

Piled Up

FOCUS

Mathematics Objective Find the total number of objects in a group by using counting and addition strategies.

Language Objective Explain predictions and solutions for real-world problems in writing and verbally.

Essential Understanding Many real-world problems can be represented with a mathematical model, but that model may not represent a real-world situation exactly.

COHERENCE

Look Back Earlier in the topic, students learned to add tens and ones on a hundred chart.

This Lesson In this lesson, students solve a real-world problem by employing their understanding of counting tens and ones.

Look Ahead In later topics, students will add and subtract with larger numbers.

BALANCE

Conceptual Understanding Students draw on their conceptual understanding of counting and addition.

Application Students use math they know to solve a real-world problem.

Reinforce Vocabulary

model

Materials

Provide manipulatives and other tools that students request.



Teacher Resources

Available at
Savvas Realize®



Editable Lesson Plan



enVision on the Go: Planning Support



Act 1 The Hook



10-15 min

Act 1

Name _____

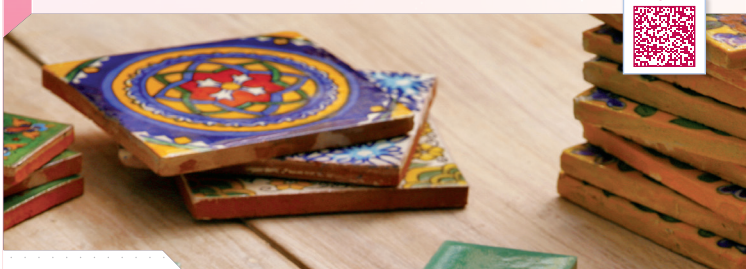
Piled Up

I can ... model with math to solve a problem that involves using strategies to add.

Let's Model in 3 Acts

Lesson 2-12

ACT 1



ACT 1

- Apply Math** What do you notice? What do you wonder?
Sample answer: How many tiles are there?, Are there more yellow tiles or more blue tiles?, What is she going to do with the tiles?
- Predict a reasonable answer to the Main Question. Why do you think that?
Students will predict a range of numbers. Check students' explanations.

Copyright © Savvas Learning Company LLC. All Rights Reserved. Lesson 2-12 105

Students are tasked with determining the total number of tiles given information about the quantity of tens and ones for each color tile.

Play the Video WHOLE CLASS

Take advantage of your students' initial reactions to watching the video. Ask: *What do you notice about the video? What do you wonder?*

Brainstorm Questions WHOLE CLASS

Item 1 Apply Math Encourage students to share their questions in a class discussion. Record their questions and store them for later. Listen for interesting mathematical and non-mathematical questions.

To help students work on posing interesting, mathematical problems, ask: *Which question do you find most interesting? Which questions could we use mathematics to answer?*

Pose the Main Question WHOLE CLASS

Use the Main Question screen in Act 1 to pose the problem situation students will be tasked with modeling and solving.

Main Question

How many tiles are there?

Make Predictions INDIVIDUAL

Item 2 Point out that the prediction is only an estimate. Do not give students time to make calculations.

Ask About Predictions WHOLE CLASS

Analyze Survey the class for a range of predictions. Point out that, without any information, you expect a wide range of predictions. Record student predictions. Ask: *Why do you think your prediction is the answer to the Main Question? Who has a similar prediction? Who has a different prediction?*

Make sure students understand it is equally important to think about unreasonable predictions for the Main Question. Ask: *What is a number too small to be the number of tiles? What number is too many tiles?*

Act 2 The Model



20-30 min

Act 2

ACT 2

3. What information do you need?

Sample answer: The number of blue tiles, The number of yellow tiles, If the color of the tiles matters, Which color tile there is more of.

4. **Plan** Show how you can find the answer to the Main Question.

Check students' work.
See sample solutions.

Build G.R.I.T.
Trust yourself.



ACT 3

5. What is the answer shown in the video?
81 tiles

6. **Check** Does your answer match the Act 3 video? If not, explain why.

Sample answer: Yes, I correctly added the number of tiles using my diagrams.

106 Lesson 2-12

Copyright © Savvas Learning Company LLC. All Rights Reserved.

Sample Student Work

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	39	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

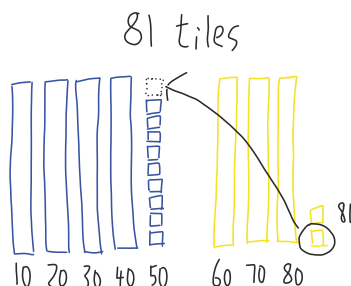
81 tiles

Corey's Work

Corey filled in the hundreds chart one square at a time. He could have counted by tens by coloring a whole row at once.

Lydia's Work

Lydia made 10 using the 9 left over blue tiles with 1 yellow tile. She has to do less counting since she can count by 10s for all of the tiles but 1 instead of counting by 1s for the leftover tiles.



Identify Important Information WHOLE CLASS

Item 3 Before showing any information, give students time to think about what quantities are relevant to the problem situation. Ask: *What information do you need to answer the Main Question?* I will only give you the information you the ask for.

Connect After discussing what information would be useful, ask: *How could you get that information? How would you use it?* You can also have students complete the sentence frame "If I knew ____, then I could figure out ____."

Reveal the Information WHOLE CLASS

Use the Act 2 video to reveal each piece of information. Record information as students identify it and keep the information where students can refer to it. Have students discuss whether this information matches their expectations.

- Blue tiles: 4 columns of 10, 1 column of 9
- Yellow tiles: 3 columns of 10, 1 column of 2

Develop a Model SMALL GROUP

Item 4 Plan To support productive struggle, observe. If needed, ask guiding questions that elicit thinking. *What assumption do you need to make to use a math model?* [That all of the tiles are shown, and that you are counting both the blue and the yellow tiles.]

Share Solution Strategies WHOLE CLASS

Communicate Have students share their solution methods. If needed, use the student work shown in Act 2, also shown here. Ask: *Is there a faster, more efficient way Corey could have counted? How did making a ten help Lydia count?*

Update Predictions WHOLE CLASS

Explain to students that what they found in Act 2 is a mathematical answer. It's a newer, more accurate prediction based on modeling. Ask: *How does your new prediction compare to your original prediction? Do you think the real-world answer will match your answer exactly?*

Act 3 The Solution



15-30 min

Act 3

Use the Video to Reveal the Answer

WHOLE CLASS

Item 5 The Act 3 video shows the girl combining both arrays of tiles into a single array. Each row contains 10 tiles, except for the final row with one tile left over. Have students record this real-world answer. To support the connection between variability and mathematical modeling, ask: *Why does our class have a variety of answers, and the video has only one answer? Why are some predictions closer to the answer in the video than others?*

Main Question Answer

There are 81 tiles.

Validate Conclusions SMALL GROUP

Item 6 Check Encourage students to discuss possible sources of error involved in using math to model this real-world situation. Accept a model as useful even if it is not perfect. Use the Answer screen in Act 3 to ask: *How useful was your model at predicting the answer? Would you change your model after watching the video? How would you change it?*

Explain You can also use the following question to test students' understanding of the real-world situation. *Would the answer be the same if all of the tiles were the same color?* [Yes, the color of the tiles does not change the total number of tiles.]

Reflect on Thinking WHOLE CLASS

If time allows, ask students the following questions to discuss how they incorporated math processes during the task.

Represent Explain how you used math to represent the situation. How did doing that help you answer the Main Question?

Analyze How can you use making ten to help figure out how many tiles there are?

Check How might you analyze and evaluate the efficiency of the approach you chose to solve the problem?

Create a Problem INDIVIDUAL

Have students create a problem. Write your own problem related to the video in Act 1. Include any additional information needed to solve your problem. Explain how you would use math to solve your problem. Then solve your problem. Remind students that they could use a question they came up with in Act 1.

If there were a third group of 11 purple tiles, how would you find the total number of tiles?

I could count on:

81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92

└────────────────────────────────┘
11

There are 92 tiles.