Curriculum topic:

- Adding Positive and Negative Numbers

Subject: Math

Grade range: 4 – 8

ABOVE & BELOW ZERO GAME

High or low: win either way you go!
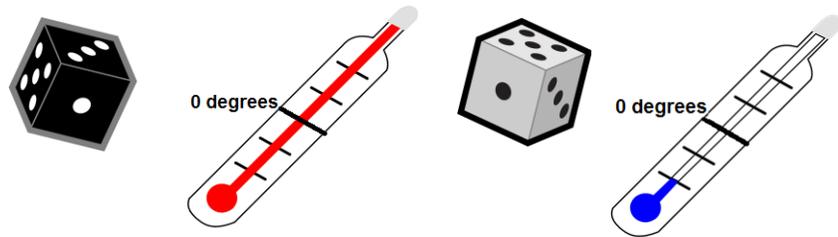
Add positive and negative numbers on a vertical number line.

Who we are:

Resource Area for Teaching (RAFT) helps educators transform the learning experience through affordable "hands-on" activities that engage students and inspire the joy and discovery of learning.

For more ideas and to see RAFT Locations

www.raft.net/visit-raft-locations
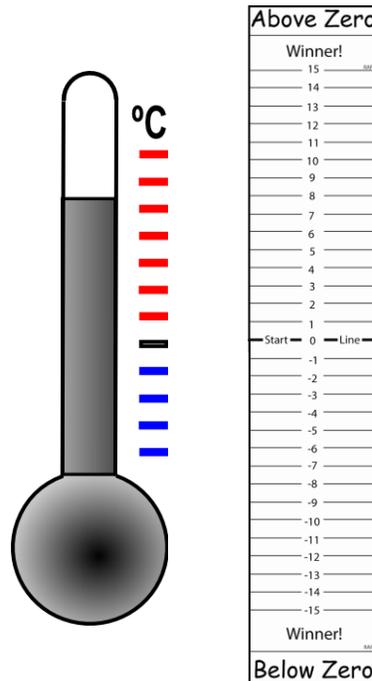
A thermometer is one example of a scale that goes above and below zero. Can you think of others?

http://www.raft.net/raft-idea?isid=622

Materials required

- **_Above & Below Zero Game_**
  Board (see page 4)

- Two 6-sided dice, each a different color
- Four pawns, different colors

Playing the game (for 2 – 4 players)

Winning the game:

The first player to reach either end of the game board wins!

1 Place game board vertically between players (see figure at right). Each player places his or her playing piece on the Start Line (at "0" in the center of the game board).

2 Choose one color die for positive numbers. The other die will represent negative numbers.

3 Each player takes turns rolling the "positive" die; the player with the highest roll goes first.

4 Now the first player rolls both dice.
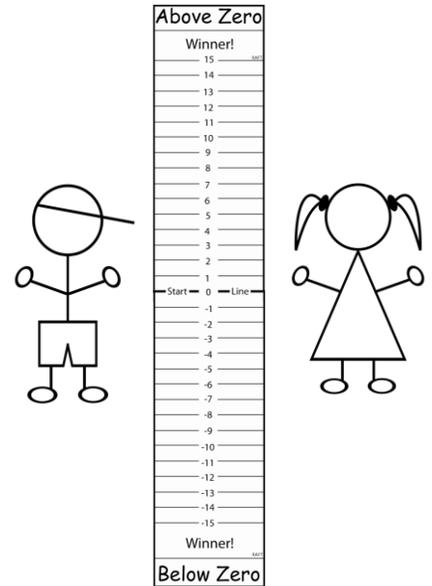
Counting aloud, the player moves his or her piece…

… UP the board the number of lines shown on the **positive** die, and then

… DOWN the number of lines on the **negative** die.

For example:

For a roll of **+5** and **– 3**, the piece would move:
UP 5 lines (positive) then
DOWN 3 lines (negative),
ending up **2** lines above where it started.

+5 + (-3) = 2

Go up 5… …then down 3

Start at 0 End at 2
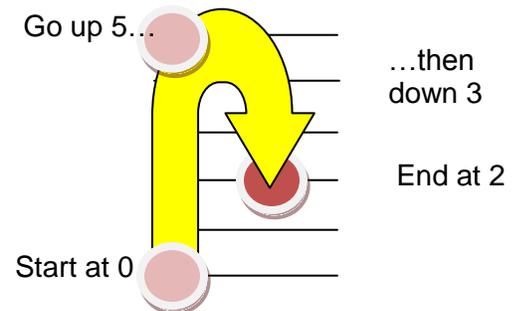
5 Players take turns rolling the dice and moving their pieces on the game board. Each piece's movement starts from its current location. Two pieces may occupy the same line.

6 As students become more comfortable with adding positive and negative numbers, they may add the numbers mentally and then move the piece the sum of the values.

7 The first player to reach either end of the game board (positive or negative) wins.   Players do not have to have the exact number to land at the end of the board.

The math behind the activity

Some students have trouble grasping the meaning of the **minus sign** (-). It can signify subtraction, direction, or the fact that a number is negative. A negative number, such as −2, is less than zero. A positive number, such as 4, is greater than zero. Zero itself is neither positive nor negative. Negative numbers are used to describe values on a scale that goes below zero, such as very cold temperatures shown on a thermometer.

Learn more

- A vertical number line can also be illustrated as an elevator or escalator (positive direction above the main floor; negative direction means below the main floor, as in parking levels.)

- Illustrate other types of number lines (timelines, football yard lines, mileage scales on maps, etc.).

- Create word problems that use this same concept: "Mary had 5 raisins and ate 3. Now how many does she have?"

Related activities: See RAFT Idea Sheets:

Adding Positive and Negative Integers:
Absolutely Valuable Game -
http://www.raft.net//ideas/Absolutely Valuable Game.pdf

Positive and Negative Integers on a Number Line:
Hi–Ho!, Hi–Low! -
http://www.raft.net/ideas/Hi Ho Hi Low.pdf

Positive and Negative Integers on a Coordinate Game Board:
Graphing Race to the Edge -
http://www.raft.net/ideas/Graphing Race to the Edge.pdf

Resources

Visit www.raft.net/raft-idea?isid=622 for "how-to" video demos & more ideas!

See these websites for more information on the following topics:
- **Adding positive and negative numbers** –
  http://www.mathsisfun.com/positive-negative-integers.html
- **A history of negative numbers** –
  http://www.mathpages.com/home/kmath298.htm
- **Videos and exercises on negative numbers and absolute value from the Khan Academy** -
  https://www.khanacademy.org/math/arithmetic/absolute-value
- **Teacher designed math courses from the New Jersey Center for Teaching & Learning** – https://njctl.org/courses/math

Acknowledgements:

Above Zero

Winner!

15
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13
12
11
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6
5
4
3
2
1

RAFT

Start — 0 — Line

-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15

Winner!

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Below Zero

Tape Here