Game-a-thon Starter Kit

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The Game-a-thon Challenge

The **Game-a-thon** was created as an opportunity to promote and foster creativity, collaboration and mathematical thinking for students, in a game design context.

- Students **learn by doing**, thus they become invested in their own learning
- Students develop **systems thinking**, understanding how every component of a game relate to each other to achieve a goal
- Students have ownership of their **mathematical exploration** in a game-based, project-driven environment
- Students model process for **continuous learning** as they cycle through iterations of their game, based on feedback
- Students **collaborate** in groups with other students – however, the Game-a-thon also supports individual student games.
- Games are created in any form and from any materials, allowing for a high level of **creativity** and **critical thinking** in the design and construction process.
- All games are presented on camera as a form of **reflection**, which serves the dual purpose of reinforcing what students learned as well as explaining the rules of the game to other players.

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Implementing the Starter Kit

This Starter Kit is designed to help initiate the game design process for Game-a-thon participants. The kit guides participants through key parts of the process, but the most important part of the process is the formation of Learning Goals in the *Game Design Activity Form*. Use the facilitator version of this form as a reference on what each of the sections entails and how these game design elements can be explored.

Learning Goals

These are what make a game rich and meaningful to its players. It is the source of mathematical thinking that game players will go through - the stronger the goal, the deeper into the learning the players will go. Game-a-thon participants must carefully consider and brainstorm learning goals they want the game to embody. The best way to facilitate this process is to provide examples from your favorite math (or learning) games and demonstrate how those games teach their concepts.

Additional Forms

The remainder of the Starter Kit includes Printable Templates and a Game Feedback Form. The Feedback Form gives students the opportunity to iterate on their game designs from crucial feedback. The Templates provide printable gameplay elements (dice, boards, shapes, etc.) as points of inspiration for students to start from.

Facilitator Role

A large part of the success of a Game-a-thon project is the role of the facilitator or coach. In this role, it is your job to mentor and guide students through their process, giving them the space to explore while guiding them along the way.

The experience is enriching for both student and facilitator alike as the depth of creative ideas that emerge take root.

Enjoy the process and have fun!

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Game Design Activity Form (Student Version)

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Game name:

Target audience:	**Game type:**

Learning goal(s):
What does the game teach?

Game goal:
What does a player or team have to do to win?

Game mechanics:
What actions drive the gameplay?

Game components:
What make up the materials of play?

Game rules and challenges:
What can a player do or cannot do in the game? What obstacles are in place to make the game more challenging and interesting?

Materials/Tools:
What things (tech. or non-tech.) are needed to build the game?

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Game Design Activity Form (Facilitator Version)

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Game name: Dice Bingo

Target audience:	**Game type:**
Ages 8+	Card game, multi-player

Learning goal(s):

What does the game teach?

Practice arithmetic skills (addition, subtraction, multiplication, division)

Game goal:

What does a player or team have to do to win?

Instead of drawing random numbers, depending on the operation die rolled, a Bingo number is obtained by calculating the sum, difference or product of two other rolled dice. The first player to achieve a predetermined pattern on his or her bingo card (e.g., a horizontal, diagonal or vertical line) wins.

Game mechanics:

What actions drive the gameplay?

Rolling three dice, including an operation die, and then performing the necessary arithmetic. Players mark the number on their card, if present.

Game components:

What make up the materials of play?

Three dice: 2 regular dice, 1 die with two '+', '-' and 'x' operations on it
5 x 5 Bingo cards with possible numbers from 0 to 36 randomly assigned to each cell
Chips or stamp to mark the numbers on the Bingo cards

Game rules and challenges:

What can a player do or cannot do in the game? What obstacles are in place to make the game more challenging and interesting?

Choose a Bingo pattern to play, e.g., any horizontal, BNO, Coverall, Letter T
Start the game by rolling all three dice together.
Perform the arithmetic quietly, for instance, if the moderator rolled a 4, 3 and the operation 'x', look for the number 12 (4 x 3 = 12) on the card. Indicate it on the card if available.
Continue until a player completed the specified pattern and called out BINGO.

On the operation die, a JiJi silhoutte can be introduced as a "wildcard", so a player can turn JiJi into whatever operation they want (only one of 3 possible operations). Players can use this "wildcard" to their advantage.
Other variations of the game include using only two operations, e.g., '+' and 'x' or '+' and 'x', and introducing operations such as division and exponentiation for older players.

Materials/Tools:

What things (tech. or non-tech.) are needed to build the game?

Cardstock, Sharpie, Ruler, Scissors, Dot Stamps (or Chips), Dice

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Game name: Blobstacle

Target audience:	**Game type:**
Ages 11+	Outdoor game, 4 players

Learning goal(s):

What does the game teach?

Practice math concepts like whole number addition, odd and even numbers, multiples and prime numbers.

Game goal:

What does a player or team have to do to win?

6 blobs are strategically placed on 6 special squares of a life-sized 10 x 10 grid filled with numbers 1-100. Three dice are rolled and the sum denotes the question number. Players answer each math question by jumping to a square containing the solution to the question. The player who lands on the special squares and picks up the most blob win.

Game mechanics:

What actions drive the gameplay?

Rolling three dice, and then solving a math problem to move within a life-sized grid. Players pick up a blob if they land on a special square.

Game components:

What make up the materials of play?

Three dice, life-sized 10 x 10 grid with randomly placed numbers from 1-100, blobs (e.g., quarters, counters), a list of math problems labeled from #3 to #18 (e.g., hop to a prime number, hop to a perfect square, hop to a multiple of 9)

Game rules and challenges:

What can a player do or cannot do in the game? What obstacles are in place to make the game more challenging and interesting?

Each player takes one corner of the grid. This is the start location.
A moderator rolls all three dice together and pose a math question to all players based on the sum of the dice.
Each player must jump to a square to answer a math problem. If two players choose the same square, the player who jumped last must choose another square to jump to.
If you can't jump, you await the next math prompt in whatever stance you are currently in.
If you fall, you go back to the start location.
If you jump to the wrong square (incorrect answer), you go back to the start location.
No touching of the grid edges allowed. If you do, you go back to the start location.
If you jump to a special square, you must pick up the blob.
To add a fun and challenging element, include a fourth die (different color) that specifies the manner of jump. E.g., roll a 1, 2, or 3 means jump normally, a 4 means jump backwards and a 5 or 6 means jump and land one-footed.
Example: Dice rolled with a 1, 2, 3 and 4 means solve question #6 (1 + 2 + 3) and jump backwards to get to a square.
For team challenge edition, the game goal can be modified to see which team gets all the blobs in the least number of questions. So, once all four players in one team collect all blobs, they have passed that round. The next team tries the same grid and same blob locations to see if they can do it in fewer steps.

Materials/Tools:

What things (tech. or non-tech.) are needed to build the game?

Variety of sidewalk chalk, Measuring tape, Dice, Blobs (e.g., quarters, counters, small Lego blocks), Paper, Pen

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Game name: Place Value Card War

Target audience:	**Game type:**
Ages 8+	Card game, multi-player

Learning goal(s):
What does the game teach?

Practice number recognition and place value concepts.

Game goal:
What does a player or team have to do to win?

A deck of 36 cards (see Materials/Tools) is split equally among the number of players. Each player must create n-digit numbers (e.g., 3-digit) using the cards they received. Each timed round, the player with the largest n-digit number wins and takes all the cards used in that round. The player with the most cards at the end of all the rounds wins.

Game mechanics:
What actions drive the gameplay?

In each round, all players draw n-cards from their own pile and try to make the largest n-digit number by ordering and sequencing their cards.

Game components:
What make up the materials of play?

Standard card deck with modifications (see Materials/Tools), timer

Game rules and challenges:
What can a player do or cannot do in the game? What obstacles are in place to make the game more challenging and interesting?

Players can only draw n-cards from the top of their pile each time. They cannot pick and choose which cards to use for each round.

At the beginning of each round, a timer is set (e.g., 5 seconds). Players will simultaneously flip the top n-cards and move their cards in any position they wish within the time frame. When the time is up, each player must say out loud his/her number and the player with the largest number made wins the round and collects all the cards in that round (these will not be played again unless sudden death occurs). However, if the player says the number incorrectly, the player with the next largest number spoken correctly wins all the cards.

If a tie occurs during a round (same largest number), then all the cards from that round go to a side pot. This pot keeps growing if another tie happens, and will only be won by the player who wins the next no-tie round.

At the end of all the rounds, the player with the most cards wins. However, in the event of a tie, a sudden death round is initiated. The players use (n+1)-cards from their pile and play the last round of the game. This time, they have to create the largest (n+1)-digit number within the time limit to win it all.

Another variation of the game is to create the smallest n-digit number in each round.

Materials/Tools: gameatho
What things (tech. or non-tech.) are needed to build the game?

Timer/stopwatch, Deck of cards with jokers, 10s and face cards removed. Ace equals one.

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Game Feedback Form

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Game name:

Learning Outcomes:

What did you learn from this game?

Understanding of Rules:

How clear were the rules?

It was rough I got it

Fun:

How fun was the game to play?

Boring Awesome

Difficulty Level:

Would you like this game to be ...

☐ Less Challenging ☐ As is ☐ More Challenging

What did you like most about the game?

What did you like least about the game?

What suggestions do you have for the game?

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Printable Templates

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(1 inch x 1 inch) Grid Template

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(0.5 inch x 0.5 inch) Grid Template

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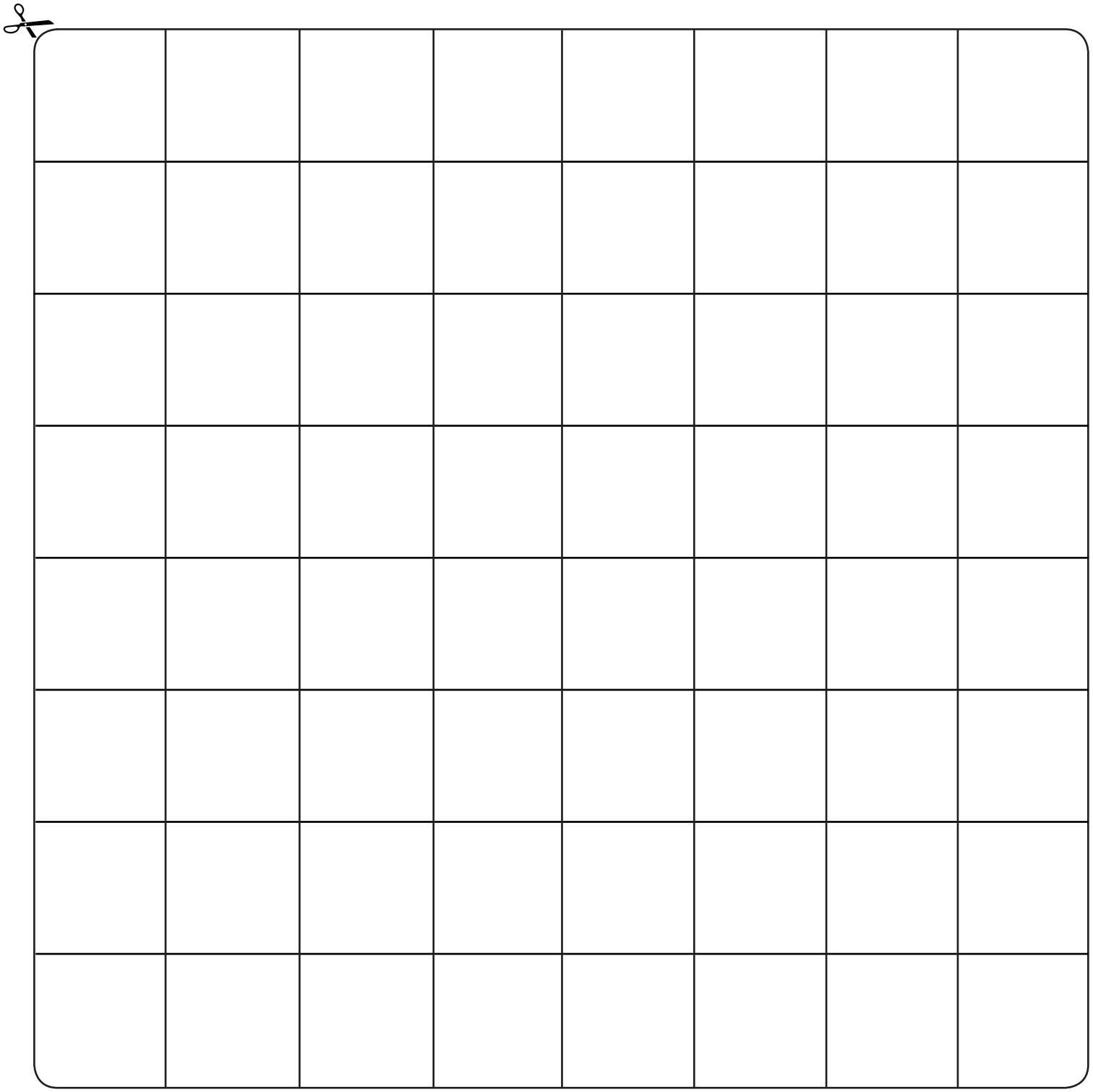
5 x 5 Grid Template



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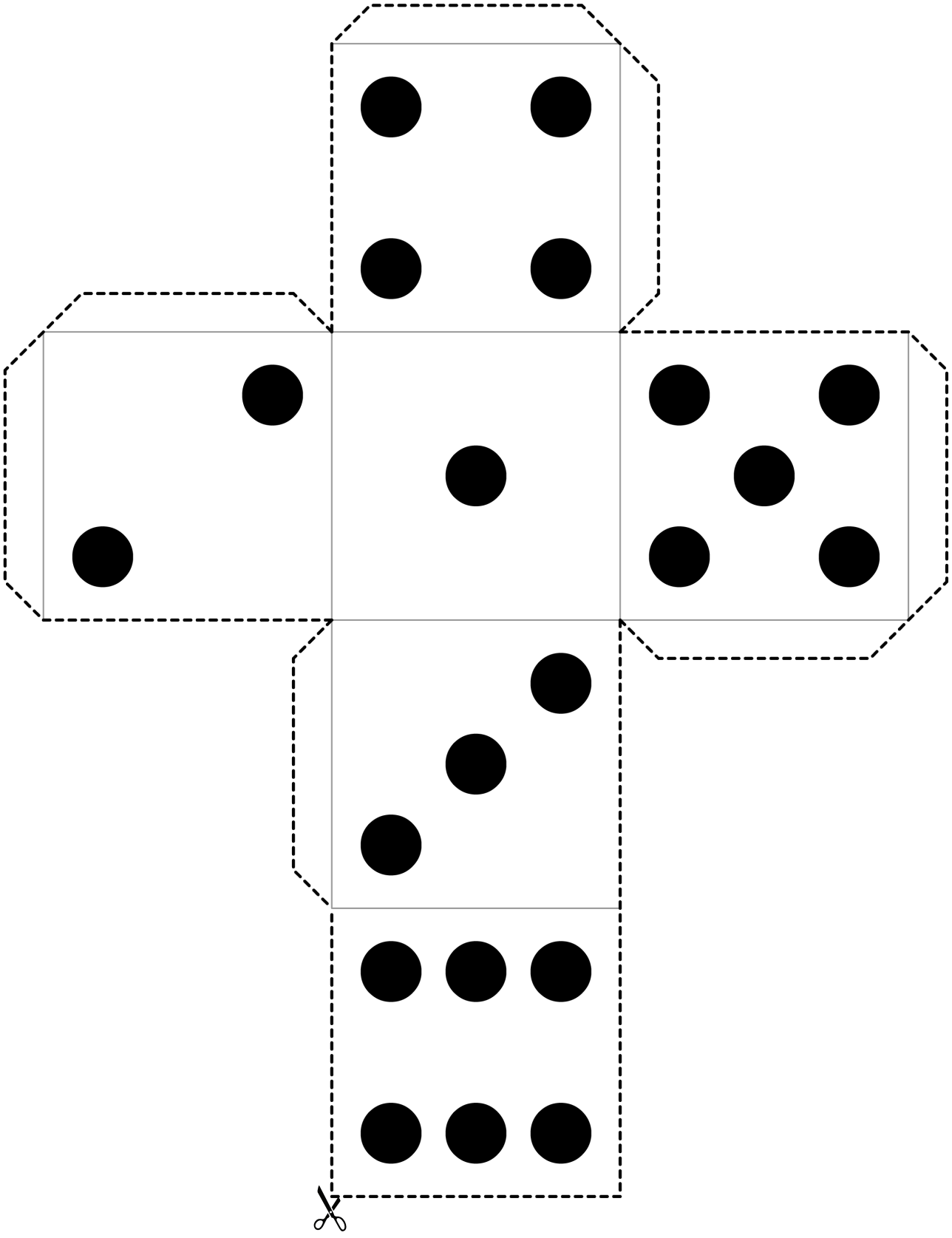

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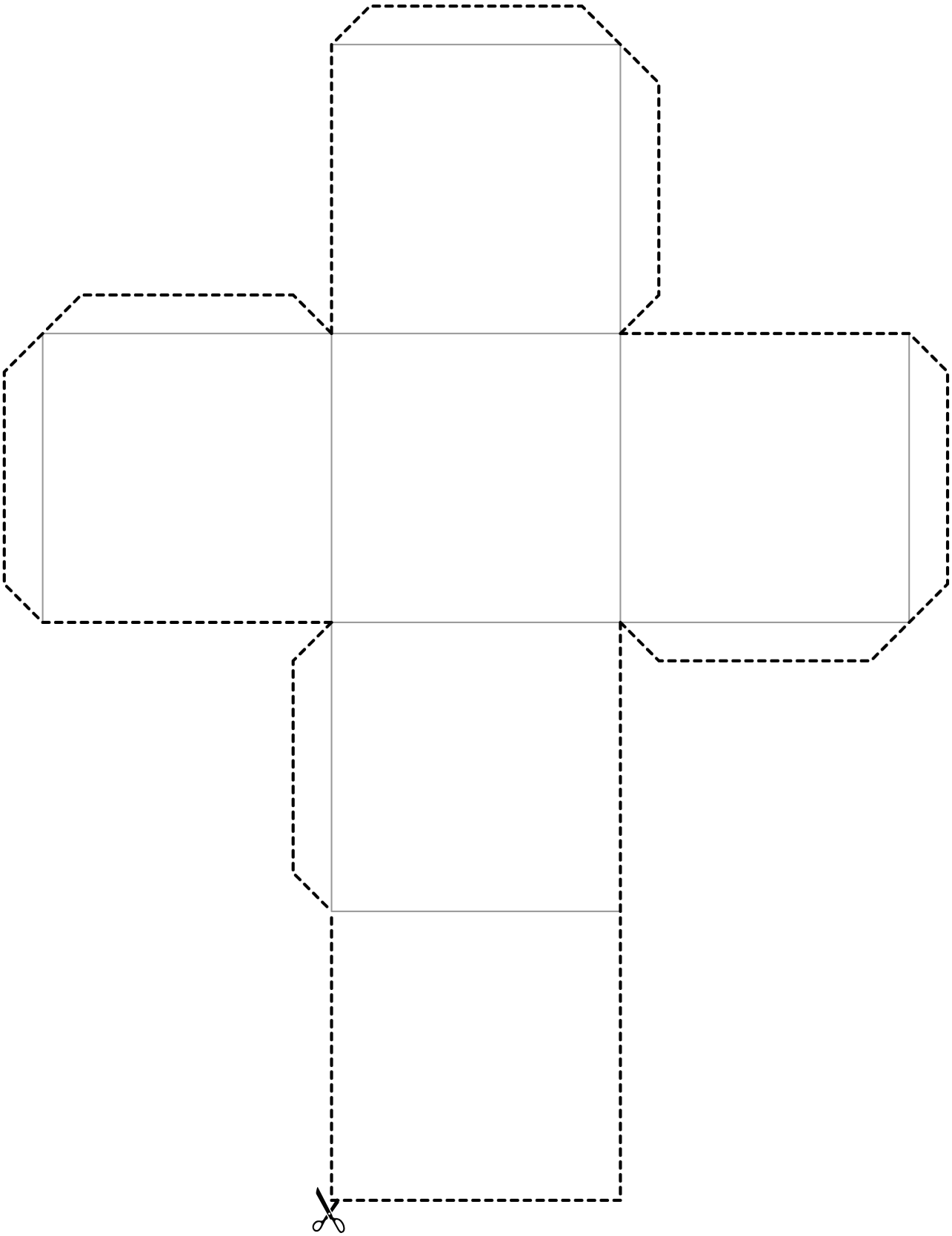
Die Template



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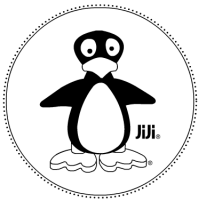
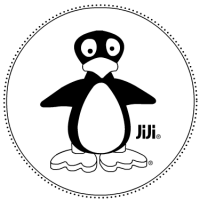
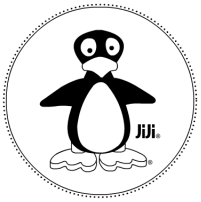
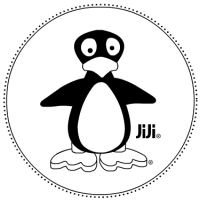
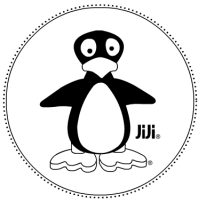
Blank Die Net Template

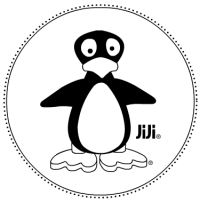


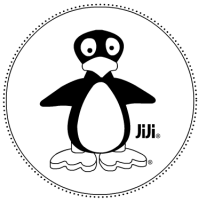


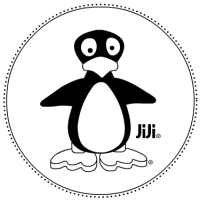












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JiJi Playing Card Template

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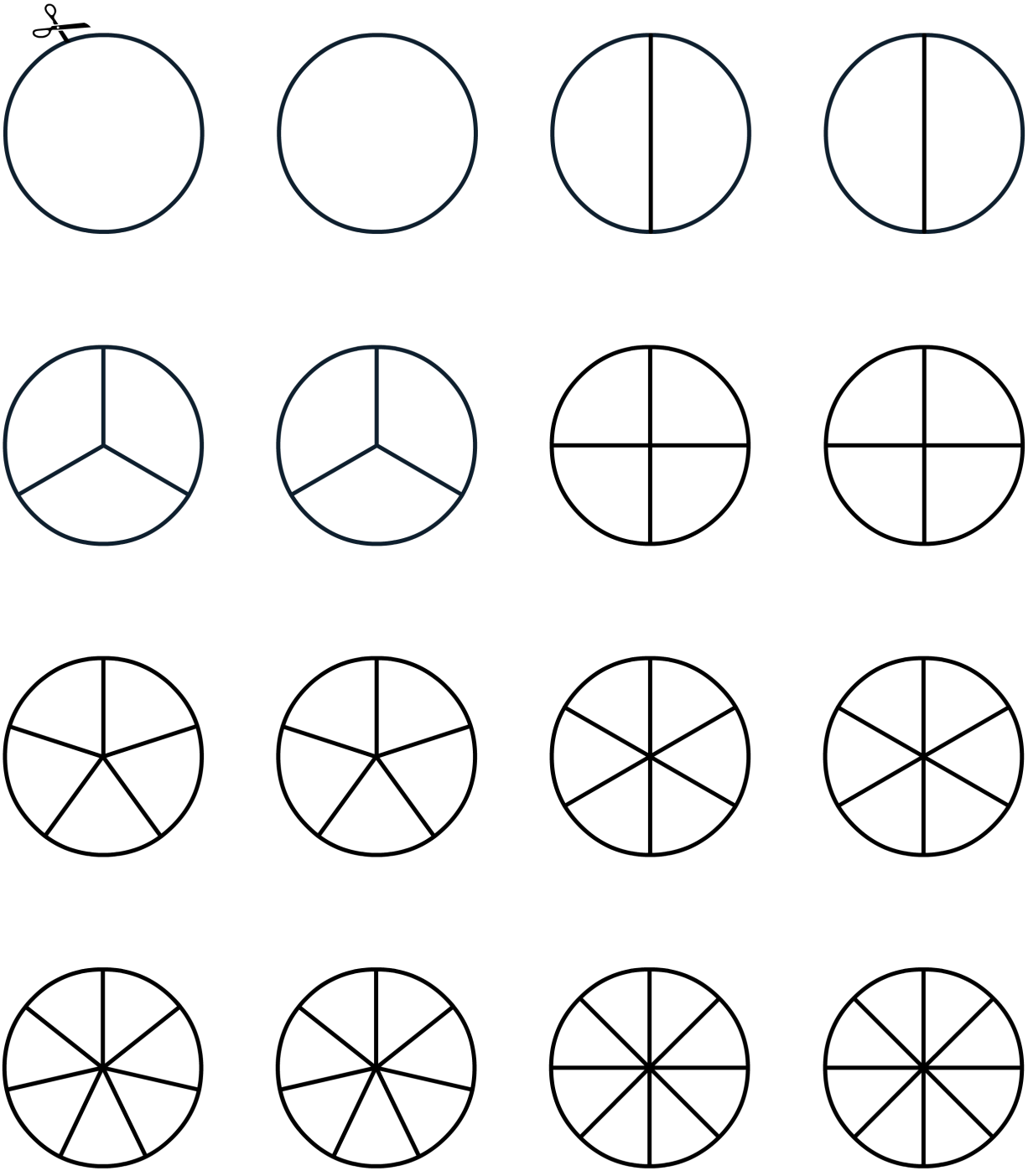
Blank Playing Card Template



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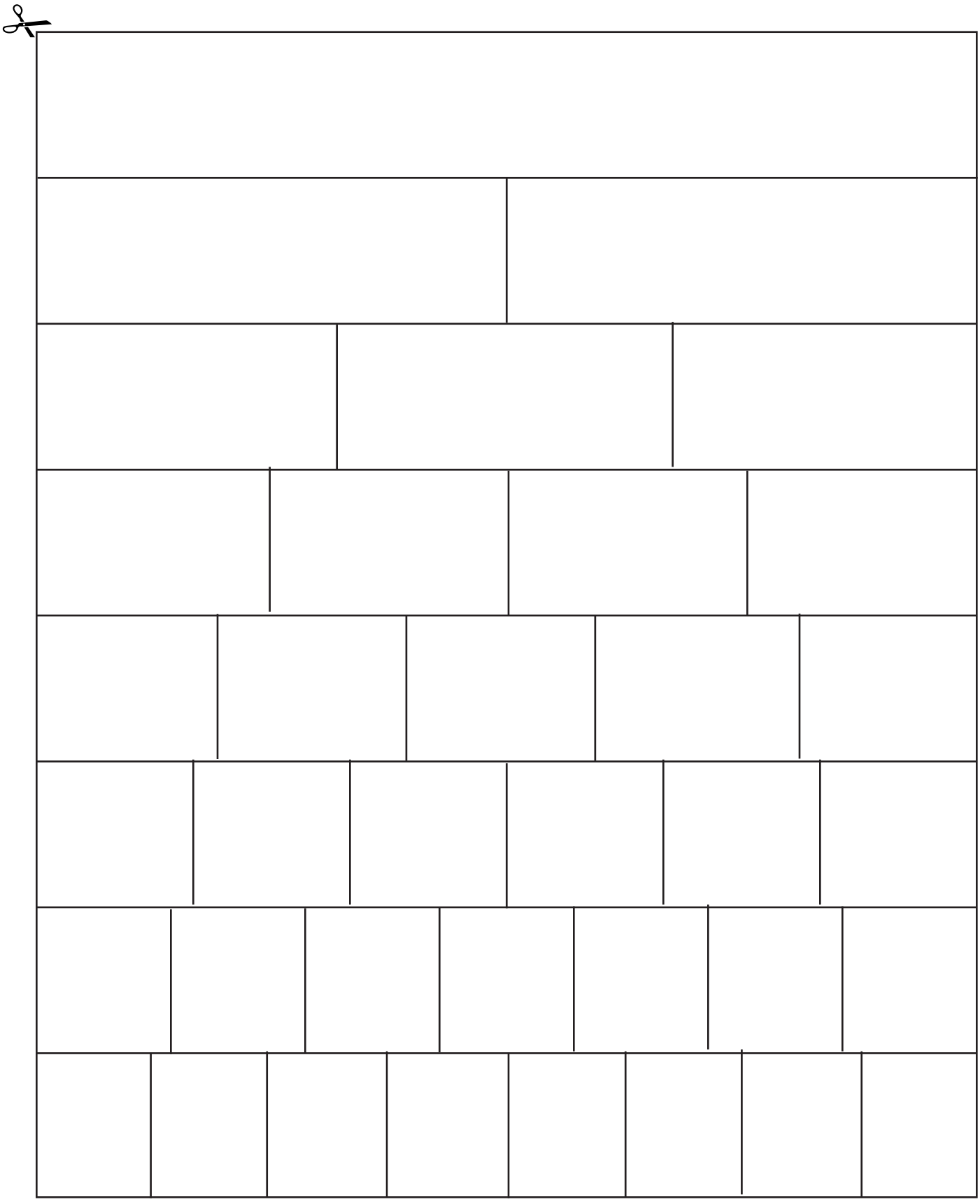

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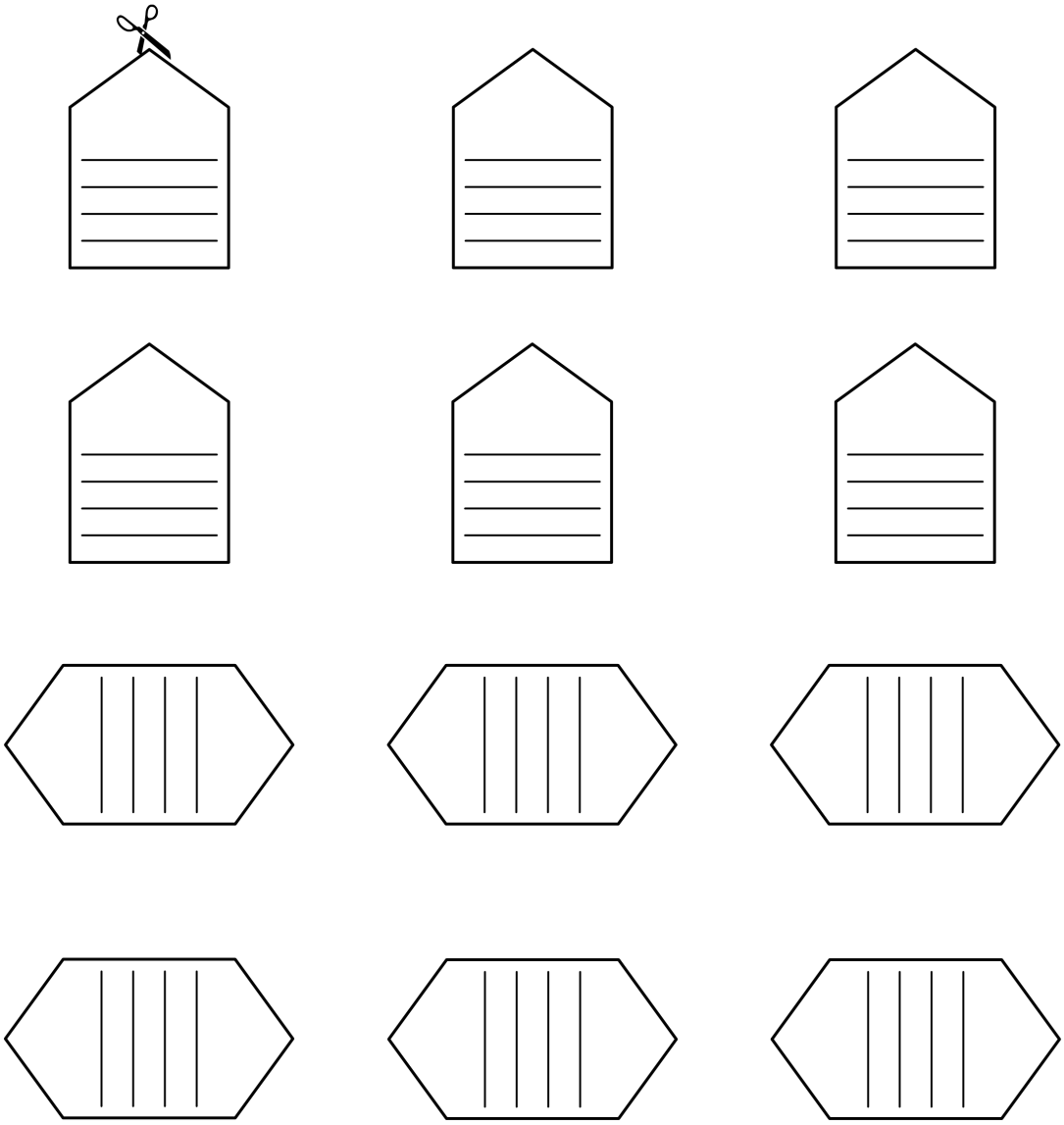
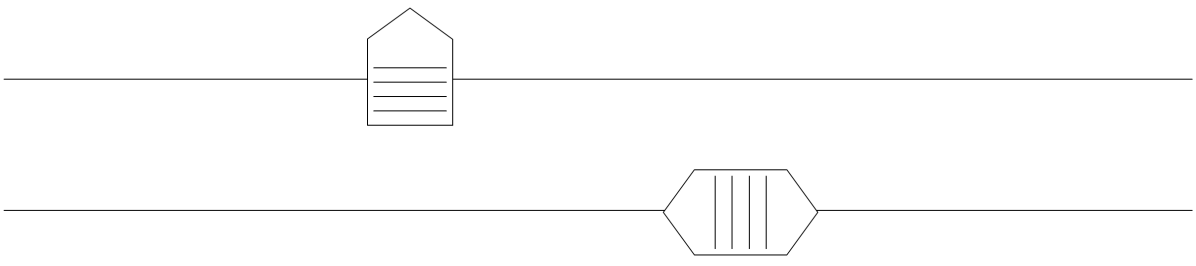


Examples:



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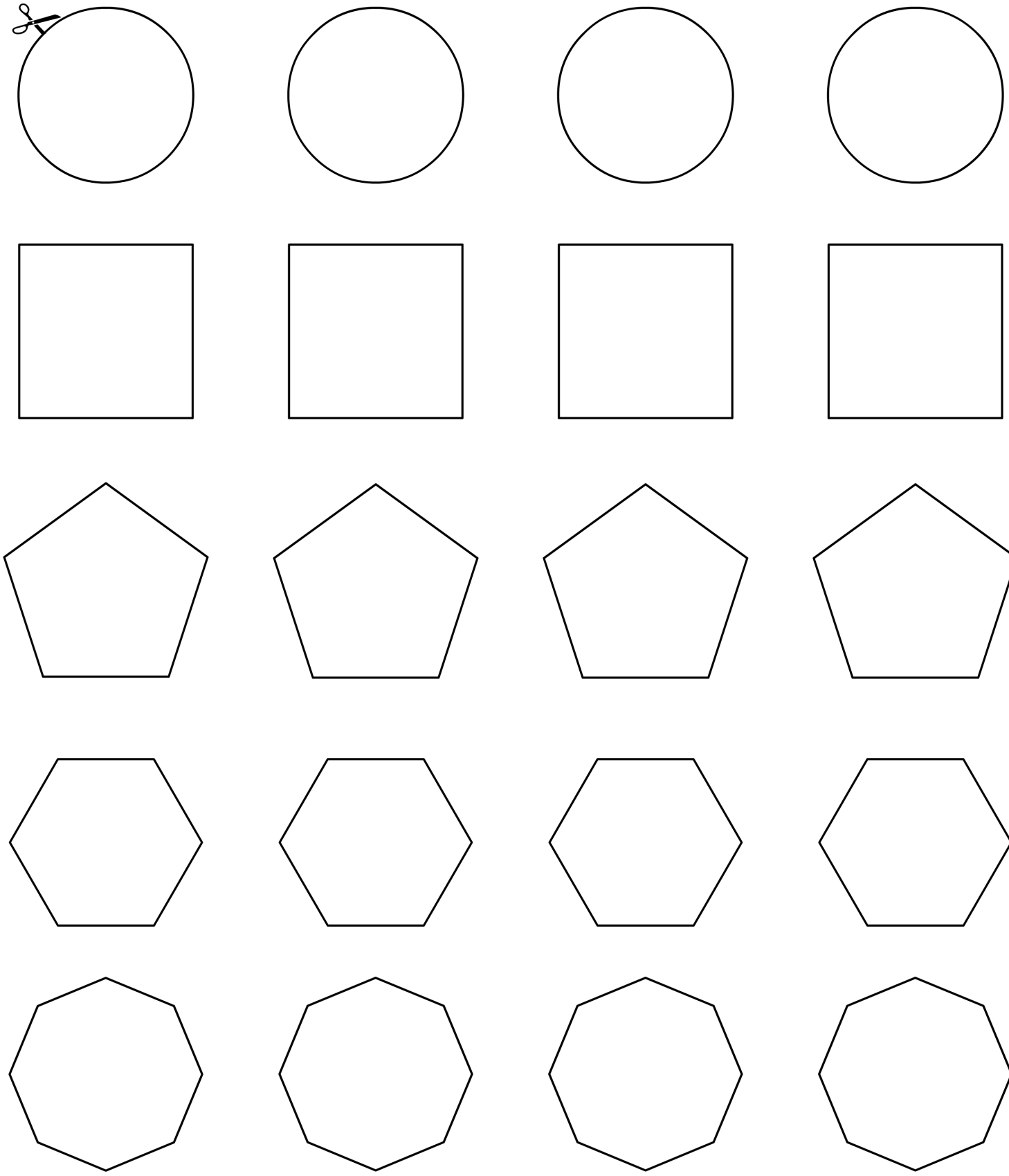

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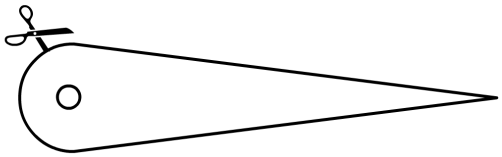
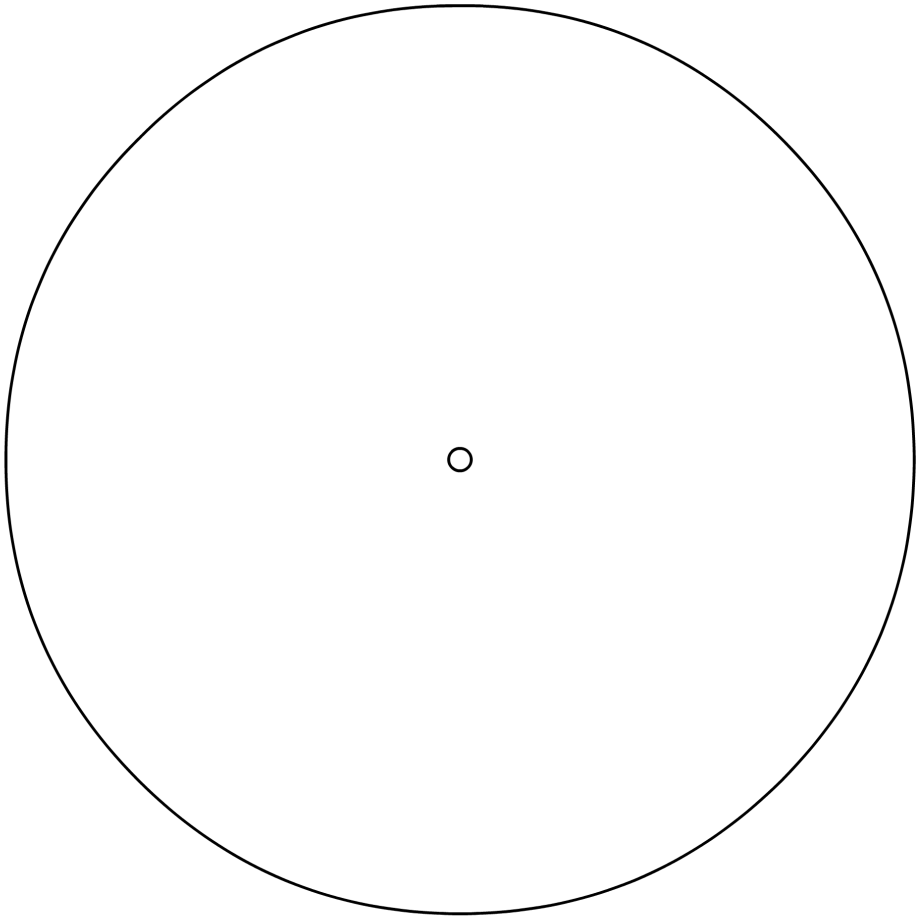
Shapes Template





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