GAME DESIGNER

TEACHER GUIDE

K-12 Game-a-thon

DESIGN YOUR OWN MATH GAME!

MIND Research Institute
A neuroscience and education social benefit organization

Table of Contents

Copyright © 2017 MIND Research Institute.
All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means—electronic, mechanical, photocopying, or otherwise—without the prior written permission of the publisher.

MIND Research Institute
www.mindresearch.org
111 Academy, Suite 100
Irvine, California 92617
Printed in the United States of America

K -12 Game-a-thon Challenge
Teacher Information Overview

Welcome to MIND Research Institute's National K-12 Game-a-thon Challenge! The Game-a-thon challenges students to design, build and share a game that features creative and unusual solutions to mathematical problems. Students can work alone or in groups to invent card games, board games, apps, outdoor games or anything else that addresses a mathematical topic.

We are excited to partner with you to pilot our first ever in-class Game-a-thon Challenge Course. This Game Designer Teacher Guide provides you with an overview of the course structure and schedule, brief descriptions of each task and mini-challenge, facilitation process and content, helpful resources and more. As you implement this course in your classroom, utilize the Teacher Guide to help you facilitate the design process for your students and to ensure successful completion of the course.

Available along with this Teacher Guide is a Game Designer Manual, provided for students participating in the Game-a-thon Challenge. The Game Designer Manual, comprised of tasks and mini-challenges, engages students in organizing their thinking, developing design strategies, and formulating a plan for creating their own math game. Like any other design challenges, students will have the opportunity to exercise their creativity and problem solving skills, try different ideas, learn from their mistakes and then try again until a desired design is obtained. As they ideate, build and cycle through iterations of their game, remember to refer to this Teacher Guide for facilitating questions to drive and guide large and small group discussions.

Since this is an on-going pilot, we would truly appreciate any feedback you have regarding the manuals, or the course in general, as it will support our efforts in improving future experiences for both teachers and students. We wish you the best of luck and thank you for participating in the 2017 National K-12 Game-a-thon Challenge!

Sincerely,
The Game-a-thon Team

Remember to tweet your progress @JiJiMath #Gameathon #stmath #MathMINDs

Course Format

The table below describes the various activities your students will encounter as they participate in the challenge.

Type	Delivery	Time Frame
Task *(8 tasks)*	In class	**20 - 25-minutes** (Allow 45 minutes for each session in Task #0. Can be done over 2 days) *Take a few minutes at the beginning of each task to allow students to share out the prior task.*
Mini-Challenges *(8 mini-challenges)*	Homework	**1-2 weeks** *Set the due dates to complete activities.*
Game Rules Bonus Challenges	Optional, can be homework or in class	**Varies**
National K-12 Game-a-thon Submission	Online through the Game-a-thon website	**By July 1st, 2017**

How to complete the K-12 Game-a-thon Challenge Course

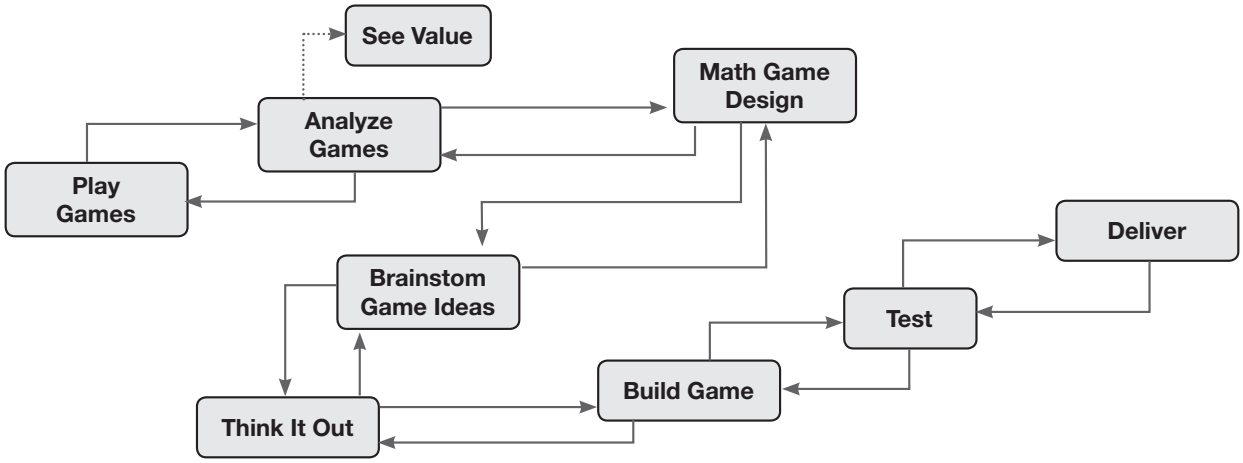
1. Present the K-12 Game-a-thon challenge to the students. View the intro video at: http://www.mindresearch.org/gameathon/.
2. Following this video, share the Game Designer letter with students.
3. Print the entry form on page 25. Have students form teams and complete the form for their team. (Only needed if we are going to have teams register on the website)
4. Engage students in the tasks and mini challenges that are in the Game Designer Manual.
5. Students create a video presentation and complete the video permission form on pages 27-28 for the National K-12 Game-a-thon Challenge.
6. Students submit their game to the National K-12 Game-a-thon Challenge by uploading their game video to YouTube with the help of a teacher, or parent and filling the submission form on the Game-a-thon website.

Teacher Tips:

- Brainstorming is always a challenge for students. Use the **Game Brainstorming Sheet** on page 30 in the GAT Teacher Guide to help students organize their thinking for the first 3 tasks. There is also a **Math Concept Web** on pages 31-32 that can be used to help students think through the concept they are creating their game around.
- Strategies for support, tips and ideas for your student's video submissions can be found on page 26 in the GAT Teacher Guide.
- Be sure to check out twitter @JiJiMath #Gameathon #stmath #MATHMinds to see the GAT progress and ideas from classrooms around the country. Be sure to tweet your progress as well.
- For questions, please visit the Game-a-thon website http://www.mindresearch.org/gameathon/ or email gameathon@mindresearch.org.

Understanding the Game Design Process

The Game Designer Manual is specifically constructed and organized for students to navigate the cycles of effective game design. It is rare in any creative endeavor to advance to the next step of a process without revisiting prior steps. This is highlighted in the cyclical nature of the diagram below.



What is the Game Design Process?

The process above is a proprietary flow diagram created by MIND's game design experts to bring to life the critical aspects in designing a math game. The flow of the Game Designer Manual is devised to match each of the 7 main phases on the diagram: play games, analyze games, math game design, brainstorm game ideas, think it out, build game, and test.

Play Games
Get a feel for different games prior to making your own

Analyze Games
Understand what games are and see the value in playing math games

Math Game Design
Explore key characteristics of what makes good math games

Brainstorm Game Ideas
Incorporate your knowledge of and experience with games to brainstorm your math game ideas

Think It Out
Narrow down your math game ideas into a single game and think carefully about the components of the game

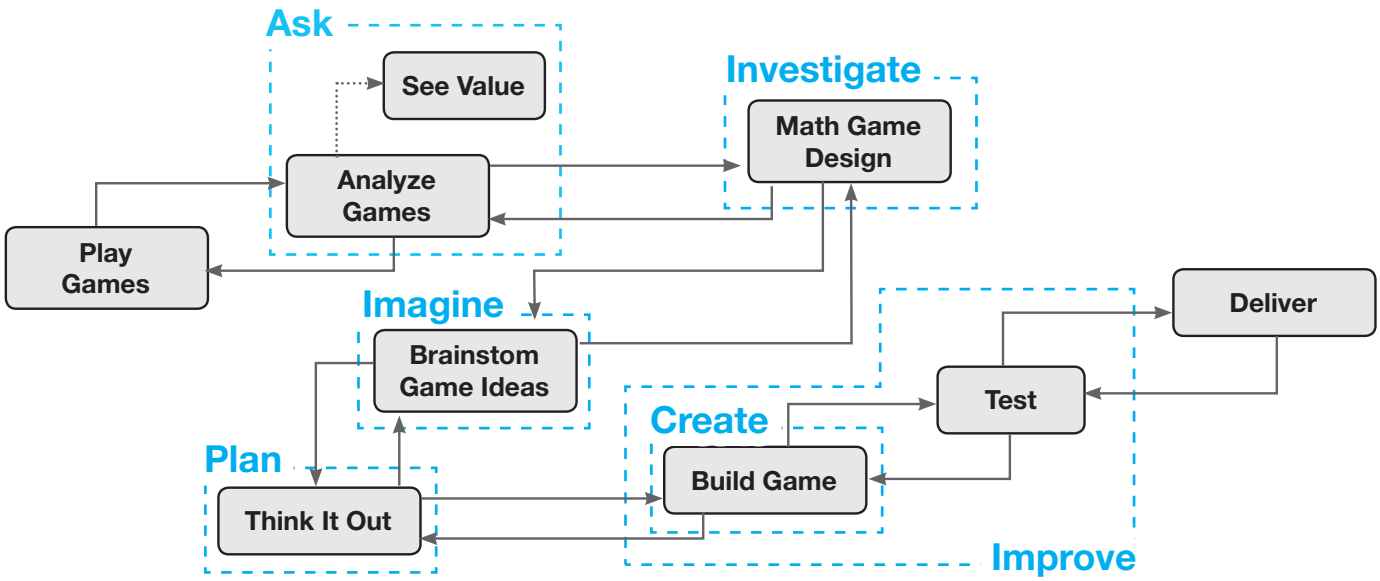
Build a Game
Execute your game idea and make improvements as you go

Test
Pilot your game with others and continuously improve until the desired game is obtained

Deliver
Enter your game into the National K-12 Game-a-thon Challenge

MIND's Game Design Process is distinct from the Engineering Design Process, but aligns well with the Engineering Design Process which is described on the next page.

Understanding Game Design
with the Engineering Design Process



What is the Engineering Design Process?

The Engineering Design Process is a series of steps used to guide engineers through different design challenges, and can easily be adapted by students participating in the Game-a-thon Challenge. Modified from the *Museum of Science Boston* "Engineering Is Elementary" program, this is a cyclical process as students may need to repeat one or more phases to produce the final version of their game, similar to MIND's Game Design Process.

Ask
Define a problem or need

Investigate
Research what has been done and identify the circumstances/constraints around the problem

Imagine
Brainstorm potential ways to solve the problem; choose a solution

Plan
Plan how the solution will be carried out/created; determine materials; draw a diagram/picture

Create
Use the plan to construct the solution/model/prototype; test it out

Improve
Evaluate the product and make improvements

Task/Mini-Challenge Descriptions

Activities	Purpose	Suggestions and facilitating questions to promote critical thinking
Task #0: Play/Explore *Print the Tarumbeta, Traffic Lights, Achi and Dara game boards and game rules on pages 11-18 for your students to complete this task. (Session 1:Tarumbeta and Traffic Lights; Session 2: Achi and Dara)*	• To expose students to a few games that are currently available and to get them to start thinking about the components of the games.	• How are the games Traffic Light and Achi similar to Tic Tac Toe and how are they different? • Was using a strategy important in playing the game? • What are some things you liked about these games? • What did you find challenging?
Mini-Challenge #0 *To be completed after Task #0 Session 2.*	• To get students to think about the entirety of games (what makes them fun, challenging, exciting, how do rules play a factor, how are the games they played similar and different)	• What made the games fun and exciting? • How did the rules add to the challenge and excitement of the games? • Think about the rules, how important were they to determining the outcome of the game? What one rule could you change that would make the game completely different? • How did each of the games you played involve mathematics? • Many people naturally think about computation when designing math games. Is it possible to design a math game without computation?
Game –a-thon Intro *Watch Game-a -thon intro video and share Game Designer Manual.*	• To introduce students to the Game-a-thon Challenge and the opportunity to design and build a game.	• Get students to think about how they might approach this challenge. This is a great opportunity to discuss why they should consider how strategy, logic, problem solving, fun and creativity can be included in their game. • How did they see those characteristics embedded in the two games they played for Task #0?
Task #1: Ask	• To determine and understand the task at hand. • To think and reflect on the knowledge they have about games in general.	• After giving the groups time to discuss the questions for Task #1, it would be a great opportunity to allow some of them to share a few of their thoughts. • Provide explanation to students after they have shared their thoughts based on talking points provided. (See page 19.)
Mini-Challenge #1	• To draw from their own gaming experience the components or elements of games that they like and dislike, which will help them build a general understanding of designing better games.	• Ensure the group that it is okay that they may all have different things written here. This provides a great opportunity for discussion. • As students talk about the games they like and don't like, ask questions to help them determine if there is a style of game they like.

Activities	Purpose	Suggestions and facilitating questions to promote critical thinking
Task #2: Investigate	• To determine key characteristics of a good game and a good math game. • To consider different styles of games.	• After giving the groups time to discuss the questions for Task #2, it would be a great opportunity to allow some of them to share a few of their thoughts. • Provide explanation to students after they have shared their thoughts based on talking points provided. (See page 20.)
Mini-Challenge #2	• To research existing math games. • To examine the aspects of each game and identify what they like and don't like. • To begin analyzing a set of games and identifying good math game characteristics that are present or missing from those games.	• This provides the opportunity for students to begin to examine what is important to them in designing a good game. • Ensure the group that it is okay that they may all have different things written here. This provides a great opportunity for discussion.
Task #3: Imagine	• To build upon their prior research in helping them brainstorm good game ideas. • To think deeply about the math concepts they would like to convey in the game. • To merge game ideas and math concepts that will allow greatest benefit to the players. • To put the value of math games to use by determining a game style (multiple ideas) that can help encourage a particular math concept. (The goal of Mini-Challenge #3 is to narrow down to a single idea.)	• Engage students in processing all that they have learned. What are their thoughts about designing a math game and what math concepts do they want their game to address? • Encourage the students to really think about the experiences they have had with playing games and the experiences with learning math. This is an opportunity to bring the characteristics that they think are important for both to a game. • The idea is not just to create a game for fun. It is to create a fun game that can be used to teach or practice a math concept. What do they need to have in their game for that to become a reality? • How does what they have been learning about and thinking about help them begin to imagine the type of math game they will create? Why is creating that type of game important to them?
Mini-Challenge #3 *This Mini-Challenge is designed to be completed as a team, not individually.*	• To determine the math game they want to build and to provide reasoning as to how they arrived at that decision.	• This is a great opportunity to let groups talk to each other and share their ideas and knowledge. Encourage students to critically listen and ask questions to help them understand.
Now that you've made it this far, all tasks and mini-challenges are designed for each team to complete within their group, unless otherwise stated.		

Activities	Purpose	Suggestions and facilitating questions to promote critical thinking
Task #4: Plan	• To make sure the chosen game idea fulfills the characteristics of a good math game. • To examine and discuss how game players will explore the math concepts in the game.	• This is a great opportunity to engage students in a discussion around their chosen math concepts. Look for misconceptions as they explain how the game players will explore math concepts. Look for opportunities to make connections within mathematics. • What is important about this concept? • What do you want the players to understand about this concept as a result of playing your game? • What will be the evidence that they have successfully learned, or practiced this concept? • Why is this an important concept to learn? • Does it connect to other math concepts that you have learned? If so, how?
Mini-Challenge #4	• To create a blueprint for the game (including a sketch). • To think more deeply about the rules of the game. This is a critical component of all good games.	• How will this blueprint help you create your game?
Game Rules Bonus Challenge	• To provide students opportunities to explore the importance of rules, thich about what makes rules important and consider how rules affect the outcomes of the game.	• Why are there rules when you play a game? • What are some important things to consider when writing rules?
Task #5	• To identify team roles and responsibilities for game creation. • To set goals and deadlines for game creation. • To build the game.	• Emphasize formalizing the rules. It is really important that students create clear, concise and sensible rules. • One idea is to brainstorm with the class characteristics of good rules. You could create a t-chart with examples and nonexamples. • Students need to create their games at this point.
Building Game Sessions *Answering questions in Task #5 may be 20 minutes, but it could take several class periods to build the games during school hours.*	• To provide open class time for the building of the game.	• Before moving on to Mini-Challenge #5, it is recommended that students have ample time to complete their team game. The amount of time needed will vary from game to game. • See page 23 for a list of facilitating questions you can ask students that get them to think while building their games.
Mini-Challenge #5	• To self-reflect and examine their game as honestly as they can and prepare themselves for external testing.	• Students will be playing their games and asking themselves some reflective questions. • It would be a good idea to provide time for students to share their thoughts after playing their games. How did their experience playing their game differ from their idea of what gameplay would be like? How was it the same? • How did their thinking change as they played their game?

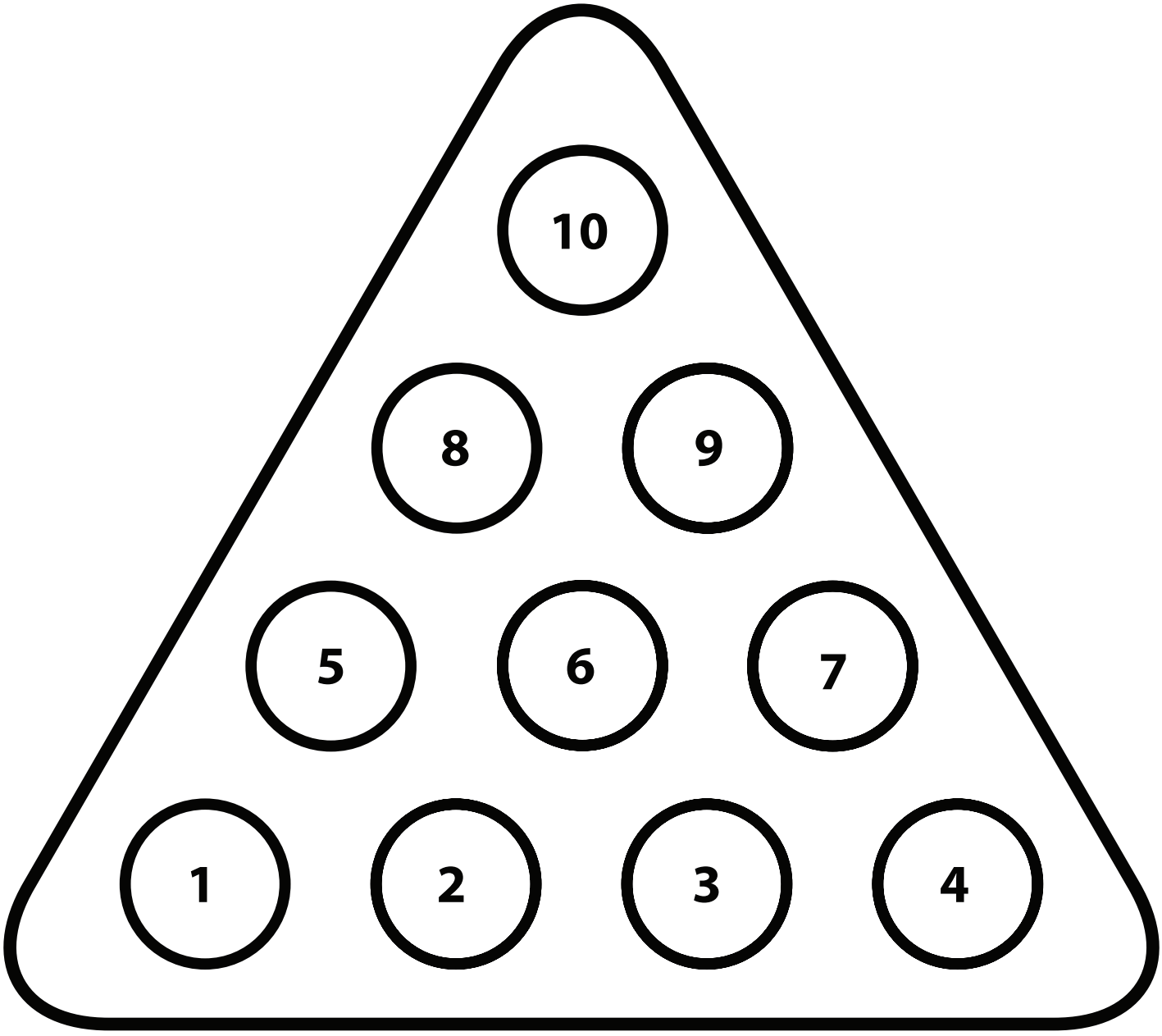
Activities	Purpose	Suggestions and facilitating questions to promote critical thinking
Task #6 *Similar to Task #5, making improvements could take some time.*	• To identify and make modifications based on self-reflective questions. • To brainstorm specific items they want to learn from playtesting (these can be questions that they pose to game testers).	• Students should make modifications to their game design. • Ask students to share their reasoning for the changes. How will their changes improve their design and the overall game experience?
Mini-Challenge #6	• To observe the game being played and record observations. • To solicit feedback from game players.	• This is an opportunity for students to play each other's games. The students should observe the gameplay and respond to the reflective questions. • The players will also complete a game player feedback form.
Task #7	• To evaluate all of the feedback received. • To summarize the observations, thinking and learning from research and game play. • To reflect on what they learn from the testing process.	• This is where students will summarize all of the learning they have engaged in throughout this process. • It is a great time to examine how analyzing their feedback prompted them to change their thinking.
Mini-Challenge #7 *Similar to Task #5, making improvements could take some time.*	• To determine and make improvements to their game based on informative feedback from their peers.	• Students will think about how they can improve on game design. • Students will revise their games.
Entry in National K-12 Game-a-thon (after completing Game Designer Manual)	• To upload the video to the Game-a-thon website to be entered into the National K-12 Game-a-thon.	• Students will need to practice what they will say before they create their video to upload on the Game-a-thon website. • To submit videos, see http://www.mindresearch.org/gamathon. • Once their video is loaded send an e-mail to ohiogat@mindresearch.org with the subject line: GAT Videos have been submitted.

As you engage your students in the game design process, the following materials are recommended to support student learning, exploration and imagination throughout this course.

- Red, Yellow and Green Color Tiles/Counters (TRAFFIC LIGHT Game)
- Various Colored Counters (TARUMBETA, ACHI and DARA Games)
- Standard Game Making Materials: Construction Paper, Markers, Scissors, Glue, Rulers, Index Cards, File Folders, Tape, Blank White Paper, Card Board, Poster Board
    - As far as game making materials are concerned, we encourage you and your students to use your imagination to identify additional materials that make sense for creating the games. For example, marbles (for use as game pieces), card board tubes, pipe cleaners, string, post-it notes, cotton balls, etc.
    - Remember to check page 33 and onwards for various printable templates, such as dice, grids, cards, spinners, etc.

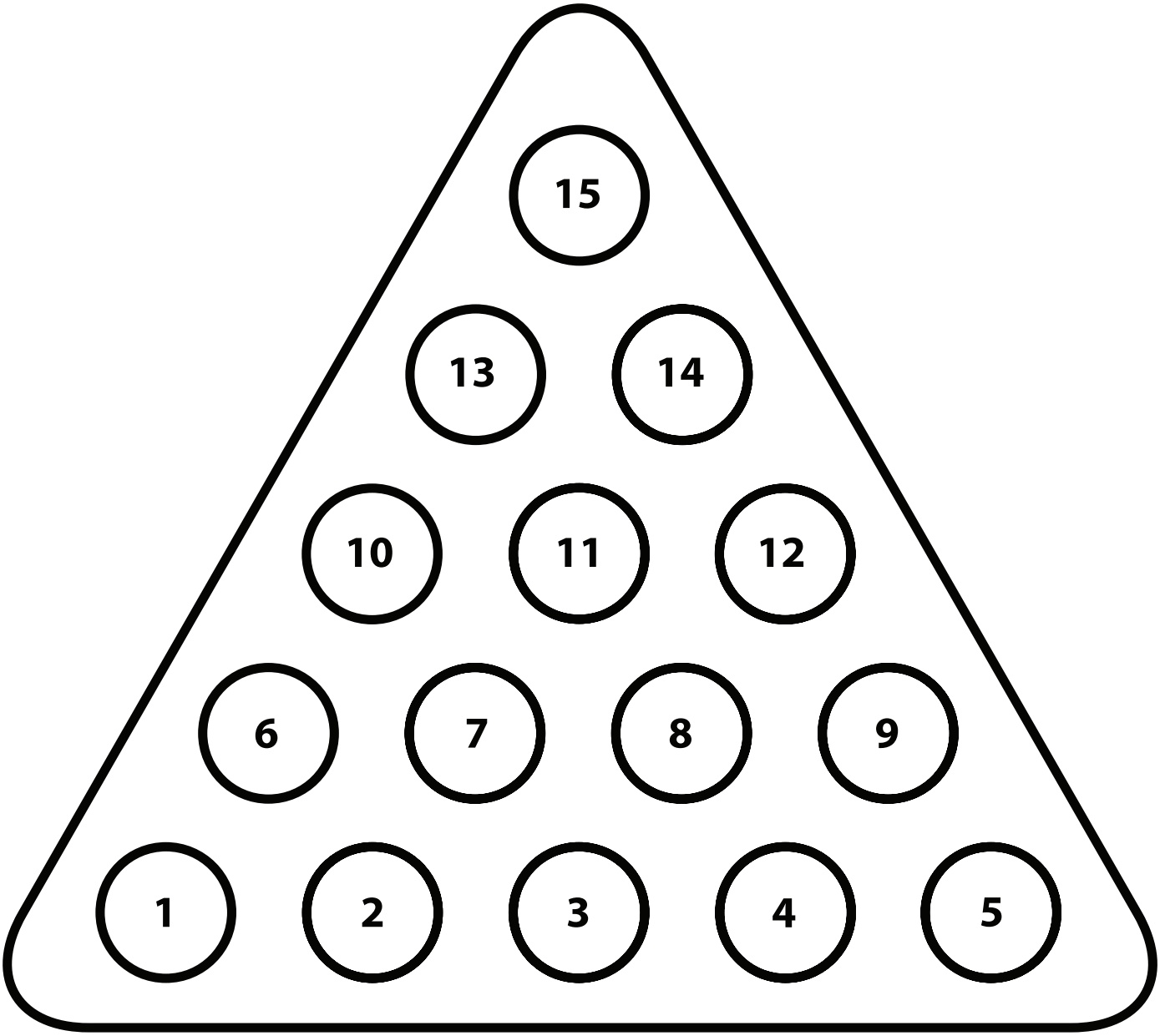
Task #0: Play/Explore

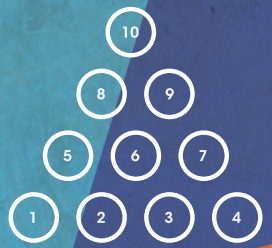
TARUMBETA Game Board (Intro)



Task #0: Play/Explore

TARUMBETA Game Board (Standard)



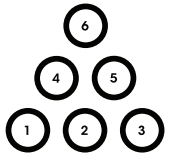


Tarumbeta

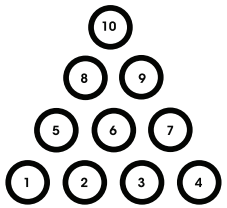
Game Rules

Goal: Score the most points by guessing the correct numbers on the triangle

For ages 7 and up



A setup with 6 pieces

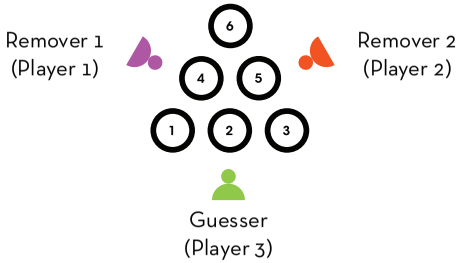


A setup with 10 pieces

1. Form a triangle of any size using the circles

Form a triangle using the numbered circles from lowest to highest, starting with 1.

The bigger the triangle, the more difficult the game.



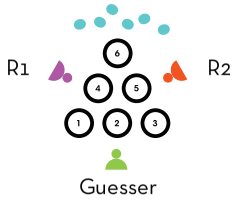
2. Assign roles and seating

This is a 3 player game: there are 2 Rock Removers and 1 Guesser.

Arrange your seating as pictured above.

The Guesser sits at the bottom of triangle by the row with 1, 2, 3.

3. Set up the game



Removers 1 and 2 cover each number with a rock.

The time that it takes the Removers to cover the board is the time the Guesser has to study the board.

When the triangle is completely covered, the Challenger has to turn around.

4a. Learn the order of removal Start with Remover 1

Removers 1 and 2 alternate back and forth, removing the rocks closest to them, working towards the center until a row is complete.

Guesser is turned around. Remover 1 always starts the game by removing the first rock on the bottom left to show number 1.

Guesser shouts out prediction of the number under the rock.

Remover 1 tells the Guesser if the number is correct.

4b. Alternate removal turn: Remover 2

Remover 2 removes the next rock closest to him/her on that same row.

Guesser shouts out prediction of the number under the rock.

Remover 2 tells the Guesser if the number is correct.

4c. Alternate removal turn: Remover 1

Remover 1 removes the next rock closest to him/her on that same row.

Guesser shouts out prediction of the number under the rock.

Remover 1 tells the Guesser if the number is correct.

4d. Alternate removal turn: Remover 2

Remover 2 removes the next rock closest to him/her on the next row up.

When the Guesser makes a mistake, the round is over, and his/her score is the number of rocks correctly predicted.

In this case, the Green player earned 3 points.

© 2016 MIND Research Institute. All rights reserved.

Task #0: Play/Explore

TRAFFIC LIGHT Game Board and Rules

Need:

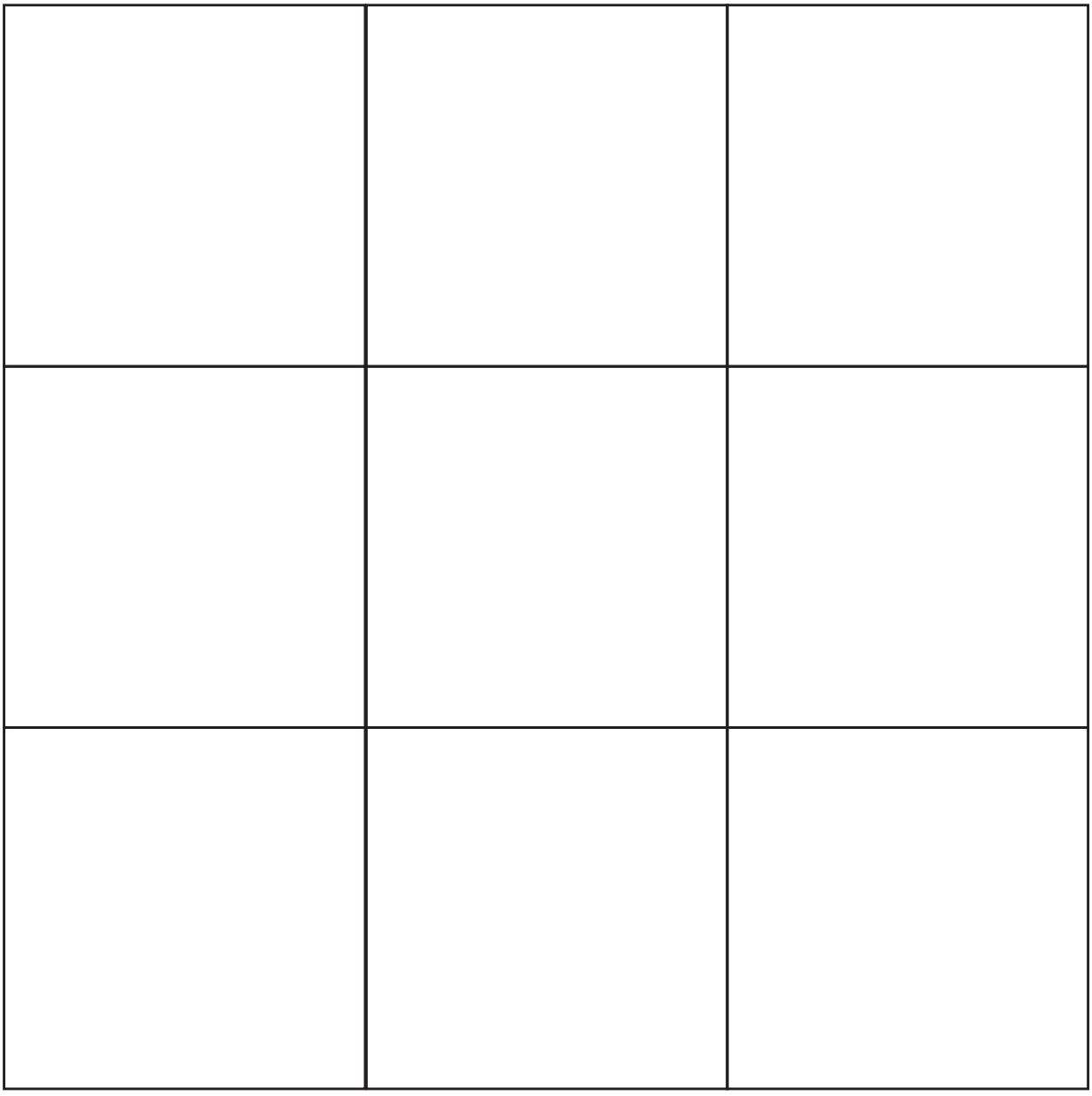
2 Players

Tic-Tac-Toe board

6 Red, 6 yellow and 6 green markers/tiles/blocks/counters (each player gets 3 of each color)

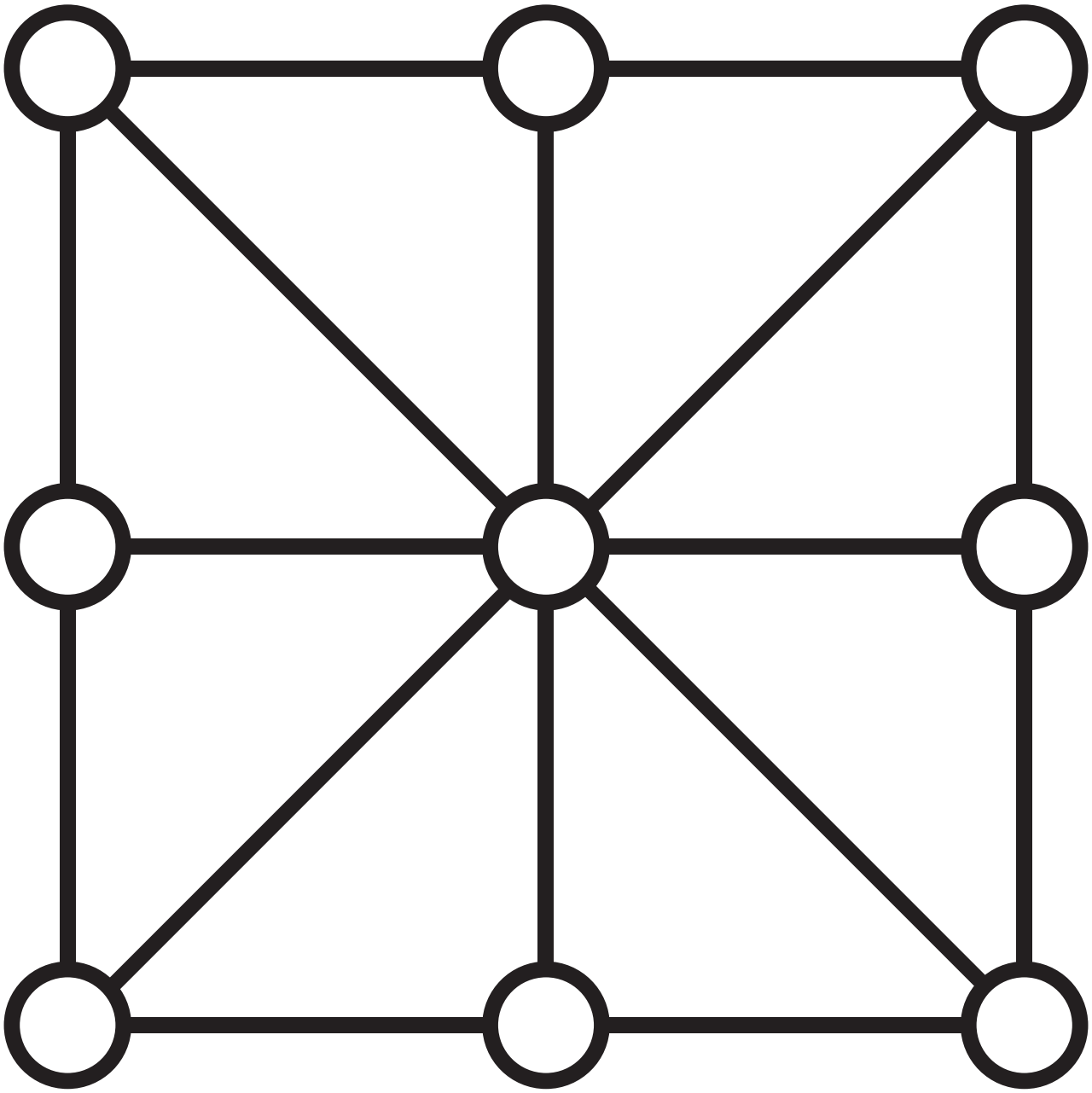
How to Play:

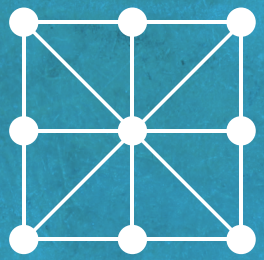
Players take turns placing a marker on the Tic-Tac-Toe board. Only a red marker can be played in an empty cell. A yellow marker replaces a red marker. A green marker replaces a yellow marker. Players can make any possible play, in any cell. The winner is the player who gets 3 same colored markers in a row (across, up and down, or diagonal).



Task #0: Play/Explore

ACHI Game Board

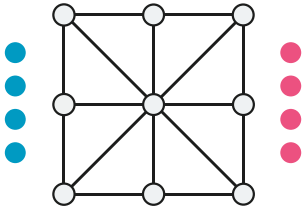




Achi
Game Rules

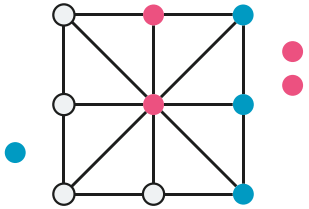
Goal: Be the first player to connect 3 of your pieces in a row, vertically, horizontally, or diagonally

For ages 7 and up



Start with an empty board.

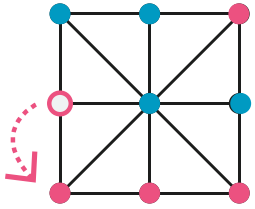
Each player has 4 pieces of one color.



Blue wins!

1. Place pieces on empty spaces

Two players take turns placing one piece at a time on an empty space of the board. When a player connects 3 pieces in a row, that player wins the game.



Pink wins!

2. Move pieces along a line to an empty and adjacent space.

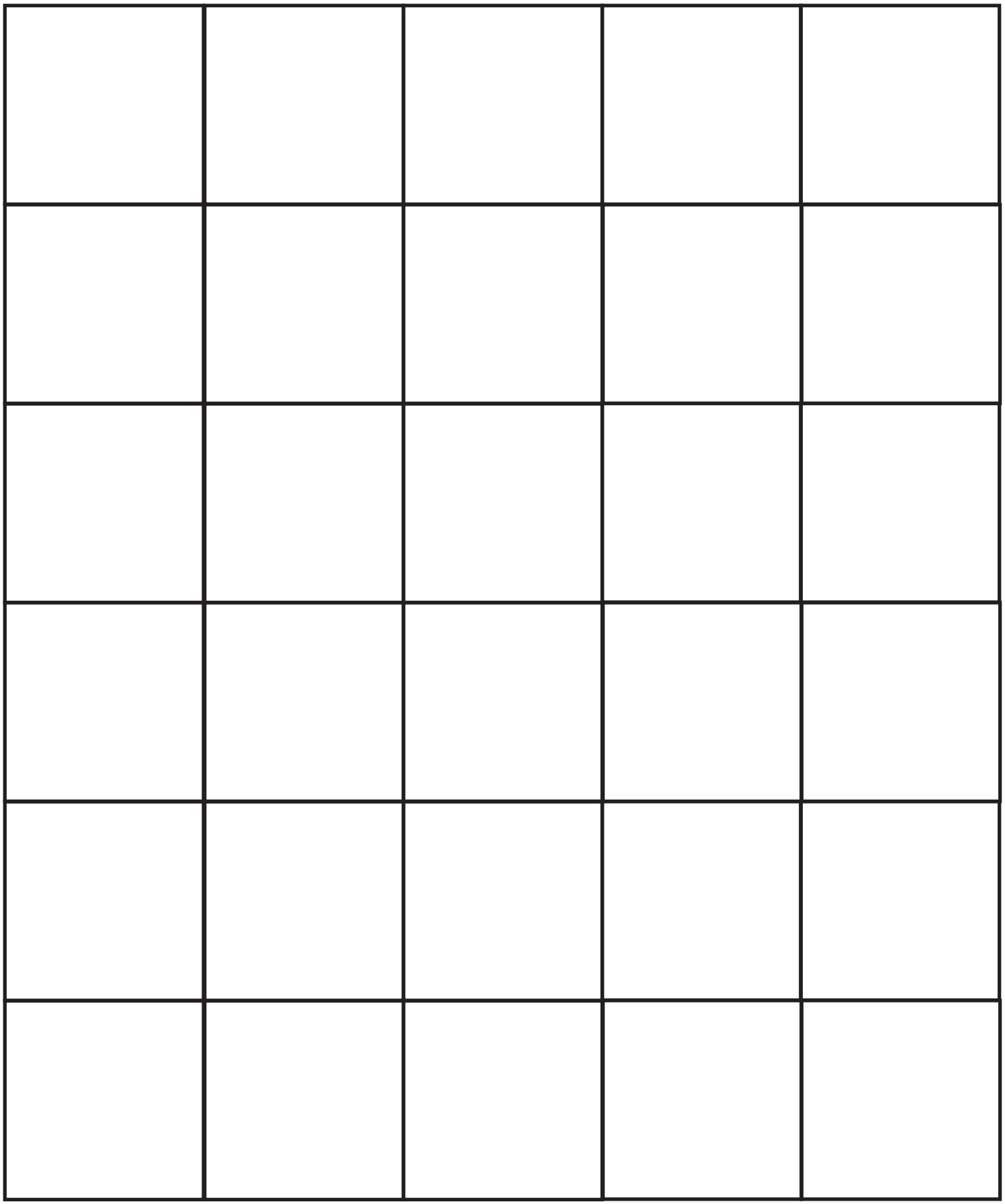
If all 8 pieces have been placed on the board and no one's made a connection of 3 pieces, players take turns moving one of their pieces to an empty space next to it.

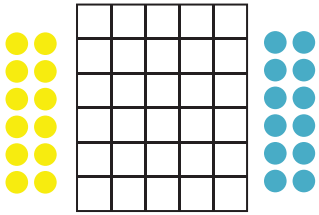
© 2016 MIND Research Institute. All rights reserved.

Task #0: Play/Explore
ACHI Game Rules

Task #0: Play/Explore

DARA Game Board

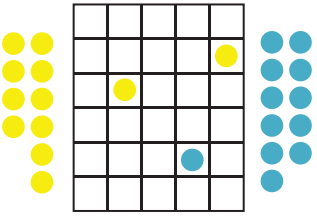




Game Set up

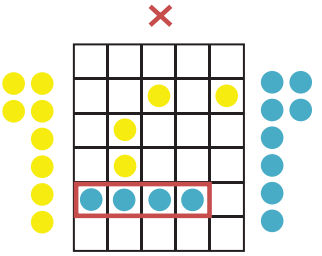
Start with an empty board.

Each player has 12 rocks of one color.



1. Place rocks strategically

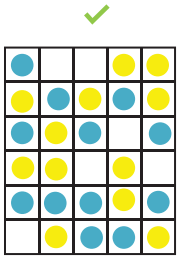
Opponents take turn placing their rocks on the empty squares on the board.



2. Having 4 or more consecutive rocks in a horizontal or vertical row is not allowed

Having 4 or more consecutive rocks of the same color in a horizontal or vertical row is not allowed at any time during the game.

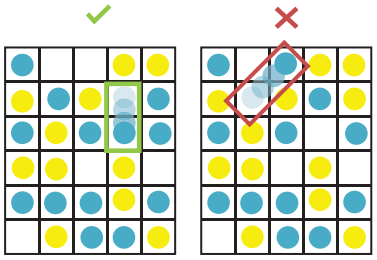
You can have as many consecutive pieces as you want diagonally.



3. Continue placing rocks until all rocks are on the board

Applying the previous rules, continue placing rocks until all are on the board.

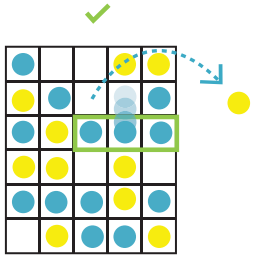
Once all pieces have been placed, opponents move and capture each other's pieces.



4. Move a rock horizontally or vertically to an empty square

Players take turn moving one of their rocks horizontally or vertically to an adjacent empty space. Pieces are not allowed to move diagonally.

If a player cannot move, his/her turn is skipped.



Blue forms 3 in a row and captures one of Yellow's pieces

5. Capture an opponent's rock by lining up 3 in a row

To capture, players must form a new horizontal or vertical row of 3 consecutive rocks.

When this connection is formed, the player can remove ANY one of the opponent's rocks from the game. Only one rock can be captured per move, even if multiple connections of 3 are created with one move.

What if I already have 3 in a row after all the rocks have been placed? Do I get to capture immediately?

No, after all rocks are placed, capturing happens when players make a new line of 3 consecutive rocks.

What happens if I make more than one 3 in a row in a single move?

Only one rock can be captured per turn, even if multiple connections of 3 are created. On your next turn, you must create a newly formed 3 in a row for a capture to happen. Unused 3 in a rows from a previous turn does not count.

Is reforming the same 3 in a row acceptable?

Yes, but not immediately because moving back to the same space from your last turn is not allowed.

© 2016 MIND Research Institute. All rights reserved.

What is a game versus an activity?

An activity is something that a person or a group does together. A game is an activity with clear rules as opposed to instructions and generally a winner (or a group of winners).

A game is an activity, but not all activities are games. Games have rules that govern the behavior of the game. The rules of the game tend to restrict choices so that strategy becomes a part of the game. The players determine their own steps. An activity may be something that you do over and over (walking the dog), but it tends to end whenever we decide for it to end. A game ends when something very specific happens.

An activity is something that you can do and learn from without the winning / losing aspect. A game leads to a result - a clear end of the round. Often times, an activity can be turned into a game by adding a competitive element (walking home vs walking home the fastest).

What is the value in playing math games?

A game is inherently designed to activate strategic reasoning. This is generally accomplished with multi-step reasoning (thinking ahead), deductive reasoning, or quantitative reasoning and sometimes even all of the above. Games are natural problem-solving environments.

Mathematics has many rules for students to learn and work with, but we don't generally think about mathematical play. What is mathematical play? It's playing within the rules of the system we are in. This is what a math game is - mathematical play. Games are mathematical experiences for students to build upon for greater mathematical insight.

Because games are mathematical experiences, we shouldn't limit ourselves to see the value in games solely based on the math concept we learn. Math games can encourage exploration of specific pieces of math content - operations, place value, etc. But, we shouldn't limit the value of games just to the information we learn. Games do many other things, including but not limited to:

- Help us see that math can be experienced, not just learned.
- Provide natural situations for being stuck (not sure of the best move). This encourages the development of our own strategies.
- Highlight the fun of deep reasoning.
- Allow adults and kids to play together without it being skewed towards the adults or based on prior content knowledge.
- Help build other skills, e.g., cognitive skills, communication skills, social skills.

Task #2: Investigate
Talking Points

What makes a good game?

Some characteristics of a good game:

- is deceptively simple, but challenging at the same time. These challenges are continuous. Remember, challenging doesn't equal hard!
- has clear rules and goals, especially how the game ends.
- requires some decision making to happen.
- has obstacles to overcome.
- keeps players engaged at all times, so fun factor is important.
- has room for the person behind to come back and still win.
- has high replayability factor. An activity is something you often only do once. A good game is fun to play over and over.
- is a battle between good players/teams. The more you learn about how to play the game, the better the competition should be.
- has an appropriate length. There are great games that are short or long, but always keep an eye out for if the game ends too quickly or takes too long based on the engagement and objective of the game.

What makes a good MATH game?

Some characteristics of a good **math** game:

- is a good game (see all characteristics of a good game).
- is enhanced because of the mathematical aspect to the game.
- avoids having the math feel superficial, but rather math is integrated into the game seamlessly.
- has mathematical reasoning for all players. Whether you've mastered the concept in the game or not, the game should open all players to thinking more about it.
- (if multiplayer) allows those learning the concept and those that already know it to be able to play with each other well.
- is unintimidating to play and is set up so that losing doesn't mean that you are less skilled at the concept. You don't want the game to promote math anxiety. Often times, an element of luck helps with this.
- allows different ways to solve a problem.
- allows players to figure out their own strategy to solve problems.

What types of games are there?

Examples Include:

- Competitive
- Cooperative
- Single player
- Multi-player
- Team versus Team
- Digital/Computer/Video games
- Tabletop, e.g., card, board
- Outdoor

Bonus Challenge

Game Rules Bonus Challenge

There is an **optional** bonus challenge available for students to work on as a team.

Learning about Rules

All games have rules. They are an important part of playing the games. They help determine who may win the game.

What are some other reasons rules are important?

Below are some games that you might know. Write other games you think of that are not listed.

Memory	I SPY
Connect Four	UNO
Tic Tac Toe	Jenga
Checkers	Chutes and Ladders

Select one of these games and write down what the rules are for the game you choose.

Game we choose is _____

The rules of this game are:

Bonus Challenge

Game Rules Bonus Challenge cont.

Rewriting the Rules

Thinking about the rules that other games have can help prepare you to develop your own rules for your game.

Think of the game you selected. Write 2 new game-changing rules for this game.

1.

2.

Play the Game with the New Rules

Describe what it was like playing the game with the new rules. How did it change the game?

What worked?

What didn't work?

What did you like about the game that you didn't like before?

What did you not like about the game with these new rules?

How can this activity help you when creating your own rules?

What are some things that you have learned are important when determining rules for you game?

Facilitating Questions

NOTE: Remember to refer students to their Game Designer Manual.

For students who are having difficulty getting started:

- Tell me about a game you played before. What did you like about it? What didn't you like about it? How can that information help you in creating your own game?
- If you think about the different games that you have played before, what are some components of those games that you would like to include in your game? *Special play cards (go back to start, go backwards, switch with another player), playing as a team, competition, etc.*

General questions:

- How do you feel about math?
- Have you ever played a math game?
- What would you do to make a math game exciting?
- Can you think of ways to incorporate math into a game?
- What are some of the ideas you're thinking of?
- What are some of the challenges?

Math content questions:

- Which math concept are you using?
- Why did you pick that one?
- How are you incorporating the math concept?
- What are you asking the player to figure out?

Game design questions:

- What makes this a game? A game should have these key components:
    - Goals
    - A set of rules that govern play
    - Some challenges
- What is the goal(s) of the game (how does the game end)?
- What are the rules of the game?
- Are the rules straightforward and clear?
- Does it feel like the game is fair? Is there a clear winner from the start?
- Can you think of games that are similar to this? If so, how is it similar, and how is it different?
- Are there obstacles/challenges in place to make the game more challenging and interesting?
- What are the actions or steps players will take in the game?
- How can a player win? Can multiple players win? What if there is a tie?
- Can you explain how you will design your game and what materials you will use?
- How is math being used in the game?
- Can the math be removed from the game? If so, how?
- What other skills did you feel like you learned from this game?

Game Designer Letter

Dear Game Designers,

I am so happy that you have decided to create a math game for the MIND Research Institute's K-12 Game-a-thon Challenge. You have been working so hard all year to develop your math skills and the Game-a-thon gives you a great way to show off your problem-solving skills in a fun way. Remember to be creative as you design a game that focuses on mathematics. Think about everything you already know about games and conduct research to find out more information. Consider how strategy, logic, uniqueness, problem-solving opportunities, fun and creativity can be included in your design. You can invent card games, board games, apps, outdoor games or anything else that addresses a math concept. You can even adapt an existing game and turn it into a math game.

Here's what you need to do to get started:

- Complete Task #0 (two sessions)
- Complete Game-a-thon Intro
- Form a team
- Pick a team name
- Complete the entry form provided by your teacher and get a teacher to sign off

You are now ready for Task #1!

As a game designer, you will complete tasks and mini-challenges to help you develop your game. These tasks and mini-challenges will take you through the strategies in designing a game - including the steps of the engineering design process.
Good luck Game Designers!

I am excited to see your games!

— JiJi

K-12 Game-a-thon
Entry Form

School _____

Teacher _____ Grade Level _____

Team Name _____

Team Mentor _____

Student Names

_____

_____

_____

_____

_____

_____

==========

Important Notes To Enter the National K-12 Game-a-thon:
(Keep for your information)

1. For information on the Game-a-thon challenge visit:
   http://www.mindresearch.org/gameathon/
2. Complete the Game Designer Manual to help you think through your game design.
3. Create your game video presentation and complete the Video Permission Form.
4. Upload your video to YouTube with the help of your team mentor.
5. Complete the submission form by visiting http://mindresearch.org/gameathon/submission to enter your game into the National K - 12 Game-a-thon Challenge for a chance to win.

K-12 Game-a-thon
Video Submission Tips

Video Submission Tips

1. All students participating in the K-12 Game-a-thon should have video permission forms signed.
    - You don't need to film the students' faces. Instead you can film their hands playing the game, if you prefer.
    - When students introduce themselves in the video, ensure that they don't provide their full names and other personal information. Team name and school name should suffice.
2. Make sure that the area you are filming in has good lighting and limited outside sounds.
3. Add a title (e.g., Game Name by Team Name) to your video.
4. Keep the video to less than 4 minutes long. Ensure that the video content includes description of the game, how math is being showcased in the game, and a game demonstration highlighting the game instructions and rules. If playing cards are used, show examples of the cards in the video.
5. Include game decription and rules in the Comment section of your YouTube video page. This provides an alternative way to access those information during the evaluation process, especially if the video quality is poor.
6. Have students practice before recording. Writing a script is helpful.
7. Encourage students to speak loudly and clearly.

MIND Research Institute

A neuroscience and education social benefit organization

School:_____ Teacher:_____ Grade:____

MIND RESEARCH INSTITUTE
APPEARANCE RELEASE & AUTHORIZATION

I understand that The MIND Research Institute (the "Producer") is producing a series of presentations in connection with The MIND Research Institute's ST Math Program (the "Presentations") and that my child may be photographed or videotaped in the classroom or elsewhere for inclusion in the presentations.

In consideration of the opportunity for my Child to appear in the Presentations and for other good and valuable consideration, the receipt and sufficiency of which I acknowledge, I hereby grant the Producer complete permission to photograph, record, tape and otherwise reproduce my and/or my child's appearance, performance, photographs, voice, name and likeness as part of the Presentations, as well as in advertisements and publicity for the Presentations. I also grant the Producer the right to distribute, exhibit or sell the Presentations, throughout the world, in perpetuity, in all media and by any means.

All of the releases, waivers and rights I hereby grant to the Producers shall be binding on my heirs, successors, representatives, assigns, agents, and attorneys. I also grant the Producers the right to assign this Release, in whole or in part, to any party. The rights I grant hereunder shall inure to the benefit of any and all of the Producer's successors, assigns and licensees.

I understand that the Producer is relying upon this permission and grant of rights to proceed with the production and distribution of the Presentations. I agree that I will not have the right to terminate or rescind this Release or to revoke any of the rights I hereby grant.

I warrant and represent that I am the natural parent or legal guardian of my child and that I have the full legal right and authority to contract on behalf of my child with respect to the subject matter of this Release and the rights granted to Producers under this Release.

I have read and understand the meaning of this Release and have been given a copy of it to keep.

Agreed to and accepted:

_____ _____

Signature of Parent or Guardian | Relationship to Minor Child, if applicable

_____ _____

Type or Print Name | Type or Print Minor Child's Name

_____ _____

Matthew Peterson, CEO and Co-Founder
MIND Research Institute | Date

MIND Research Institute
A neuroscience and education social benefit organization

Escuela:_____Maestra:_____Grado:____

MIND RESEARCH INSTITUTE
AUTORIZACION Y LIBERACIÓN DE APARIENCIA

Es mi entendimiento que MIND Research Institute, y su compañía de producción, (colectivamente, los productores"), están produciendo una serie de videos en conexión con el programa de ST Math de este instituto("las Presentaciones") y que mi niño/a puede ser fotografiado o puede ser grabado en vídeo en el salón o en otra parte para de la escuela.

En consideración a la oportunidad para mi niño/a de aparecer en las presentaciones y para otras consideraciones buenas y valiosas, yo otorgo a los productores el permiso completo para fotografiar, registrar, grabar y de otro modo para reproducir la apariencia, desempeño, fotografías, voz, y nombre de mi niño/a, como parte de las presentaciones, anuncios y publicidad. También otorgo a los productores el derecho de distribuir, exhibir o vender las presentaciones, a través del mundo, en la perpetuidad, y por todos los medios de comunicación.

Yo otorgo todas las liberaciones, renuncias y los derechos a los productores que estarán atando a mis herederos, los sucesores, los representantes, los agentes, y los abogados. Otorgo también a los Productores el derecho de asignar esta Liberación, en el total o en la parte, a cualquier partido. Los derechos que otorgo a continuación acostumbrarán al beneficio de cualquier sucesor, y licencias del productor.

Entiendo que los productores se fían de este permiso y la beca de derechos para avanzar con la producción y la distribución de las presentaciones. Concuerdo que yo no tendré el derecho de terminar ni rescindir esta Liberación ni para revocar cualquiera de los derechos que yo por la presente otorgo.

Justifico y represento que soy el padre natural o guardián legal del menor nombrado y que tengo toda la autoridad legal para firmar a favor de él/ella con respecto al tema de esta Liberación y los derechos otorgados a productores bajo esta Liberación.

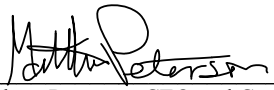
He leído y entendido el significado de esta Liberación y se me ha dado una copia de ello para mantener.

Estoy de acuerdo y lo acepto:

_____
Firma del Padre o Guardian legal

_____
Relación con el menor

_____
Escriba el nombre del menor



_____
Matthew Peterson, CEO and Co-founder
MIND Research Institute

_____
Fecha

Graphic Organizers

Tools to help stimulate conversation and organize student thinking

Game Brainstorming Sheet

The purpose of this sheet is to help you collect the ideas you have for your game as you complete Tasks #0, #1 and #2.

Ideas from Task #0

Ways to make my game challenging:

Ideas from Task #1

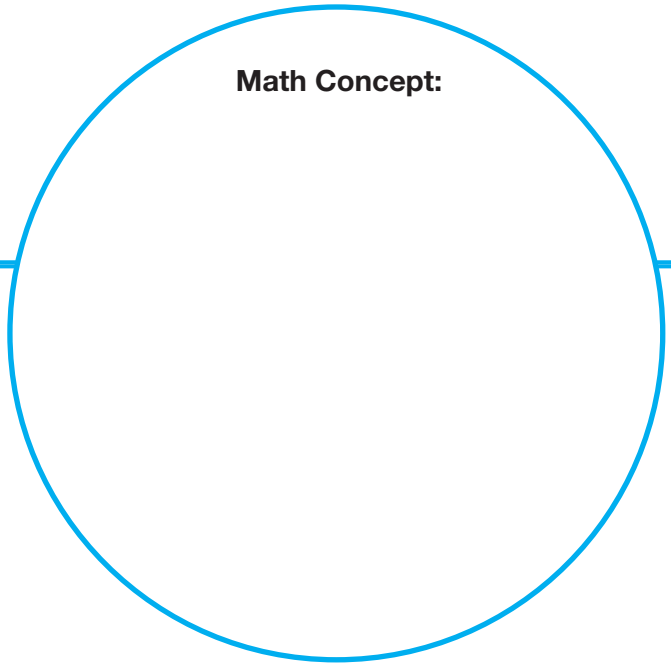
Reasons why someone would want to play my game:

Ideas from Task #2

Things I like in games that I might want to include in my game:

Math Concept Web

How have you used/experienced this concept? Give examples.



Visualize the concept.

Math Concept Web

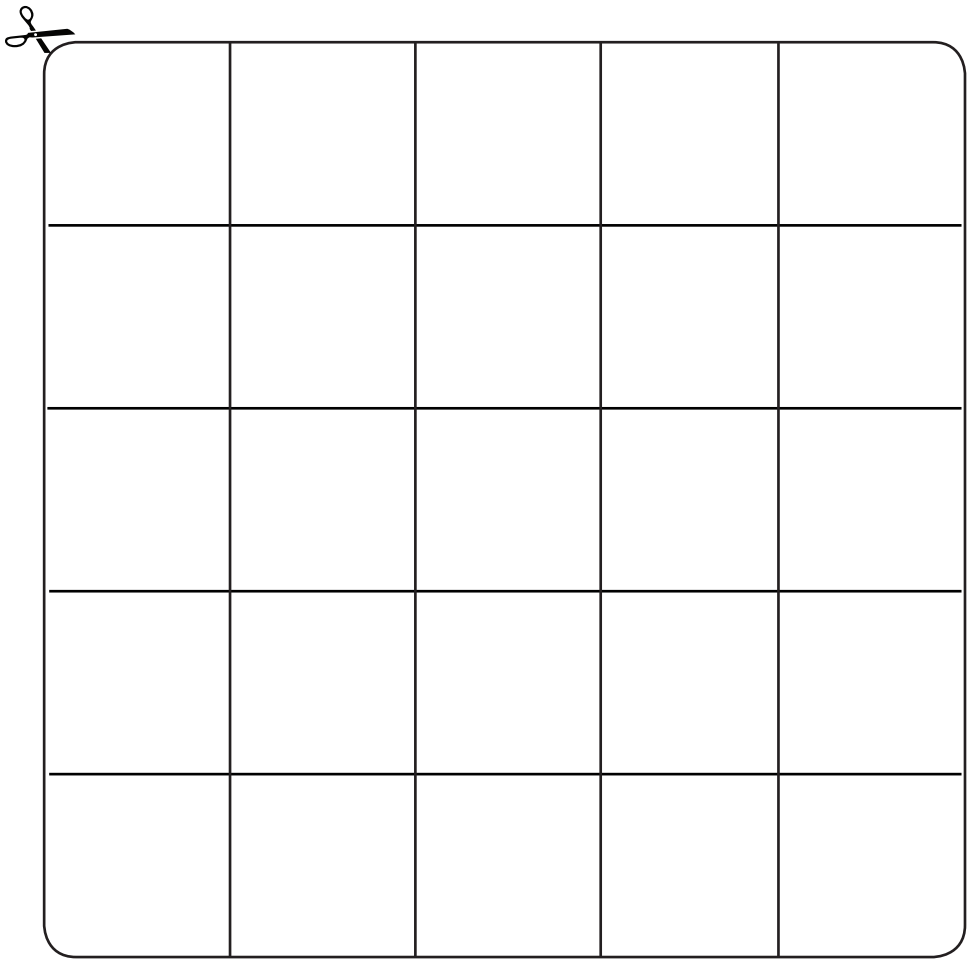
What are some common misconceptions about the concept?	Why do you think the misconceptions are happening?

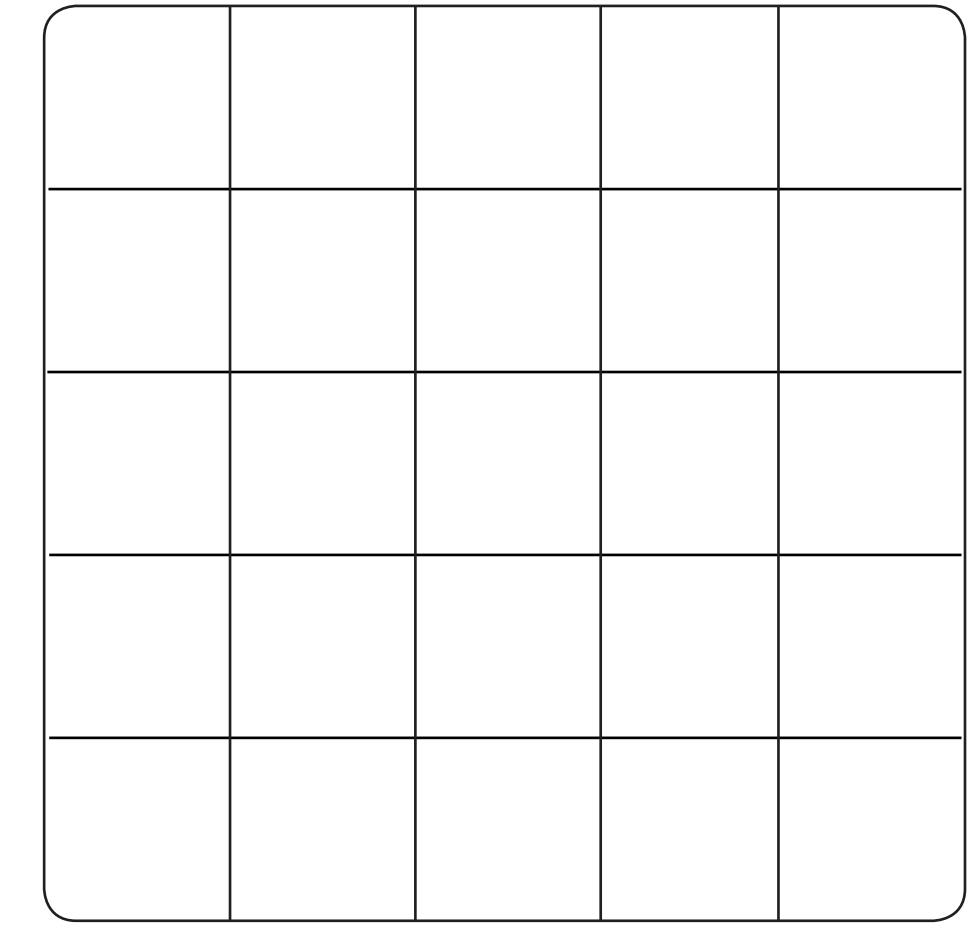
How would you create a game to address the math concept?

Printable Templates

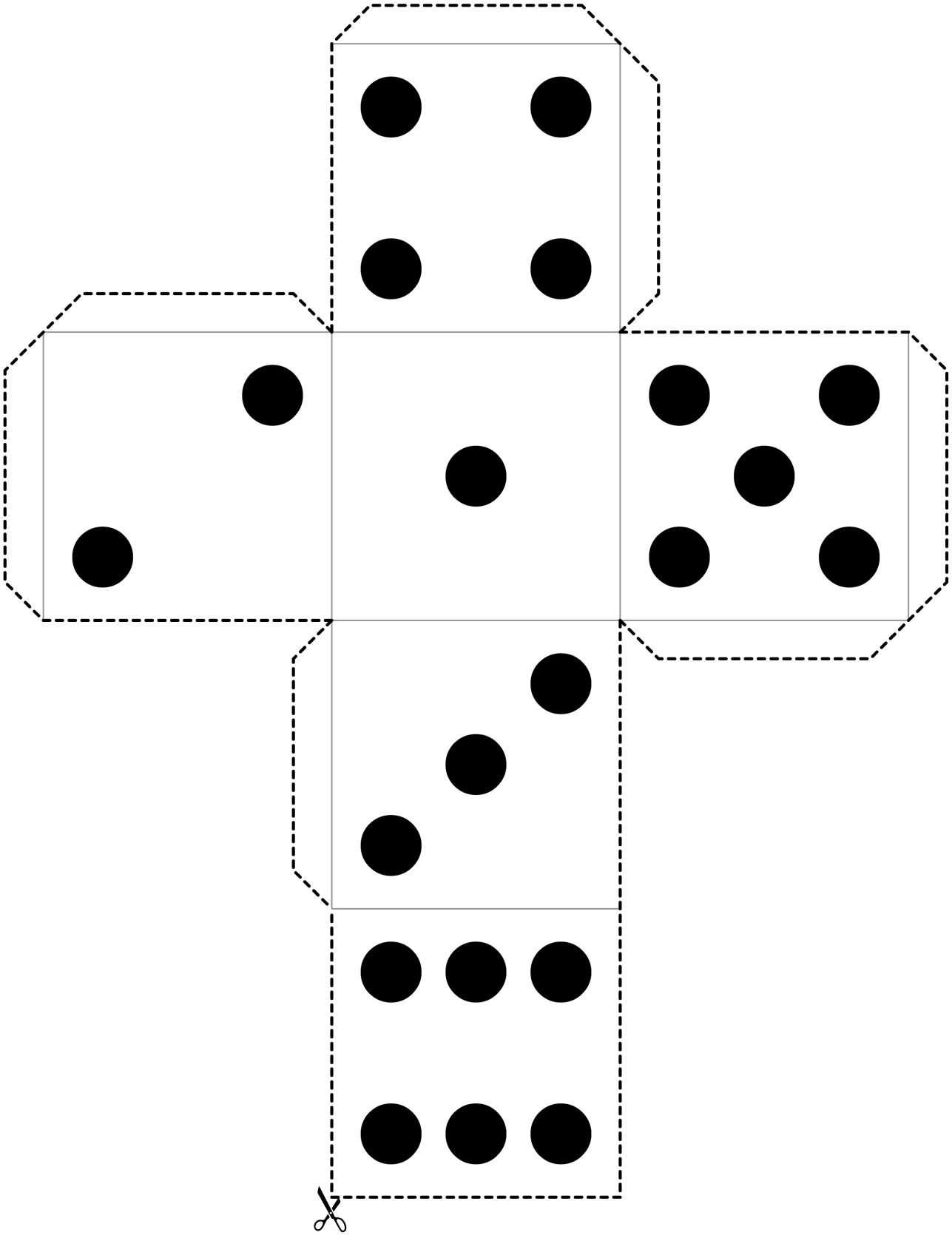
(1 inch x 1 inch) Grid Template

(0.5 inch x 0.5 inch) Grid Template

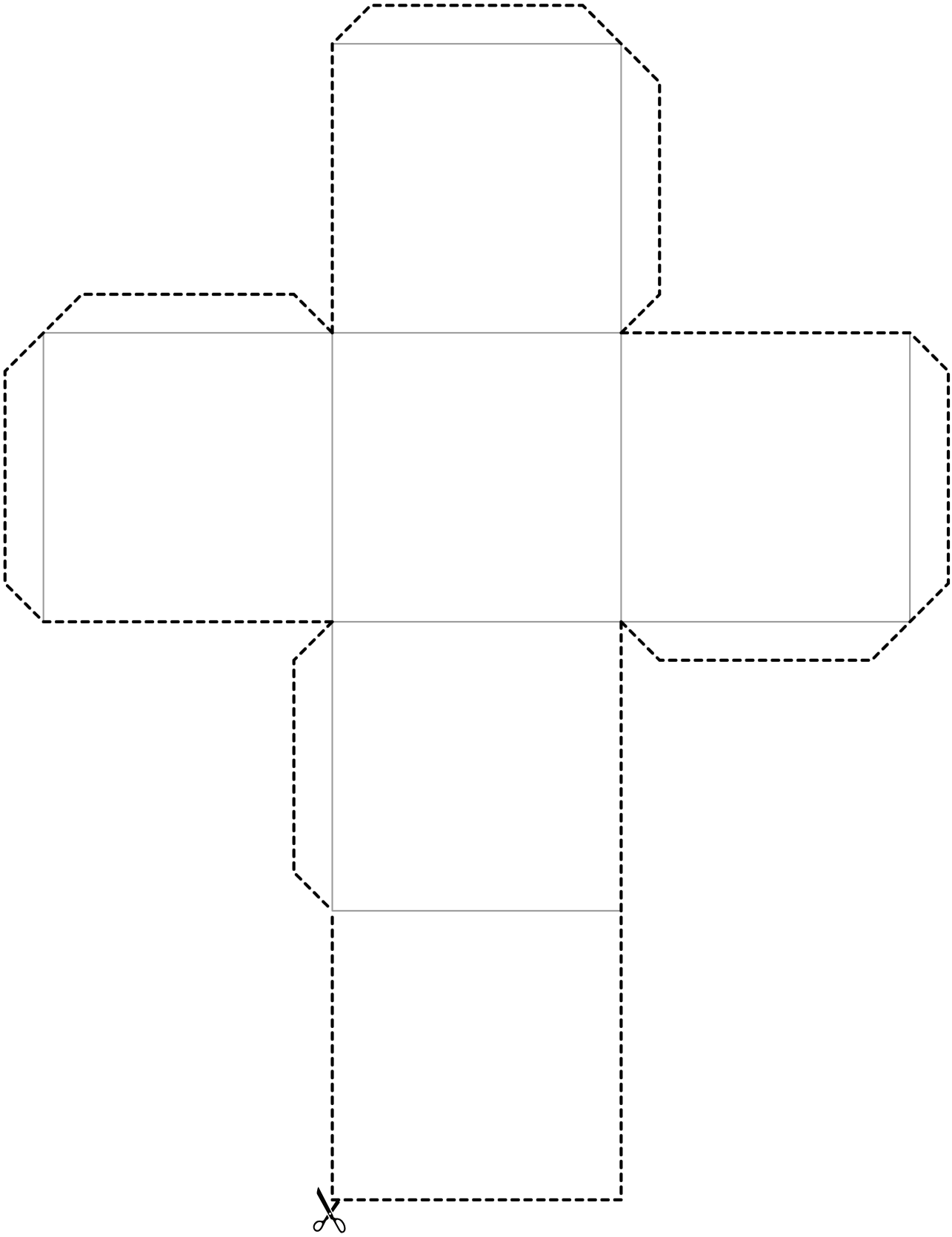




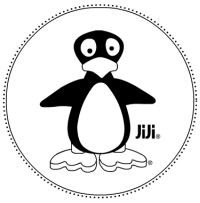
5 x 5 Grid Template

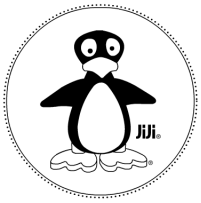


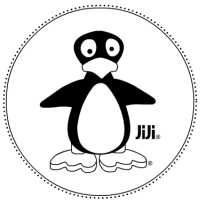
Die Template

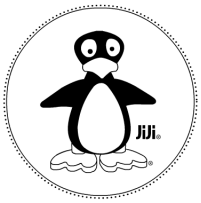


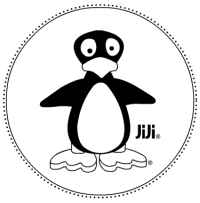
Blank Die Net Template

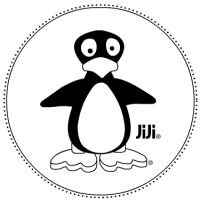

JiJi

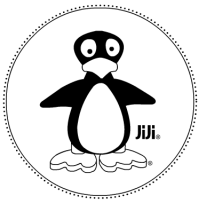

JiJi

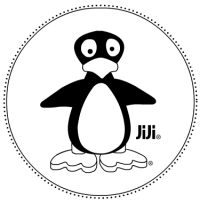

JiJi

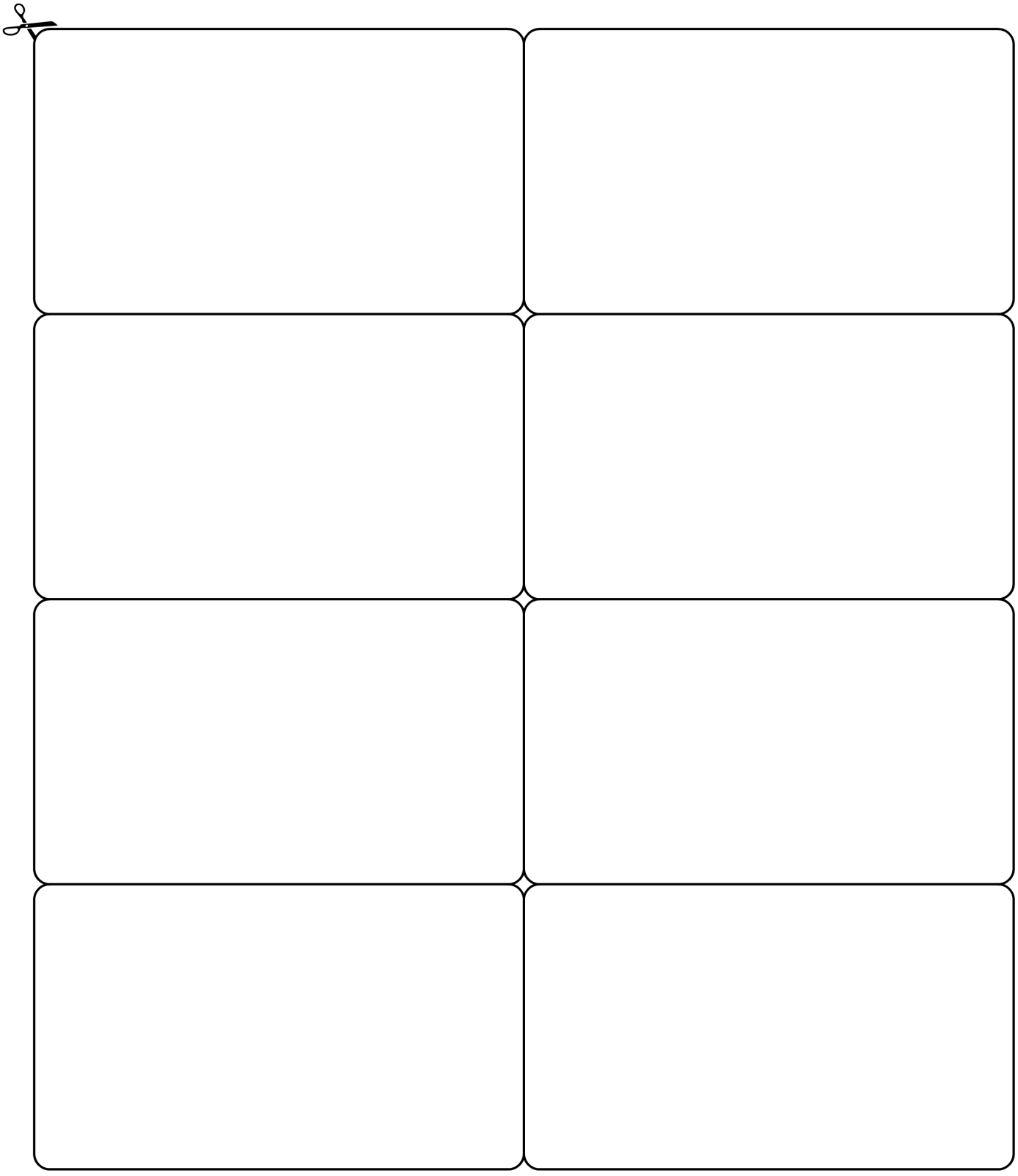

JiJi


JiJi

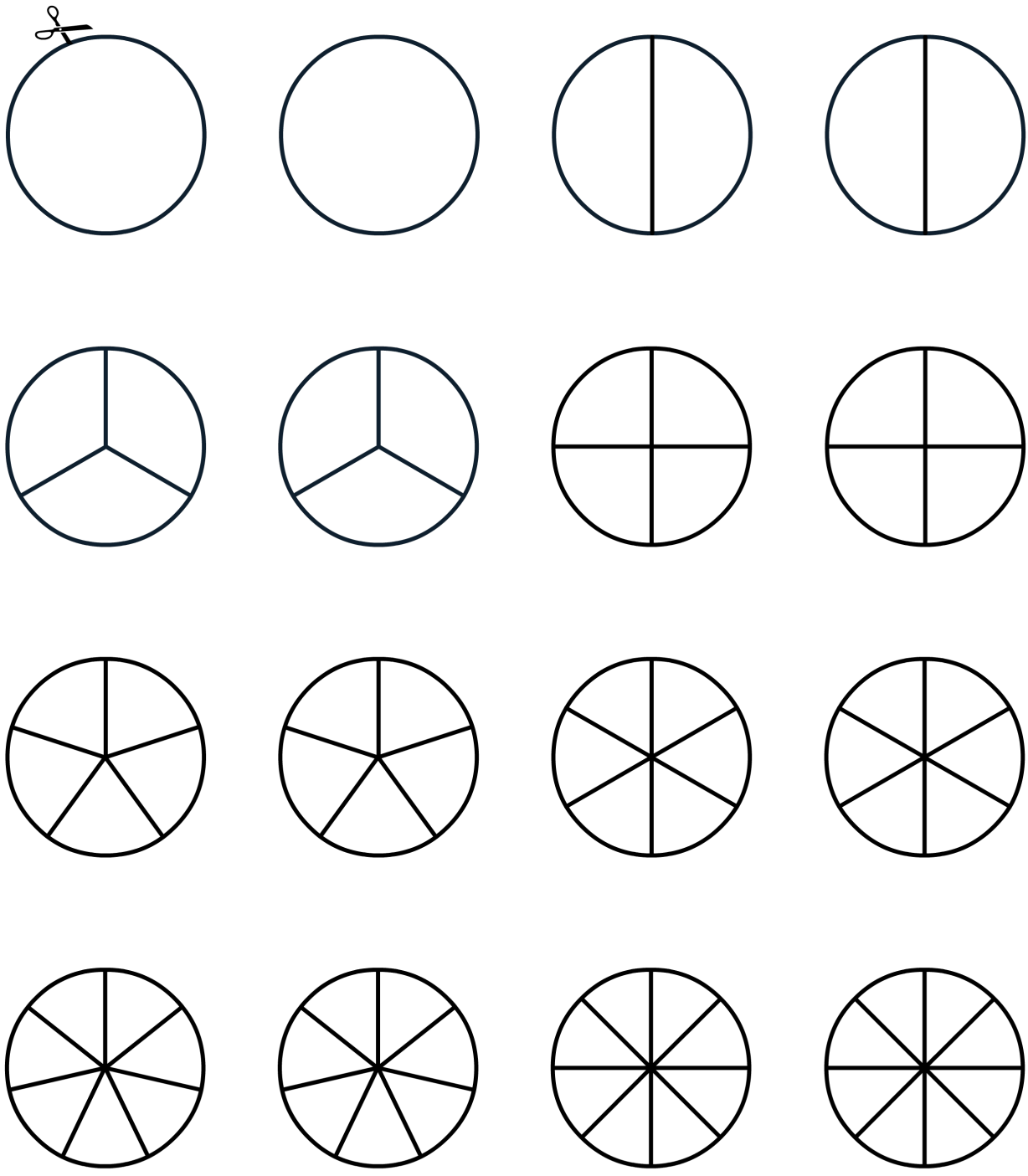

JiJi


JiJi

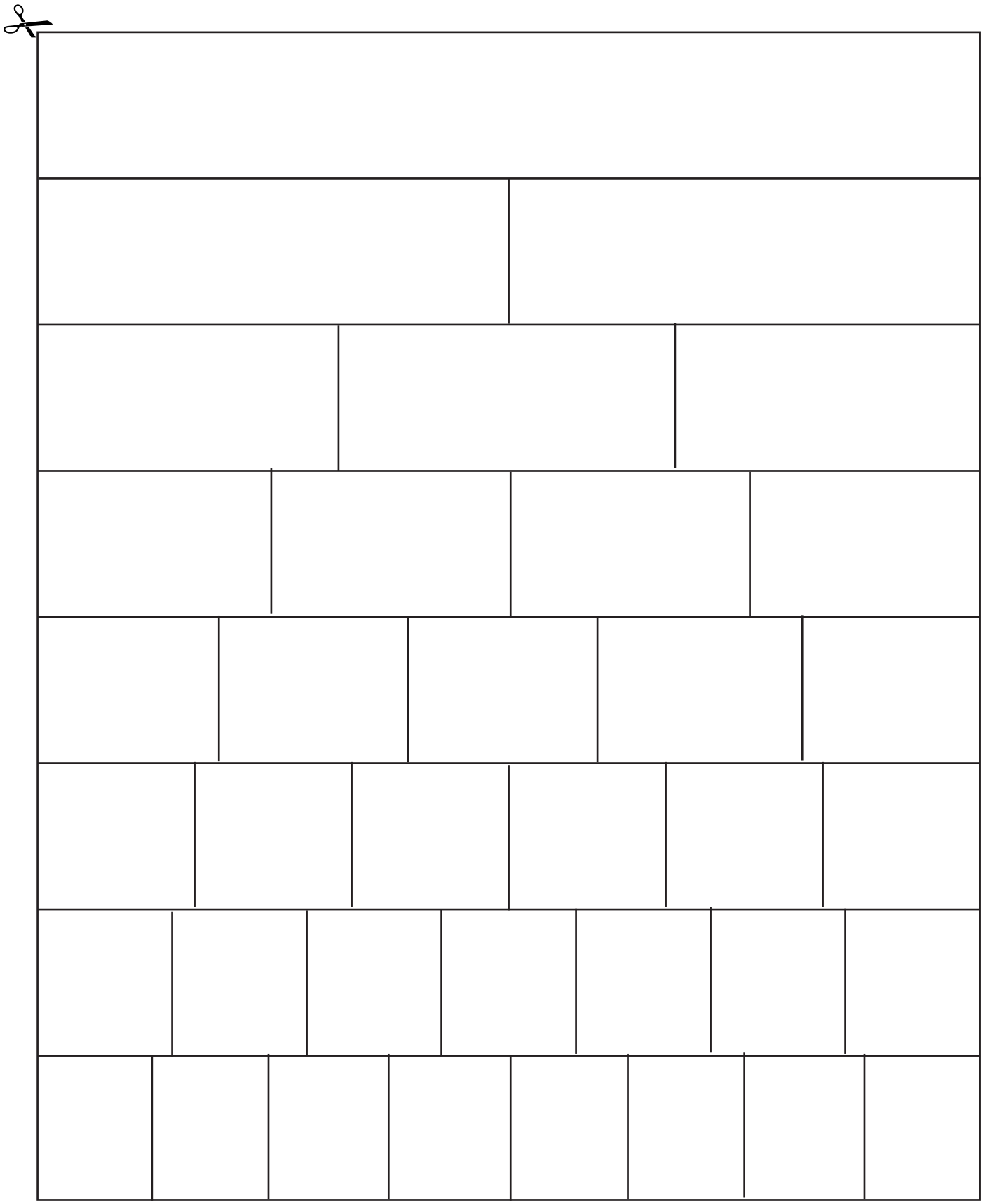

JiJi

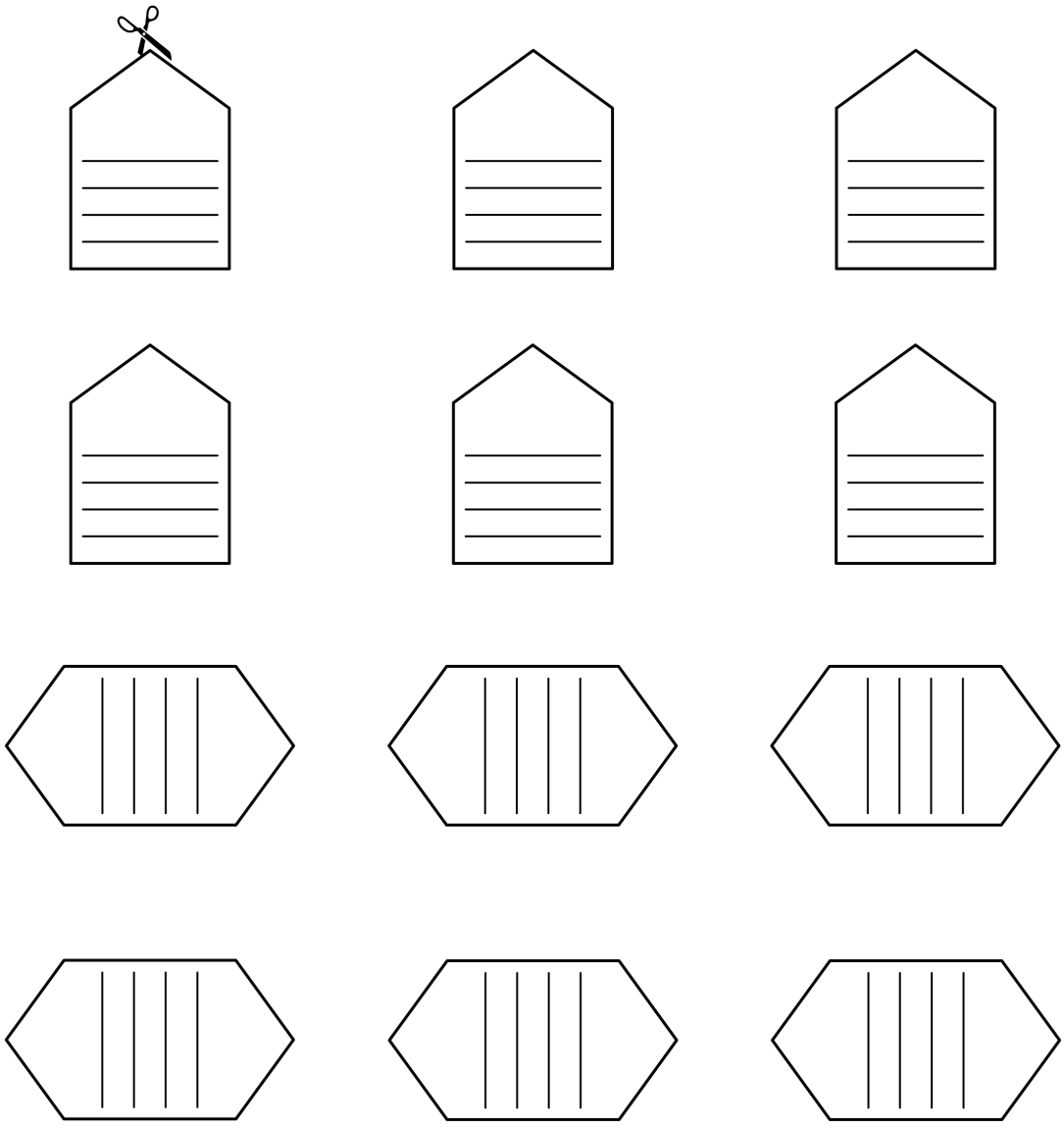


Blank Playing Card Template



Fraction Pie Template





Examples: