

Use this 3-Act Math task any time after Lesson 3-5.

3-ACT MATH PREVIEW

Page 92 This page gives students a preview of the 3-Act Math task for Topic 3. Read the robot's speech bubble to students.

Generate Interest Ask students if they like to sort and count objects. Say: *What are different ways you can sort objects?* Have them share about how sorting objects can help you count them.

TASK OVERVIEW

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

Students use the 3-Act Math task to practice mathematical modeling. They:

- identify an important problem,
- identify the important information,
- develop a model that represents that situation,
- use the model to propose a solution, and
- test the appropriateness of that math model.

In the 3-Act Math for Topic 3, students draw on their conceptual understanding of counting and addition. They make use of representations and tools such as

- place-value blocks,
- make ten strategy, and
- hundred chart.

TASK PLANNING

The following pages contain specific support for using this task with your class.

Before introducing the 3-Act Math task, consider when you'd prefer students to draw or write their answers on their Recording Sheets and when they should share their answers verbally.

For emerging readers and writers, you may wish to record student responses on the board in a numbered or color-coded list. Students could write the number that represents their response(s) or make a mark with the color that represents their answer(s). In some situations, it may be helpful to have each student in the class write their prediction on a sticky note, and use all of the sticky notes to create a chart or number line to represent the class predictions.

The slide features a background of colorful marbles. At the top, it says '3-ACT MATH PREVIEW' and 'Math Modeling Piled Up'. A speech bubble from a robot character asks: 'Before watching the video, talk to a classmate: When you have a large number of items, it's not easy to count them all. What are some strategies you use to speed up the process? How is counting different from adding?'. A small box says 'I can ...' followed by a line of gibberish text. The bottom left shows '92 ninety-two' and the bottom right shows 'Topic 3 | 3-Act Math'.

TASK CONTENT

In every task, students apply a variety of concepts and skills.

| Lesson | Concept/Skill |
|--------|----------------------------|
| 3-3 | Break apart numbers to add |
| 2-4 | Make arrays to find totals |
| 1-3 | Make a 10 to add |

They also combine conceptual understanding with math practices and processes in every step of the task.



Video



Activity

ACT 1: THE HOOK



BRAINSTORM

PLAY THE VIDEO WHOLE CLASS

The first screen shows a video of a girl emptying a container of two types of colored tiles. 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 Make Sense Start a discussion with students to develop a main question. Record interesting mathematical and non-mathematical observations and questions, and decide which are questions. Revisit this list at the end of the task.

Students may need help developing mathematical questions that are applicable to the situation. Help them refine their questions in the context of the task. Ask *What is interesting about what is happening in this video? What might you want to know about what is going to happen next?*

To encourage future work posing interesting, mathematical problems, ask *Which question do you find most interesting? Which questions could we use mathematics to answer?*



PREDICTION

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.

SURVEY PREDICTIONS WHOLE CLASS

Construct Arguments Survey the class for a range of predictions. Help 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?*

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?*

3-ACT MATH RECORDING SHEET

Name _____

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3-ACT MATH Recording Sheet

ACT 1

1. What questions do you have?



Brainstorm

**Students may say: How many tiles are there?
Are there more yellow tiles or more blue tiles?
What is she going to do with the tiles?**

2. Predict a reasonable answer to the Main Question. Why do you think that?



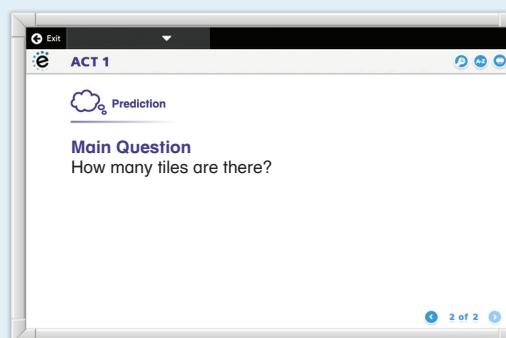
Prediction

**Students will predict a range of numbers.
Check students' explanations.**

3-Act Math Recording Sheet 1 of 3

Use any time after Lesson 3-5.

CONSIDER THE MAIN QUESTION



Have students consider what they know about the scenario so far. Encourage students to think about how that information can help them make a prediction to answer the Main Question.



3-ACT MATH

ACT 2: THE MODEL

INFO

IDENTIFY IMPORTANT INFORMATION WHOLE CLASS

Item 3 Before showing any information, use the Information screen in Act 2 to 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.*

Use Appropriate Tools 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

MODEL

DEVELOP A MODEL SMALL GROUP PARTNERS

Item 4 Model with Math 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.]

EXTEND THE TASK INDIVIDUAL

Item 7 For early finishers, use the SEQUEL button on the Video screen to reveal the Sequel, shown on the next page. You can also assign the Sequel after Act 3 or as homework.

SHARE SOLUTION STRATEGIES WHOLE CLASS

Critique Reasoning Have students share their solution methods. If needed, use the Analyze Student Work screen in Act 2, also shown at the right.

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?*

3-ACT MATH RECORDING SHEET

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ACT 2

3. What information do you need? Info

Students may say: the number of blue tiles, the number of yellow tiles, if the color of the tiles matters, and which color tile there is more of

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

Check students’ work. See sample solutions below.

3-Act Math Recording Sheet **2 of 3**

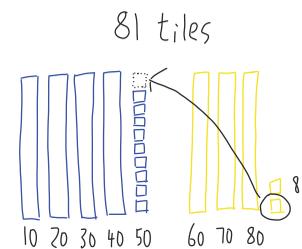
ANALYZE STUDENT WORK

Corey’s Work



81 tiles

Lydia’s Work



Corey says he filled in the hundreds chart one square at a time. Is there a faster, more efficient way he could have done this? [Yes, he could have counted by tens by coloring a whole row at once.]

Lydia says she can make 10 using the 9 left over blue tiles with 1 yellow tile. How does that help her? [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.]



Video



Activity

ACT 3: THE SOLUTION

ANSWER

REVEAL AN 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 the video than others?*

MAIN QUESTION ANSWER

There are 81 tiles.

REFLECT

VALIDATE CONCLUSIONS WHOLE CLASS

Item 6 Model with Math 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 Reflect 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?*

Reasoning 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.]

REVISE THE MODEL INDIVIDUAL

Look for students to revise their models based on Act 3 before developing a model for the Sequel. Students may adopt a classmate's model as a result of the discussion in Act 2.

DISCUSS MATH PRACTICES WHOLE CLASS

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

Model with Math Explain how you modeled with math to represent the situation. How did doing that help you answer the Main Question?

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

REVISIT BRAINSTORMING WHOLE CLASS

Item 1 To acknowledge that students have important ideas, use remaining class time to return to their list of questions. Answer as many as time allows. You can also assign interesting questions for homework, particularly for the students who asked those questions.

3-ACT MATH RECORDING SHEET

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ACT 3

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

Answer

6. Does your answer match the Act 3 video?
If not, explain why?
Students may say: Yes, I correctly added the number of tiles using my diagrams.

Reflect

SEQUEL

7. Show how you would answer the Sequel.
Students may say: I would add 11 to 81 by adding 1 more ten and 1 more one to the drawing. Check students' work. Look for student answers that incorporate the 11 new tiles into their existing model.

3-Act Math Recording Sheet 3 of 3

SEQUEL

POSE THE SEQUEL INDIVIDUAL

Item 7 You can assign this similar problem situation involving using arrays to find totals for early finishers or as homework.

Exit

SEQUEL

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

1 of 1

Sequel Answer Look for student answers of 92 tiles.