

## Mathematical Practice Virtual Professional Development Series

### Math Practice 4: Model with Mathematics Facilitation Guide

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#### Intended Use

The facilitation guide is intended to be used by educators when viewing the voice over recording of Math Practice 4: Model with Mathematics. Districts and schools are encouraged to use this resource as part of a professional development series that spans all 8 Standards for Mathematical Practice.

Viewing the recordings of the Math Practice sessions can be done in any order. Viewing the recording is encouraged to be done in groups, but it can be done individually. To get the full benefit of the professional development series, educators should engage in the tasks and participate in local discussions on the Mathematical Practice.

#### Reproducing the Facilitation Guide

If you would like to make copies of any portion of this facilitation guide or accompanying PowerPoint presentation, please credit the Ohio Department of Education.

#### During Facilitation: Discussion Questions

Pause the recording at the times indicated below to discuss each question.

##### Discussion Questions

PowerPoint Slide 7: Act 1: A Guatemalan Sinkhole Activity

1. What do you notice?
2. What do you wonder?

Other potential discussion questions include:

3. How much material will they need to fill the sinkhole?
4. How much will it cost to fill the sinkhole in?
5. What events cause sink holes?
6. Why did it happen here instead of somewhere else?
7. What is the land compositions that cause sinkholes?

##### Discussion Questions

PowerPoint Slide 8: Act 2: Estimate

1. What do you know?
2. What information do we need?
3. Create a high estimate and a low estimate for the volume of this sink hole.

##### Discussion Questions

PowerPoint Slide 16

Grades K-5, explore the tasks on [slides 3-11](#)

1. Discuss the questions in the tasks on slides 3-11 with colleagues.

Grades 6 and above, explore the tasks on [slides 28-32](#).

1. Create a model for the task on [slide 33](#).
2. Discuss the questions in the tasks on [slides 35-39](#) with colleagues.

## Discussion Questions

PowerPoint Slide 27: Explore the tasks at your grade band on [slides 55-68](#)

1. How would you transform these problems into modeling problems?
  - Grades K-2 tasks on [slides 55-56](#)
  - Grades 3-5 tasks on [slides 58-60](#)
  - Grades 6-8 tasks on [slides 62-65](#)
  - High School tasks on [slides 67-68](#)
2. Answer keys are available in the [Guidelines for Assessment & Instruction in Mathematical Modeling Education \(GAIMME\) Report](#)
  - Grades K-8 answer keys on pages 141-143
  - High School answer keys on pages 55-57 and 180-191

## Discussion Questions

PowerPoint Slide 37: Explore the rubrics on [slides 70-90](#)

1. Discuss with your colleagues how you can use the tasks on the slides or something similar to assess modeling in your classroom.
  - Grades K-2 tasks on [slides 70-75](#)
  - Grades 3-5 tasks on [slides 76-80](#)
  - Grades 6-8 tasks on [slides 81-85](#)
  - High School tasks on [slides 86-90](#)

## Resource Links

- [Conrad Wolfram on Computational Thinking](#)
- [Engaging in Mathematical Practice \*Look Fors\*](#)
- [Performance Level Descriptors for Grades K-2 Mathematics](#) by CCSSO
- [Standards for Mathematical Practice Rubric](#)
- [Guidelines for Assessment & Instruction in Mathematical Modeling Education \(GAIMME\)](#)
- [Mathematical Modeling of the Mathematics Framework for California Public Schools: Kindergarten through Grade 12](#)
- [Using Mathematics and Computational Thinking](#)
- [MPRES Toolkit for Teachers Conceptual Change – Using Mathematics & Computational Thinking](#)
- [Ohio Learning Standards](#)
- Robert Kaplinsky
  - [Beware of Fake Math Modeling Problems](#)
  - [Do You Need Better Spies of Analysts?](#)
  - [Sink Hole](#)
  - [What Isn't Modeling?](#)

## Conversation Notes: