INCLUSION IN TEXAS

Instructional Routines for Mathematics Intervention

The purpose of these mathematics instructional routines is to provide educators with materials to use when providing intervention to students who experience difficulty with mathematics. The routines address content included in the grades 2-8 Texas Essential Knowledge and Skills (TEKS). There are 23 modules that include routines and examples – each focused on different mathematical content. Each of the 23 modules include vocabulary cards and problem sets to use during instruction. These materials are intended to be implemented explicitly with the aim of improving mathematics outcomes for students.

TEA
Texas Education Agency

Instructional Routines for Mathematics Intervention

MODULE 17

Integers

Module 17: Integers
Mathematics Routines

A. Important Vocabulary with Definitions

Term	Definition
absolute value	The distance of a number from 0 on a number line.
integer	A positive or negative whole number.
negative number	Any number less than 0.
number line	A straight line with numbers placed at equal intervals along its length.
opposites	Two numbers that are equal distance from 0 on a number line.
positive number	Any number greater than 0.
zero pair	A pair of numbers with a sum of 0.

B. Background Information

In this module, we focus on integers. An integer is a positive or negative whole number. We use the following different models to help students understand integers: (1) Number Line, (2) Two-Color Counters, and (3) Positive and Negative Mat with Cubes.

When referring to integers, be sure to emphasize that numbers without a negative symbol (-) are assumed positive. So:

7 is “positive seven” or “seven.”

-7 is “negative seven.”

Be sure to use the negative symbol (-), instead of a minus sign (–), for representing negative numbers.

Emphasize *zero pairs* when teaching integers. A zero pair is a pair of numbers with a sum of 0. So, -7 + 7 = 0.

C. Routines and Examples

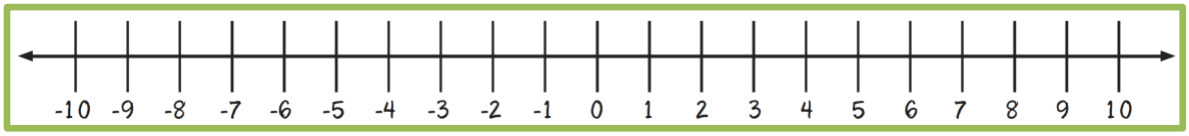
(1) Integers with a Number Line

Routine

Materials:

- Module 17 Problem Sets
- Module 17 Vocabulary Cards
    - If necessary, review Vocabulary Cards before teaching
- A hands-on tool or manipulative like a number line

ROUTINE WITH NUMBER LINE



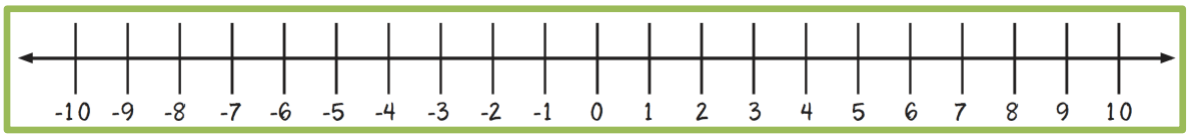
Teacher	**Let's show different integers. An integer is a positive or negative whole number. What's an integer?**
Students	A positive or negative whole number.
Teacher	**Let's think about a positive number. How do you know a number is positive?**
Students	It has a positive sign or it doesn't have any sign in front of the number.
Teacher	**We know a number is positive if the positive sign is directly in front of a number. The positive sign is a smaller plus sign.** (Draw +.)
Teacher	**We assume a number is positive if there is not a negative sign directly in front of a number. When do we assume a number is positive?**
Students	When there is not a negative sign directly in front of the number.
Teacher	**How do you know a number is negative?**
Students	It has a negative sign.
Teacher	**We know a number is negative if there is a negative sign directly in front of a number. The negative sign is a smaller minus sign.** (Draw -.)
Teacher	**So, let's read a few different numbers. What's this number?** (Write 6.)
Students	Six or positive six.
Teacher	**This is six or positive six. What's this number?** (Write -2.)
Students	Negative two.
Teacher	**Is this number "two?"**
Students	No!
Teacher	**What's this number?**
Students	Negative two.

Teacher	**Yes. This is "negative two." What's this number?** (Write -14.)
Students	Negative fourteen.
Teacher	**This number is negative fourteen.** (Show number line.)
Teacher	**Today, let's show different integers on a number line. What's this number?**
Students	__.
Teacher	**If the number is positive, we will start at zero and move forward or right on the number line. What do we do if a number is positive?**
Students	Start at zero and move forward on the number line.
Teacher	**If the number is negative, we will start at zero and move backward or left on the number line. What do we do if a number is negative?**
Students	Start at zero and move backward on the number line.
Teacher	**Let's show __ on the number line. First, is __ a positive number or negative number?**
Students	__.
Teacher	**__ is a positive/negative number. So, let's place our finger on zero. Where?**
Students	Zero.
Teacher	**Because this number is positive/negative, we move forward/backward __ spaces on the number line. Ready? Count with me.**
Students	__, __, __, …
Teacher	**So, our finger shows where __ falls on the number line. What number did we show?**
Students	__.
Teacher	**Great work! Using this number line helps you understand the value of positive and negative integers. How can you use the number line to show integers?**
Students	Start at zero. If the number is positive, move forward on the number line. If the number is negative, move backward on the number line.

Example

-6

EXAMPLE WITH NUMBER LINE



Teacher	**Let's show different integers. An integer is a positive or negative whole number. What's an integer?**
Students	A positive or negative whole number.
Teacher	**Let's think about a positive number. How do you know a number is positive?**

Students	It has a positive sign or it doesn't have any sign in front of the number.
Teacher	**We know a number is positive if the positive sign is directly in front of a number. The positive sign is a smaller plus sign.** (Draw +.)
Teacher	**We assume a number is positive if there is not a negative sign directly in front of a number. When do we assume a number is positive?**
Students	When there is not a negative sign directly in front of the number.
Teacher	**How do you know a number is negative?**
Students	It has a negative sign.
Teacher	**We know a number is negative if there is a negative sign directly in front of a number. The negative sign is a smaller minus sign.** (Draw -.) (Show number line.)
Teacher	**Today, let's show different integers on a number line. What's this number?**
Students	-6.
Teacher	**If the number is positive, we will start at zero and move forward or right on the number line. What do we do if a number is positive?**
Students	Start at zero and move forward on the number line.
Teacher	**If the number is negative, we will start at zero and move backward or left on the number line. What do we do if a number is negative?**
Students	Start at zero and move backward on the number line.
Teacher	**Let's show -6 on the number line. First, is -6 a positive number or negative number?**
Students	Negative.
Teacher	**-6 is a negative number. So, let's place our finger on zero. Where?**
Students	Zero.
Teacher	**Because this number is negative, we move backward 6 spaces on the number line. Ready? Count with me.**
Students	1, 2, 3, 4, 5, 6.
Teacher	**So, our finger shows where -6 falls on the number line. What number did we show?**
Students	-6.
Teacher	**Great work! Using this number line helps you understand the value of positive and negative integers. How can you use the number line to show integers?**
Students	Start at zero. If the number is positive, move forward on the number line. If the number is negative, move backward on the number line.

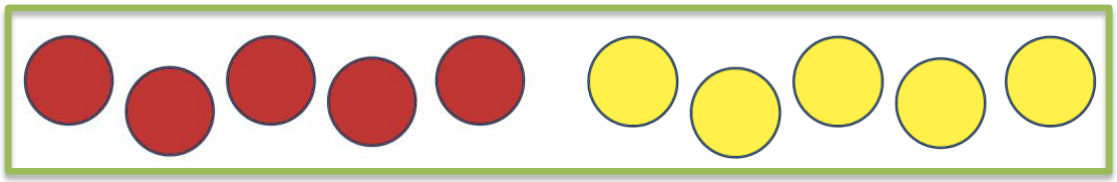
(2) Integers with Two-Color Counters

Routine

Materials:

- Module 17 Problem Sets
- Module 17 Vocabulary Cards
    - If necessary, review Vocabulary Cards before teaching
- A hands-on tool or manipulative like two-color counters or multi-colored cubes

ROUTINE WITH TWO-COLOR COUNTERS



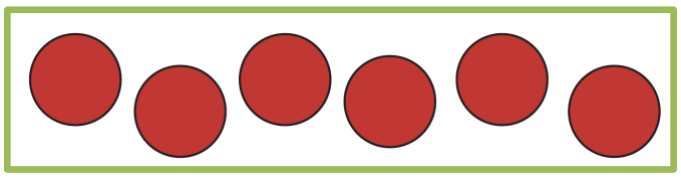
Teacher	**Let's show different integers. An integer is a positive or negative whole number. What's an integer?**
Students	A positive or negative whole number.
Teacher	**Let's think about a positive number. How do you know a number is positive?**
Students	It has a positive sign or it doesn't have any sign in front of the number.
Teacher	**We know a number is positive if the positive sign is directly in front of a number. The positive sign is a smaller plus sign.** (Draw +.)
Teacher	**We assume a number is positive if there is not a negative sign directly in front of a number. When do we assume a number is positive?**
Students	When there is not a negative sign directly in front of the number.
Teacher	**How do you know a number is negative?**
Students	It has a negative sign.
Teacher	**We know a number is negative if there is a negative sign directly in front of a number. The negative sign is a smaller minus sign.** (Draw -.)
Teacher	**So, let's read a few different numbers. What's this number?** (Write 3.)
Students	Three or positive three.
Teacher	**This is three or positive three. What's this number?** (Write -9.)
Students	Negative nine.
Teacher	**Is this number "nine?"**
Students	No!
Teacher	**What's this number?**
Students	Negative nine.
Teacher	**Yes. This is "negative nine." What's this number?** (Write -13.)

Students	Negative thirteen.
Teacher	**This number is negative thirteen.** (Show counters.)
Teacher	**Today, let's show different integers with two-color counters. With the two-color counters, we'll use the yellow side to show positive integers. What will the yellow side represent?**
Students	Positive integers.
Teacher	**We'll use the red side to show negative integers. What will the red side represent?**
Students	Negative integers.
Teacher	**Let's show a number. What's this number?**
Students	__.
Teacher	**Let's show __ with the two-color counters. First, is __ a positive number or negative number?**
Students	__.
Teacher	**__ is a positive/negative number. So, which color will we use?**
Students	Yellow/red.
Teacher	**Because this number is positive/negative, we'll use the yellow/red side. We need to show __, so let's show __ yellow/red counters. Count with me.**
Students	__, __, __, …
Teacher	**So, we showed __. What number did we show?**
Students	__.
Teacher	**Great work! Using the two-color counters helps you show positive and negative integers. How can you use the two-color counters to show integers?**
Students	The yellow side represents positive integers. The red side represents negative integers. To show a positive integer, show the yellow counters. To show a negative integer, show the red counters.

Example

-6

EXAMPLE WITH TWO-COLOR COUNTERS



Teacher	**Let's show different integers. An integer is a positive or negative whole number. What's an integer?**
Students	A positive or negative whole number.
Teacher	**Let's think about a positive number. How do you know a number is positive?**
Students	It has a positive sign or it doesn't have any sign in front of the number.

Teacher	**We know a number is positive if the positive sign is directly in front of a number. The positive sign is a smaller plus sign.** (Draw +.)
Teacher	**We assume a number is positive if there is not a negative sign directly in front of a number. When do we assume a number is positive?**
Students	When there is not a negative sign directly in front of the number.
Teacher	**How do you know a number is negative?**
Students	It has a negative sign.
Teacher	**We know a number is negative if there is a negative sign directly in front of a number. The negative sign is a smaller minus sign.** (Draw -.) (Show counters.)
Teacher	**Today, let's show different integers with two-color counters. With the two-color counters, we'll use the yellow side to show positive integers. What will the yellow side represent?**
Students	Positive integers.
Teacher	**We'll use the red side to show negative integers. What will the red side represent?**
Students	Negative integers.
Teacher	**Let's show a number. What's this number?**
Students	-6.
Teacher	**Let's show -6 with the two-color counters. First, is -6 a positive number or negative number?**
Students	Negative.
Teacher	**-6 is a negative number. So, which color will we use?**
Students	Red.
Teacher	**Because this number is negative, we'll use the red side. We need to show -6, so let's show 6 red counters. Count with me.**
Students	1, 2, 3, 4, 5, 6.
Teacher	**So, we showed -6. What number did we show?**
Students	-6.
Teacher	**Great work! Using the two-color counters helps you show positive and negative integers. How can you use the two-color counters to show integers?**
Students	The yellow side represents positive integers. The red side represents negative integers. To show a positive integer, show the yellow counters. To show a negative integer, show the red counters.

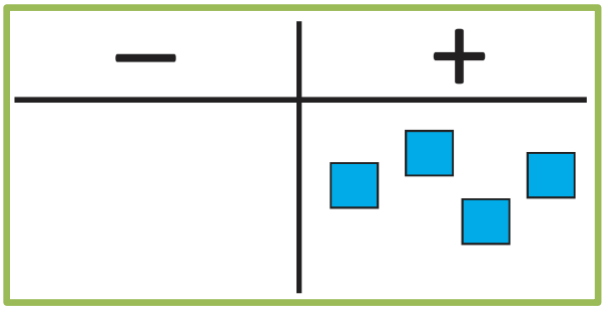
(3) Integers with Positive and Negative Mat

Routine

Materials:

- Module 17 Problem Sets
- Module 17 Vocabulary Cards
    - If necessary, review Vocabulary Cards before teaching
- A hands-on tool or manipulative like cubes or paperclips

ROUTINE WITH POSITIVE AND NEGATIVE MAT



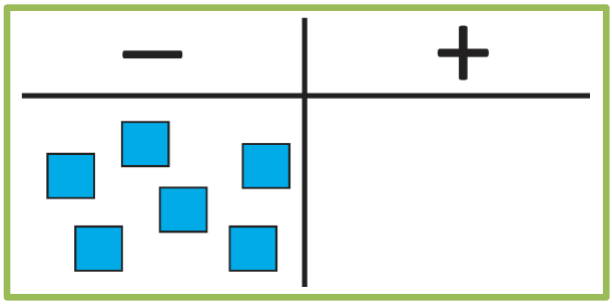
Teacher	**Let's show different integers. An integer is a positive or negative whole number. What's an integer?**
Students	A positive or negative whole number.
Teacher	**Let's think about a positive number. How do you know a number is positive?**
Students	It has a positive sign or it doesn't have any sign in front of the number.
Teacher	**We know a number is positive if the positive sign is directly in front of a number. The positive sign is a smaller plus sign.** (Draw +.)
Teacher	**We assume a number is positive if there is not a negative sign directly in front of a number. When do we assume a number is positive?**
Students	When there is not a negative sign directly in front of the number.
Teacher	**How do you know a number is negative?**
Students	It has a negative sign.
Teacher	**We know a number is negative if there is a negative sign directly in front of a number. The negative sign is a smaller minus sign.** (Draw -.)
Teacher	**So, let's read a few different numbers. What's this number?** (Write 7.)
Students	Seven or positive seven.
Teacher	**This is seven or positive seven. What's this number?** (Write -1.)
Students	Negative one.
Teacher	**Is this number "one?"**
Students	No!

Teacher	**What's this number?**
Students	Negative one.
Teacher	**Yes. This is "negative one." What's this number?** (Write -24.)
Students	Negative twenty-four.
Teacher	**This number is negative twenty-four.** (Show mat and cubes.)
Teacher	**Today, let's show different integers with this positive and negative mat and these cubes. With the mat, we'll place positive integers on this positive side** (point)**. Where will we place positive integers?**
Students	Positive side of mat.
Teacher	**We'll place negative integers on this negative side** (point)**. Where will we place negative integers?**
Students	Negative side of mat.
Teacher	**Let's show a number. What's this number?**
Students	__.
Teacher	**Let's show __ with the cubes. First, is __ a positive number or negative number?**
Students	__.
Teacher	**__ is a positive/negative number. So, where will we place the cubes? On the positive side or negative side?**
Students	Positive/negative.
Teacher	**Because this number is positive/negative, we'll place the cubes on the positive/negative side. We need to show __, so let's show __ cubes on the positive/negative side of the mat. Count with me.**
Students	__, __, __, …
Teacher	**So, we showed __. What number did we show?**
Students	__.
Teacher	**Great work! Using the positive and negative mat helps you show positive and negative integers. How can you use the mat to show integers?**
Students	You use the cubes and place positive integers on the positive side of the mat. You use the cubes and place negative integers on the negative side of the mat.

Example

-6

EXAMPLE WITH POSITIVE AND NEGATIVE MAT



Teacher	**Let's show different integers. An integer is a positive or negative whole number. What's an integer?**
Students	A positive or negative whole number.
Teacher	**Let's think about a positive number. How do you know a number is positive?**
Students	It has a positive sign or it doesn't have any sign in front of the number.
Teacher	**We know a number is positive if the positive sign is directly in front of a number. The positive sign is a smaller plus sign.** (Draw +.)
Teacher	**We assume a number is positive if there is not a negative sign directly in front of a number. When do we assume a number is positive?**
Students	When there is not a negative sign directly in front of the number.
Teacher	**How do you know a number is negative?**
Students	It has a negative sign.
Teacher	**We know a number is negative if there is a negative sign directly in front of a number. The negative sign is a smaller minus sign.** (Draw -.) (Show mat and cubes.)
Teacher	**Today, let's show different integers with this positive and negative mat and these cubes. With the mat, we'll place positive integers on this positive side** (point)**. Where will we place positive integers?**
Students	Positive side of mat.
Teacher	**We'll place negative integers on this negative side** (point)**. Where will we place negative integers?**
Students	Negative side of mat.
Teacher	**Let's show a number. What's this number?**
Students	-6.
Teacher	**Let's show -6 with the cubes. First, is -6 a positive number or negative number?**
Students	Negative.
Teacher	**-6 is a negative number. So, where will we place the cubes? On the positive side or negative side?**

Students	Negative.
Teacher	**Because this number is negative, we'll place the cubes on the negative side. We need to show -6, so let's show 6 cubes on the negative side of the mat. Count with me.**
Students	1, 2, 3, 4, 5, 6.
Teacher	**So, we showed -6. What number did we show?**
Students	-6_.
Teacher	**Excellent! Using the positive and negative mat helps you show positive and negative integers. How can you use the mat to show integers?**
Students	You use the cubes and place positive integers on the positive side of the mat. You use the cubes and place negative integers on the negative side of the mat.

D. Problems for Use During Instruction

See Module 17 Problem Sets.

E. Vocabulary Cards for Use During Instruction

See Module 17 Vocabulary Cards.

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Module 17:

Integers

Problem Sets

A. Positive integers (30)
B. Negative integers (30)

A.

3

A.

26

A.

10

A.

4

A.

14

A.

24

A.

9

A.

15

A.

2

A.

13

A.

17

A.

5

A.

19

A.

16

A.

12

A.

29

A.

20

A.

1

A.

18

A.

27

A.

25

A.

6

A.

11

A.

22

A.

28

A.

23

A.

8

A.

0

A.

21

A.

7

B.

-5

B.

-8

B.

-25

B.

-14

B.

-11

B.

-19

B.

-16

B.

-21

B.

-6

B.

-2

B.

-13

B.

-23

B.

-7

B.

-1

B.

-20

B.

-9

B.

-26

B.

-17

B.

-27

B.

-15

B.

-30

B.

-10

B.

-28

B.

-3

B.

-29

B.

-24

B.

-12

B.

-22

B.

-18

B.

-4

Module 17:

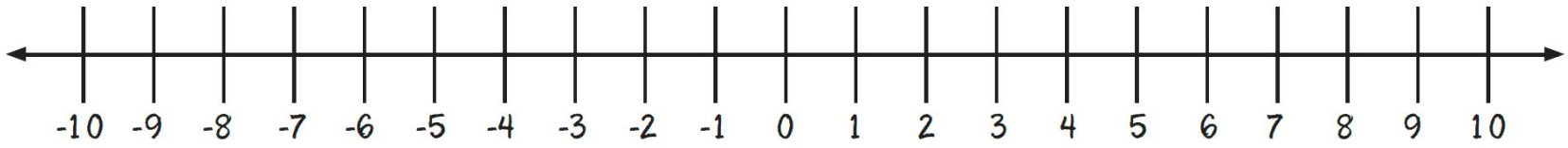
Integers

Vocabulary Cards

absolute value
integer
negative number
number line
opposites
positive number
zero pair

absolute value

The distance of a number from 0 on a number line.



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integer

A positive or negative whole number.

-3 -2 -1 1 2 3

negative number

Any number less than 0.

-3 -2 -1

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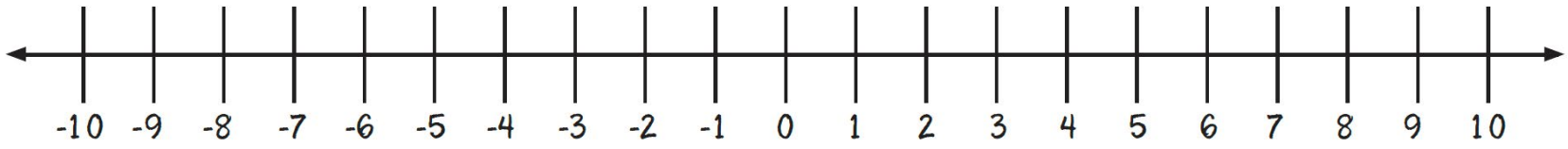
number line

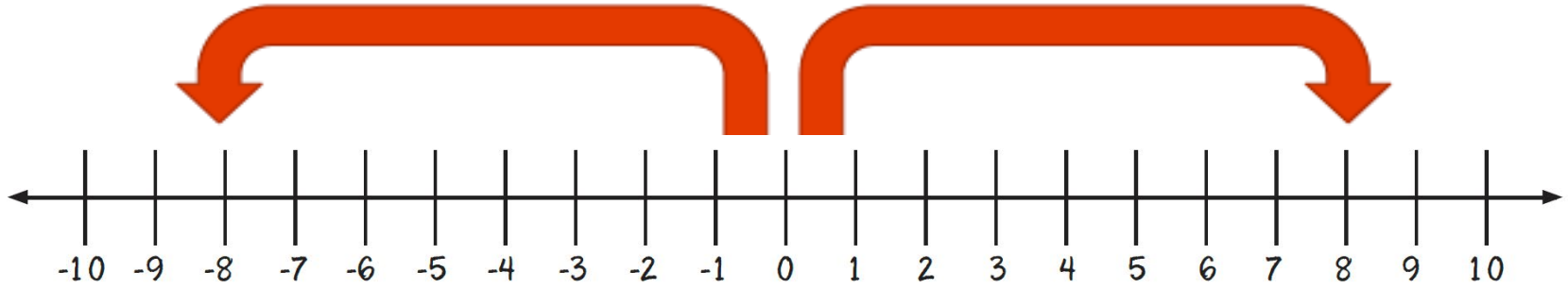
A straight line with numbers placed at equal intervals along its length.



opposites

Two numbers that are equal distance from 0 on a number line.

-8 and 8 are opposites



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positive number

Any number greater than 0.

1 2 3

zero pair

A pair of numbers with a sum of 0.

$$-7 + 7 = 0$$