



Activity C.6: Mountain Goat Scramble II (This is the collaborative version of the game in the Games Section.)

Special Note: This more advanced version uses all four operations and develops factoring skills. The first time children play, the it may take a little while to understand how the dice are rolled and uses. Each time one player rolls the dice, but all players make a move from that roll. We do this so the students will see that it is not luck; there are many moves possible and some moves are more optimum than others.

Learning Objectives:

- 1) Practice simple addition, subtraction, multiplication and division.
- 2) Understand equivalency.
- 3) Begin to develop factoring skills.
- 4) Practice cooperative play.

Examples of Skills Accomplished:

- 1) $2 + 5 = 7$.
- 2) $6 \times 4 = 24$.
- 3) $6 \times 4 = 6$ steps on the 4x staircase or 4 steps on the 6x staircase.
- 4) Factors of 24 are 2, 3, 4, 6, 8, and 12.

Setup:

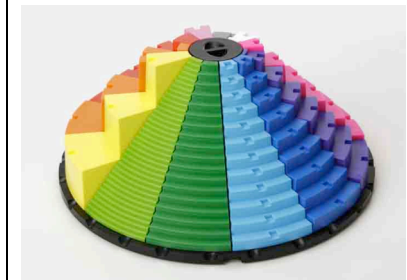
- 1) Put staircases in counterclockwise sequence $1x \rightarrow 12x$.
- 1) One foam card, any color. Players will place one token blank side in front of staircases $2x \rightarrow 12x$. These tokens will become goats that can only move vertically.

Hints:

For the children the stated objective is to get all goats to the top. Our real objective is to have them practice as much math as tolerable, which is why they may roll three dice but only use two of them. This requires more mental math.

Maximum Number of Players for Small Group Activities: 4

Players Positions: Standing or seated



Game Objective: Working together as a team, help each goat (token) scramble to the top of the trail (staircase).

- 1) Place a goat (token any color, blank side up) in the notch at the bottom of each staircase, except 1x. The player who moves a goat to the top gets to say what the goat will eat when it gets there.
- 2) Explain that any player may move any goat and several players may move the same goat on the same staircase. Nobody owns a goat and nobody owns a staircase. For example, if two players plan to move the goat on the 11x staircase, the first player moves the goat up one step and then the second player moves the same goat up another step.
- 3) Do a practice roll where you merely write the numbers 2, 5 and 6 on the board and let everybody take a practice turn. (See chart at right for possible moves).
- 4) The first player, A, rolls the three dice. After the dice have been rolled, all players make a move (discussed below) based on the roll. This allows them to see over the course of the game that some choices result in more optimum movements.
- 5) Goats can leap up one or more whole step(s) on their own trail. Goats cannot leap up partial steps; the move must be exactly equal to the elevation gain as calculated.
- 6) To calculate possible elevation gains (moves) a player may decide to use any **one** dice or any operation (+, -, x, ÷) using any **two** dice.
- 7) Each player then moves the appropriate goat for his/her play.
- 8) After all players have made a move, the dice are handed to the next player, B. Play continues with every player making his/her move.
- 9) Eventually, every player will have one or more turns to roll the dice.
- 10) When a goat gets to the top, the player who last moved the goat gets to decide what the goat finds to eat there. Encourage originality.

For example, if a 2, 5, and a 6 were rolled, the possible elevation gains and moves are:

Dice Used and Operations	Possible moves (only one per turn)
Single dice 2	1 step on 2x
Single dice 5	1 step on 5x
Single dice 6	3 steps on 2x 2 steps on 3x 1 step on 6x
Sum of 2 + 5 = 7	1 step on 7x
Sum of 2 + 6 = 8	4 steps on 2x 2 steps on 4x 1 step on 8x
Sum of 5 + 6 = 11	1 step on 11x
Subtract 5 - 2 = 3	1 step on 3x
Subtract 6 - 2 = 4	2 steps on 2x 1 step on 4x
Multiply 2 x 5 = 10	5 steps on 2x 2 steps on 5x 1 step on 10x
Multiply 2 x 6 = 12	6 steps on 2x 4 steps on 3x 3 step on 4x 2 steps on 6x 1 step on 12x
Multiply 5 x 6 = 30	15 steps on 2x 10 steps on 3x 6 step on 5x 5 steps on 6x 3 step on 10x
Divide 6 / 2 = 3	1 step on 3x

Variation:

- 1) For a competitive version, allow each player to pick a color for his/her own goats. Each player will place his/her goats at the bottom of each staircase in use and only move his/her own goats. The first player who gets all of his/her goats to the top wins.

Observe and Assess:

- 1) To move a goat on the 7x and 11x staircases, players must use addition. In all other circumstances, players who use addition frequently may not yet be comfortable with their multiplication skills.
- 2) Players who calculate an elevation gain ($6 \times 5 = 30$) and then move on staircases not represented by the dice (2x, 3x, 10x) are becoming more fluent with numbers.
- 3) If there is a wide range in ability and less skilled players feel intimidated, ask one or two of them to act as scribes. On a flip chart or white board, ask them to record the roll of the dice, and the choices the players made. As the game progresses ask them to write down one or more other possible moves that were not taken.
- 4) Use your own creativity to accelerate the game or increase the challenges by creating "lightning rounds" that you and/or the players define.

Group Discussion & Review of Findings:

N/A

Transition to Paper:

- 1) Assign a 2D Zillio worksheet for the times tables as either class work or homework or follow-up with simple multiplication problems from your routine curriculum.

