

Add Whole Numbers

KEY CONCEPTS

Mathematics Objective Add 3-digit numbers using place-value concepts and the standard algorithm.

Language Objective Describe, orally, the thought process when completing the standard algorithm for addition, including the reasoning behind performing each step and how place-value concepts are related.

Essential Understanding There is more than one way to add and subtract multi-digit whole numbers. The standard algorithms for addition and subtraction both use place value, starting with the ones, then the tens, and so on. Regrouping is done when needed.

COHERENCE

Look Back Previously, students learned place-value relationships.

This Lesson Students use place value and addition algorithms, such as the standard algorithm, to add 3-digit numbers.

Look Ahead Later, students will use their knowledge of place value and the standard algorithm to subtract 3-digit numbers.

BALANCE

Conceptual Understanding Students generalize an addition algorithm to use with 3-digit numbers. Throughout the lesson, place value is used as a starting point for deepened thought about addition algorithms, with final arrival at the standard algorithm for addition.

Procedural Skill Students rely on their knowledge of addition and estimation to add numbers with up to 3 digits. Students improve their fluency in addition as they solve problems that require regrouping.

New Vocabulary

algorithm, standard algorithm

Materials

- Place-value blocks (or Teaching Tool 37), optional

Student Resources

 Family Engagement

Intervention System (IS)

G10 Adding Three-Digit Numbers

G18 Adding Greater Numbers

Teacher Resources

Available at
Savvas Realize®

 Editable Lesson Plan

 Lesson Presentation Slides

 enVision on the Go: Planning Support



Texas Essential Knowledge and Skills (TEKS)

Number and operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. The student is expected to:

4.4A* add and subtract whole numbers and decimals to the hundredths place using the standard algorithm.

*Readiness Standard

Mathematical Process Standards

The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

4.1C select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.

4.1D communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.

4.1F analyze mathematical relationships to connect and communicate mathematical ideas.

Language Support

Think Aloud Use this activity with Box C of the Visual Learning to help students explain what they are thinking during each step of the standard algorithm for addition.

Begin by writing the problem on the board. As you complete each step using the standard algorithm, say out loud what you are thinking. Say:

First, I add the ones, which equals 15, so I have to regroup the 15 into a single ten and five ones. I place a 1 above the 5 in the equation.

Then, I add the tens which is the 5, the 7, and the 1 I wrote above. This equals 13 tens. I have to regroup.

Finally, I add the hundreds. 3 + 2 + 1 equals 6 hundreds. I write a 6 in the hundreds place to arrive at the answer.

Have students repeat this process using an example from the Practice and Problem Solving. Ask them to share their thinking out loud with a partner during each step of the standard algorithm.

Math Talk Available at Savvas Realize®

Number Strings

What is each number rounded to the nearest 10?

300 + 50 + 9

5 hundreds
17 ones

234

360, 520, 230

TEKS 4.2B, 4.2D Use anytime.

Number Sense Present a set of related math problems, one problem at a time, to students. For each problem, students first think about the problem and their solution strategy. Then they share their strategies and solutions. Represent student strategies and facilitate discussion about relationships within and between problems.

Exit Ticket

Formative Assessment

Name

Lesson 2-1
Exit Ticket

1. Choose the correct sum of 354 + 267.

A 501

B 621

C 611

D 113

2. Choose the correct sum of 183 + 697.

A 770

B 870

C 880

D 580

Have you met the lesson goals?

Math Goal

I can connect place value concepts to using addition algorithms.

I Can

With Help

Not Yet

Language Goal

I can tell the steps I have used to add numbers using the standard algorithm.

I Can

With Help

Not Yet

Teacher Answer Key

Assessment 1 of 1

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TEKS 4.4A, DOK 1, Math Process 4.1C

You can use the Assessment Sourcebook version or the auto-scored version at Savvas Realize®.

Use the Exit Ticket results to support students as needed by reminding them that they can use place value in combination with partial sums or the standard algorithm when adding 3-digit whole numbers. If students need additional assistance, complete the following example using each method.

724
+ 187

English Language Proficiency Standards (ELPS)

LISTENING 1E Demonstrate listening comprehension from information presented orally during formal and informal classroom interactions by restating, responding, paraphrasing, summarizing, or asking for clarification or additional details.

College and Career Readiness Standards (CCRS)*

I.A.2 Perform computations with rational and irrational numbers.

I.B.1 Use estimation to check for errors and reasonableness of solutions.

*Standards in **VII** Problem Solving and Reasoning, **VIII** Communication and Representation, and **IX** Connections are infused throughout the program.

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EP

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Step 1 Explore and Share | ENGAGE & EXPLORE



10-15 min



Explore and Share



Scout Observational Assessment

Name _____

Add Whole Numbers

I can ... connect place-value concepts to using addition algorithms.

TEKS 4.4A The student is expected to add and subtract whole numbers and decimals to the hundredths place using the standard algorithm. Mathematical Process Standards 4.1C, 4.1D, 4.1F

Let's Build

Lesson 2-1

Explore and Share

Students collect empty milk cartons to recycle. How many milk cartons were collected in the first two months? How many milk cartons were collected in all three months? **Solve this problem any way you choose.**



Select tools, such as drawings or place-value blocks, to help you add.



See margin for sample student work.

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Explore and Share



Formative Assessment

Purpose Investigate ways to add 3-digit whole numbers.

Materials Place-value blocks (or Teaching Tool 37), optional

Introduce WHOLE CLASS

Ask: Have you ever recycled cartons or plastic bottles?

How many did you collect?

Monitor, Select, and Sequence SMALL GROUP

Observe students at work.

- **What tools do students use to help them represent and solve the problem?** They might use a drawing or place-value blocks.
- **Which addition algorithms do students use to solve the problem?** They might use partial sums or the standard algorithm for addition. Alternatively, they may rely instead on only a drawing or model.

Look for solutions that use addition algorithms. If students use an addition algorithm to add 357, 243, and 468, ask: **How did place value help you when using addition algorithms?**

Select solutions for students to present. Show solutions that used visual models or place value blocks (Michael) before solutions that used algorithms (Taylor).

Early Finishers

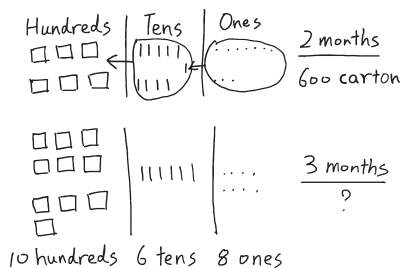
Ask: How many cartons were collected in only October and November? [711] Ask: How many were collected in only September and November? [825]

Connect WHOLE CLASS

Connect Solution Strategies Discuss students' work. Connect Taylor's use of partial sums with Michael's use of a drawing. Explain that both students use place-value understanding to help them reach their answer, but Taylor uses an addition algorithm while Michael does not.

Connect to the Visual Learning During the Visual Learning, connect to student work in Explore and Share. Be sure students understand that place-value concepts are helpful when using addition algorithms, such as partial sums and the standard algorithm.

Sample Student Work



Michael's Work

Michael used a drawing. He circled the blocks in the ones and tens columns. 10 ones is equal to 1 ten, so he circled it and moved it to the tens column. Then 10 tens is equal to 1 hundred, so he circled it and moved it to the hundreds column.

Two Months	Three Months
$\begin{array}{r} 357 \\ + 243 \\ \hline 10 \\ 90 \\ + 500 \\ \hline 600 \end{array}$	$\begin{array}{r} 600 \\ + 468 \\ \hline 8 \\ 60 \\ + 1000 \\ \hline 1,068 \end{array}$

Taylor's Work

Taylor used the partial sums addition algorithm and previous knowledge of place value. She added the number of cartons collected in November to the sum of the first two months.

Step 2 Visual Learning | EXPLAIN



5-10 min

Visual Learning Animation

Essential Question How Do You Add Whole Numbers Efficiently?

Visual Learning

A The students at Kennedy Elementary School collected paper to recycle. How many pounds of paper did they collect in all?
Add $358 + 277$.

Paper Collected	
Month	Pounds
March	358
April	277

B Add using partial sums.

$$\begin{array}{r} 358 \\ + 277 \\ \hline 15 \\ 120 \\ + 500 \\ \hline 635 \end{array}$$

8 ones + 7 ones = 15 ones
5 tens + 7 tens = 12 tens
3 hundreds + 2 hundreds = 5 hundreds

C Add using the standard algorithm.

Step 1 Add ones.

$$\begin{array}{r} 358 \\ + 277 \\ \hline 5 \end{array}$$
 8 ones + 7 ones = 15 ones
Regroup: 15 ones = 1 ten + 5 ones

Step 2 Add tens.

$$\begin{array}{r} 358 \\ + 277 \\ \hline 35 \end{array}$$
 5 tens + 7 tens + 1 ten = 13 tens
Regroup: 13 tens = 1 hundred + 3 tens

Step 3 Add hundreds.

$$\begin{array}{r} 358 \\ + 277 \\ \hline 635 \end{array}$$
 3 hundreds + 2 hundreds + 1 hundred = 6 hundreds

The students collected 635 pounds of paper.

Talk About Math Ideas When you add partial sums, you can add the ones first or the hundreds first. Can you do the same when you add using the standard algorithm?

Target ELPS Support LISTENING 1E

Pre-Production Provide students with note cards showing a problem being solved with either partial sums or the standard algorithm. Say “partial sums” or “standard algorithm” and have students hold up the matching card.

Beginning In small groups, have students solve a multi-digit addition problem using both methods. Each group should state their preferred method.

Intermediate Describe how to solve a problem using the standard algorithm or partial sums. Have students identify which method was used.

High Intermediate Pair students and have them take turns describing how to solve a multi-digit addition problem using either method. Each partner identifies the strategy described.

Advanced Challenge students to create and solve their own multi-digit addition problems using both methods. They should then present their solutions to the class and explain their thinking.

Visual Learning

Classroom Conversation

A Ask: How would you use rounding to estimate the sum? [Sample answer: I would round to the nearest hundred to get $400 + 300 = 700$] Ask: Will the actual answer be greater than or less than the estimated sum? Explain. [Less because both numbers were rounded up]

B Analyze Ask: How do you know if you need to regroup? [Sample answer: You need to regroup if the sum of the digits in a place value is greater than 9] Ask: How would you regroup ones using place-value tools, such as blocks? [Sample answer: I would exchange 10 of a lesser place-value block for 1 of the next greater place-value block.]

C Ask: What do the two small 1s above 358 represent when using the standard algorithm? [Sample answer: They represent the regrouped ten and the regrouped hundred.]

Language Support: Use the activity in the Lesson Opener.

Prevent Misconceptions Watch for students who did not get a reasonable estimate. Ensure that they understand that it is important to check that they have correctly rounded the numbers to get a reasonable result.

Language Routine: Critique, Correct, and Clarify

Display the problem $358 + 277$ on the board. In the sample, the student has placed a small number 15 over the 5 when using the standard algorithm for addition. Ask: Can you identify the error? Why is this incorrect? [The student wrote 15 instead of 1 over the 5 in 358 when using the algorithm. This is incorrect because a 1 represents a regrouped ten. The 5 should be written below since these are ones and not tens.]

Talk About Math Ideas

Have students engage in a think-pair-share to connect partial sums to the standard algorithm, including how place value is used in each. Listen for conversations about the similarities and differences between the addition algorithms. Regarding place value, listen for conversations about regrouping, ones, tens, and hundreds.

Revisit the Essential Question

Point out to students that in order to find the number of pounds of paper collected, they used the standard algorithm to add $358 + 277$. Discuss how using previous knowledge of place value and addition algorithms, like partial sums and the standard algorithm, can help them to add whole numbers efficiently.

Step 3 Practice and Problem Solving | ELABORATE

15-20 min

Interactive Practice Adaptive Practice

You may opt to have students complete automatically scored practice items online.

Name _____

Guided Practice

Do You Understand?

1. When you place a 1 above the tens values, what does it mean?
Sample answer: It means that there were 10 or more ones and that 10 ones were regrouped as 1 ten.
2. When you place a 1 above the hundreds values, what does it mean?
Sample answer: It means that there were 10 or more tens and that 10 tens were regrouped as 1 hundred.

Do You Know How?

Find the sum by using partial sums and by using the standard algorithm.

3.
$$\begin{array}{r} 378 \\ + 557 \\ \hline 935 \end{array}$$

For 4-6, find each sum using the strategy you choose.

4.
$$\begin{array}{r} 678 \\ + 253 \\ \hline 931 \end{array}$$

5.
$$\begin{array}{r} 325 \\ + 256 \\ \hline 581 \end{array}$$

6.
$$\begin{array}{r} 185 \\ + 253 \\ \hline 438 \end{array}$$

Practice and Problem Solving

For 7-15, find each sum using the standard algorithm for addition.

7.
$$\begin{array}{r} 148 \\ + 157 \\ \hline 305 \end{array}$$

8.
$$\begin{array}{r} 389 \\ + 461 \\ \hline 850 \end{array}$$

9.
$$\begin{array}{r} 365 \\ + 58 \\ \hline 423 \end{array}$$

10.
$$\begin{array}{r} 126 \\ + 138 \\ \hline 264 \end{array}$$

11.
$$\begin{array}{r} 371 \\ + 404 \\ \hline 775 \end{array}$$

12.
$$\begin{array}{r} 357 \\ + 498 \\ \hline 855 \end{array}$$

13.
$$142 + 178 = 320$$

✓ 14.
$$565 + 694 = 1,259$$

15.
$$375 + 548 = 923$$

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16. **Higher Order Thinking** Sipala solved this problem using the standard algorithm, but she made an error. What was her error, and how can she fix it?

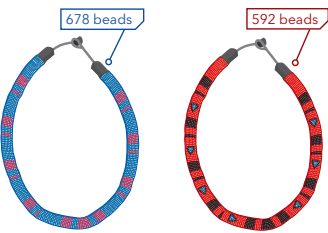
$$\begin{array}{r} 437 \\ + 175 \\ \hline 5,112 \end{array}$$

Sample answer: Sipala added the tens and recorded 11 tens below the line instead of regrouping 10 tens as 1 hundred and recording it above the hundreds place. Sipala should record the regrouped 1 hundred above the 4 and then add the hundreds, $4 + 1 + 1 = 6$. The correct sum is 612.

- ✓ 17. **Analyze** On Saturday, a movie theater sold 416 tickets to the afternoon show and 290 tickets to the evening show. How many tickets in all did they sell on Saturday?
706 tickets

18. **Communicate** Use place-value ideas to explain how you can tell just by looking at the numbers that $446 + 813$ is greater than 1,000.
Sample answer: The first number has 4 hundreds and the second number has 8 hundreds. So, altogether, there will be at least 12 hundreds. 1,000 is only 10 hundreds.

19. The Maasai necklace is an East African necklace made with tiny beads. Marla made the two bead necklaces shown. How many beads did she use?
1,270 beads



STAAR Assessment Practice

- ✓ 20. Select all the correct sums. 4.4A
- ☒ $742 + 353 = 1,095$
- ☐ $428 + 247 = 665$
- ☒ $604 + 684 = 1,288$
- ☒ $735 + 298 = 1,033$
- ☐ $912 + 198 = 1,010$

21. What is the missing digit in the addition problem? 4.4A

$$\begin{array}{r} 3 \boxed{4} 5 \\ + 6 \boxed{5} 9 \\ \hline 1,004 \end{array}$$

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Guided Practice



Error Intervention Item 3

If students need assistance using partial sums, then remind students that to use partial sums, they need to add the hundreds together, the tens together, and the ones together. While the order of the partial sums does not change the sum, you may wish to get students in the habit of adding from right to left.

Choose Efficient Strategies Remind students that for both partial sums and the standard algorithm for addition, place value is important and must be considered.

Item 2 Communicate It may be helpful to have students first refer back to the Visual Learning and explain regrouping.

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Practice and Problem Solving

Targeted ELPS Support

Item 16 Higher Order Thinking Analyzing mistakes. Students may need a visual representation to help them understand what Sipala did incorrectly when using the standard algorithm. Have students model the correct addition by using place-value blocks.

Item Analysis: Practice and Problem Solving

Item	DOK	TEKS	
		Content	Process
7-15, 19-21	1	4.4A	
16	3	4.4A	
17	2	4.2A	4.1F
18	2	4.2A	4.1D

Step 4 Assess and Differentiate | EVALUATE

15-30 min

Quick Check



✓ Assess lesson content with the Quick Check. Check marks in Practice and Problem Solving indicate items for prescribing differentiation. Items 14 and 20: 1 point. Item 17: up to 3 points. See the Item Analysis on the previous page. The online Quick Check is **automatically scored** and **remediation, practice, or enrichment** will be assigned based on student performance.

0-3 points: Intervention Activity (below) and Reteach to Build Understanding Activity

4-5 points: Enrichment Activity

In addition, **emergent bilingual students** may benefit from the Build Mathematical Literacy Activity.

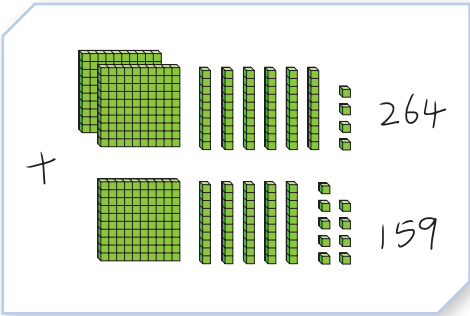
Differentiation Library DL

- Additional Differentiation Library resources are described at the start of this topic.
- Differentiation resources that support diverse learning styles are online and in the Differentiation Library Teacher’s Guide.

Intervention Activity

Materials Place-value blocks (or Teaching Tool 37), or student drawn blocks

- Write five different 3-digit addition problems on the board that require regrouping. Include at least two problems that require regrouping in two places.
- Remind the students that regrouping is required when the sum of the digits in any place is greater than 9.
- Ask students to identify the regrouping in each problem, and then use their place-value blocks to find the sums.
- When finished, have student pairs write their own problems and repeat the activity.



Video Tutorial Available at Savvas Realize®

Students can access this video anytime to reinforce lesson content.

Another Look Video

Additional Practice

Printable or autoscored at Savvas Realize®

Additional Practice 2-1

Another Look!

Add 137 + 145.

Step 1
Add ones.
7 ones + 5 ones = 12 ones
Regroup: 12 ones = 1 ten + 2 ones

Step 2
Add tens.
3 tens + 4 tens + 1 ten = 8 tens

Step 3
Add hundreds.
1 hundred + 1 hundred = 2 hundreds

For 1-12, find each sum.

1. 456 + 134 590	2. 638 + 257 895	3. 263 + 375 638
4. 914 + 435 1,349	5. 829 + 413 1,242	6. 585 + 387 972
7. 87 + 526 613	8. 845 + 178 1,023	9. 659 + 486 1,145
10. 384 + 491 875	11. 591 + 680 1,271	12. 745 + 557 1,302

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The table shows the miles a 12-player soccer team travels to play teams in other cities. Use the table to answer 13-14.

13. In October, the team traveled to Tampa and to Gainesville. How many miles did they travel in all?
538 miles

14. **Explain** In August, the team traveled to Tallahassee and St. Augustine. In September, they traveled to Gainesville and Daytona Beach. In which month did they travel farther? Explain.
August; Sample answer: 334 + 82 = 416, 142 + 180 = 322, 416 > 322

City	Miles (round trip)
Daytona Beach	180
Gainesville	142
St. Augustine	82
Tallahassee	334
Tampa	396

15. **Analyze** How many times do you need to regroup to add 873 + 465? Explain.
2 times; Sample answer: Because 70 + 60 > 100, you regroup 10 tens as a hundred. Because 800 + 400 + 100 > 1,000, you regroup 10 hundreds as a thousand.

16. **Higher Order Thinking** Wapi added two 3-digit numbers and he did not have to regroup. What numbers could Wapi have added? Kyla added two 3-digit numbers and she had to regroup three times. What numbers could Kyla have added?
Sample answer: Wapi could have added 125 + 243; Kyla could have added 678 + 596.

STAAR Assessment Practice

17. Select all the correct sums.

☐ 646 + 259 = 895
☒ 828 + 147 = 975
☒ 295 + 768 = 1,063
☐ 388 + 375 = 753
☒ 952 + 484 = 1,436

18. Which is the missing addend?
556 + _____ = 1,046
☐ A 510
☐ B 480
☒ C 490
☐ D 523

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Item Analysis: Additional Practice

Item	DOK	TEKS	
		Content	Process
1-13, 17-18	1	4.4A	
14	2	4.4A	4.1G
15	2	4.2A	4.1F
16	3	4.2A	