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 5

Addition of Whole Numbers

Module 5: Addition of Whole Numbers
Mathematics Routines

A. Important Vocabulary with Definitions

Term	Definition
add/addition	To put amounts together to find the sum or to increase a set.
addend	Any numbers that are added together.
algorithm	A procedure or description of steps that can be used to solve a problem.
computation	The action used to solve a problem.
equal sign	The symbol that tells you that two sides of an equation are the same, balanced, or equal.
hundreds column	The column with digits in the hundreds place.
join	To add to an existing set.
ones column	The column with digits in the ones place.
plus sign	The symbol that tells you to add.
regroup/trade/exchange	The process of exchanging 10 ones for 1 ten, 10 tens for 1 hundred, 10 hundreds for 1 thousand, etc.
sum	The result of adding two or more numbers or the total number when you combine sets.
tens column	The column with digits in the tens place.
together	To combine sets or numbers.

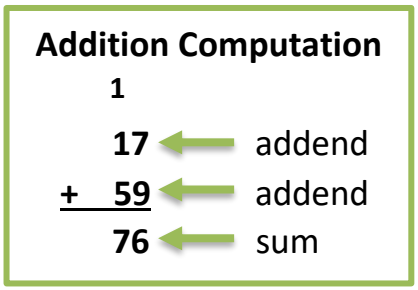
B. Background Information

If your focus is on the conceptual understanding of addition, see *Module 4: Concepts of Addition*. This module, *Module 5*, focuses on addition computation of whole numbers. As you focus on computation, continue to emphasize addition as combining and addition as joining to a set because students will see these concepts within word problems.

For learning computation with addition, we recommend presenting problems vertically. Some students may require explicit instruction on translating a horizontal problem (e.g., 17 + 59) to the vertical presentation (see below). Depending upon the algorithm, leave enough space above or below the problem for students to complete their written work.

Every student should develop efficiency with an addition computation strategy. In the following sections, we provide examples of (1) addition with a traditional algorithm – no regrouping, (2) addition

with a traditional algorithm – regrouping, and (3) addition with a partial sums algorithm. Teachers should understand both the traditional and partial sums algorithms and help students develop competency with at least one algorithm.



C. Routines and Examples

(1) Addition with Traditional Algorithm – No Regrouping

Routine

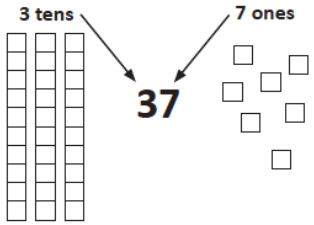
Materials:

- Module 5 Problem Sets
- Module 5 Vocabulary Cards
    - If necessary, review Vocabulary Cards before teaching
- A hands-on tool or manipulative like Base-10 blocks or unifix cubes
    - Note that drawings can be used alongside or instead of manipulatives

2-DIGIT + 2-DIGIT: ROUTINE WITH MANIPULATIVES

Teacher	**Let's work on addition. What does it mean to add?**
Students	To put together or to join to a set.
Teacher	**Addition means to put together or to join to a set. Look at this problem.** (Show problem.)
Teacher	**First, I see a plus sign** (point). **The plus sign tells us to add. What does the plus sign mean?**
Students	To add.
Teacher	**Let's do this problem with Base-10 blocks.** (Move Base-10 blocks to workspace.)
Teacher	**With our Base-10 blocks, the rods represent tens. What do the rods represent?**
Students	Tens.
Teacher	**With our Base-10 blocks, the units represent ones. What do the units represent?**
Students	Ones.
Teacher	**Our first addend is __. What's our first addend?**
Students	__.

Teacher **Let's show this addend by showing __ tens and __ ones.**
(Show with Base-10 blocks.)



Teacher **How many?**
Students __.
Teacher **Our second addend is __. What's our second addend?**
Students __.
Teacher **Let's show the second addend by showing __ tens and __ ones.**
(Show with Base-10 blocks. Place Base-10 blocks under the first addend.)
Teacher **How many?**
Students __.
Teacher **So, we have __ plus __. Let's add by combining. What does combining mean?**
Students To put together.
Teacher **Yes. Let's combine or put together. First, let's combine the ones. That means we put all the ones together.**
(Move two sets of ones together.)
Teacher **Let's count to learn the sum of the ones.**
(Count ones.)
Teacher **How many ones are there in total or altogether?**
Students __.
Teacher **Yes! There are __ ones. If we have more than 9 ones, we have to regroup. With addition, we regroup 10 ones for 1 ten. Do we have more than 9 ones?**
Students No.
Teacher **We don't have more than 9 ones, so we don't have to regroup. Now, let's combine the tens. That means we put all the tens together.**
(Move two sets of tens together.)
Teacher **How many tens are there in total or altogether?**
Students __.
Teacher **There are __ tens. If we have more than 9 tens, we have to regroup. Do we have more than 9 tens?**
Students No.
Teacher **We don't have more than 9 tens, so we don't have to regroup. So, let's count the tens and ones to learn the sum. Ready?**
(Count the tens, then count the ones.)
Teacher **That means __ plus __ equals __. Let's say that together.**
Students __ plus __ equals __.
Teacher **Let's say it together again.**
Students __ plus __ equals __.

Teacher	**So, if you have a set of __ and a set of __, when you combine (or put together) the sets, the sum is __. __ plus __ equals __. Let's review. What's an addend?**
Students	One of the sets or numbers added together in an addition problem.
Teacher	**What's a sum?**
Students	The total number when you combine sets, or the result of adding two or more numbers together.
Teacher	**How could you explain solving this problem to a friend?**
Students	We started by showing each addend. Then, we added the ones. We did not have to regroup. Then, we added the tens. We did not have to regroup. The sum was the total of tens and ones.

2-DIGIT + 2-DIGIT: ROUTINE WITHOUT MANIPULATIVES

Teacher	**Let's work on addition. What does it mean to add?**
Students	To put together or to join to a set.
Teacher	**Addition means to put together or to join to a set. Look at this problem.** (Show problem.)
Teacher	**First, I see a plus sign** (point). **The plus sign tells us to add. What does the plus sign mean?**
Students	To add.
Teacher	**Let's do this problem with our pencil. First, when I see a problem like this that requires computation, I like to draw vertical lines to separate the ones from the tens. Let's draw a vertical line between the ones column and the tens column.** (Draw vertical lines to separate place value columns.)
Teacher	**Now, we start by adding the ones. What should we add first?**
Students	The ones.
Teacher	**Which ones do we add?**
Students	__ plus __.
Teacher	**What's __ plus __?** (If a student has difficulty with addition, say: **Start with the greater addend. Place that number in your fist, and let's count up __ more. Ready? __: __, __, __.** See Counting Up poster at the end of Module 4 for more information.)
Teacher	**How many ones are there in total or altogether?**
Students	__.
Teacher	**Yes! There are __ ones. If we have more than 9 ones, we have to regroup. Do we have more than 9 ones?**
Students	No.
Teacher	**We don't have more than 9 ones, so we don't have to regroup. Let's write the ones below the equal line.** (Writes.)
Teacher	**Now, let's add the tens. Which tens do we add?**

Students	__ plus __.
Teacher	**What's __ plus __?** (If a student has difficulty with addition, say: **Start with the greater addend. Place that number in your fist, and let's count up __ more. Ready? __: __, __, __.** See Counting Up poster at the end of Module 4 for more information.)
Teacher	**How many tens are there in total or altogether?**
Students	__.
Teacher	**There are __ tens. If we have more than 9 tens, we have to regroup. Do we have more than 9 tens?**
Students	No.
Teacher	**We don't have more than 9 tens, so we don't have to regroup. Let's write the tens below the equal line.** (Write.)
Teacher	**So, what's __ plus __?**
Students	__.
Teacher	**That's right. __ plus __ equals __. Let's say that together.**
Students	__ plus __ equals __.
Teacher	**So, if you have a set of __ and a set of __, when you combine (or join) the sets, the sum is __. __ plus __ equals __. Let's review. What's an addend?**
Students	One of the sets or numbers added together in an addition problem.
Teacher	**What's a sum?**
Students	The total number when you combine sets, or the result of adding two or more numbers together.
Teacher	**How could you explain solving this problem to a friend?**
Students	First, we combined the ones. Then, we combined the tens. The sum is the total number of tens and ones.

Example

$$\begin{array}{r} 224 \\ +\ 63 \\ \hline 287 \end{array}$$

3-DIGIT + 2-DIGIT: EXAMPLE WITHOUT MANIPULATIVES

Teacher	**Let's work on addition. What does it mean to add?**
Students	To put together or to join to a set.
Teacher	**Addition means to put together or to join to a set. Look at this problem.** (Show problem.)
Teacher	**First, I see a plus sign** (point). **The plus sign tells us to add. What does the plus sign mean?**
Students	To add.

Teacher	**Let's do this problem with our pencil. First, when I see a problem like this that requires computation, I like to draw vertical lines to separate the ones from the tens and the tens from the hundreds. Let's draw a vertical line between the ones column and the tens column. Then, draw a vertical line between the tens column and the hundreds column.** (Draw vertical lines to separate place value columns.)
Teacher	**Now, we start by adding the ones. What should we add first?**
Students	The ones.
Teacher	**Which ones do we add?**
Students	4 plus 3.
Teacher	**What's 4 plus 3?** (If a student has difficulty with addition, say: **Start with the greater addend. Place that number in your fist, and let's count up 3 more. Ready? 4: 5, 6, 7.** See Counting Up poster at the end of Module 4 for more information.)
Teacher	**How many ones are there in total or altogether?**
Students	7.
Teacher	**Yes! There are 7 ones. If we have more than 9 ones, we have to regroup. Do we have more than 9 ones?**
Students	No.
Teacher	**We don't have more than 9 ones, so we don't have to regroup. Let's write the ones below the equal line in the one place.** (Write.)
Teacher	**Now, let's add the tens. Which tens do we add?**
Students	2 plus 6.
Teacher	**What's 2 plus 6?** (If a student has difficulty with addition, say: **Start with the greater addend. Place that number in your fist, and let's count up 2 more. Ready? 6: 7, 8.** See Counting Up poster at the end of Module 4 for more information.)
Teacher	**How many tens are there in total or altogether?**
Students	8.
Teacher	**There are 8 tens. If we have more than 9 tens, we have to regroup. Do we have more than 9 tens?**
Students	No.
Teacher	**We don't have more than 9 tens, so we don't have to regroup. Let's write the tens below the equal line in the tens place.** (Write.)
Teacher	**Now, let's add the hundreds. Which hundreds do we add?**
Students	2.
Teacher	**Yes. There's only 2 in the hundreds column. We can think of this as 2 plus 0 or 2. Let's write the hundreds below the equal line in the hundreds place.** (Write.)
Teacher	**So, let's look at our sum. What's 224 plus 63?**
Students	287.
Teacher	**That's right. 224 plus 63 equals 287. Let's say that together.**

Students	224 plus 63 equals 287.
Teacher	**So, if you have a set of 224 and a set of 63, when you combine (or join) the sets, the sum is 287. Let's review. What's an addend?**
Students	One of the sets or numbers added together in an addition problem.
Teacher	**What's a sum?**
Students	The total number when you combine sets, or the result of adding two or more numbers together.
Teacher	**How could you explain solving this problem to a friend?**
Students	First, we combined the ones. Then, we combined the tens. Then, we added the hundreds. The sum is the total number of hundreds, tens, and ones.

(2) Addition with Traditional Algorithm – Regrouping

Routine

Materials:

- Module 5 Problem Sets
- Module 5 Vocabulary Cards
  - If necessary, review Vocabulary Cards before teaching
- A hands-on tool or manipulative like Base-10 blocks or unifix cubes
  - Note that drawings can be used alongside or instead of manipulatives

2-DIGIT + 2-DIGIT: ROUTINE WITH MANIPULATIVES

Teacher	**Let's work on addition. What does it mean to add?**
Students	To put together or to join to a set.
Teacher	**Addition means to put together or to join to a set. Look at this problem.** (Show problem.)
Teacher	**First, I see a plus sign** (point). **The plus sign tells us to add. What does the plus sign mean?**
Students	To add.
Teacher	**Let's do this problem with Base-10 blocks.** (Move Base-10 blocks to workspace.)
Teacher	**With our Base-10 blocks, the rods represent tens. What do the rods represent?**
Students	Tens.
Teacher	**With our Base-10 blocks, the units represent ones. What do the units represent?**
Students	Ones.
Teacher	**Our first addend is __. What's our first addend?**
Students	__.
Teacher	**Let's show this addend by showing __ tens and __ ones.** (Show with Base-10 blocks.)
Teacher	**How many?**

Students __.

Teacher **Our second addend is __. What's our second addend?**

Students __.

Teacher **Let's show the second addend by showing __ tens and __ ones.**

(Show with Base-10 blocks. Place Base-10 blocks under the second addend.)

Teacher **How many?**

Students __.

Teacher **So, we have __ plus __. Let's add by combining. What does combining mean?**

Students To put together.

Teacher **Yes. Let's combine or put together. First, let's combine the ones. That means we put all the ones together.**

(Move two sets of ones together.)

Teacher **Let's count to learn the sum of the ones.**

(Count ones.)

Teacher **How many ones are there in total or altogether?**

Students __.

Teacher **Yes! There are __ ones. If we have more than 9 ones, we have to regroup. Do we have more than 9 ones?**

Students Yes.

Teacher **We have more than 9 ones. That means we have to regroup. To regroup, we count 10 ones and regroup/trade/exchange the 10 ones for 1 ten. Let's do that together. Let's count out 10 ones.**

(Count 10 ones.)

Teacher **Let's regroup/trade/exchange the 10 ones for 1 ten. See how 1 ten is the same as 10 ones?**

Students Yes.

Teacher **We leave the remaining ones here. But we can't put this 1 ten in the ones place. The ones place is only for ones. So, we place the 1 ten in the tens column. I like to place the 1 ten above the other tens.**

(Place 1 ten above tens column.)

Teacher **Now, let's combine the tens. That means we put all the tens together.**

(Move sets of tens together.)

Teacher **How many tens are there in total or altogether?**

Students __.

Teacher **There are __ tens. If we have more than 9 tens, we have to regroup. Do we have more than 9 tens?**

Students No.

Teacher **So, let's count the tens and ones to learn the sum. Ready?**

(Count the tens, then count the ones.)

Teacher **That means __ plus __ equals __. Let's say that together.**

Students __ plus __ equals __.

Teacher **Let's say it together again.**

Students __ plus __ equals __.

Teacher	**So, if you have a set of __ and a set of __, when you combine (or put together) the sets, the sum is __. __ plus __ equals __. Let's review. What's an addend?**
Students	One of the sets or numbers added together in an addition problem.
Teacher	**What's a sum?**
Students	The total number when you combine sets, or the result of adding two or more numbers together.
Teacher	**What does it mean to regroup/trade/exchange?**
Students	You can regroup/trade/exchange 10 ones for 1 ten.
Teacher	**How could you explain solving this problem to a friend?**
Students	We started by showing each addend. Then, we combined the ones. We regrouped 10 ones for 1 ten. Then, we combined the tens. The sum was the total number of tens and ones.

2-DIGIT + 2-DIGIT: ROUTINE WITHOUT MANIPULATIVES

Teacher	**Let's work on addition. What does it mean to add?**
Students	To put together or to join to a set.
Teacher	**Addition means to put together or to join to a set. Look at this problem.** (Show problem.)
Teacher	**First, I see a plus sign** (point). **The plus sign tells us to add. What does the plus sign mean?**
Students	To add.
Teacher	**Let's do this problem with our pencil. First, when I see a problem like this that requires computation, I like to draw vertical lines to separate the ones from the tens. Let's draw a vertical line between the ones column and the tens column.** (Draw vertical lines to separate place value columns.)
Teacher	**Now, we start by adding the ones. What should we add first?**
Students	The ones.
Teacher	**Which ones do we add?**
Students	__ plus __.
Teacher	**What's __ plus __?** (If a student has difficulty with addition, say: **Start with the greater addend. Place that number in your fist, and let's count up __ more. Ready? __: __, __, __.** See Counting Up poster at the end of Module 4 for more information.)
Teacher	**How many ones are there in total or altogether?**
Students	__.
Teacher	**Yes! There are __ ones. If we have more than 9 ones, we have to regroup. Do we have more than 9 ones?**
Students	Yes.

Teacher	**We have more than 9 ones. That means we have to regroup. We think of our ones sum as 1 ten and __ ones. We write the ones in the ones column under the equal line.**
	(Write ones under equal line.)
Teacher	**We regroup the 1 ten to the tens column. We write the 1 ten in the tens column above the other tens.**
	(Write 1 above tens column.)
Teacher	**Now, let's add the tens. Which tens do we add?**
Students	__ plus __ plus __.
Teacher	**What's __ plus __ plus __?**
Students	__.
Teacher	**How many tens are there in total or altogether?**
Students	__.
Teacher	**There are __ tens. If we have more than 9 tens, we have to regroup. Do we have more than 9 tens?**
Students	No.
Teacher	**Let's write the tens below the equal line in the tens column.**
	(Write.)
Teacher	**So, let's look at the problem. What's __ plus __?**
Students	__.
Teacher	**That's right. __ plus __ equals __. Let's say that together.**
Students	__ plus __ equals __.
Teacher	**So, if you have a set of __ and a set of __, when you combine (or join) the sets, the sum is __. __ plus __ equals __. Let's review. What's an addend?**
Students	One of the sets or numbers added together in an addition problem.
Teacher	**What's a sum?**
Students	The total number when you combine sets, or the result of adding two or more numbers together.
Teacher	**What does it mean to regroup/trade/exchange?**
Students	You can regroup/trade/exchange 10 ones for 1 ten.
Teacher	**How could you explain solving this problem to a friend?**
Students	First, we combined the ones. We regrouped 10 ones for 1 ten. Then, we combined the tens. The sum was the total number of tens and ones.

Example

$$\begin{array}{r} 153 \\ +\ 79 \\ \hline 232 \end{array}$$

3-DIGIT + 2-DIGIT: EXAMPLE WITHOUT MANIPULATIVES

Teacher	**Let's work on addition. What does it mean to add?**
Students	To put together or to join to a set.

Teacher	**Addition means to put together or to join to a set. Look at this problem.** (Show problem.)
Teacher	**First, I see a plus sign** (point). **The plus sign tells us to add. What does the plus sign mean?**
Students	To add.
Teacher	**Let's do this problem with our pencil. First, when I see a problem like this that requires computation, I like to draw vertical lines to separate the ones from the tens and the tens from the hundreds. Let's draw a vertical line between the ones column and the tens column. Then, let's draw a vertical line between the tens column and the hundreds column.** (Draw vertical lines to separate place value columns.)
Teacher	**Now, we start by adding the ones. What should we add first?**
Students	The ones.
Teacher	**Which ones do we add?**
Students	3 plus 9.
Teacher	**What's 3 plus 9?** (If a student has difficulty with addition, say: **Start with the greater addend. Place that number in your fist, and let's count up 3 more. Ready? 9: 10, 11, 12.** See Counting Up poster in Module 4 for more information.)
Teacher	**How many ones are there in total or altogether?**
Students	12.
Teacher	**Yes! There are 12 ones. If we have more than 9 ones, we have to regroup. Do we have more than 9 ones?**
Students	Yes.
Teacher	**We have more than 9 ones. That means we have to regroup. We think of our ones sum as 1 ten and 2 ones. We write the 2 in the ones column under the equal line.** (Write ones under equal line.)
Teacher	**We regroup the 1 ten to the tens column. We write the 1 ten in the tens column above the other tens.** (Write 1 above tens column.)
Teacher	**Now, let's add the tens. Which tens do we add?**
Students	1 plus 5 plus 7.
Teacher	**That's right. Don't forget to add the 1 ten you just regrouped. What's 1 plus 5 plus 7?**
Teacher	**How many tens are there in total or altogether?**
Students	13.
Teacher	**There are 13 tens. If we have more than 9 tens, we have to regroup. Do we have more than 9 tens?**
Students	Yes.
Teacher	**We have 13 tens. That means we have to regroup. We think of our tens sum as 1 hundred and 3 tens. 13 tens is the same as 1 hundred and 3 tens. We write the 3 in the tens column under the equal line.** (Write tens under equal line.)

Teacher	**We regroup the 1 hundred to the hundreds column. We write the 1 hundred in the hundreds column above the other hundreds.** (Write 1 above hundreds column.)
Teacher	**Let's add the hundreds. Which hundreds do we add?**
Students	1 plus 1.
Teacher	**That's right! Don't forget to add the 1 hundred you just regrouped. What's 1 plus 1?**
Students	2.
Teacher	**How many hundreds are there in total or altogether?**
Students	2.
Teacher	**If you have more than 9 hundreds, we have to regroup. Do we have more than 9 hundreds?**
Students	No.
Teacher	**We don't have to regroup. Let's just write 2 under the equal line.** (Write hundreds under equal line.)
Teacher	**So, let's look at the problem. What's 153 plus 79?**
Students	232.
Teacher	**That's right. 153 plus 79 equals 232. Let's say that together.**
Students	153 plus 79 equals 232.
Teacher	**Let's review. What's an addend?**
Students	One of the sets or numbers added together in an addition problem.
Teacher	**What's a sum?**
Students	The total number when you combine sets, or the result of adding two or more numbers together.
Teacher	**What does it mean to regroup/trade/exchange?**
Students	You can regroup/trade/exchange 10 ones for 1 ten.
Teacher	**How could you explain solving this problem to a friend?**
Students	First, we combined the ones. We regrouped 10 ones for 1 ten. Then, we combined the tens. We regrouped 10 tens for 1 hundred. Then, we added the hundreds. The sum was the total of hundreds, tens, and ones.

(3) Addition with Partial Sums Algorithm

Routine

Materials:

- Module 5 Problem Sets
- Module 5 Vocabulary Cards
    - If necessary, review Vocabulary Cards before teaching
- A hands-on tool or manipulative like Base-10 blocks or unifix cubes
    - Note that drawings can be used alongside or instead of manipulatives

2-DIGIT + 2-DIGIT: ROUTINE WITH MANIPULATIVES

Teacher	**Let's work on addition. What does it mean to add?**
Students	To put together or to join to a set.
Teacher	**Addition means to put together or to join to a set. Look at this problem.** (Show problem.)
Teacher	**First, I see a plus sign** (point). **The plus sign tells us to add. What does the plus sign mean?**
Students	To add.
Teacher	**Let's do this problem with Base-10 blocks.** (Move Base-10 blocks to workspace.)
Teacher	**With our Base-10 blocks, the rods represent tens. What do the rods represent?**
Students	Tens.
Teacher	**With our Base-10 blocks, the units represent ones. What do the units represent?**
Students	Ones.
Teacher	**Our first addend is __. What's our first addend?**
Students	__.
Teacher	**Let's show this addend by showing __ tens and __ ones.** (Show with Base-10 blocks.)
Teacher	**How many?**
Students	__.
Teacher	**Our second addend is __. What's our second addend?**
Students	__.
Teacher	**Let's show the second addend by showing __ tens and __ ones.** (Show with Base-10 blocks. Place Base-10 blocks under the first addend.)
Teacher	**How many?**
Students	__.
Teacher	**So, we have __ plus __. Let's add by combining the partial sums. What does combining mean?**
Students	To put together.
Teacher	**Yes. Let's combine or put together. First, let's combine the tens. This will be our first partial sum. It's the sum for part of the problem. Adding the tens means we put all the tens together.** (Move two sets of tens together.)
Teacher	**Let's count to learn the sum of the tens.** (Count tens.)
Teacher	**How many tens are there in total or altogether?**
Students	__.
Teacher	**This __ is one of our partial sums. It's the sum of the tens. Now, let's combine the ones. That means we put all the ones together.** (Move ones together.)
Teacher	**How many ones are there in total or altogether?**
Students	__.

Teacher	**This __ is one of our partial sums. It's the sum of the ones. To determine the total sum, we add __ plus __.**
	(Start with tens and add ones.)
Teacher	**That means __ plus __ equals __. Let's say that together.**
Students	__ plus __ equals __.
Teacher	**Let's say it together again.**
Students	__ plus __ equals __.
Teacher	**So, if you have a set of __ and a set of __, when you combine (or put together) the sets, the sum is __. __ plus __ equals __. Let's review. What's an addend?**
Students	One of the sets or numbers added together in an addition problem.
Teacher	**What's a sum?**
Students	The total number when you combine sets, or the result of adding two or more numbers together.
Teacher	**How could you explain solving this problem to a friend?**
Students	We started by showing each addend. Then, we combined the tens. Then, we combined the ones. We added the partial sums of the tens and ones. The sum was the total number of tens and ones.

2-DIGIT + 2-DIGIT: ROUTINE WITHOUT MANIPULATIVES

Teacher	**Let's work on addition. What does it mean to add?**
Students	To put together or to join to a set.
Teacher	**Addition means to put together or to join to a set. Look at this problem.**
	(Show problem.)
Teacher	**First, I see a plus sign** (point). **The plus sign tells us to add. What does the plus sign mean?**
Students	To add.
Teacher	**Let's do this problem with our pencil. First, when I see a problem like this that requires computation, I like to draw a vertical line to separate the ones from the tens. Let's draw a vertical line between the ones column and the tens column.**
	(Draw vertical lines to separate place value columns.)
Teacher	**Today, let's use the partial sums strategy. With the partial sum strategy, we add the tens then we add the ones. Then, we add the partial sums from the tens and ones together. Now, we start by adding the greatest place value in the problem - the tens. What should we add first?**
Students	The tens.
Teacher	**Which tens do we add?**
Students	__ plus __.
Teacher	**What's __ plus __?**
	(If a student has difficulty with addition, say: **Start with the greater addend. Place that number in your fist, and let's count up __ more. Ready? __: __, __, __.** See Counting Up poster at the end of Module 4 for more information.)

Teacher	**How many tens are there in total or altogether?**
Students	__.
Teacher	**So, let's write __ under the equal line.** (Write tens.)
Teacher	**Now, let's add the ones. Which ones do we add?**
Students	__ plus __.
Teacher	**What's __ plus __?** (If a student has difficulty with addition, say: **Start with the greater addend. Place that number in your fist, and let's count up __ more. Ready? __: __, __, __.** See Counting Up poster at the end of Module 4 for more information.)
Teacher	**How many ones are there in total or altogether?**
Students	__.
Teacher	**So, let's write __ under the equal line.** (Write ones.)
Teacher	**Now, let's add the partial sums. What's __ plus __?**
Students	__.
Teacher	**That's right. __ plus __ equals __. Let's write the total sum.**
Students	(Writes sum.)
Teacher	**So, if you have a set of __ and a set of __, when you combine (or join) the sets, the sum is __. __ plus __ equals __. Let's review. What's an addend?**
Students	One of the sets or numbers added together in an addition problem.
Teacher	**What's a sum?**
Students	The total number when you combine sets, or the result of adding two or more numbers together.
Teacher	**How could you explain solving this problem to a friend?**
Students	We combined the tens. Then, we combined the ones. We added the partial sums of the tens and ones. The sum was the total number of tens and ones.

Example

$$\begin{array}{r} 259 \\ +\ 75 \\ \hline 334 \end{array}$$

3-DIGIT + 2-DIGIT: EXAMPLE WITHOUT MANIPULATIVES

Teacher	**Let's work on addition. What does it mean to add?**
Students	To put together or to join to a set.
Teacher	**Addition means to put together or to join to a set. Look at this problem.** (Show problem.)
Teacher	**First, I see a plus sign** (point). **The plus sign tells us to add. What does the plus sign mean?**
Students	To add.

Teacher	**Let's do this problem with our pencil. First, when I see a problem like this that requires computation, I like to draw vertical lines to separate the ones from the tens and the tens from the hundreds. Let's draw a vertical line between the ones column and the tens column. Then, let's draw a vertical line between the tens column and the hundreds column.**
	(Draw vertical lines to separate place value columns.)
Teacher	**Today, let's use the partial sums strategy. We'll add the hundreds to determine a partial sum. Then, we'll add the tens to determine a partial sum. Then, we'll add the ones to determine a partial sum. To calculate the total sum, we add all the partial sums. What's this strategy called?**
Students	Partial sums.
Teacher	**Now, we start the partial sums strategy by adding the greatest place value. What should we add first?**
Students	The hundreds
Teacher	**Which hundreds do we add?**
Students	200 plus 0 hundreds.
Teacher	**We have 200 added to 0 hundreds. What's 200 plus 0?**
Students	200.
Teacher	**So, let's write 200 under the equal line. Make sure to place the 2 in the hundreds column, the 0 in the tens column, and the other 0 in the ones column.**
	(Write 200.)
Teacher	**200 is the partial sum when you add the hundreds. Now, let's add the tens. Which tens do we add?**
Students	50 plus 70.
Teacher	**That's right. We had 50 plus 70. 5 tens is 50 and 7 tens is 70. What's 50 plus 70?**
Students	120.
Teacher	**120 is how many hundreds, tens, and ones?**
Students	1 hundred, 2 tens, and 0 ones.
Teacher	**So, write 1 hundred, 2 tens, and 0 ones below the 200.**
	(Write 120.)
Teacher	**120 is the partial sum when you add the tens. Now, let's add the ones. Which ones do we add?**
Students	9 plus 5.
Teacher	**What's 9 plus 5?**
Students	14.
Teacher	**14 is how many tens and ones?**
Students	1 ten and 4 ones.
Teacher	**Let's write 1 tens and 4 ones below the 120.**
	(Write 14.)
Teacher	**Now, let's add the partial sums. Let's add in steps. What's 200 plus 120?**
Students	320.
Teacher	**Then, what's 320 plus 14?**

Students	334.
Teacher	**That's right. 200 plus 120 plus 14 equals 334. That's the total sum!**
Students	(Write 334.)
Teacher	**So, if you have a set of 259 and a set of 75, when you combine (or join) the sets, the sum is 334. 259 plus 75 is 334. Let's review. What's an addend?**
Students	One of the sets or numbers added together in an addition problem.
Teacher	**What's a sum?**
Students	The total number when you combine sets, or the result of adding two or more numbers together.
Teacher	**How could you explain solving this problem to a friend?**
Students	We added the hundreds. Then, we added the tens. Then, we added the ones. We added the partial sums of the hundreds, tens, and ones. The sum was the total of the partial sums.

D. Problems for Use During Instruction

See Module 5 Problem Sets.

E. Vocabulary Cards for Use During Instruction

See Module 5 Vocabulary Cards.

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Module 5:
Addition of Whole Numbers

Problem Sets

A. Two-digit numbers without regrouping (20)
B. Two-digit numbers with regrouping (20)
C. Three-digit numbers without regrouping (10)
D. Three-digit numbers with regrouping (10)
E. Three- and two-digit numbers without regrouping (5)
F. Three- and two-digit numbers with regrouping (5)
G. Two- and one-digit numbers without regrouping (5)
H. Two- and one-digit numbers with regrouping (5)

A.

$$\begin{array}{r} 52 \\ +\ 32 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 46 \\ +\ 51 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 42 \\ +\ 12 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 53 \\ +\ 31 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 82 \\ +\ 11 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 35 \\ +\ 22 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 25 \\ +\ 33 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 48 \\ +\ 20 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 30 \\ +\ 18 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 60 \\ +\ 19 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 87 \\ +\ 10 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 11 \\ +\ 56 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 10 \\ +\ 66 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 65 \\ +\ 12 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 70 \\ +\ 17 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 29 \\ +\ 10 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 11 \\ +\ 36 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 39 \\ +\ 50 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 46 \\ +\ 42 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 22 \\ +\ 33 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 15 \\ +\ 89 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 52 \\ +\ 78 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 74 \\ +\ 67 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 97 \\ +\ 56 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 84 \\ +\ 36 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 54 \\ +\ 88 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 98 \\ +\ 93 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 19 \\ +\ 92 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 43 \\ +\ 67 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 54 \\ +\ 57 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 44 \\ +\ 78 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 48 \\ +\ 92 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 39 \\ +\ 47 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 74 \\ +\ 96 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 44 \\ +\ 88 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 91 \\ +\ 39 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 62 \\ +\ 69 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 67 \\ +\ 77 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 56 \\ +\ 29 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 44 \\ +\ 66 \\ \hline \end{array}$$

c.

$$\begin{array}{r} 854 \\ +130 \\ \hline \end{array}$$

c.

$$\begin{array}{r} 220 \\ +542 \\ \hline \end{array}$$

c.

$$\begin{array}{r} 226 \\ +633 \\ \hline \end{array}$$

c.

$$\begin{array}{r} 731 \\ +241 \\ \hline \end{array}$$

c.

$$\begin{array}{r} 320 \\ +\ 139 \\ \hline \end{array}$$

c.

$$\begin{array}{r} 395 \\ +\,103 \\ \hline \end{array}$$

c.

$$\begin{array}{r} 151 \\ +313 \\ \hline \end{array}$$

c.

$$\begin{array}{r} 703 \\ +\,202 \\ \hline \end{array}$$

c.

$$\begin{array}{r} 117 \\ +120 \\ \hline \end{array}$$

c.

$$\begin{array}{r} 100 \\ +\,490 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 967 \\ +244 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 134 \\ +519 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 806 \\ +\,586 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 888 \\ +453 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 656 \\ +615 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 267 \\ +155 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 338 \\ +374 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 792 \\ +638 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 897 \\ +565 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 907 \\ +\,444 \\ \hline \end{array}$$

E.

$$\begin{array}{r} 965 \\ +\ 30 \\ \hline \end{array}$$

E.

$$\begin{array}{r} 610 \\ +\ 43 \\ \hline \end{array}$$

E.

$$\begin{array}{r} 700 \\ +\ 97 \\ \hline \end{array}$$

E.

$$\begin{array}{r} 418 \\ +\ 60 \\ \hline \end{array}$$

E.

$$\begin{array}{r} 506 \\ +\ 43 \\ \hline \end{array}$$

F.

$$\begin{array}{r} 409 \\ +\ 89 \\ \hline \end{array}$$

F.

$$\begin{array}{r} 527 \\ +\ 74 \\ \hline \end{array}$$

F.

$$\begin{array}{r} 326 \\ +\ 37 \\ \hline \end{array}$$

F.

$$\begin{array}{r} 256 \\ +\ 44 \\ \hline \end{array}$$

F.

$$\begin{array}{r} 945 \\ +\ 69 \\ \hline \end{array}$$

G.

$$\begin{array}{r} 11 \\ +\ 3 \\ \hline \end{array}$$

G.

$$\begin{array}{r} 76 \\ +\ \ 2 \\ \hline \end{array}$$

G.

$$\begin{array}{r} 83 \\ +\ \ 5 \\ \hline \end{array}$$

G.

$$\begin{array}{r} 37 \\ +\ \ 2 \\ \hline \end{array}$$

G.

$$\begin{array}{r} 24 \\ +\ \ 5 \\ \hline \end{array}$$

H.

$$\begin{array}{r} 16 \\ +\ \ 4 \\ \hline \end{array}$$

H.

$$\begin{array}{r} 25 \\ +\ 8 \\ \hline \end{array}$$

H.

$$\begin{array}{r} 46 \\ +\ \ 5 \\ \hline \end{array}$$

H.

$$\begin{array}{r} 58 \\ +\ 7 \\ \hline \end{array}$$

H.

$$\begin{array}{r} 83 \\ +\ 9 \\ \hline \end{array}$$

Module 5:

Addition of Whole Numbers

Vocabulary Cards

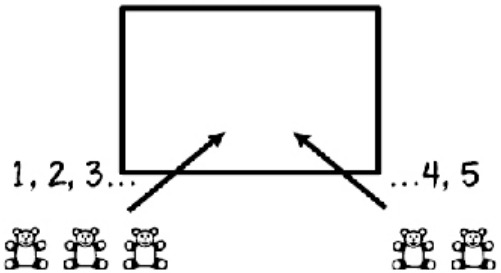
add/addition
addend
algorithm
computation
equal sign
hundreds column
join
ones column
plus sign
regroup/trade/exchange
sum
tens column
together

add/addition

To put amounts together to find the sum or to increase a set.

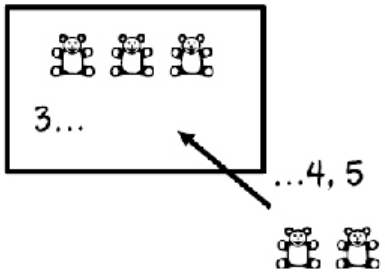
To put amounts together

3 + 2 = 5



To increase a set

3 + 2 = 5



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addend

Any numbers that are added together.

6 + 2 = 8

6 and 2 are addends

algorithm

A procedure or description of steps that can be used to solve a problem.

---

computation

The action used to solve a problem.

equal sign

The symbol that tells you that two sides of an equation are the same, balanced, or equal.

12 + 8 = 20

= is the equal sign

---

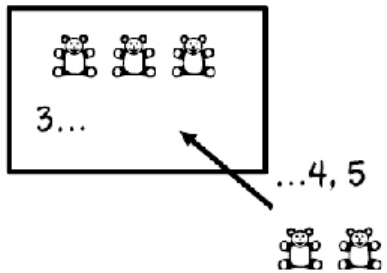
hundreds column

The column with digits in the hundreds place.

In the number 423, 4 is in the hundreds column.

join

To add to an existing set.



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ones column

The column with digits in the ones place.

In the number 423**, **3** is in the ones place.**

plus sign

The symbol that tells you to add.

5 + 4 = 9

+ is the plus sign

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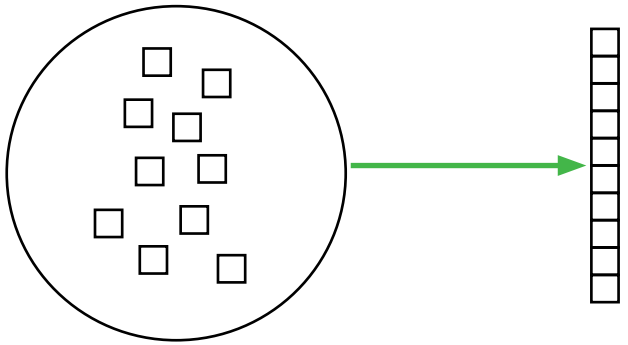
regroup/trade/exchange

The process of exchanging 10 ones for 1 ten, 10 tens for 1 hundred, 10 hundreds for 1 thousand, etc.



sum

The result of adding two or more numbers or the total number when you combine sets.

$$7 + 2 + 1 = 10$$

10 is the sum

---

tens column

The column with digits in the tens place.

In the number 423, 2 is the in the tens column.

together

To combine sets or numbers.