a math journal sharing what you learned.

Give or share your completed calendar and math journal with your teacher.

(Ask your teacher how to turn them in.)

**Math Journal with Juli**

NAME: _____ DATE: _____

**1** WRITE OR DRAW SOMETHING YOU LEARNED

**2** TELL SOMETHING THAT WAS EASY OR HARD

**3** TELL HOW FEEL YOU WITH MATH

**4** MATH VOCABULARY

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3. Math Activity _____ Pg. _____

4. Math Game _____ Pg. _____

ST Math

Resources to support, monitor, and assess student learning while they play ST Math.

Teacher Guidance:

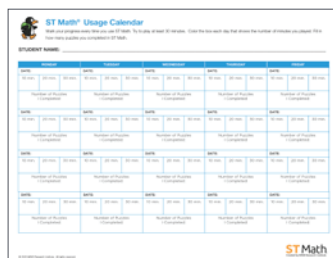
- Encourage students to work independently on ST Math and track their usage on the ST Math calendar. Recommended usage time is 20 to 30 minutes at least 3 times per week.
- Remind your student to use the Think Before You Click strategy to help them think through games. This will help support them when they are stuck on puzzles. For more information on this strategy, view the videos on our instructional resources [Youtube playlist](#).
- Encourage parents to support the student's thinking by asking [facilitating questions](#) instead of telling or showing the student how to solve the puzzles. The parent guide includes a facilitating questions poster. For more information on how parents can facilitate student thinking as they work on ST Math puzzles, view the videos on our instructional resources [Youtube playlist](#).
- Consider posting or emailing a link to the Think Before You Click and Facilitation videos for easy access for parents.
- Review the other resources on the site to determine what other things you might want to share to support the use of ST Math at home.

Below are tips to share with families working with their children at home:

- Work with your child to set goals and monitor their progress toward achieving their goals. This is a great opportunity to help your child see that they can achieve their goals.
- When your child is finished playing ST Math, have them complete a math journal to share what they have learned.
- If possible, take time to sit with your child and ask them to explain to you what they are learning with ST Math.
- A fun way to share learning together is to have your child "teach" a family member how to play one of the ST Math games. They can share the mathematics in the game.
- If your child gets stuck playing the ST Math puzzles, you can have them think through the questions on the Think Before You Click poster. If you are able, you can use the questions on the Facilitating Questions poster to help your child problem-solve through the ST Math games.

ST Math Resources in the Teacher Guide

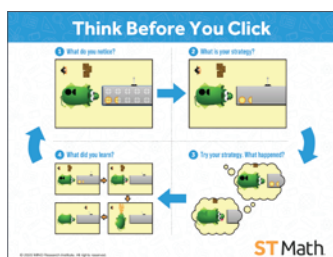
The resources in the table below are provided in the Parent and Teacher Guides to support students as they learn at home.



ST Math Usage Calendar: As students play ST Math, have them track their progress on the calendar.



ST Math Journals: There are different Math Journals for students to communicate their learning. You may choose to use only one or to provide all of them for students to choose from. Students can turn these in via email or another virtual tool each week or you may choose to have them turned in when students return to school.



Think Before You Click Poster: This poster is a great resource for students to ask themselves questions as they work through ST Math puzzles. It will help students as they get stuck. Students may have to try different strategies and observe the feedback several times before they get the correct answer. For more information on this strategy, view the videos on our instructional resources [Youtube playlist](#).



Facilitating Questions Poster: This poster is a great resource provided to parents to help support their student while they play ST Math at home. It is important to remind parents not to tell the student the answer, but to ask questions that help them think through the puzzles. For more information on this strategy, view the videos on our instructional resources [Youtube playlist](#).



Additional Resources: Additional resources for teachers and parents can be found at <https://www.stmath.com/coronavirus>.



ST Math® Usage Calendar

Mark your progress every time you use ST Math. Try to play at least 30 minutes. Color the box each day that shows the number of minutes you played. Fill in how many puzzles you completed in ST Math.

STUDENT NAME: _____

MONDAY			TUESDAY			WEDNESDAY			THURSDAY			FRIDAY		
DATE:			DATE:			DATE:			DATE:			DATE:		
10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.
Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:		
DATE:			DATE:			DATE:			DATE:			DATE:		
10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.
Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:		
DATE:			DATE:			DATE:			DATE:			DATE:		
10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.
Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:		
DATE:			DATE:			DATE:			DATE:			DATE:		
10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.
Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:		
DATE:			DATE:			DATE:			DATE:			DATE:		
10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.	10 min.	20 min.	30 min.
Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:			Number of Puzzles I Completed:		



Math Journal with JiJi



NAME: _____ GAME: _____ DATE: _____

1 WRITE OR DRAW SOMETHING YOU LEARNED

2 TELL SOMETHING THAT WAS EASY OR HARD

3 TELL HOW THIS HELPS YOU WITH MATH

4 MATH VOCABULARY



Math Journal with JiJi

Write or draw something you learned today. Write in one box each day.

NAME: _____ GAME: _____

1

2

3

4

WRITE MATH WORDS YOU USED IN THIS GAME.





NAME: _____ DATE: _____

OBJECTIVE PROGRESS	SYLLABUS PROGRESS	TIME SPENT	# OF PROBLEMS SOLVED

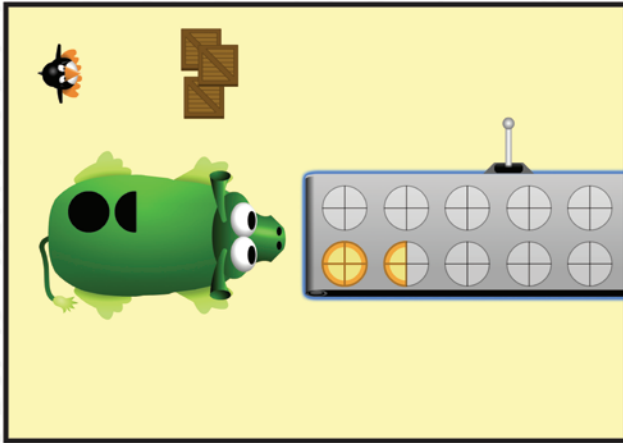
SOMETHING I LEARNED TODAY IS . . .

SOMETHING THAT WAS EASY / HARD FOR ME WAS...
(circle one)

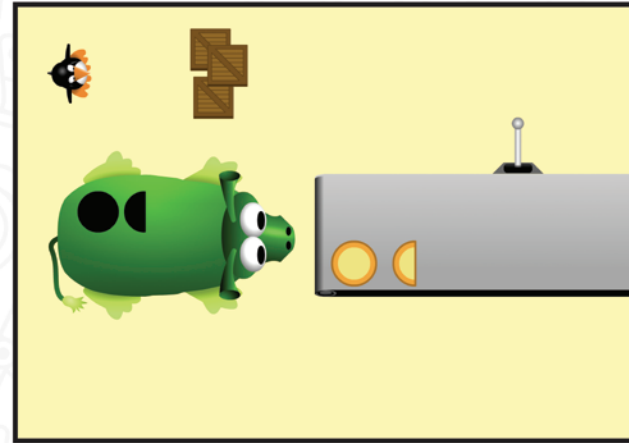
ONE WAY THIS CONNECTS TO WHAT I LEARNED IN CLASS IS . . .

Think Before You Click

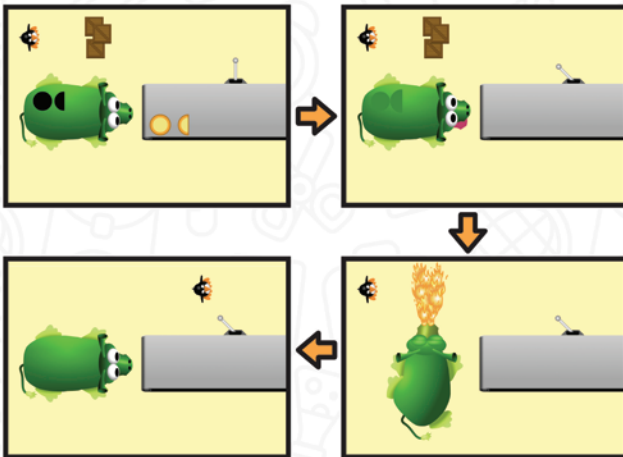
1 What do you notice?



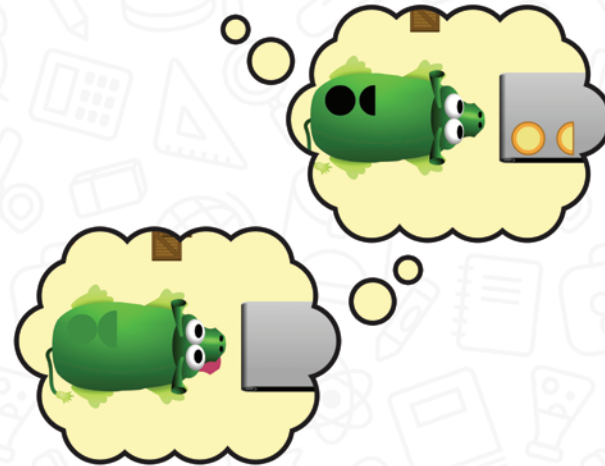
2 What is your strategy?



4 What did you learn?



3 Try your strategy. What happened?

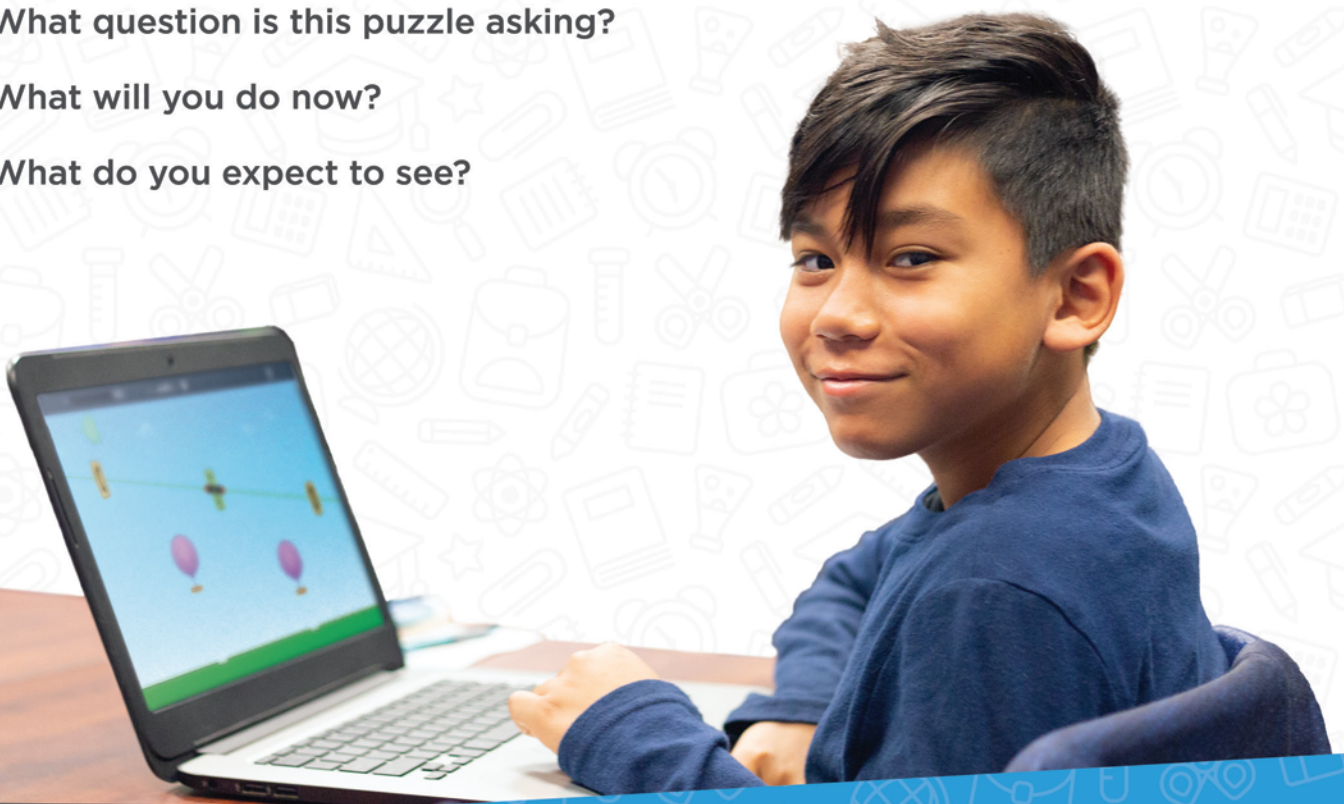


Facilitating Questions

In ST Math®, the puzzles start off simple and then get more challenging as the student progresses. When they reach a challenging problem, they may ask for your help.

To help them, ask questions like:

- What do you notice about the puzzle?
- What did you learn from the previous level that can help you here?
- What can you click?
- Describe what you see after you click. What did you learn?
- Describe the strategy that you are going to use.
- What can you do to get JiJi across the screen?
- What question is this puzzle asking?
- What will you do now?
- What do you expect to see?



Hands-On Math Activities

A collection of hands-on, grade-band activities focused on practicing and exploring math concepts.

These activities correlate to our games.

Teacher Guidance:

- These activities focus on specific math concepts within a grade-level. Each of the hands-on math activities are correlated to an ST Math game. These games are great for you to use with your students in your one-on-one meetings, or in virtual lessons. The visual models in the games help students “see” the mathematics.
- As students do these activities with their families, you may want to have students write what they learned during the activity, or write their answers to the questions so you can assess their learning. Below are some tips that you can share with parents as they do these activities with their children.

Below are tips to share with families working with their children at home:

- These are great activities for you to do with your child. Family members can use the questions and ideas provided to promote math conversations.
- Once your child finishes the activity, have them write a 5-sentence summary or draw a picture of what they learned. They should also list any questions they have for their teacher.

Hands-On Math Activity Resources in the Teacher Guide

The resources in the table below are provided in the Parent and Teacher Guides to support students as they learn at home.



Math Activity Guide: This guide outlines activities, their related materials, and math concepts.



Math Activity Sheets: These activity sheets include directions, vocabulary words, sample questions, and extension ideas. The activities are designed so that students can complete with the teacher or at home with their families.



Grade 5

Game	Materials Needed	Concepts	ST Math Game Connection
Volume Line Up	Rectangular prism shaped objects from around the house (cereal boxes, tissue boxes, deck of card box, etc.)	A solid figure has volume. Volume can be found by filling the figure with unit cubes and counting the number of unit cubes.	5th Grade Objective: Volume Games: Intro to Volume Helicopter Volume
Order Matters	- Pencil - Paper	Parentheses help establish the order of operations by noting which operation(s) to complete first.	5th Grade Objective: Using Parentheses Games: Which Parentheses
Guess My Rule	- Notecards - Pencil - Paper	Number patterns follow a rule. Two number patterns can have a relationship between the corresponding numbers.	5th Grade Objective: Patterns and Relationships Games: Linear Transform Table
Stretch It Out	- Notecards or sticky notes - Pencil - Paper	Decimals and fractions both represent equal parts of a whole. Decimals are fractions with certain denominators.	5th Grade Objective: Fraction and Decimal Concepts Games: Fractions and Decimals Grid
X Marks the Spot	- Pencil - Paper - Ruler	Fractions are numbers with a designated spot on the number line.	5th Grade Objective: Fractions on a Number Line Games: JiJi Cycle Select Wheel L.I. Estimate Fractions on a Number Line
Can You Repeat That?	- Paper - Pencil	Viewing multiplication as repeated addition can help to visualize what is happening when a whole number is multiplied by a fraction.	5th Grade Objective: Fraction Multiplication Games: Alien Bridge LI
Now Serving Breakfast	- Paper - Pencil	A fraction can be thought of as a division problem: the numerator divided by the denominator.	5th Grade Objective: Fraction Division Games: Select Peanuts Select Peanuts per Elephant
Describe That Shape	- Toothpicks - Notecard or piece of paper	Shapes can be classified based on attributes. A shape's attributes may allow it to fit into multiple categories.	5th Grade Objective: Angles Games: Shape Types



Volume Line Up

Activity for 5th Grade Students

This game focuses on helping children to understand that solid (or 3-dimensional) shapes have volume. Volume is filling a 3-dimensional space with cubes. The size of cubes depends on the unit of measurement. For example, there can be cubic feet (where each side of the cube measures one foot), cubic centimeters (where each side of the cube measures one centimeter), or any other unit of length. One cube is called a cubic unit.

Your child should understand volume as the total number of unit cubes needed to completely fill the shape. Using unit cubes will help your child to discover the formula for volume: $L \times W \times H$ (length x width x height).

Directions:

- Go on a rectangular prism shaped object hunt with your child. Gather things from around the house, such as a cereal box, tissue box, shipping box, game box, etc.
- Talk with your child about all of the different ways you could measure the box (length, width, height, weight, etc.).
- Talk about volume and how you could determine the volume of the object.
 - How might we measure how much each box holds?
 - What could we use as our unit of measurement?
 - Cotton balls
 - Marbles
 - Lego Blocks
 - Other ideas?
 - You might notice that cubes allow us to be more consistent in measuring - since cotton balls can be squashed and marbles leave gaps. Cubes - rather than a rectangular Lego Block - allow us to have the same measurement on all sides of the unit.
- Explain to your child that volume is a measurement of solid shapes. You can pack a solid shape full of unit cubes and then count the total number of unit cubes to find the volume of an object.
 - What if we didn't have enough units to completely pack the box?
 - Do we have enough units to pack one layer?
 - Can we think about multiple layers?
 - How many layers might this box hold?
 - Is there a way we could figure this measurement out for any box we find?
- Have your child compare all of the rectangular prisms and line up the objects in order from the smallest volume to the greatest volume. Have your child explain their thinking to you.





Volume Line Up (cont.)

Math Words to Use:	Materials	Sample Questions to Ask:
Solid figure 3-D shape Volume Fill Unit cube	Rectangular prism shaped objects from around the house (cereal boxes, tissue boxes, deck of card box, etc.)	- How do you know this is a rectangular prism? - How could we measure the length/width/height of this object? - Why do you think this object has a smaller/greater volume? - When would you need to know the volume of an object?

Ideas to extend Learning:

- Use a centimeter ruler to measure the length, width and height of one of the rectangular prism shaped objects. Ask your child how they could figure out how many centimeter cubes it would take to fill the object if they know these measurements. Talk about the formula $L \times W \times H$.
- Pose multiplication problems with 3 factors (e.g. $3 \times 5 \times 4$). Since $3 \times 5 \times 4$ has a product of 60, what product can we expect if we multiply $5 \times 4 \times 3$? Work together to prove that order doesn't matter when we multiply. Work through the different possible orders of each problem to prove the answer is always the same.
- Brainstorm situations where a company or business would need to know the volume of solid shapes (e.g., shipping boxes for goods, containers for their products, etc.).



Order Matters

Activity for 5th Grade Students

This game focuses on helping children to understand that parentheses help establish the order of operations by noting which operation(s) to complete first. For example, your child should see the expression $(5 + 3) \times 4$ and understand that they are solving for “the sum of 5 and 3 times 4”. Their first step would be to find the sum of 5 and 3 (8) and then multiply the sum by 4 (8×4) to get an answer of 32.

Directions:

- Gather a pencil and paper.
- Talk with your child about the role of parentheses (brackets, braces) in a math problem. Explain that the parentheses indicate which operations should be performed first.
- Look at this picture of bags of coins to the right. What are some expressions or equations that you can write to describe this picture?
 - Some ideas are $6 + 6 + 6$; $3 \times (2 + 4)$, and $3 \times 4 + 3 \times 2$ for the number of coins or $3 \times [(2 \times \$0.05) + (4 \times \$0.01)]$, and $3 \times (\$0.10 + \$0.04)$ for the amount of money.
 - We can group the coins in each bag together since they are the same number and amount and multiply that by the number of bags. Parentheses are one way we can do this.
- Pose the following expressions to your child. For each expression, ask your child to “read” the expression, explain the order in which they’ll solve the problem, and then have them solve the problem.

$3 \times (6 + 5)$	$(4 \times 3) + (5 \times 6)$	$(10 - 8) \times 12$
$(25 - 10) + (34 + 7)$	$50 - (2 \times 22)$	$(120 \times 2) - 118$



- Choose a few expressions that your child solved and rewrite the expression without the parentheses. Have your child work through the problem and discuss how the answer changes and why.

Math Words to Use:	Materials	Sample Questions to Ask:
Expression Parentheses Order Operations	- Pencil - Paper	- What is this expression asking us to do? - Where will you begin to solve this problem? Why? - Why might you change the order you do steps of an equation when there are NOT parentheses? - When would you need to do steps in order to solve a problem in real life?

Ideas to Extend Learning:

- Show your child completed equations that are missing parentheses (e.g., $4 \times 8 + 2 = 40$). Have your child use macaroni, string or other household items to represent parentheses. Have them add these “parentheses” where they need to go to make each equation true (e.g., $4 \times (8 + 2) = 40$).
- Pose word problems for your child and ask them to write an equation including parentheses that could be used to solve the problem. (e.g., “Each party guest gets 3 balloons. Eva invited 12 friends. Mallory invited 15 friends. How many balloons are needed in all?”)
- Create a matching game using notecards. Put an expression with parentheses on one notecard and the corresponding answer on another notecard. Have your child find the matching cards.



Guess My Rule

Activity for 5th Grade Students

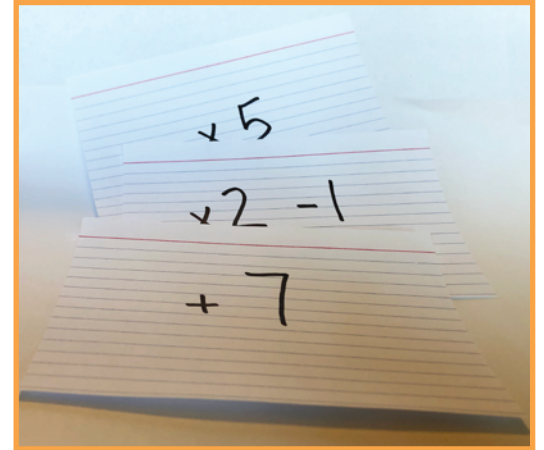
This game focuses on helping children to identify number patterns as well as create number patterns according to rules. Your child should be able to follow a rule (e.g., $\times 2$) to generate a number pattern starting at any number. They should also be able to compare two patterns to find a relationship between them (e.g., for these two patterns (2, 4, 6, 8 and 4, 8, 12, 16), the number in the second pattern is four times the matching number in the first pattern.)

Directions:

- Gather notecards (or small pieces of paper), a pencil and paper.
- On the notecards, write the following rules:

$\times 2$	$+7$	$\times 4$	$\times 2, +1$
$\times 5$	$\times 8$	$\times 2, -1$	$+ 12$

- Decide who will be Player One and Player Two.
- Player One chooses one of the notecards but does not show the rule to Player Two. Player One creates an input/output table that follows this rule and then returns the notecard to the pile of rules and mixes them up.



Example:

Input	Output
4	11
6	13
10	17
21	28

- Player Two must analyze the input/output table and find the matching rule card.
- Work together to prove that the input/output table matches the rule.
- Trade roles and repeat.



Guess My Rule (cont.)

Math Words to Use:	Materials	Sample Questions to Ask:
Input/output table Rule Pattern	• Notecards • Paper • Pencil	• How could you get from one consecutive number to the next? • What number comes next in this pattern? • How do the corresponding numbers in these two patterns relate? • How could you write a rule for this relationship?

Ideas to Extend Learning:

- Investigate the corresponding numbers in two of the patterns. For example, how are the numbers in the $\times 4$ pattern related to the numbers in the $\times 8$ pattern? Why? What other patterns would relate in the same way?
- Practice skip counting by a given number between 2 and 10. For example, 3, 6, 9, 12, up to 30. For a challenge, see how high you can skip count until you make an error. Memorization of multiplication facts will make patterns easier to see.
- Create input/output tables with missing inputs or outputs and ask your child to fill in the missing numbers.



Stretch It Out

Activity for 5th Grade Students

This game focuses on helping children to make a connection between fractions and decimals. Your child should understand that decimals and fractions both represent equal parts of a whole. Decimals are fractions with only certain denominators (tenths, hundredths, thousandths, etc.).

Directions:

- Gather paper, a pencil, and notecards.
- Label the notecards as shown below.

1/10 tenths	1/100 hundredths	1/1000 thousandths
-------------	------------------	--------------------

- Pose a number that has up to thousandths and work with your child to help them to write the number in word form.
- For example, the number .386 would be written as “386 thousandths” in word form. Have your child write out each digit in the number and then match the digit to the notecard that names the place that digit is in (e.g. 3 matches with tenths, 8 with hundredths and 6 with thousandths).
- Work together to use the notecards to help your child write the number in expanded form (e.g., $\frac{3}{10} + \frac{8}{100} + \frac{6}{1000} = .386$ or $0.3 + 0.08 + 0.006$).
- Repeat with other numbers with up to thousandths.



Math Words to Use:	Materials	Sample Questions to Ask:
Decimal point Decimal Fraction Tenths Hundredths Thousandths Equal	• Notecards or sticky notes • Pencil • Paper	• What does the decimal point represent? • How can we write this decimal as a fraction? • How can we write this fraction as a decimal? • What happens as we move to the left of the decimal point? • What happens as we move to the right of the decimal point?

Ideas to Extend Learning:

- Choose a number with hundredths and model it in a square. Work together to divide the square into a hundred equal pieces and then shade in hundredths to represent the number. Help your child to see that every ten hundredths makes up a tenth. Help them to see the connection to the whole number place value of ones, tens and hundreds.
- Compare decimals. Ask your child why tenths are bigger than hundredths. Compare the number of dimes (\$0.10) in a dollar to the number of pennies (\$0.01) in a dollar.
- Ask why thousandths are smaller than tenths. Discuss how gasoline is priced \$2.099. Ask how much extra money they might make since it is priced that way.
- Give your child a set of decimals and ask them to order them from least to greatest.



X Marks the Spot

Activity for 5th Grade Students

This game focuses on helping children to understand fractions are numbers. Your child should know that each fraction has a designated spot on the number line, just like whole numbers. The space between each two consecutive whole numbers can be divided up into fractional parts.

Directions:

- Gather a ruler, pencil and paper.
- Look closely at the ruler together. Ask your child to identify the whole numbers on the ruler. Then point out all of the other lines on the ruler. Choose 5-7 of these lines and ask your child to name both the fraction and mixed number represented by each line. These can be greater than one. For example, they might say that $2\frac{1}{4}$ inches is the same as $\frac{9}{4}$ inches.
- Draw a 0-10 number line on a piece of paper. Give your child fractions and mixed numbers and ask them to mark where each would go on the number line with an X. Have your child think out loud as they place each X.



Math Words to Use:	Materials	Sample Questions to Ask:
Fraction Mixed number Equal Divide Estimate	• Pencil • Paper • Ruler	• Which number would be at this spot? How do you know? • How can you prove this fraction and this mixed number are equal? • Where would ___ go on this number line? • Could you count by $\frac{1}{2}$ forever? Why or why not?

Ideas to Extend Learning:

- Discuss with your child why we wouldn't want to measure everything using only whole numbers.
- Talk about what happens to the size of a fraction as you move right on the number line. What happens when we move left on a number line?
- Write a fraction greater than one for your child (e.g. $\frac{5}{2}$). Have your child represent the fraction as a model, on a number line, in words and as a mixed number.



Can You Repeat That?

Activity for 5th Grade Students

This game focuses on helping children to use what they know about multiplication of whole numbers to help them to multiply a whole number by a fraction. Viewing multiplication as repeated addition can help your child to visualize what is happening when you multiply a whole number by a fraction.

Directions:

- Gather your paper and a pencil.
- Write the following problem for your child: 4×5 . Read the problem as “4 groups of 5” and ask your child how they could represent this problem with a repeated addition sentence. Work together to write $5 + 5 + 5 + 5$. Solve the problem to find an answer of 20.
- Then write the following problem for your child: $4 \times \frac{1}{3}$. Read this problem as “4 groups of $\frac{1}{3}$ ”. Ask your child how we could write this problem as a repeated addition sentence. Work together to write $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$. Solve the problem to find an answer of $\frac{4}{3}$.
- Give your child other multiplication problems to represent as repeated addition and then solve.



Math Words to Use:	Materials	Sample Questions to Ask:
Repeated addition Multiplication Fraction Whole number	• Paper • Pencil • Fraction bars (optional)	• What does this whole number multiplication problem represent? • How could we represent this multiplication problem with repeated addition? • Is your answer more than 1? How do you know? • Can you think of an example of a time you have had repeated groups of fraction pieces?

Ideas to Extend Learning:

- Use your kitchen measuring cup to act out fraction multiplication problems. For example, how much water is $4 \times \frac{1}{2}$ cups of water?
- Pose story problems for your child involving multiplication of a whole number by a fraction. For example, “After the birthday party, John counted 5 pizza boxes. Each pizza box had $\frac{1}{4}$ of a pizza inside. How much pizza does John have? Explain.”
- Ask your child to compare two problems with equivalent fractions. For example, “Is $6 \times \frac{1}{2}$ the same as $6 \times \frac{4}{8}$? Why or why not?”



Now Serving Breakfast

Activity for 5th Grade Students

This game focuses on helping children to understand that a fraction can be thought of as a division problem: the numerator divided by the denominator. Your child should think of $\frac{2}{4}$ as the result of 2 divided by 4.

Directions:

- Gather paper and a pencil.
- Pose different breakfast sharing situations that could happen with your family and friends. Focus on situations where you would have to use fractions as division to serve everyone. Assume that every person will have an equal-sized portion. Work together to draw models as needed.
- Examples of these breakfast serving situations could be:
 - 4 doughnuts for 2 people
 - 2 doughnuts for 4 people
 - 4 granola bars for 8 people
 - 5 pancakes for 3 people
 - 6 bananas for 4 people
 - 12 muffins for 8 people
 - 5 sausage links for 4 people



Math Words to Use:	Materials	Sample Questions to Ask:
Numerator Denominator Divide Equal Fraction	• Paper • Pencil	• How could we represent what is happening in this situation? • Why is our answer not a whole number? • How are these situations similar to other division problems you’ve solved? • How could we check our answer using multiplication?

Ideas to Extend Learning:

- Pose problems similar to the breakfast situations, but let your child explore fractions as division with liquid using liquid measuring cups.
- Act out problems about sharing food at home. For example, share 2 cookies with 3 people.
- Pose word problems that have fractions as an answer. For example, “Three artists are painting their own ocean artwork. They have to share five gallons of blue paint equally. How much blue paint will each artist get? Explain.”



Describe That Shape

Activity for 5th Grade Students

This game focuses on helping children to use geometry vocabulary to name and classify shapes. Your child should understand that shapes can be named and classified based on attributes such as the number of sides, types of angles, whether or not the shape has parallel or perpendicular lines, etc. These attributes might cause a shape to belong to multiple categories of shapes (e.g. a square is a rectangle AND a parallelogram).

Directions:

- Give your child toothpicks (or other straight object) and ask them to make the different shapes from the list below.
- After your child makes each shape, talk about its attributes. Ask questions about the number of sides, types of angles (right, acute, obtuse), and whether or not the shape has parallel or perpendicular sides.
- Use the corner of a notecard or piece of paper as a “right angle checker” for each shape.
- Repeat with all of the shapes in the list. Help your child to use correct geometry vocabulary as they describe the shapes.
- Shapes to make: *right triangle, isosceles triangle, equilateral triangle, rhombus, hexagon, parallelogram, quadrilateral*



Math Words to Use:	Materials	Sample Questions to Ask:
Right angle Acute angle Obtuse angle Parallel Perpendicular Isosceles Equilateral Scalene Quadrilateral	• Toothpicks • Notecard or piece of paper	• What is the name of this shape? • What type(s) of angles does this shape have? How do you know? • Does this shape have parallel sides? How do you know? • Does this shape have perpendicular sides? How do you know? • Can a shape belong to more than one category? Explain.

Ideas to Extend Learning:

- Work together to create a hierarchy of shapes (e.g., quadrilateral-parallelogram-rectangle-square)
 - Quadrilateral*-any 4-sided closed shape
 - Parallelogram*-4-sided, closed shape with two sets of parallel sides
 - Rectangle*-4-sided, closed shape, with two sets of parallel sides, and 4 right angles
 - Square*-4-sided, closed shape, with two sets of parallel sides, 4 right angles, and all sides are congruent (same length)
- Ask your child to make a rectangle. Prove that all of the angles are right angles. Work together to find the sum of the angles for a rectangle. Is the sum of the angles of a square equal to 360° too? Why or why not?
- Ask your child to make an example of the three categories of triangles (equilateral, isosceles and scalene). Have your child decide which type(s) of triangles can have right angles.

Virtual Math Talk with the Teacher

Teacher Resource

- Math talks are great ways to have students explore math concepts. Use the ST Math Creature Board to explore number concepts with your students. Challenge your students to use pictures to solve the problem and then write it symbolically.
- Use the ST Math Creatures Board to pose questions to your students online. The table below has some examples.
- The ST Math Creature Board is also a great resource to use to play the Creature Target Game. This is a great game where you can give your students target numbers and then have them submit their responses. The responses can be discussed in one on one meetings, during office hours, and through online instruction.
- Both the Creature Problem Solving and the Creature Target Game are great opportunities to talk about Number Pairs/Make Ten, Addition Concepts, Skip Counting, Additive/Multiplicative Reasoning, Multiplication Concepts, Factors, Multiples, etc.).

Creature Problem Solving

Using the creatures on the board, children can solve problems about the number of shoes each creature can wear.

(NOTE: the snake has no feet so it represents 0.)

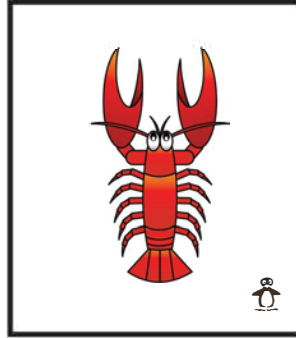
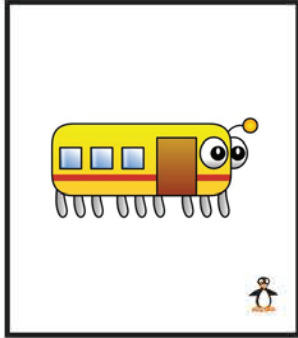
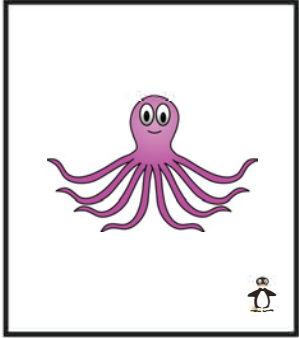
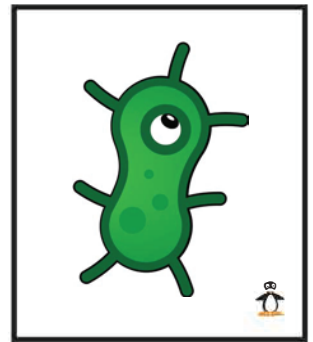
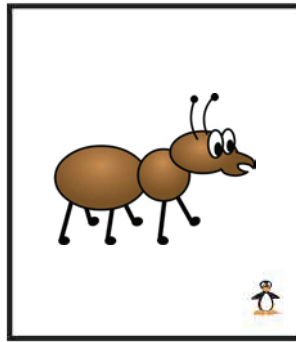
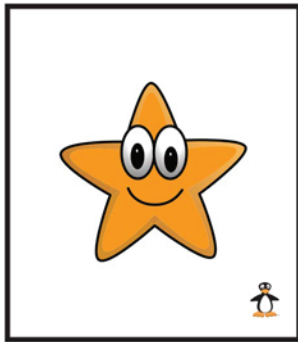
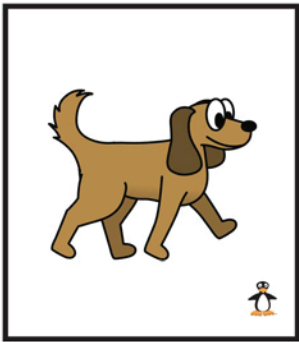
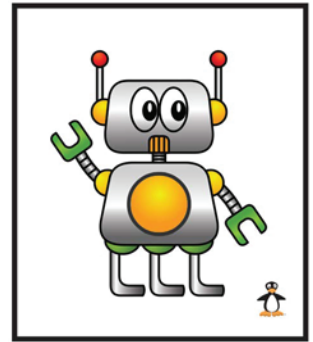
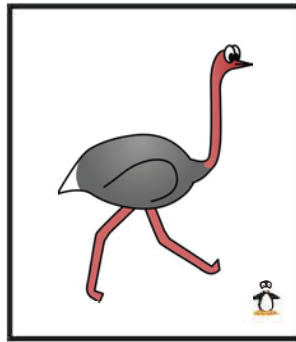
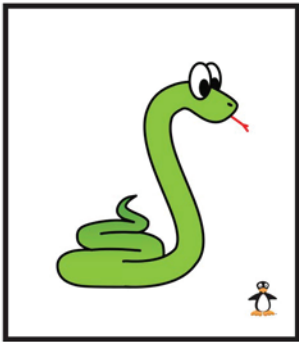
PreK-Grade 2 Ideas	Grades 3-5 Ideas
Find one creature that can wear 6 shoes. Prove that you are correct. Can you find two creatures that together can wear 6 shoes?	JiJi wanted to practice skip counting. JiJi looked at the creatures on the playground and used one of the creature's legs to skip count to 24. Which creature's legs could JiJi have used?
Angela had 10 shoes. She put them on two of the creatures. Which creatures could she put them on?	I have some creatures. Together they wear 12 shoes. If I only have 1 type of creature, which creature do I have and how many?
Paul had some shoes. He put them on robots and ants with exactly enough. How many shoes could he have?	There are 36 shoes and one type of creature. How many of those creatures do I need? Find three different ways.

Creature Target Number game

- Show the ST Math Creature Board.
The challenge is to see how many shoes each creature can wear.
Snake = 0, Eyeball = 1, Ostrich = 2, Robot = 3, Dog = 4, Starfish = 5, Ant = 6, Amoeba = 7, Octopus = 8, Bus = 9, Lobster = 10
- Give a target number. Have students identify the creatures who can wear the same number of shoes as the target number.
- Students may use any combination of creatures.
Example: Give a target number of 10. Children may choose one dog and one ant ($4 + 6$) or one octopus and one ostrich ($8 + 2$).
- Students may use any operation to make a target number.
- Give a target number of 18. Students may choose three ants (3×6) or four stars minus an ostrich ($4 \times 5 - 2$).
- If you are not able to be online with all your students at the same time, pose a few questions and have them send their responses to you.



ST Math Creature Board



Thinking Space

Target Number

Number Sense Games

Hands-on games and math stories designed to support students in building number sense.

Teacher Guidance:

- These games are for students to play with their families at home. The games are focused on number sense.
- You may want to go through the games and assign specific games for students to work on at home.
- At the conclusion of game play, you may want your students to write a short summary of their experience.

Below are tips to share with families working with their children at home:

- Play the Number Sense games with your children. This is a great opportunity to strengthen their math skills and have fun at the same time.
- Some of the games in the packet include game boards. All of the game boards can easily be made by your child instead of printing them out.
- Use the ST Math Creature Board to play the game Creature Target Number. The directions to play the game are included in your packet.
- Once your child gets a sense of how to play Creature Target Number. Challenge them to create their own problems for you.

Number Sense Activity Resources in the Parent Guide

The resources in the table below are provided in the Parent and Teacher Guides to support students as they learn at home.



Grade-Band Game Activity Guide: This guide outlines games, their related materials, and math concepts.



Game Directions: Step-by-step directions on how to play the games. These games are focused on building number sense.



ST Math Creature Board: A creature board highlighting some of the characters from the ST Math games. This board can be used to explore math concepts. Included with this resource are directions for playing the target number game.



Third, Fourth, and Fifth Grade Games to Play at Home

This is a collection of games that can be done with third, fourth or fifth-grade students. A direction sheet is provided for each activity. This outlines the activity, specifies how to play, and offers information around vocabulary words and questions family members can ask to promote thinking. All of the activities are designed for parents and children to play together.

Activity Name	Materials Needed	Key Idea(s)
Final Countdown	- Deck of Cards 3 game pieces per player to be used as Multiplication Chips	Adding, subtracting and multiplying whole numbers
Five for Twenty-Five	Deck of cards	Adding and subtracting whole numbers
Traffic Light Tic-Tac-Toe	- Tic-Tac-Toe boards. You will need to print the board or make your own. - Red, yellow and green color tiles	Logic
Dara	- Dara game board. You will need to print the board or make your own. 12 small game pieces per player	Logic
Multiplication Connect Four	- Two paper clips - Two different color chips or game pieces - Game board. You must print the game board.	Multiplying one-digit numbers
Equivalent Fraction Concentration	1 deck of Equivalent Fraction cards. You must print the cards.	Equivalent fractions
Number Line Fraction Bingo	1 set of fraction cards. You must print the fraction cards. - Number line for each player 4 centimeter cubes for each player	Adding and subtracting fractions
Race to 2	1 set of fraction cards. You must print the fraction cards. - Number line 0 to 2 for each player. You may print the number line or make your own. 1 small game marker for each player	Adding and subtracting fractions
JiJi Sudoku	JiJi Sudoku game boards. You must print the game boards and JiJi cards.	Logic



Final Countdown

For 2 to 4 players

Supplies:

- Deck of cards
- 3 game pieces per player to be used as *Multiplication Chips*

How to Play:

1. Shuffle the cards.
2. Deal out 4 cards per player.
3. Place the remaining cards in the middle face down.
4. Player One places a card from their hand face up in the center and subtracts the value from 100. (For example, Player One plays a 7 and says 93.) They take the top face-down card to replace the card they played.
5. Player Two places a card from their hand face up on top of the first card, subtracts the value of their card from the new number, and takes a card from the face-down pile. (For example, Player Two plays a 10 and says 83.)
6. As play continues, each player adds a card to the pile and states the new difference.
7. After playing their card, each player picks the top face down card from the center deck to replace the card they played.

Multiplication Chips:

- Each player gets 3 *Multiplication Chips* which they can play when it's their turn. The chips change the value of a card.
- The player can use a chip to multiply their played card by 3 or 5. For example, a 6 card played with a chip means the player can subtract 18 or 30.

Aces — 1
Jacks — Double the previous card played
Queens — Wild Card (can be played as any other card in the deck)
Kings — 0
All others — Face value (2 to 10)





Five for Twenty-Five

For 2 - 4 Players

Supplies:

- Deck of cards



Ace = 1
2-10 = face value
Jack = 11
Queen = 12
King = 13

The Object of the Game:

Have a hand of five cards that total 25 using addition and subtraction.

How to Play:

1. Deal each player five cards.
2. The remaining cards are placed in the center of the group with one card turned up beside the deck.
3. Players take turns picking up and discarding one card. They may take the face-up card or the top card in the stack and discard one of their cards to the face-up stack.
4. When a player has a hand totaling 25 using all five cards, they will call out "25." That player wins if they can successfully show how they made 25.



Traffic Lights Tic-Tac-Toe

©adapted from nrich.

For 2 Players

Supplies:

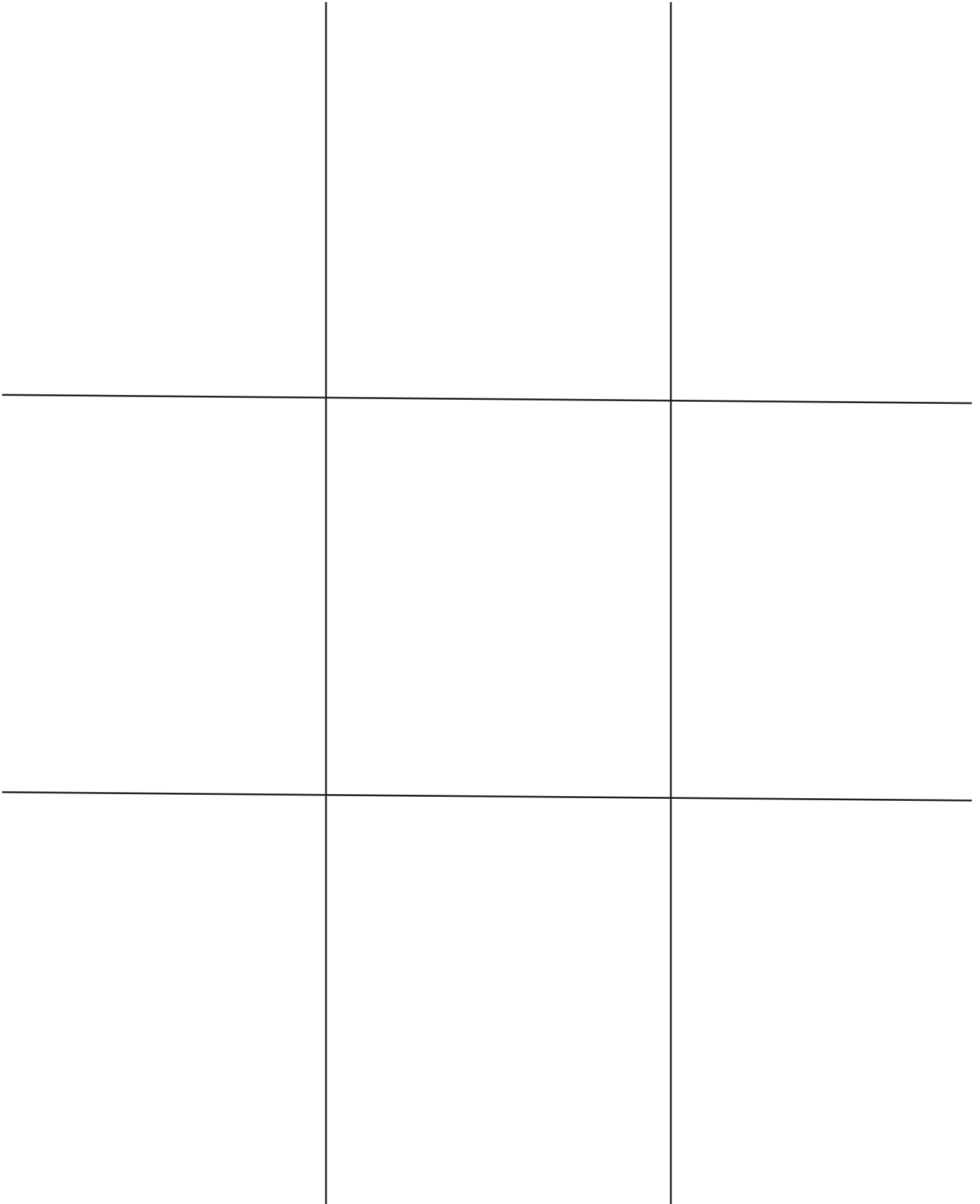
- Tic-Tac-Toe boards
- Red, yellow, and green color tiles

How to Play:

1. Players take turns placing or replacing a tile on the Tic-Tac-Toe board.
2. Only a red tile can be placed in an empty space (cell).
3. A yellow tile replaces a red tile.
4. A green tile replaces a yellow tile. Nothing replaces a green tile.
5. Players can make any possible play in any cell.
6. The winner is the player who places a tile to make 3 same color tiles in a row (across, up and down, or diagonally).



Traffic Lights Tic-Tac-Toe Game Board





For 2 players

The Object of the Game:

- Be the first to capture 10 of your opponent's game pieces

Supplies:

- Dara game board
- 12 small game pieces per player

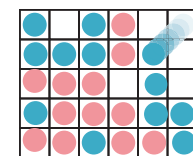
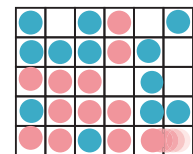
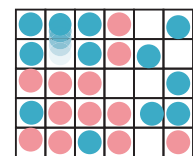
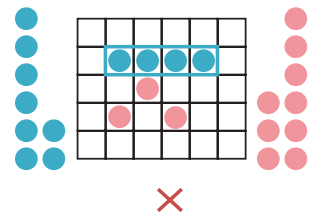
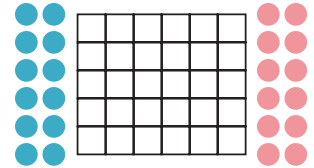
How to Play:

Phase 1: Place Pieces

1. Players take turns placing their game pieces on empty squares.
2. Avoid placing more than three pieces in a horizontal or vertical row. Having more than 3 pieces of the same color in a row is not allowed at any time.

Phase 2: Move and Capture Pieces

3. Once all the pieces have been placed on the board, players take turns moving one of their pieces one space horizontally or vertically, but NOT diagonally.
4. If a player cannot move, their turn is skipped.
5. To capture, a player makes a new horizontal or vertical row of 3 of their pieces.
6. When a new row is made, that player can remove any one of the opponent's pieces from the game.
7. Only one piece can be captured per move, even if multiple rows of 3 are created with one move.
8. Each row of three pieces can be reformed only once by moving one piece out and back in to capture another piece.





Dara



Multiplication Connect Four

For 2 Players

Supplies:

- Two paper clips
- Two different color chips or game pieces

How to Play:

1. Player One places a paper clip on a number on the bottom strip.
2. Player Two places a paper clip on a number on the bottom strip, multiplies the two numbers, and places their piece on that number (product) on the board.
3. Player One moves one paper clip, multiplies the two numbers, and places their piece on that number (product) on the board.
4. Play continues until one player has 4 of their pieces in a row, on the board, without any of the opponent's markers in between their four markers (across, up and down, or diagonal).
5. The first player with four pieces in a row wins.

Examples

12	15	20	16	7	●	20	15
13	18	10	20	15	●	19	9
11	8	17	13	18	●	10	16
10	6	14	11	9	●	●	19
13	16	4	●	●	●	●	●

12	15	20	16	●	9	20	15
13	18	10	●	●	12	19	9
11	8	●	●	●	14	10	16
10	●	●	●	●	10	15	19
13	●	●	●	●	20	12	5

12	15	20	16	7	9	20	15
13	18	10	20	15	12	19	9
11	8	17	13	18	14	10	16
10	●	●	●	●	10	15	19
●	●	●	●	●	20	12	5

Non-Examples

12	15	20	16	7	●	20	15
13	18	10	20	●	●	19	9
11	8	17	●	●	●	10	16
10	6	●	●	●	●	15	19
13	●	●	●	●	●	12	5

12	15	20	16	7	9	20	15
13	18	10	20	15	12	19	9
11	8	●	13	18	14	10	16
●	●	●	●	●	10	15	19
●	●	●	●	●	20	12	5

12	15	20	16	7	9	20	15
13	18	●	20	15	12	19	9
11	●	●	13	18	14	10	16
●	●	●	●	9	10	15	19
●	●	●	●	17	20	12	5

adapted from Marilyn Burn's Pathways

Multiplication Connect Four

81	15	64	16	7	9	30	36
28	56	36	21	54	12	40	4
24	1	27	45	18	14	72	35
49	6	24	2	63	10	54	48
3	63	56	8	42	25	32	5

1	2	3	4	5	6	7	8	9
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Equivalent Fraction Concentration

For 2 - 4 Players

Supplies:

- 1 deck of Equivalent Fractions cards

How to Play:

1. Shuffle the cards and place them face down in an array.
2. Players take turns flipping two cards face up.
3. If the numbers on the cards are equivalent, the player keeps those cards.
4. If the numbers are not equivalent, the cards are turned face down.
5. The player plays until they do not have an equivalent match.
6. Play continues until all cards are removed.
7. The winner is the player with the most cards.

Equivalent Fraction Concentration

$\frac{1}{2}$	$\frac{2}{2}$	$\frac{1}{3}$	$\frac{2}{3}$
$\frac{3}{3}$	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$
$\frac{4}{4}$	$\frac{1}{6}$	$\frac{2}{6}$	$\frac{3}{6}$
$\frac{4}{6}$	$\frac{5}{6}$	$\frac{6}{6}$	$\frac{2}{8}$
$\frac{4}{8}$	$\frac{6}{8}$	$\frac{8}{8}$	$\frac{2}{12}$

Equivalent Fraction Concentration

$\frac{3}{12}$	$\frac{4}{12}$	$\frac{6}{12}$	$\frac{8}{12}$
$\frac{9}{12}$	$\frac{10}{12}$	$\frac{1}{5}$	$\frac{2}{5}$
$\frac{3}{5}$	$\frac{4}{5}$	$\frac{5}{5}$	$\frac{2}{10}$
$\frac{4}{10}$	$\frac{5}{10}$	$\frac{6}{10}$	$\frac{8}{10}$
$\frac{3}{9}$	$\frac{6}{9}$	$\frac{4}{16}$	$\frac{12}{16}$



Number Line Fraction Bingo

For 2 to 4 Players

Supplies:

- 1 set of fraction cards, cut apart
- Number line for each player
- 4 centimeter cubes for each player

How to Play:

1. Shuffle cards and place face down in the center.
2. Each player places their centimeter cubes on various numbers on their number line. (They can place more than one cube on the same number.)
3. Players take turns flipping over two fraction cards at a time. Each player can decide to add or subtract the numbers on the cards. If their sum or difference is a number that they have a cube on, they get to remove the cube. If they have more than one cube on a number they can only remove one of the cubes.
4. When a player has removed all of their cubes, they say, "Bingo!" and win the game.

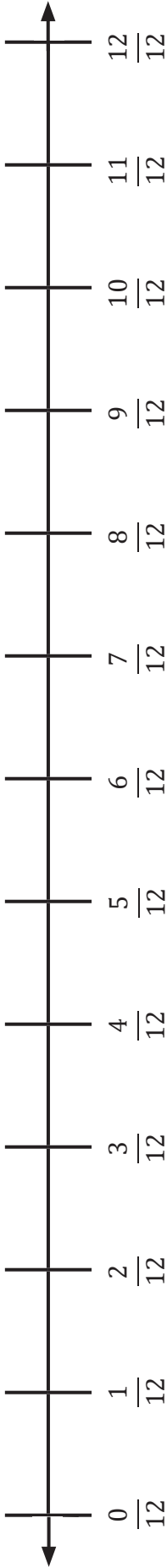
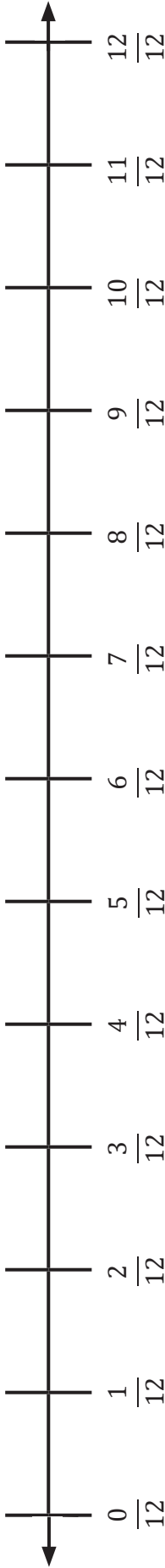
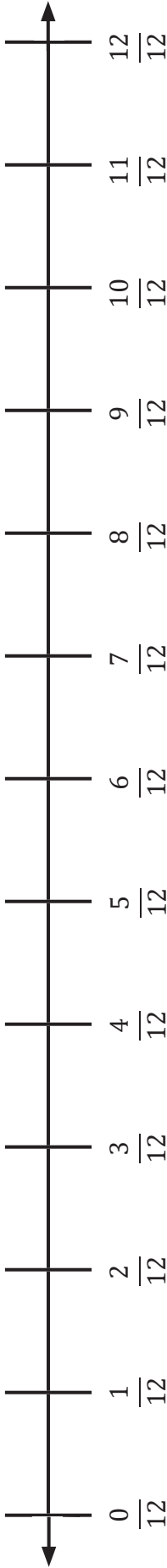
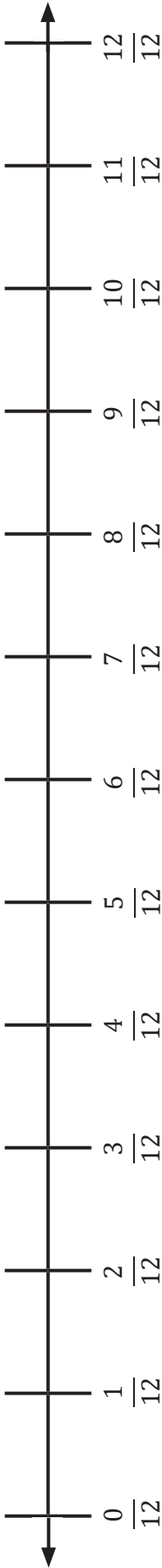
Cut out cards

Number Line Fraction BINGO

$\frac{1}{2}$	$\frac{2}{2}$	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{3}{3}$
$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$	$\frac{4}{4}$	$\frac{1}{6}$
$\frac{2}{6}$	$\frac{3}{6}$	$\frac{4}{6}$	$\frac{5}{6}$	$\frac{6}{6}$
$\frac{1}{12}$	$\frac{2}{12}$	$\frac{3}{12}$	$\frac{4}{12}$	$\frac{5}{12}$
$\frac{6}{12}$	$\frac{7}{12}$	$\frac{8}{12}$	$\frac{9}{12}$	$\frac{10}{12}$
$\frac{11}{12}$	$\frac{12}{12}$	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{1}{12}$

Number Line Fraction BINGO

Cut out number lines





Race to 2

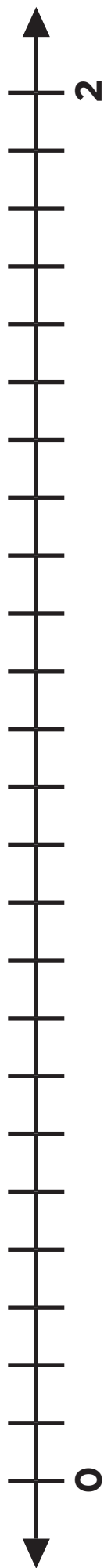
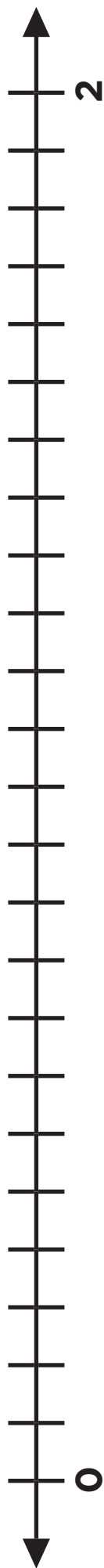
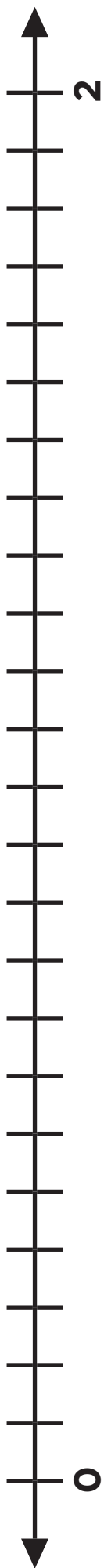
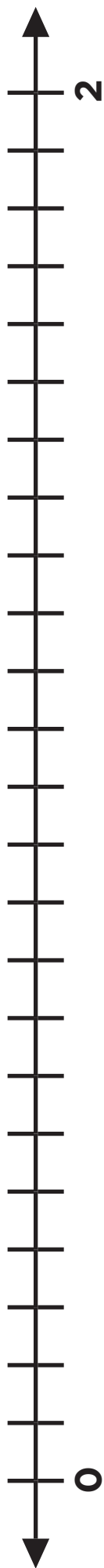
For 2 - 4 Players

Supplies:

- 1 set of fraction cards
- Number line 0 to 2 for each player
- 1 small game marker for each player

How to Play:

1. Shuffle cards and place face down in the center.
2. Each player places their marker on 0
3. Player One flips over one fraction card and moves that value to the right on the number line.
4. Play continues with each player in turn selecting a card and moving that value to the right on their number line.
5. If the selected number results in a number greater than 2, the player subtracts the value and moves to the left of their position on the number line.
6. The winner is the first player to land on 2.



Race to 2

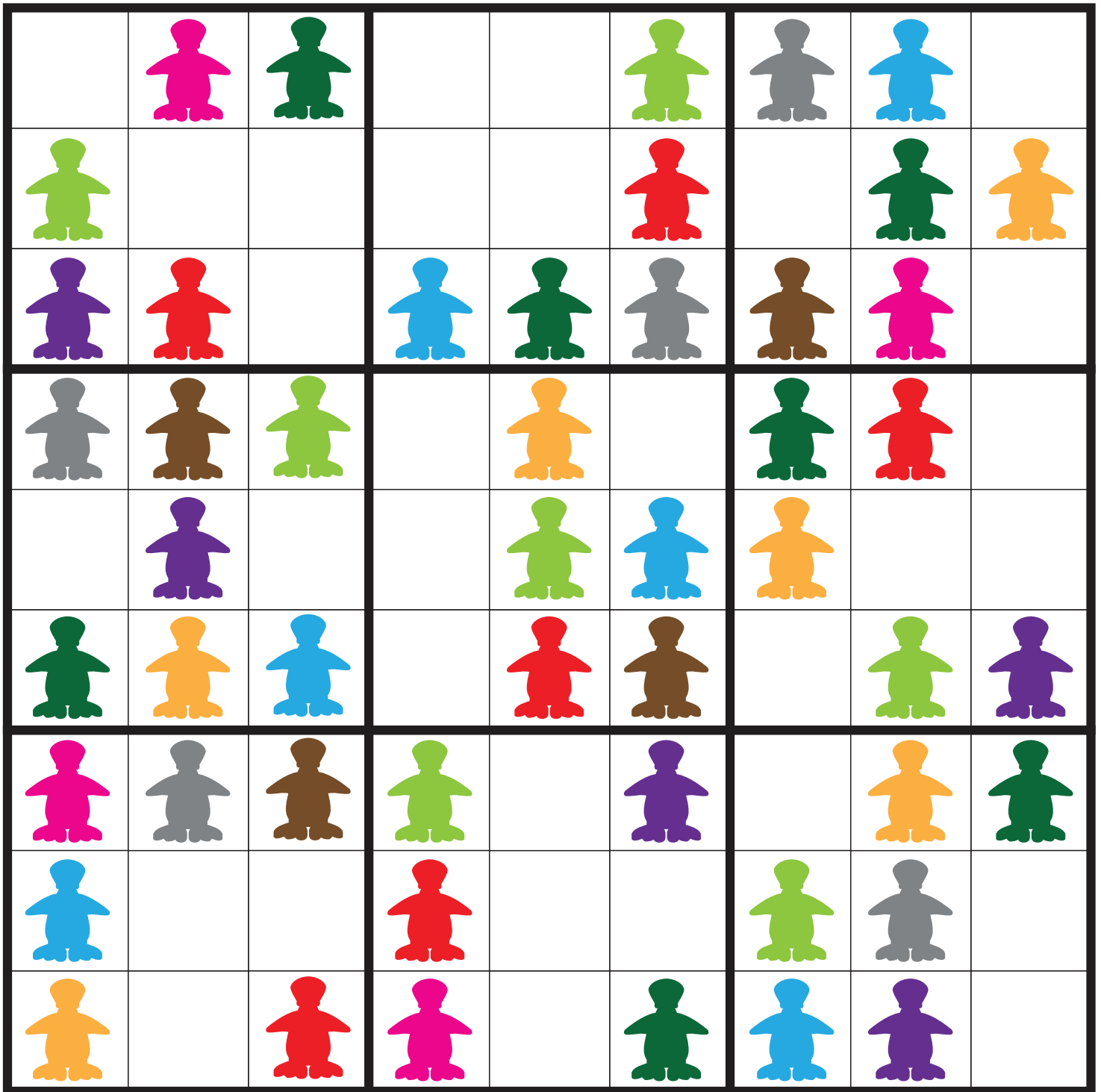
Cut cards apart.

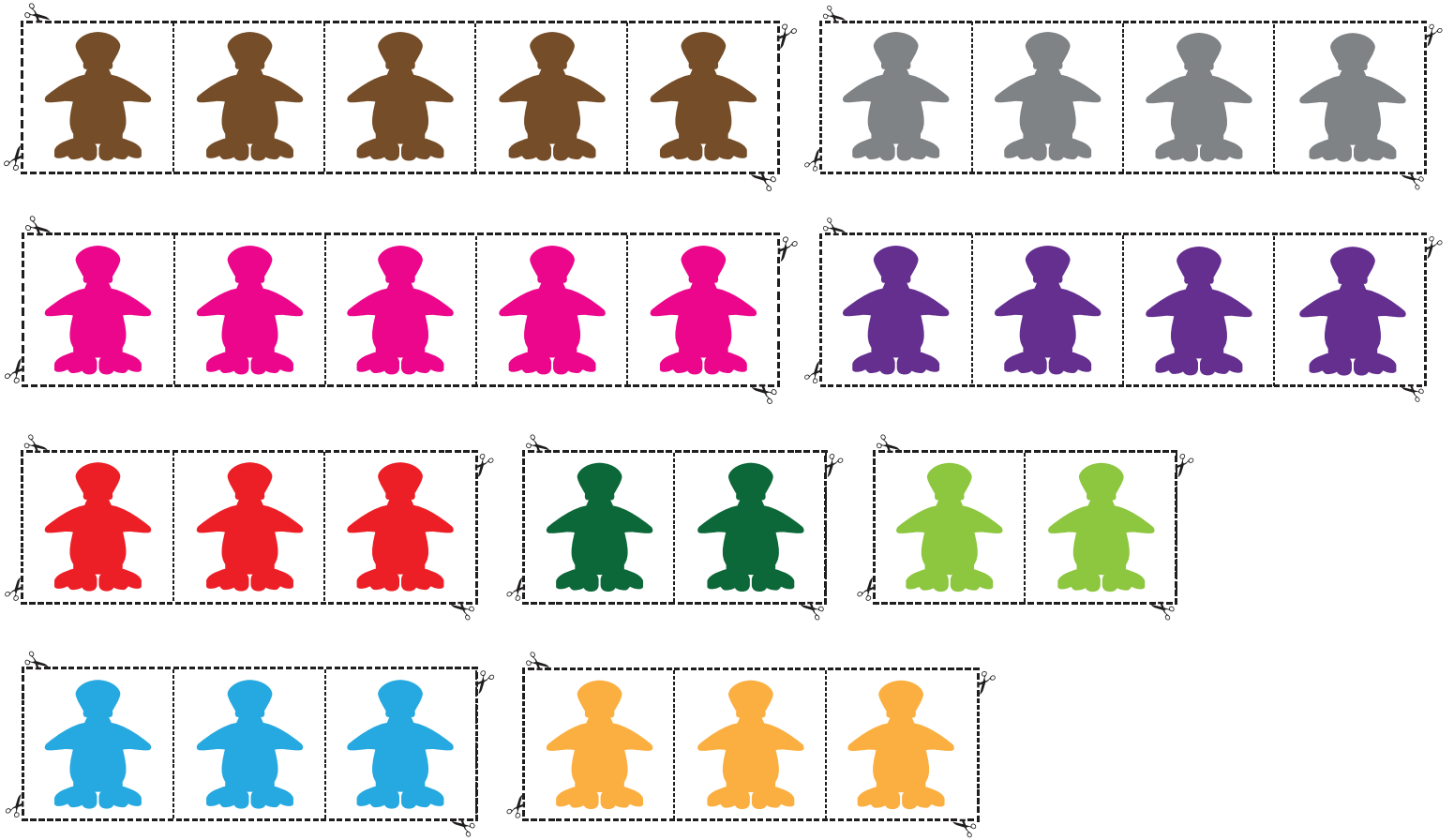
$\frac{1}{2}$	$\frac{2}{2}$	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{3}{3}$
$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$	$\frac{4}{4}$	$\frac{1}{6}$
$\frac{2}{6}$	$\frac{3}{6}$	$\frac{4}{6}$	$\frac{5}{6}$	$\frac{6}{6}$
$\frac{1}{12}$	$\frac{2}{12}$	$\frac{3}{12}$	$\frac{4}{12}$	$\frac{5}{12}$
$\frac{6}{12}$	$\frac{7}{12}$	$\frac{8}{12}$	$\frac{9}{12}$	$\frac{10}{12}$
$\frac{11}{12}$	$\frac{12}{12}$	Lose Your Turn	Draw Another Card	Draw Another Card



JiJi Sudoku

Difficulty Level: Medium





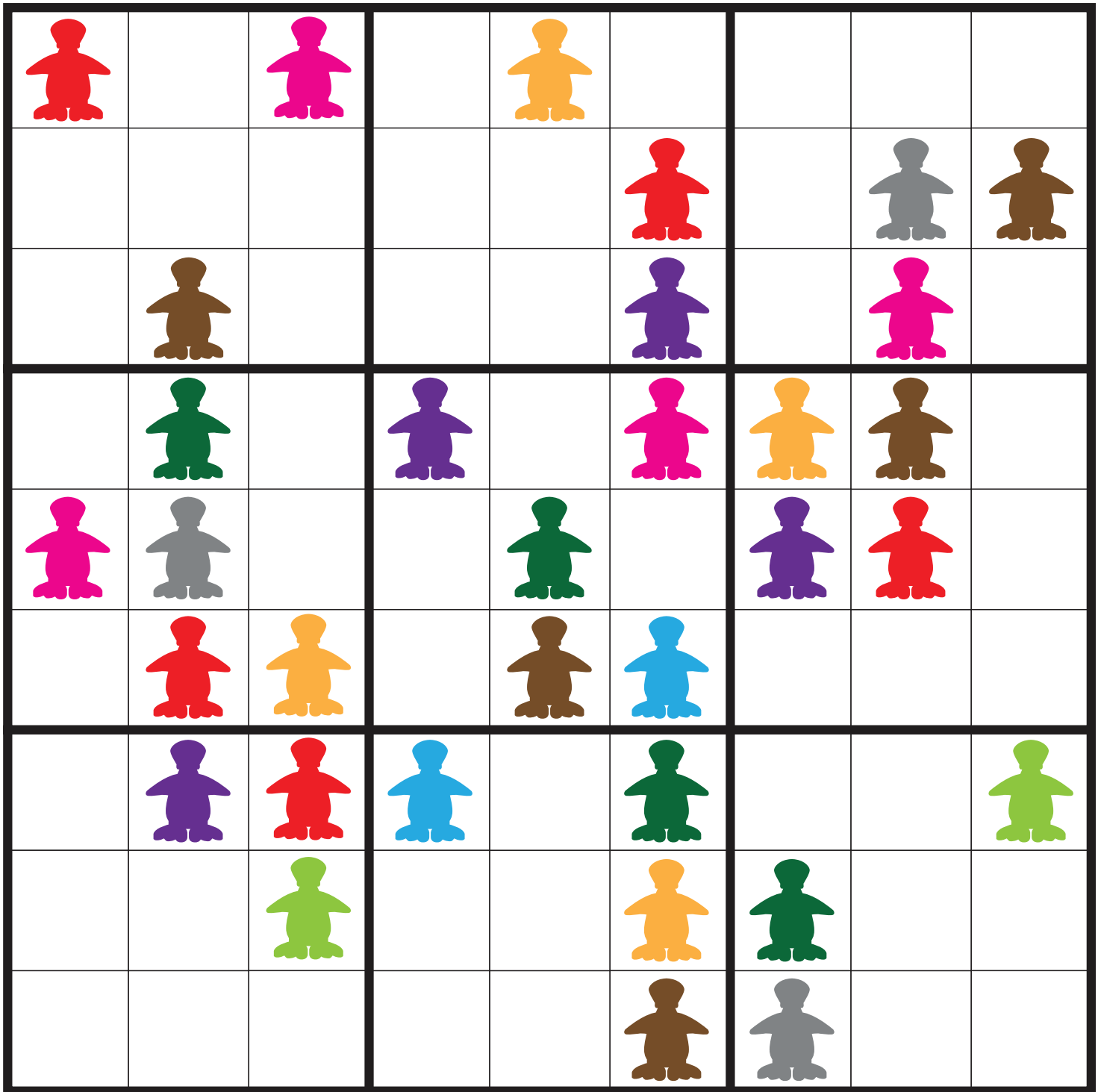
JiJi Sudoku

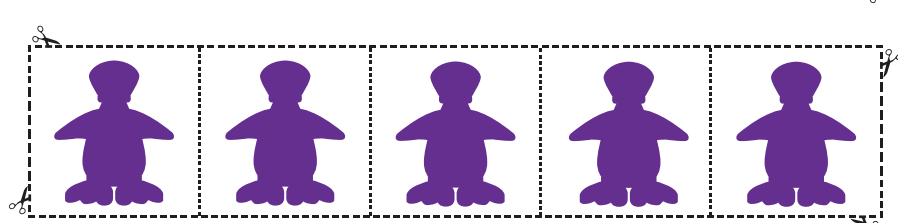
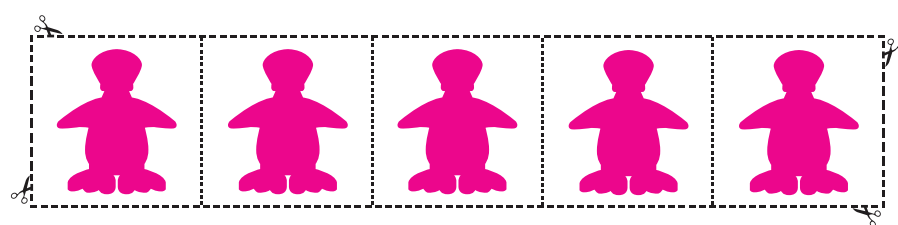
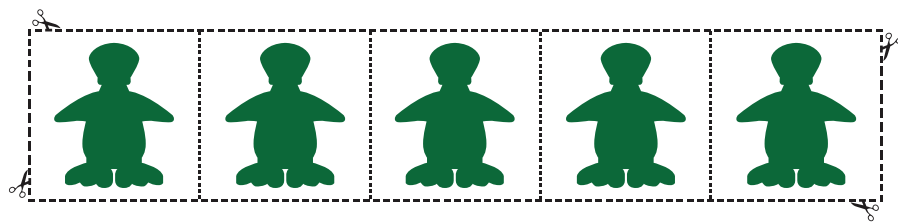
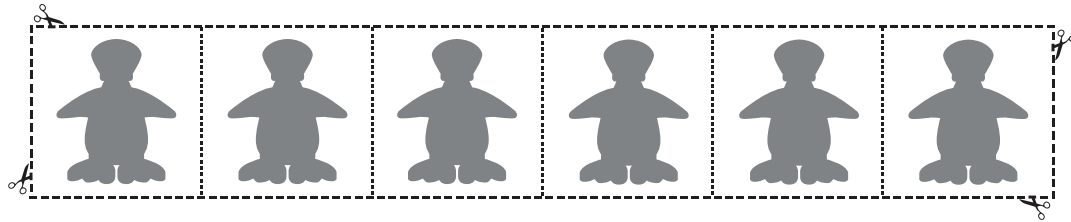
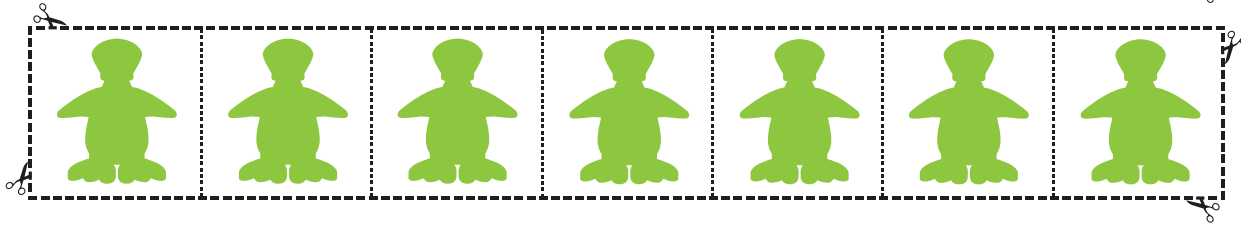
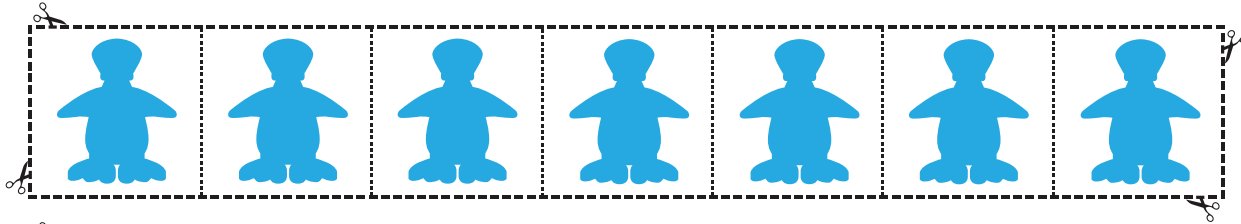
Difficulty Level: Medium
Puzzle pieces



JiJi Sudoku

Difficulty Level: Challenge





	9	3	1		5	6	4	
7								5
5		1	2		9	3		7
2								3
	3	6	9		7	5	2	
9								1
3		2	4		8	1		9
6								4
	4	7	3		2	8	5	

Easy

5					2		8	
								6
		7	1			5	3	
	3		7				5	9
		2		4		8		
7	5				9		1	
	9	8			4	3		
1								
	2		8					5

Medium

6	4			1	8			3
	2			5				
				7		1		
						6		7
	8		2		7		9	
5		9						
		7		8				
				2			3	
2			6	3			7	4

Medium

3				8				6
	1				6		2	
		4	7			5		
	4			1		9		
6			2		4			1
		3		6			5	
		8			3	6		
	2		4				1	
5				2				7

Hard