



# Factor Construction

## Strands:

Number & Quantity	X
Algebra	
Functions	
Geometry	
Statistics & Probability	

## Materials:

- Two six-sided die
- 40 cubes per player
- Scoring Sheet

## Where:

Outside	
Inside	X
On-line	
On-site	

In this game for 2 to 4 players, illustrate factors of numbers using blocks to build rectangular prisms with factor-length edges.

### Set-Up:

- Give each player 40 cubes and a recording sheet.
- The player with the lightest color eyes starts.

**Object of the Activity:** Increase awareness of factors and their links to area and volume.

### On Your Turn:

1. Roll two dice. Add the numbers rolled. Record the sum on the recording sheet in the "Amount rolled" column. Add this number to the total amount from your previous turn. (If this is your first turn, also record the amount rolled in the "total amount" column.)
2. Build a prism with the number of cubes listed in the total amount column.
3. Build as many different prisms as you can with your cubes. On your recording sheet, record the factor pairs you found as you built each prism.
4. You earn 1 point for each factor pair you find. (Note:  $4 \times 3$  and  $3 \times 4$  are considered the same factor pair.)
  - For example, if your total amount is 12, you can make prisms with dimensions  $1 \times 12$ ,  $2 \times 6$ , and  $3 \times 4$  with 12 cubes. Because there are 3 distinct prisms and factor pairs, you earn 3 points.
  - Prime numbers are counted as 1 point. For example,  $7 \times 1$  is the only factor pair for the number 7.
5. Play ends when each player has taken 5 turns. Find the total number of points.

**To Win:** The player with the most points wins.

### Think About It:

1. Can you earn more points if you roll a prime number or if you roll a composite number? Why?
2. How do the factor pairs relate to the area of a prism?
3. What do you notice when a player rolls a prime number?



### Variations:

**Prime Problems:** Anytime a prime number is rolled you skip your turn and earn 0 points for that round.

**Build It Up:** Build rectangular prisms using three factors of a number. For example: If the total number is 12, build a  $2 \times 2 \times 3$  prism or a  $1 \times 2 \times 6$  prism.

### Helpful Hints:

- Keep track of the factor pairs that were found in previous rolls. Collecting information and becoming familiar with factors of several numbers can be helpful in upcoming turns.
- Manipulate the cubes into different forms to find more factor pairs.