

Use this 3-Act Math task any time after Lesson 3-4.

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 what foods they like to eat by the handful. Say: *Can you hold more apples or strawberries in your hand?* How many tennis balls can you hold in one hand? Provide time to practice picking up objects and then counting 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 comparing numbers. They make use of representations and tools such as

- drawings that represent the problem,
- counting tools, and
- verbal counting.

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.

3-ACT MATH PREVIEW

Math Modeling
By the Handful

What did the green grape say to the purple grape? Breathe!

Directions Read the robot's speech bubble to students. **Generate Interest** Ask students what foods they like to eat by the handful. Say: *Can you hold more apples or strawberries in your hand? How many tennis balls can you hold in one hand?* Provide time to practice picking up objects and then counting them.

I can ... model with math to count groups and compare to solve a problem.

92 ninety-two

Topic 3 | 3-Act Math

TASK CONTENT

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

Lesson	Concept/Skill
2-4	Compare groups by counting
3-3	Count 9
1-4	Count 5

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 bowl of green and red grapes. Two kids each grab a handful of grapes. Discuss students' initial reactions to watching the video.

BRAINSTORM QUESTIONS WHOLE CLASS

Item 1 Make Sense Start a discussion with students to develop a main question. Help students distinguish questions from statements. Record interesting mathematical and non-mathematical observations and questions. Revisit this list at the end of the task.

Help students develop mathematical questions that are applicable to the situation. If students are struggling, have them consider what type of question may be helpful here. Ask *What do you wonder? What type of situation is shown in the video? Is this a more/less situation? A how many situation? A who situation? A time situation?*

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 grapes did each person grab? Who grabbed more grapes?

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 to the Main Question. Ask *What is a number too small to be the number of grapes? What number is too many grapes?*

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 _____

Teaching Tool
55

3-ACT MATH Recording Sheet

ACT 1



Students may say: How many grapes are in the bowl? How many grapes did the kids grab? Are there more green grapes or more red grapes? What else did the kids eat?



Brainstorm



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



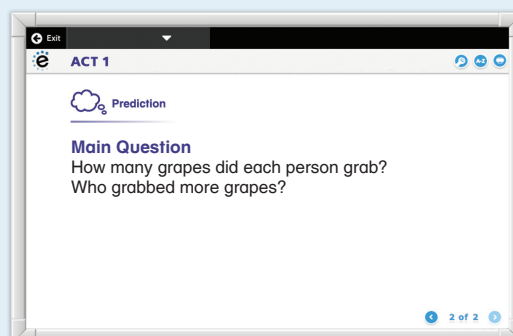
Prediction

Directions Say: What are you wondering? Say: Predict a reasonable answer. Why do you think that?

3-Act Math Recording Sheet 1 of 3

Use any time after Lesson 3-4.

CONSIDER THE MAIN QUESTION



ACT 1

Prediction

Main Question
How many grapes did each person grab?
Who grabbed more grapes?

2 of 2

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 the Main Question.

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 ask for.* Draw a simple picture to represent each piece of information students request. Number each picture and save the numbered list. Have students record the number for each piece of information they think they will need.

Use Appropriate Tools After discussing what information would be useful, ask *How could you get that information? How would you use it?* Students can also use the sentence frame “If I knew _____, then I could figure out _____.”

REVEAL THE INFORMATION WHOLE CLASS

Use the Image Gallery screen in Act 2 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.

- Boy: 3 green grapes, 2 red grapes
- Girl: 3 green grapes, 6 red grapes

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. *How can counting help you compare?* [If you know how many each person has, you can tell which number is greater.] *What assumption do you need to make to use a math model?* [The color of the grapes doesn't matter.]

EXTEND THE TASK INDIVIDUAL

Item 7 For early finishers, use the use the EXTENSION feature on the Image Gallery screen to reveal the Sequel, shown on the next page. You can also assign the Sequel after Act 3.

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

Teaching Tool
55

ACT 2

3

Students may say: the number of grapes the boy grabbed and the number of grapes the girl grabbed

Info

4

Check students' work. See sample solutions below.

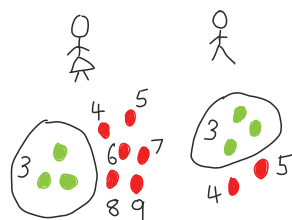
Model

Directions  Say: What information do you need?  Say: Show how you can find the answer.

3-Act Math Recording Sheet 2 of 3

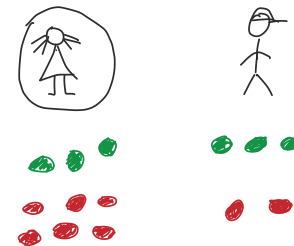
ANALYZE STUDENT WORK

Jackson's Work



Jackson says he knows both kids have 3 green grapes. How can that help him figure out how many grapes each kid has? [He can count on from 3 when counting the red grapes.]

Bria's Work



Bria says she knows that the girl has more grapes without counting all the grapes. How does she know? [Both kids have the same number of green grapes. Since the girl has more red grapes, she has more grapes than the boy.]



Video



Activity

ACT 3: THE SOLUTION

★ ANSWER

REVEAL AN ANSWER WHOLE CLASS

Item 5 The Act 3 video shows how many grapes each kid has. 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

The boy has 5 grapes. The girl has 9 grapes. The girl has more grapes than the boy.

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. *If the grapes were different sizes, would that change the answer?* [No, the size of the grapes does not change the number of grapes.]

REVISE THE MODEL INDIVIDUAL

Allow students time 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?

Look for Relationships How can you tell which person has more grapes without counting all of the grapes?

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

Teaching Tool
55

ACT 3



Students may use pictures and numbers to show the boy has 5 grapes, the girl has 9 grapes, and the girl has more grapes than the boy.



Answer



Students may say: Yes, I counted the grapes.



Reflect

SEQUEL



Students may say: The boy, because the girl has more grapes than him. Check students' work. Look for student answers that recognize how this question and the main question are related.

Directions Say: What is the actual answer? Does your answer match the answer in the video? If not, explain why. Say: Show how you would answer the sequel.

3-Act Math Recording Sheet 3 of 3

SEQUEL

POSE THE SEQUEL INDIVIDUAL

Item 7 You can assign this similar problem situation involving comparing numbers for early finishers or as homework.

The screenshot shows a digital interface for the 'SEQUEL' screen. At the top, there is a title bar with 'Exit' and 'SEQUEL' buttons. Below the title bar, the main content area contains the text: 'Who grabbed fewer grapes? Explain your reasoning.' To the right of the text is a vertical toolbar with various icons for drawing and editing. At the bottom right, there is a small status bar that says '1 of 1'.

Sequel Answer Look for student answers to realize that if the girl had more grapes than the boy, then the boy has fewer grapes than the girl.