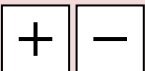## Packet 2: Integer Addition and Subtraction
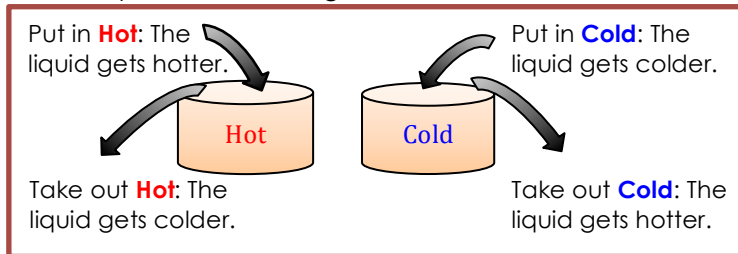
Dear Parents/Guardians,

Integers: Packet 2 introduces the counter model for operating on integers, which is helpful for visual and tactile learners. The temperature change context (magic hot and cold cubes) may be a helpful supporting model for students. Students represent quantities and add and subtract with these models. They use the models to develop rules for addition and subtraction of integers.
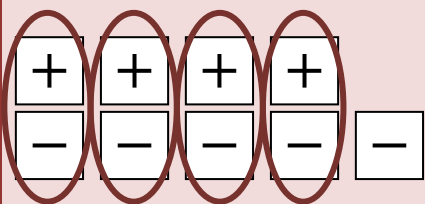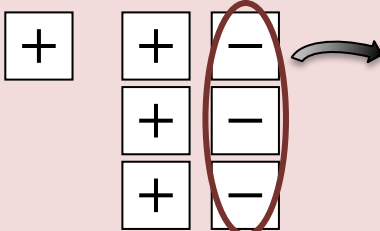
### Counter Model

| | |
|---|---|
| **+** | A value of **positive 1** represented by a **+** counter. |
| **−** | A value of **negative -1** is represented by a **−** counter. |
| **+** **−** | A value of **zero**, referred to as a "zero pair", is represented by a pair of **+ −** counters. |

### Temperature Change Model

Students will learn about Mr. Mortimer's Magic Hot and Cold cubes to represent and operate with integers.

Put in **Hot**: The liquid gets hotter.

Put in **Cold**: The liquid gets colder.

Hot          Cold

Take out **Hot**: The liquid gets colder.

Take out **Cold**: The liquid gets hotter.

### Addition and Subtraction of Integers

| 4 + (-5) = -1 | 1 – (-3) = 4 |
|---|---|
| **+ + + +** <br> **− − − − −** | **+** **+** **−** <br> **+** **−** <br> **+** **−** |

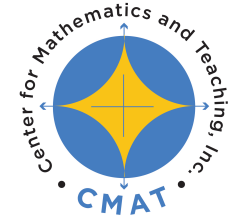| Counter Model | |
|---|---|
| Start with a value equal to zero. <br> Create a value of 4. <br> Add 5 negatives. <br> Notice there are 4 zero pairs. <br> 1 negative is left. | Start with a value equal to zero. <br> Create a value of 1. <br> Since there are not -3 counters to remove, create 3 zero pairs. <br> Remove -3. <br> 4 positives are left. |

| Temperature Model | |
|---|---|
| Start with a temperature of zero. <br> Create a temperature of 4. <br> Add five cold cubes. <br> 1 cold cube is left. | Start with a temperature of zero. <br> Create a temperature of 1. <br> To remove 3 cold cubes means the temperature is 3 degrees hotter. <br> The temperature is 4. |

## INTEGERS PACKET 2

### By the end of the packet, your student should know…

- How to represent integers using a counter model, supported by the temperature change model Lesson 2.1
- How to add and subtract integers using a counter model, supported by the temperature change model Lessons 2.2 and 2.3
- Relate the counter model and temperature change model to the 'rules' for adding and subtracting integers Lessons 2.2 and 2.3

### Additional Resources

- For definitions and additional notes please refer to section 2.5.
- Adding and subtracting integers:
  http://youtu.be/hGVm2xs0HEA
  http://youtu.be/pU2zPf846L4
- Subtracting integers:
  http://youtu.be/p5v57aayD5M