

## about this book:

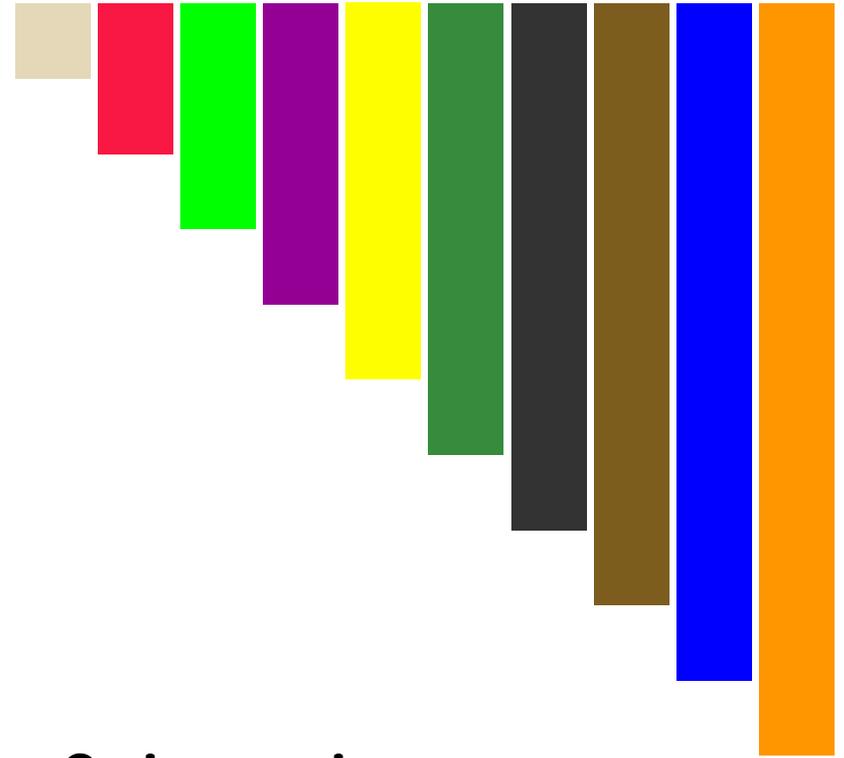
When my third child, Sophie, was 4, her older siblings went through a phase of dedicated math bookwork. Sophie loved peering over her brother and sister's shoulders, but she wanted some math "work" of her own.

Her older sister patiently played with dried beans, egg cartons, dice and cuisenaire rods with her. The rods were what really grabbed Sophie, though, and she wanted more games. I was very fond of the Miquon Math program but she didn't seem quite ready to dive into that in a structured way. So she and I began experimenting with ideas for games. I began creating and then recording some of the better ones on my computer.

This booklet is the distillation of our inventions and explorations. It contains conceptual math games suitable for the K and pre-K level. They are particularly suited to children who are almost going to be using Miquon Math at the 1st grade level, because they use a similar philosophy and manipulatives.

If you wish to print and use the whole booklet, I suggest printing four copies of the flashcards on heavy cardstock, for a total deck of 48 cards. With the booklet, print page 1 on coloured cardstock, and the remainder front and back on regular copier paper. Take the booklet to a copy shop and have them cut the pages in half and punch-bind them, with the page 1 serving as a cover. The cards should be cut into 3" x 4¼" rectangles and are most durable and appealing when laminated.

Feedback?  
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# Cuisenaire Activity and Exploration Book

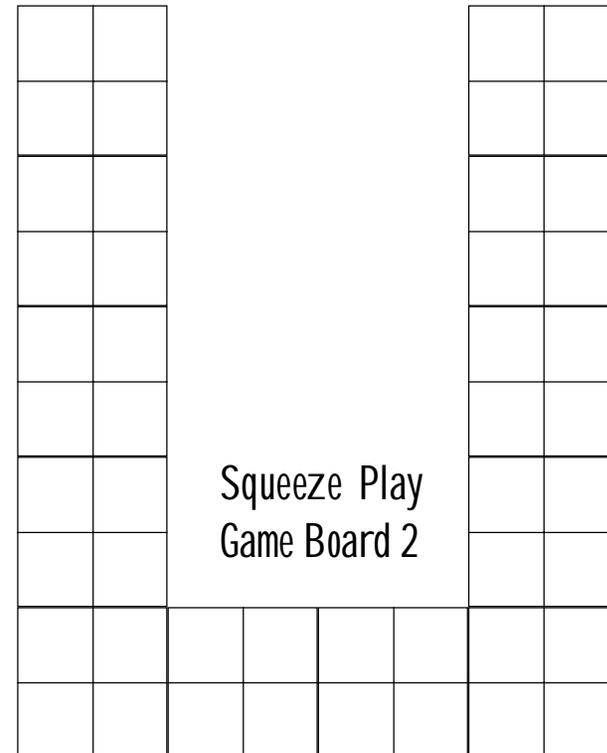
for pre-Miquon Kids

Just get the rods out. They're lovely to stack and arrange. If your child doesn't seem interested, just start playing by yourself and you'll probably find a curious pair of eyes looking over your shoulder before too long. Build a staircase or a tile floor. Make a hollow pyramid. Make squares. Stand the rods upright and make a little garden. Make a colourful four-pointed star. Give the rods "flavours" and build desserts. Put on a rod play with a standing-up yellow rod in a starring role.

Measure things with your rods. Measure your child's thumbs and fingers. Compare them to yours. How tall is a juice cup? How long is my celery stick? What is there in the house that is the same shape as a white rod? What is there that's roughly the same shape as a red rod?

Organize your rods. This is an activity that can be done over and over again. Sort them into cups or boxes. Arrange them by colour or size. Are there more whites or more reds? How many yellows make an orange? You don't have to ask or demonstrate things like this... the observations will arise naturally through play.

If they're fun to put away, they'll get put away too! We use an inexpensive fishing tackle box for ours. The top tray is shallow and the rods are easy to grab. The bottom is open and we keep a matching base-ten set in there for the older kids.

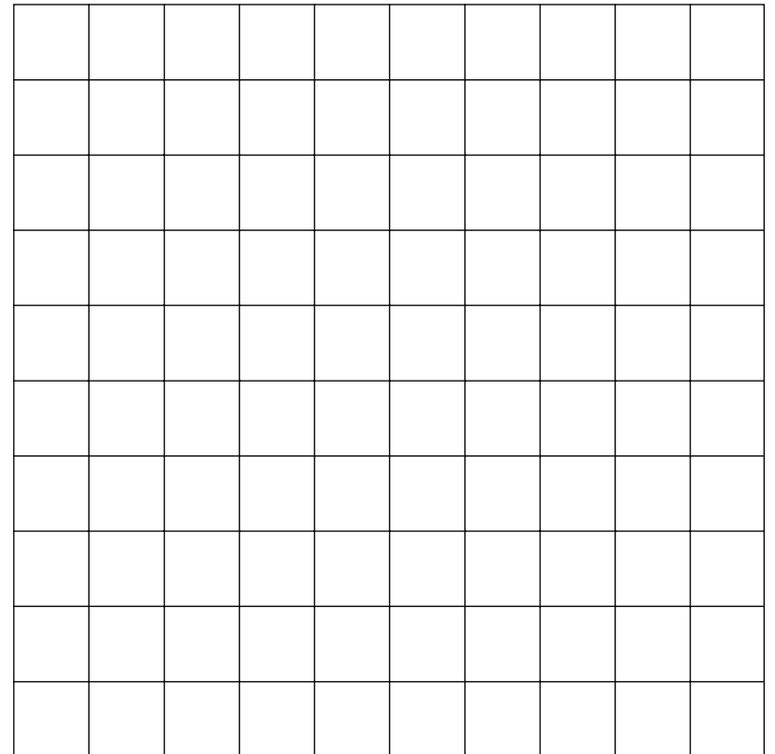
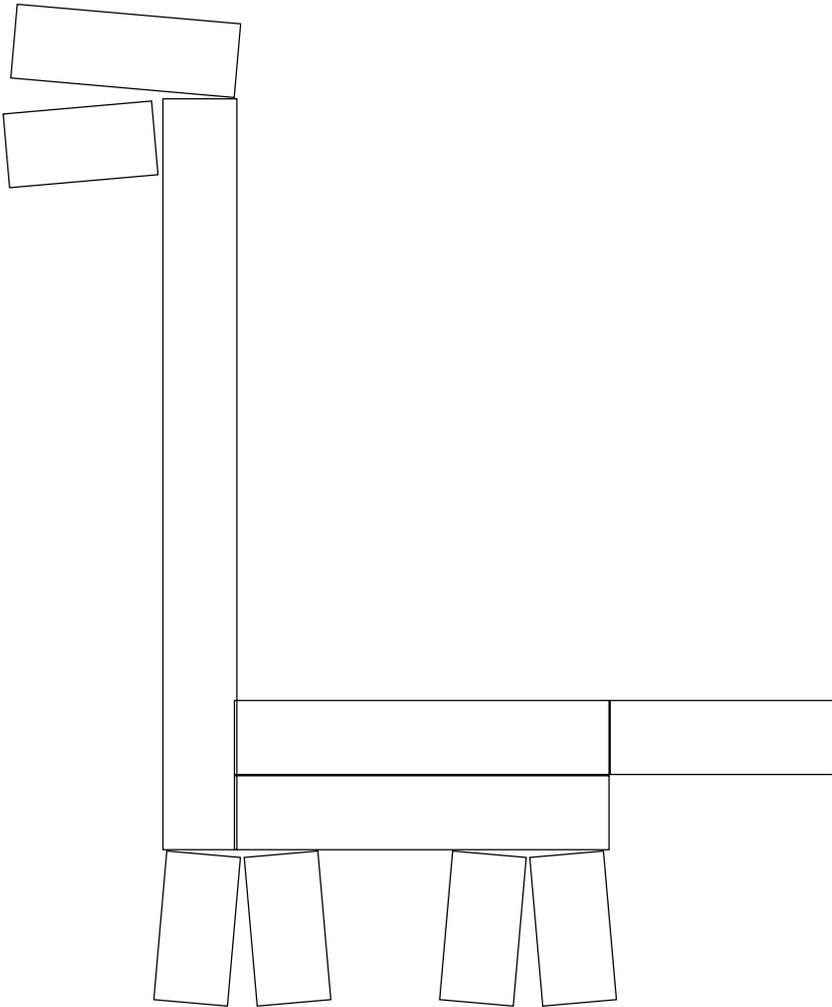


# Cuisenaire Activity and Exploration Book

for pre-Miquon Kids

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# Squeeze Play

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**Players: 2**

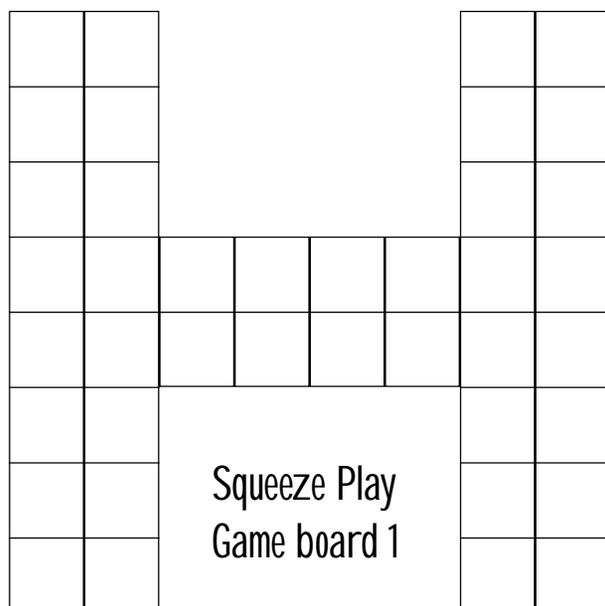
**Competitive**

**Materials:** cuisenaire rods  
Squeeze Play game board - see next page

**Skills:** 2-dimensional strategizing

**Rules:** Select one of the Squeeze Play game boards. Each player gets 10 rods, 1 of each color.

Players take turns placing the rod of their choice within the grid lines on the game board. The object is to be the player who places the last Cuisenaire Rod on the game board.



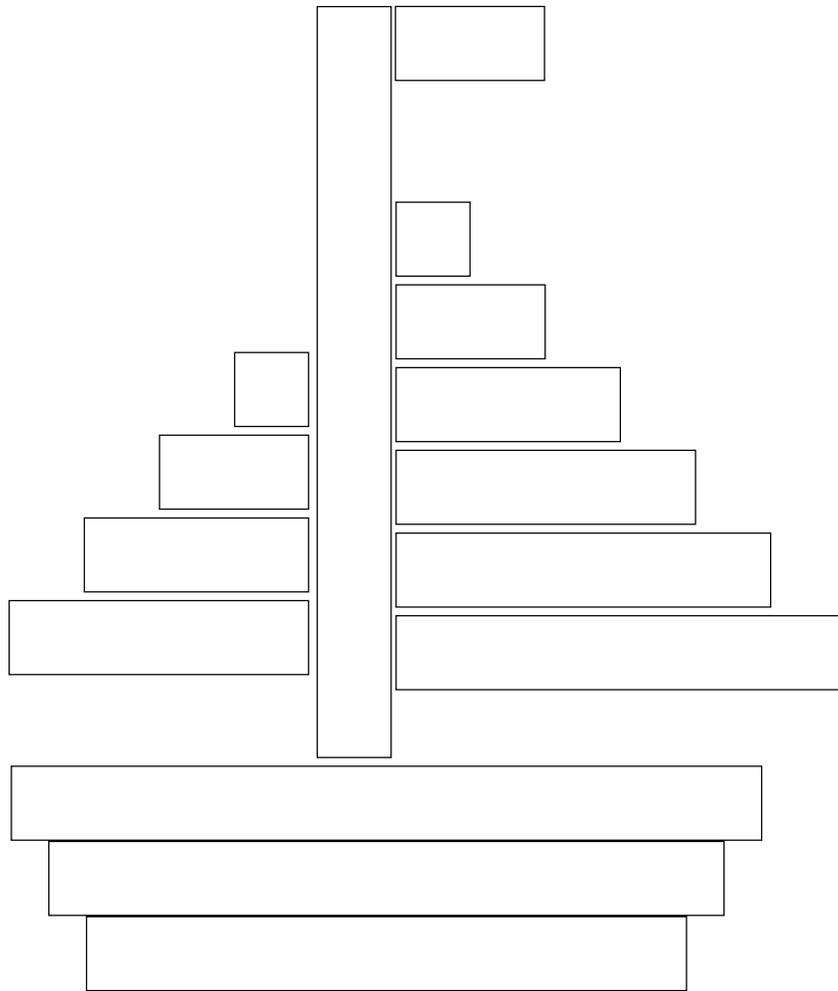
# Rod-Pictures

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The following pages contain some pre-made rod-pictures. The idea is to place rods on matching shapes on the page. They're good for developing recognition of rod-lengths and proportions, and for developing fine-motor control.

Encourage your child to make his or her own pictures. If you have a camera you can photograph particularly appealing ones and use the photo to challenge your child to reproduce the same design later.

Encourage your child to build letters out of Cuisenaire rods to spell his or her name. Make numerals too. Can you make a "1" out of white rods? A "2" out of red rods? What other numbers can you make out of their corresponding rods?



## Players: 2-4

## Competitive or Co-operative

**Materials:** regular starter set of cuisenaire rods  
Cuisenaire Cards (with 11's and 12's removed)

**Skills:** simple addition  
numerical values of cuisenaire rods  
identification of pairs of rods adding up to ten

**Rules:** Create a rod diagram with Cuisenaire rods, depicting "different names for ten". In other words, lay out an orange rod, and beside it place (blue + white), (brown + red), (black + light green), and so on. Keep this diagram in plain view in the centre of the playing surface.

Deal out five cards to each player. Cards are laid face-up. The youngest player begins. If this player has any orange rod cards, or any combinations of two cards which equal ten, he or she picks up all such cards. Dealer replaces the cards and play moves on. If no tens or ten-pairs can be made player can do a trade of 1 or more cards with the dealer in lieu of a turn. Play continues until all cards have been dealt.

Competitive version: Person who has picked up the most tens and ten-pair cards wins.

Co-operative version: Players co-operate to make tens out of all remaining cards.

**Players: 2-4**

**Co-operative**

**Materials:** regular starter set of cuisenaire rods  
one six-sided die  
Gridlock game board - see next page

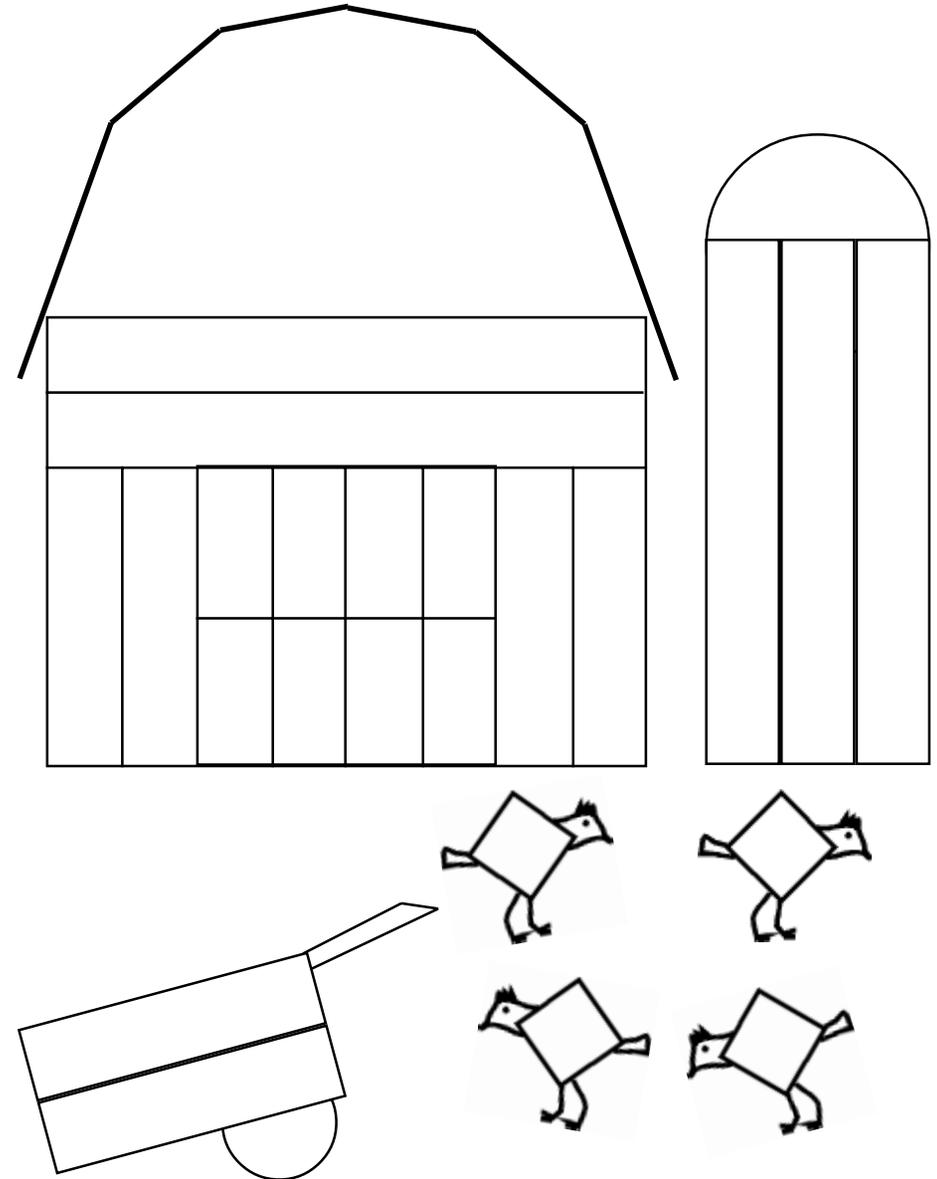
**Skills:** numerical values of cuisenaire rods  
2-dimensional strategizing  
introduction to area and multiplication  
familiarity with grid, pre-graphing skills

**Rules:** On his or her turn, a player rolls the die twice to determine which Cuisenaire Rods to take. The first roll tells "how long" a rod to use. The second roll tells "how many" rods to take.

Players arrange their rods into a rectangle, place it on their grid. You may choose to calculate or use a rod track to calculate the area of the rectangle.

The game is over when one player can't place a rectangle because there's no room on the grid. Then players count or compute how many of their squares are uncovered.

Aim is to minimize this score.





# 2-Layer Rectangles

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**Players: 2**

**Non-competitive**

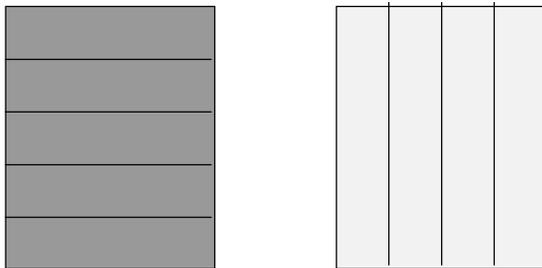
**Materials:** Cuisenaire Rods

**Skills:** counting  
familiarity with rectangle shape  
fine motor control  
multiplication terminology

**Rules:** One player lays out a “rectangle” of rods of identical length.

The other player lays out a commutative rectangle on top, using rods placed at 90 degrees to the first set.

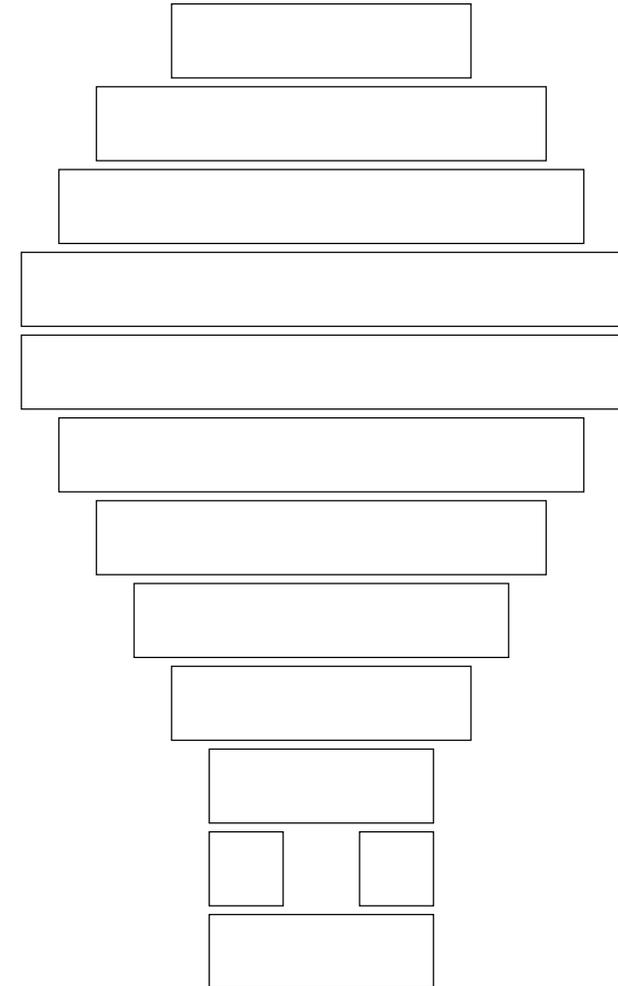
eg. first player places five purple rods side by side, second player places four yellow rods on top, forming a rectangle of the same shape:



If desired, “check” that the rectangles are the same size by laying out two rod trains, one made from each rectangles. They will be of equal length.

# Hot Air Balloon

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**Players: 2****Competitive or Non-Competitive**

Materials: Cuisenaire Cards

Skills: comparing rod lengths  
recognizing and naming rod values to 12  
concepts of equal, greater than and less than

Rules: Each player is dealt half the deck of cards. Both players face off, turning over one card each. The player with the higher-value card wins both cards, adding them to the bottom of his or her stack.

If there is a “tie”, the tied cards stay face up. Each player adds three face-down cards, then one face-up card. The greater card wins the entire trick. Repeat if necessary for “double war” or “triple war” if further ties occur.

Non-competitive version: Game ends when players have been through the deck once.

Competitive version: Game ends when one player has won all the cards from the other. Or game ends at an agreed-upon time, and players count how many cards they each have to determine a winner.

**Players: 2-4****Competitive or Co-operative**

Materials: Cuisenaire Cards (remove “1” cards)  
two six-sided dice

Skills: counting (dots on dice)  
simple addition 2 to 12 (two dice added together)  
pattern recognition (dots on dice)  
correspondence of numerals and cuisenaire rods

Rules: Each player is dealt six Cuisenaire Cards. They are laid out in a row, face-up, in front of the player. Players then take turns rolling the dice. If the number rolled is equivalent to the value of a Cuisenaire card that player has, the card is flipped over. The object of the game is to turn over all one’s cards.

Competitive version: winner is the first person to turn over all his cards.

Co-operative version: object is for all players to turn over all their cards, so a player who rolls a number he cannot use can give his roll to a player who can.

# Chutes and Ladders Gameboard

41		42	43	44	45	46	47	48	49	50
40	39	38	37	36	35	34	33	32	31	End
21	22	23	24	25	26	27	28	29	30	
20	19	18	17	16	15	14	13	12	11	
1	2	3	4	5	6	7	8	9	10	
	Start									

# Snakey Rods

**Players: 1-4**

**Competitive or Co-operative**

**Materials:** regular starter set of cuisenaire rods  
one six-sided die (dots or numerals)  
Snakey Rods game board

**Skills:** fine-motor control  
numeral recognition  
correspondence of numerals and cuisenaire rods  
visual estimation of lengths  
strategizing

**Rules:** To begin each player rolls die five times, selecting a rod to match each roll of die. Thus each player begins the game with a pile of five rods of value 1 - 6. The object is to use up all one's rods as soon as possible. Players take turns placing a rod on the snake path beginning at "Start." If a rod ends directly in front of a square with a number in it, that player must add the corresponding rod to his pile. If no move can be made, player rolls the die, adding the corresponding rod to his pile until a move can be made.

In the competitive version, the aim is to be the first to use up all one's rods. In the co-operative version the aim is to work together to make the shortest possible "snake", and once one player is out of rods, he or she assists the other(s) in using up remaining rods. If the snake reaches the "End" square before the game ends, the snake wins.

## Players: 1-4

## Non-Competitive

Materials: regular starter set of Cuisenaire rods  
set of Cuisenaire Cards

Skills: the concept of “sum”  
relative value of rods  
representation of numbers from 11-20 with rods

Rules: Player chooses a rod, then draws a card. The object is to make rod diagram illustrating the sum of these two values.

*eg. Child chooses purple rod and draws a black rod card, then lines up purple end on end with black and demonstrates how orange and white match the sum.*

Parent can narrate the result: “The sum of purple and black is orange with white. The sum of 7 and 4 is 11.”

Other players take turns in a similar fashion.

If children have used the Cuisenaire Cards for other games they will be familiar with the standard cuisenaire representation of 11 and 12. You can explain that the other “teens” are named by adapting the names of the rods that represent them: “five-ten” is “five-teen” or “fif-teen”. “Six-ten” is “sixteen” and so on.

## Players: 1-4

## Non-Competitive

Materials: regular starter set of Cuisenaire rods  
set of Cuisenaire Cards

Skills: the concepts of “sum” and “difference”  
the different way we represent these operations with rods  
relative value of rods  
representation of numbers from 11-20 with rods

Rules: This game is just a combination of “Sums” and “Differences”. With each turn the player can choose whether to make a sum rod diagram or a difference rod diagram.

# Steps and Stairs

# Differences

## Players: 2-4

## Co-operative

**Materials:** regular starter set of cuisenaire rods  
set of Cuisenaire Cards (remove 11's and 12's)

**Skills:** relative value of rods  
concepts of "equals", "greater than" and "less than"  
strategizing

**Rules:** Each player is dealt six cards. These are laid face up in a row. Players take turns placing a rod matching one of their cards to create "steps and stairs" array of cuisenaire rods in the centre of the playing surface. The rods are laid parallel to each other, and each rod must be equal to, or one greater than or one less than the last one placed. Once a card is used it is removed, set aside in a common "discard" pile, and replaced from the deck.

A player who cannot move must forfeit his turn and trade one card with the deck.

The aim is to have as few cards as possible remaining undiscarded at the end of the game.

## Players: 1-4

## Non-Competitive

**Materials:** regular starter set of Cuisenaire rods  
set of Cuisenaire Cards

**Skills:** the concept of "difference"  
relative value of rods  
the idea that "same" means "zero difference"

**Rules:** Player chooses a rod, then draws a card. The object is to make rod diagram illustrating the difference between these two values.

*eg. Child chooses purple rod and draws a black rod card, then lines up purple beside black and demonstrates how light green fills in the difference.*

Parent can narrate the difference shown: "The difference between black and purple is light green. The difference between 7 and 4 is 3."

Other players take turns in a similar fashion.

To reduce difficulty, it may be helpful to remove the 11 and 12 cards from the deck.

Most children see the "zero difference" scenario as a funny joke. They enjoy the coincidence of choosing