

# I Can Do Centers Right!

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<http://goo.gl/oGohl7>

## What does “Doing Centers Right” mean to us?

For us the idea of “doing centers right” means having ALL students actively and independently engaged on purposeful and mathematically rich activities while the teacher works with a small group of students at their level. If we’re “doing centers right” then everyone is learning and the teacher is not being interrupted while teaching the small group of students.

## Key Ideas to Doing Centers Right!

- 1) **Creating classroom norms:** Class norms are the behavioral expectations or rules of the class. Class norms inform us how we are expected to behave towards each other and towards the materials we use in school. *(See the work of Paul Cobb and Jo Boaler)*
- 2) **Building Stamina/Independence:** Students need training and stamina building with respect to the idea of working independently *(See the work of Gail Boushey & Joan Moser)*
- 3) **Keeping it Engaging**
  - The choice of what you put in the centers will affect the success.
  - A balance of a “drier” center (i.e. vocabulary or puzzles and problems) with a more “engaging” (i.e. strategy games, fast facts) center in the schedule

## Why we chose the centers we did and how do they promote the mathematical practices?

<b>Fast Facts:</b>	This center focuses on games that build fluency through continual practice of basic math skills. (MP8)
<b>Strategy Games:</b>	This center focuses on games that thinking ahead and working backwards – planning your moves. This is an essential skill in problem solving. (MP1, MP5, MP7)
<b>Vocabulary:</b>	This center focuses on building and reinforcing vocabulary. It allows for a continual review of the new vocabulary introduced with math concepts. Depending on the activity, it can be a way of checking for misconceptions (e.g. Frayer model) or a different way for the student to represent his/her understanding (e.g. foldables). (MP3, MP6)
<b>Manipulatives:</b>	This center focuses on the student manipulating and modeling with manipulatives. It is a way for students to interact with the manipulatives on their own, to practice what the teacher has modeled in their practice and to remove the negative stigma associated to the use of manipulatives. [In middle school this can be replaced by calculator use, a center designed to learn the power of the calculator and how to use it effectively]. (MP1, MP4)
<b>Puzzles and Problems:</b>	This center focuses on problem solving. It is a way for students to practice their skills and strategies to understand and solve word problems individually or in pairs. (MP1, MP3, MP5)
<b>Ketchup &amp; Pickles:</b> <i>(Catch-up and free choice)</i>	This center focuses on accommodating students that work more slowly. It is an opportunity for students to complete work begun during "Teacher Time" and to encourage students to complete tasks for the reward of "free-choice" with respect to the center they chose.
<b>Teacher Time:</b>	Instructional time in small groups. It is an opportunity for guided math.

## A Sample Schedule: What Centers Look Like in Our Classrooms

We want to reiterate that “doing centers right” is about having quality, uninterrupted “teacher-time” and having ALL students actively engaged in rich mathematical tasks. So this sample schedule is just that: a sample. It’s a look at how we structure the centers based on what our students need. If you have assessments or other district obligations you can work them into a schedule that works for you, or you can put the centers on “pause” for a day.

Also, each center is slowly introduced, building stamina & independence. You may start with a “game afternoon” in which you introduce some of the games before introducing the centers.

### Sample Schedule:

	Monday	Tuesday	Wednesday	Thursday	Friday
20minutes	“Teacher-time”				
20 minutes	Fast Facts	Manipulatives	Ketchup and Pickles	Vocabulary	Fast Facts
20 minutes	Puzzles and Problems	Strategy Games	Puzzles and Problems	Strategy Games	Free Choice

## The first “steps” to setting up Math Centers in your classroom

These have been laid out as steps rather than days as depending on your class, grade level, etc. some activities may take more than a day. Do not rush through this. Taking the time to establish a strong foundation will create the independent students needed in order to be successful. This will allow you to work with small groups without having to constantly stop and redirect misbehaviors.

Step	Content
1) Class Discussion: What are Math Centers and why do we do them?	Why do centers instead of whole group? - Set expectations
2) Routines/Rules/ Procedures (Fast Facts)	- What is “Fast Facts”? Discuss importance and sample activities. - Set up I-chart. - Introduce sound signal. - Model in class, bring back. (Begin building stamina)

3) Practice Fast Facts	<ul style="list-style-type: none"> <li>- Review I-chart created previous day.</li> <li>- Model, bring back.</li> <li>- Continue building stamina</li> <li><i>*Take a couple of days to introduce new games in Fast Facts and use the opportunity to build stamina so that students can play for longer periods of time.</i></li> <li>- Don't rush this, as it is your foundation and needs to be secure before you move on.</li> </ul>
4) Vocabulary Procedures	<ul style="list-style-type: none"> <li>- What is "vocabulary"? Discuss importance and sample activities.</li> <li>- Set up I-chart.</li> <li>- Introduce Word Wall.</li> <li>- Model the primary vocabulary tool you will use with students (e.g. a Frayer model graphic organizer, or foldable or interactive math notebook, or vocabulary video, etc.)</li> <li>- Model one together, and have students practice independently (continue building stamina)</li> </ul>
5) Vocabulary Practice	<ul style="list-style-type: none"> <li>- Continue building stamina.</li> <li>- Slowly, begin to run the two stations simultaneously assigning a station and allowing choice within the station.</li> </ul>
6) Strategy Games Procedures	<ul style="list-style-type: none"> <li>What is "Strategy Games"? Discuss importance and sample activities.</li> <li>- Set up I-chart.</li> <li>- Model in class, bring back. (Continue building stamina)</li> </ul>
7) Strategy Practice	<ul style="list-style-type: none"> <li>- Continue building stamina and introducing activities within strategy games.</li> </ul>
8) Work with Teacher Procedures  Schedule	<ul style="list-style-type: none"> <li>- What is "Work with Teacher"? Discuss importance and sample activities.</li> <li>- Set up I-chart.</li> <li>- Practice storage (workbooks, duotangs, binders, drawers, shelf, etc.)</li> <li>- Begin building a schedule that incorporates the centers you have up and running with teacher time.</li> <li>- As a teacher consider your student groups (ability, random, gender, etc.)</li> <li>- Draw student's attention to a choice board of activities within each center.</li> </ul>
9) Puzzles and Problems Procedures	<ul style="list-style-type: none"> <li>- What is "Puzzles and Problems"? Discuss importance and sample activities.</li> <li>- Set up I-chart.</li> <li>- Model one problem together as a class</li> <li>- Model appropriate peer collaboration for problem solving (helping vs. doing).</li> <li>- Have students practice.</li> </ul>

10) Puzzles and Problems Practice	<ul style="list-style-type: none"> <li>- Continue building stamina.</li> <li>- Continue running multiple stations, adjust schedule appropriately.</li> </ul>
11) Manipulatives Procedures	<ul style="list-style-type: none"> <li>- What is "Manipulatives"? Discuss importance and sample activities.</li> <li>- Set up I-chart.</li> <li>- Model the primary vocabulary tool you will use with students (e.g. task cards, open ended, peer challenges, parroting teacher models, etc.)</li> <li>- Model one together, and have students practice independently.</li> </ul>
12) Manipulatives Practice	<ul style="list-style-type: none"> <li>- Continue building stamina.</li> <li>- Continue running multiple stations, adjust schedule appropriately.</li> </ul>
13) Ketchup and Pickles Procedures	<ul style="list-style-type: none"> <li>- What is "Ketchup and Pickles"? Discuss importance and sample activities.</li> <li>- Set up I Chart.</li> <li>- Discuss schedule and choice. Practice.</li> </ul>
14) Practice Whole Class	Continue to build stamina up to desired time.

***Do not be afraid to go back to the "I-charts" that you created to review expected behaviors.***

As the year goes on and you need to introduce new games or activities on new math concepts, you can either teach them to the whole class as a quick mini-lesson or teach them to specific groups within "teacher-time". Students are pretty good about teaching games to one another.

# Hurtle Multiplication

(A C.Cantin, R.Enright original game)

**Number of Players:** 2

**Materials:** 1 game board (below)  
One set of dominoes  
2 pencils  
Tracking sheet or scrap paper

**How to Play:**

- Place the dominoes face down and shuffle them.
- Player 1 chooses 2 dominoes and places them on the game board to create a four-digit number. Player 1 can choose the orientation of the two dominoes to create an advantage.
- Player 2 then chooses a domino and places it on the game board to create a two-digit multiplier. Player 2 can choose the orientation of the domino to create an advantage.
- Each player writes the multiplication problem on his/her tracking sheet and solves for the product.
- The first player to correctly solve the multiplication problem takes the dominoes.
- Players alternate turns creating the four-digit number.
- The player with the most dominoes at the end of the game wins.

# Hurtle Multiplication Game Board



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# Hurtle Multiplication Game Board



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# Hurtle Multiplication Tracking Sheet

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## Fraction Line Up

(Source: Currah, J. & Felling, J. *Domino Math Games: Linking the Learning* Cadamac Inc., No Sweat Education Inc. 2010 pp. 72 & 73)

**Number of Players:** 2

**Materials:** Game board (below)

One set of dominoes (all blanks removed)

**How to Play:**

- Remove the blank dominoes from the set.
  - Place dominoes face down and shuffle.
  - Player 1 draws a domino and makes a proper fraction.
  - Player 1 must now decide which open space of his/her game board to place it onto. Players are trying to build a sequence of five fractions **from least to greatest**. Once a domino is placed, it cannot be moved.
  - If Player 1 draws a domino that he/she cannot fit into his/her sequence, he/she must place the domino into his/her reject pile and miss a turn.
  - Players alternate turns drawing a placing dominoes onto their game board.
  - The first player to successfully line up five fractions from least to greatest wins the game.
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Fraction Line Up Game Board  
Player 1

Five vertical rectangular boxes, each divided horizontally into two sections, arranged in a row.



A horizontal rectangular box divided vertically into two sections.

REJECTS

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Fraction Line Up Game Board  
Player 2

Five vertical rectangular boxes, each divided horizontally into two sections, arranged in a row.



A horizontal rectangular box divided vertically into two sections.

REJECTS

# Battle Dominotion

(A C.Cantin, R.Enright original game)

**Number of Players: 2**

**Materials:** 2 game boards (below)

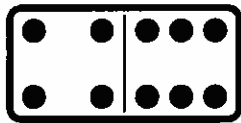
One set of dominoes

Some sort of shield (e.g. cardstock held-up by clothes pins)

54 tokens (18 of one color for the ships and 36 of another color for the cannons)

## How to Play:

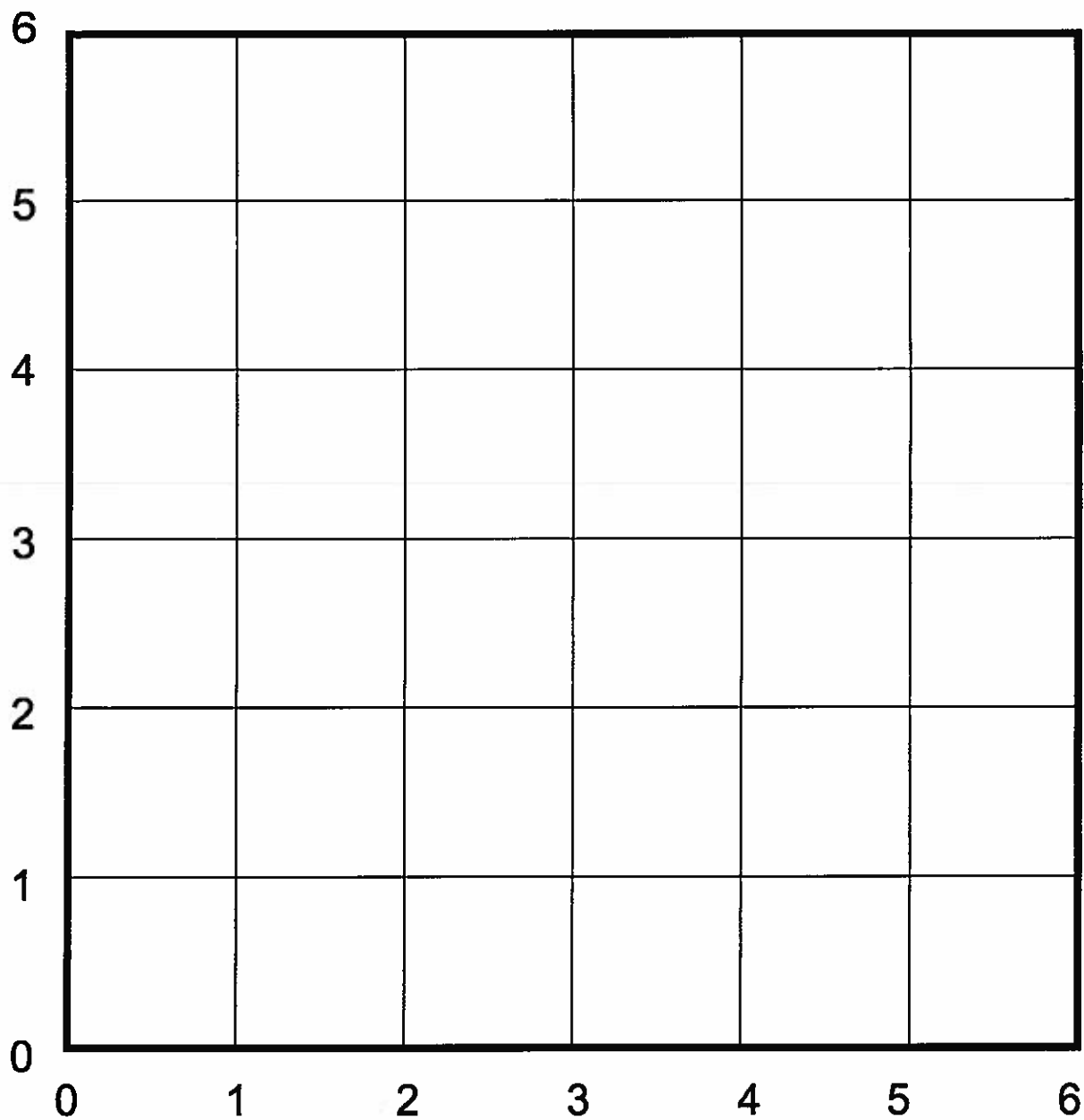
- Each player will put up the "shield" to hide his/her game board.
- Using "boat" tokens, each player will place 3 "boats" on his/her game board.
  - There must be a ship that is 4 tokens long.
  - There must be a ship that is 3 tokens long.
  - There must be a ship that is 2 tokens long.
  - Boats may be placed horizontally, vertically or diagonally.
  - The coordinate pairs for the tokens must be whole numbers.
- Place the dominoes face down and shuffle them.
- Player 1 draws a domino and reads it as a coordinate pair.  
e.g.



This domino could be (4, 6) or (6, 4).

- Player 2 signals to Player 1 whether that coordinate pair hit one of his ships or not. If the canon hit one of the ships, Player 1 uses a "canon" token to mark the location of the hit on his/her game board.
- The used domino is discarded.
- Players alternate turns drawing dominoes and calling out coordinate pairs.
- The first player to successfully sink all 3 of the opponent's ships is the winner.

# Battle Domination Game Board



# Gotcha

(source <http://nich.maths.org/1237>)

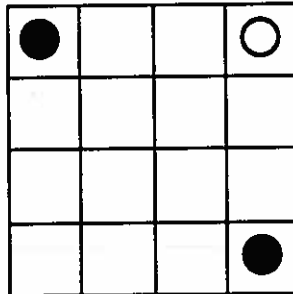
**Number of Players:** 2

**Materials:** Game board (below)

3 tokens (2 of one color, 1 of another color)

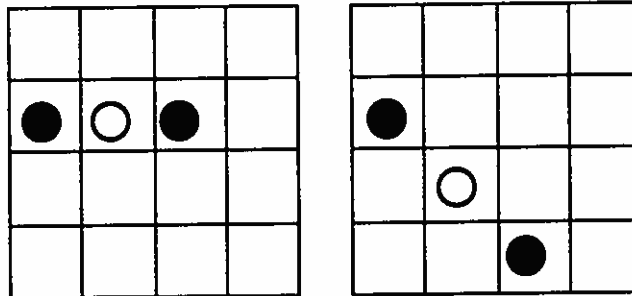
**Set-up:**

- The two tokens of the same color are placed in the top left corner of the 4 x 4 grid and in the bottom right corner of the 4 x 4 grid.
- The lone token of the other color is placed in the top right corner of the 4 x 4 grid.



**How to Play:**

- The single colored token moves first (in our example white moves first).
- Tokens can move one space up, down, left or right.
- The goal is for the player with the two tokens (in our example, black) to trap the token of the single color (see examples below).



**Variations:**

- Try drawing a 4 x 4 grid in the schoolyard and play the game with people instead of tokens.
- Try playing with 2 tokens of each color; then both players could be caught.

### Gotcha Game Board

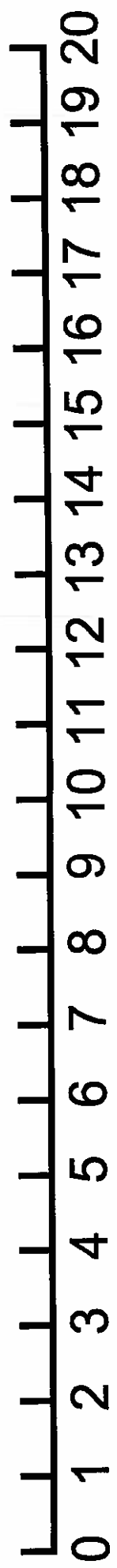



### Gotcha Game Board


# Four Go Game Board

100	25	5
10	2	26
12	4	3

+	-
×	÷



# Four Go

(Source: <http://nrich.maths.org/5633>)

**Number of Players:** 2

**Materials:** Game board (below)

40 tokens (20 of one color, 20 of another color) – Alternately 2 dry-erase markers of different colors.

**How to Play:**

- Player 1 chooses two or more numbers in the grid and uses any of the four operations to obtain a desired target number. He/she then marks the answer to the calculation on the number line with a token. (You can also use a dry-erase marker if the game board is laminated or in a plastic pouch).
- Player 2 chooses two or more numbers in the grid and uses any of the four operations to obtain a desired target number. He/she then marks the answer to the calculation on the number line with a token.
- If the answer is too big or too small to be marked on the number line (in this case greater than 20 or less than 0), the player misses his/her turn.
- The winner is the player with 4 tokens in a row with none of his/her opponent's tokens in between.



# Linja

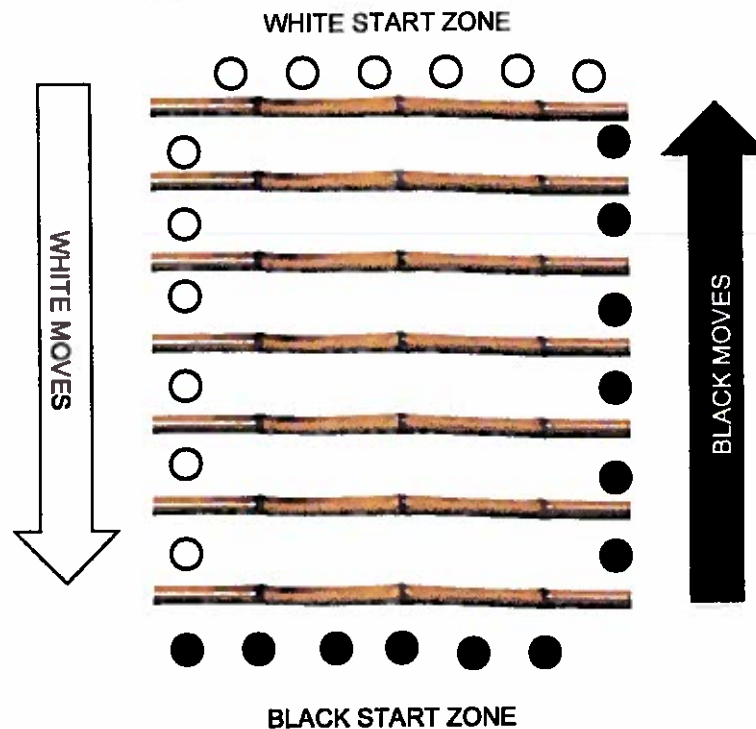
(Game author: Steffen Mühlhäuser)

**Number of Players:** 2

**Materials:** 7 bamboo (long stir stick or skewers) sticks or game board below  
24 tokens (12 of one color, 12 of another color)

## Set-up:

- The seven bamboo sticks are laid out parallel to one another (or use game board below)
- Each player chooses a color and sets up their 12 tokens with six tokens in their start zone and one token in each of the rows created by the bamboo sticks (see illustration below).
- Determine who will start.



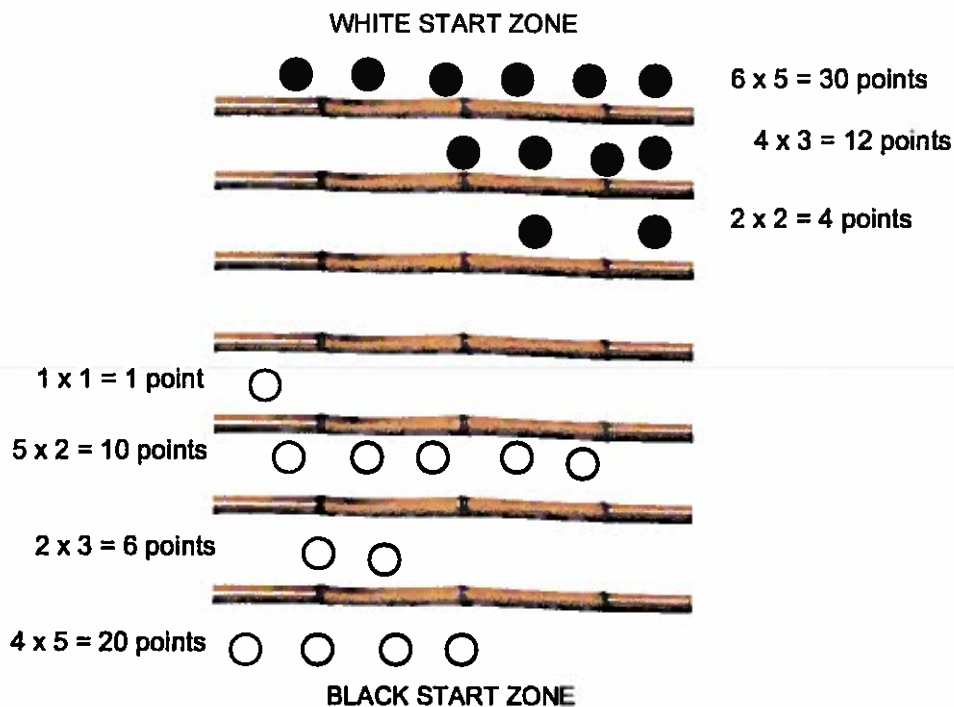
## How to Play:

- Each player has two moves when it's his/her turn:
  - Move 1: The player moves one of his/her tokens one row toward the opponents start zone.
  - Move 2 (follow-up move): The player moves one of his/her tokens the same number of rows as there are tokens of both colors (not including the one from Move 1) in the row that Move 1 landed in. – The token **MUST** move the full number of rows unless it lands in the opponent's start zone.
  - When the token from Move 1 lands in the opponent's start zone, the player can only move the token one row in Move 2.
- A token cannot land in a full row (a row with 6 tokens) but it can pass through the row on a follow-up move. The two starting zones are never considered full.
- The game ends when all the tokens of one color have passed all the tokens of the other color OR when a player gets all his/her tokens to the opponent's start zone. Note: Tokens in the same row have not passed each other.
- Once the game ends, the players must tally their scores. The winner is the player with the higher score.

**Scoring:**

- Each token in the opponent's starting zone gets 5 points.
- Each token in the 6<sup>th</sup> row (the last row before the opponent's starting zone) gets 3 points.
- Each token in the 5<sup>th</sup> row gets 2 points.
- Each token in the fourth row gets 1 point.
- Tokens in rows 1, 2 and 3 get no point.

Below is an example of a scored game:



Black's Score:  $30 + 12 + 4 = 46$  points

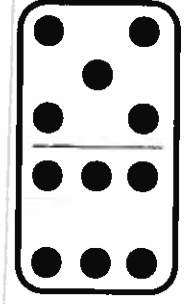
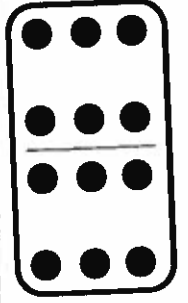
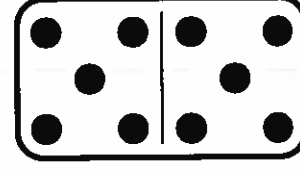
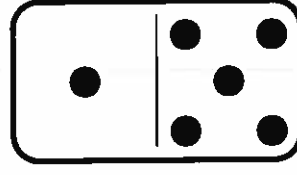
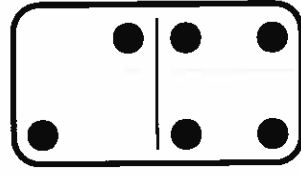
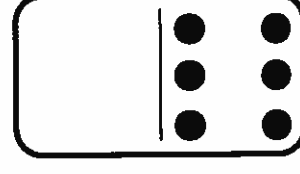
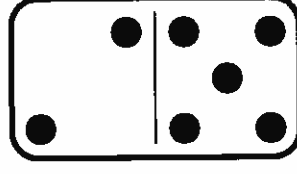
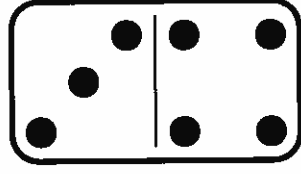
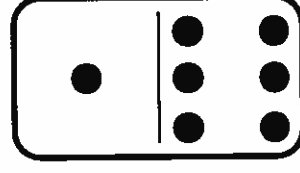
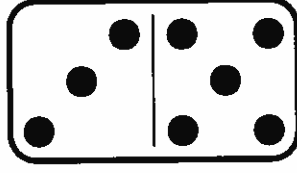
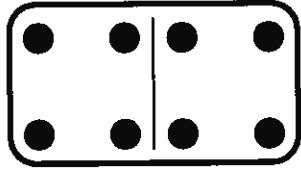
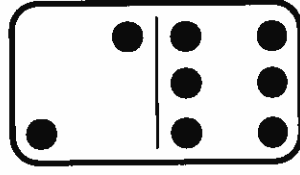
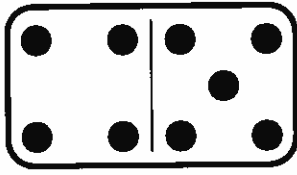
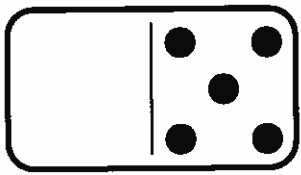
Whites's Score:  $20 + 6 + 10 + 1 = 37$  points

**Black Wins!**

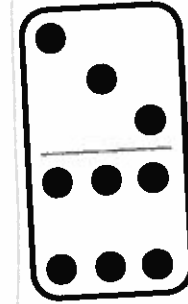
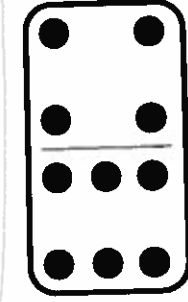
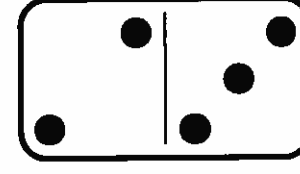
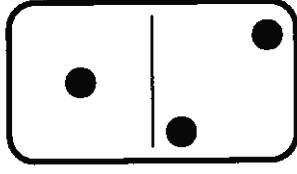
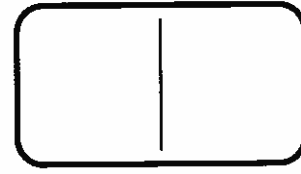
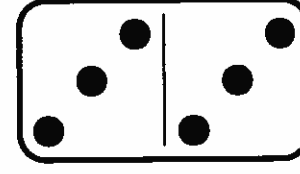
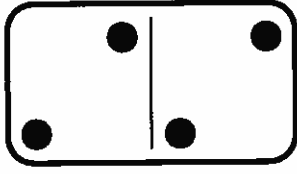
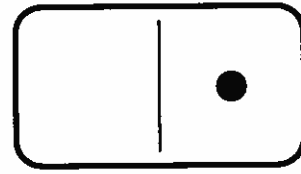
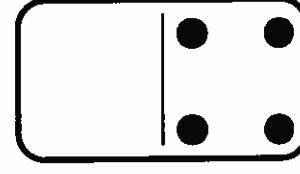
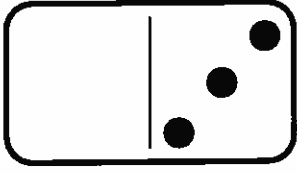
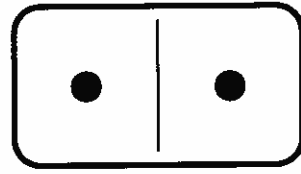
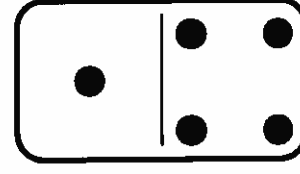
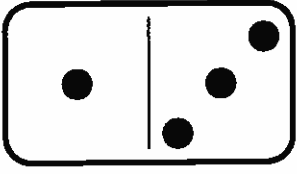
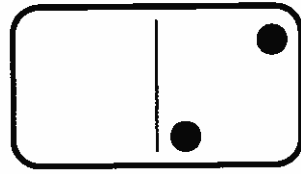
# Linja Game Board



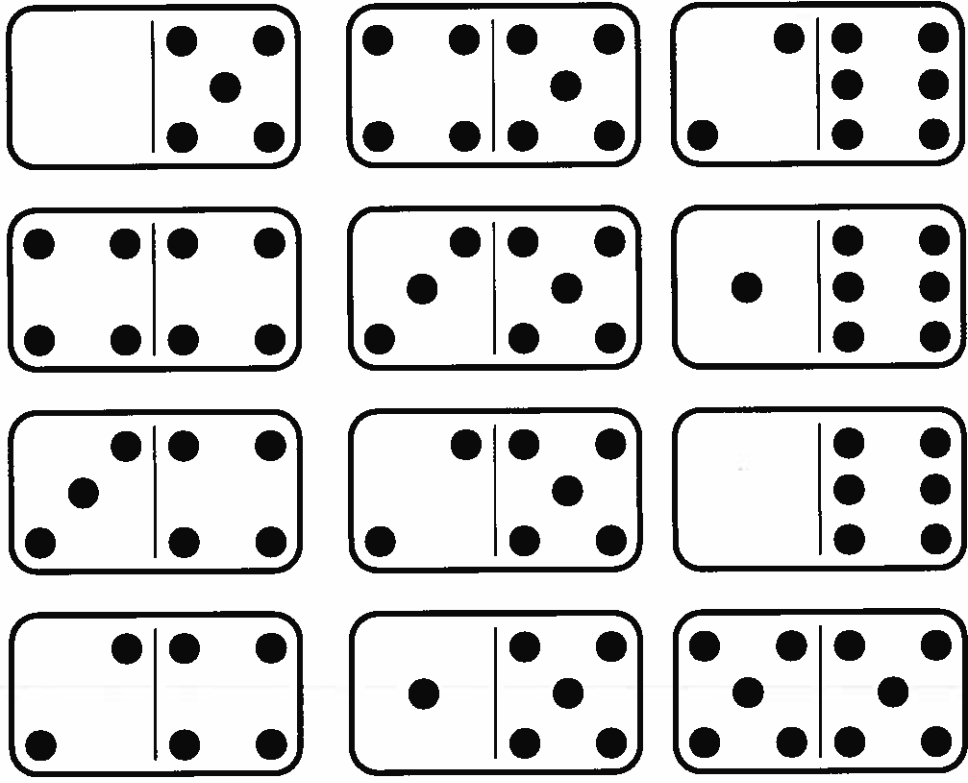
Dominoes



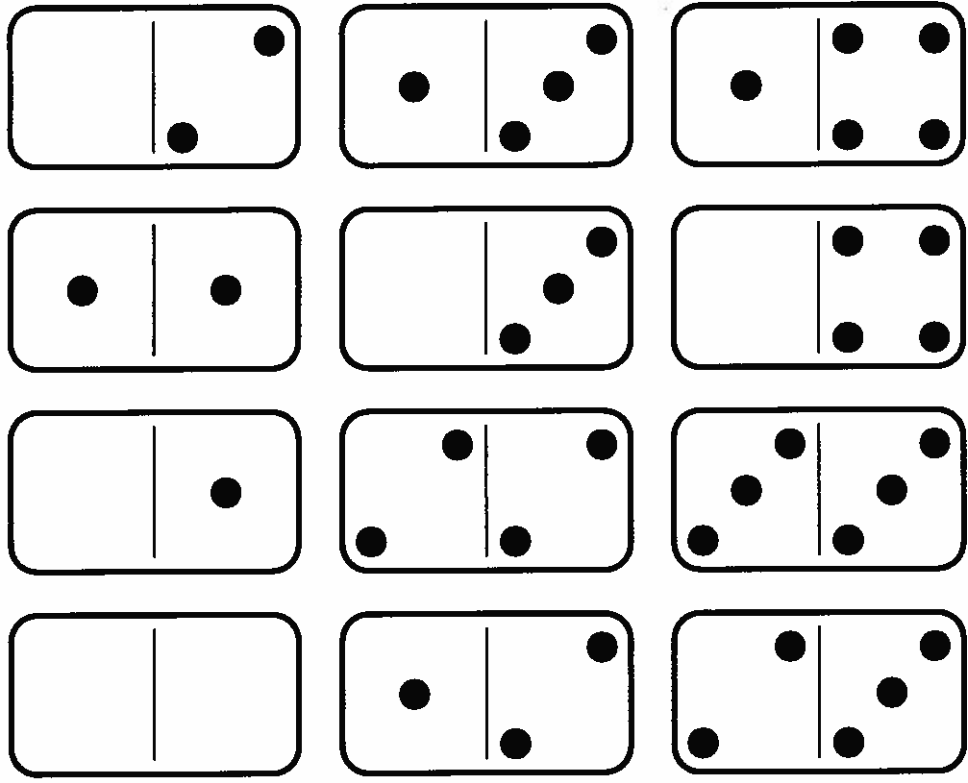
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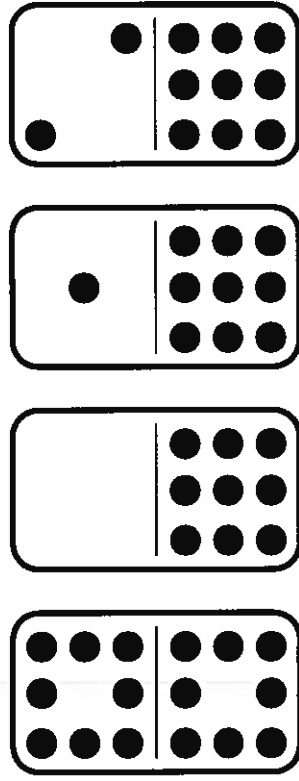
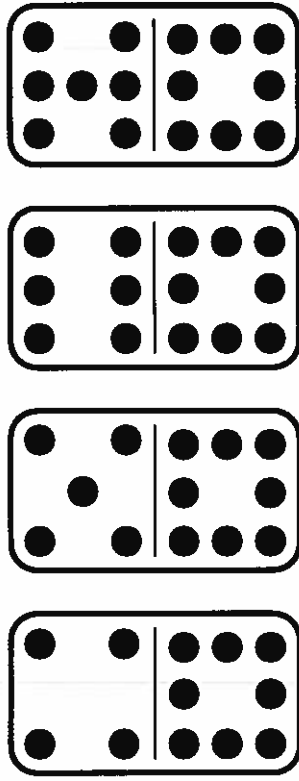
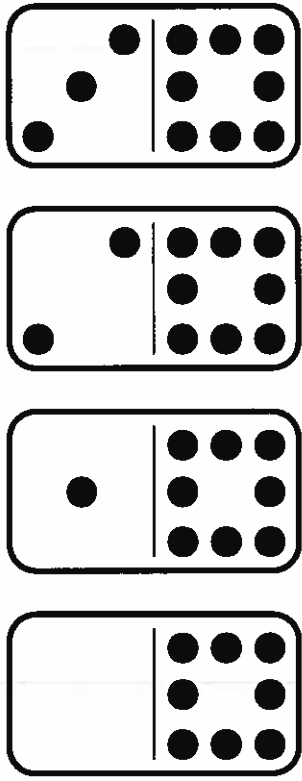
Dominoes



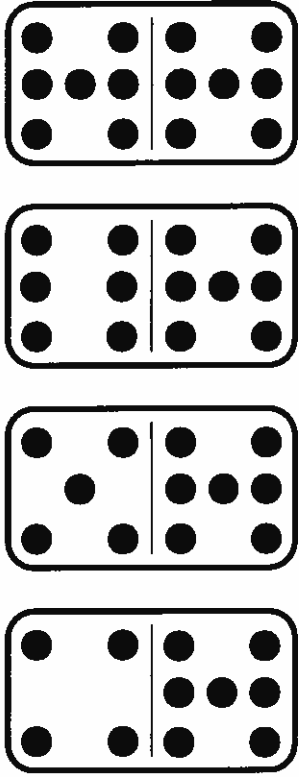
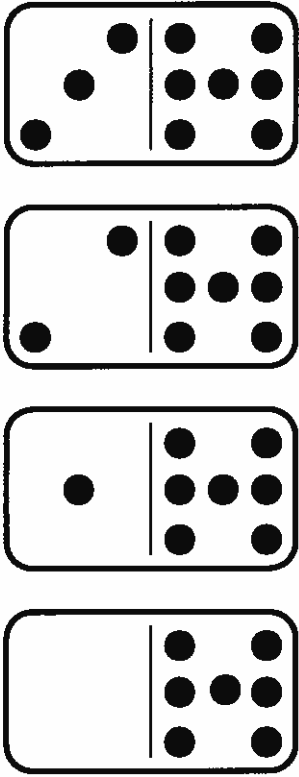
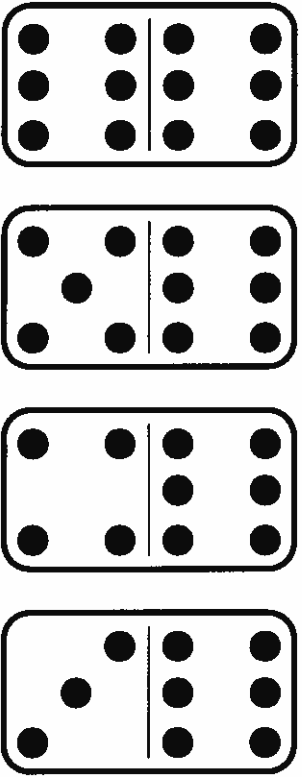
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