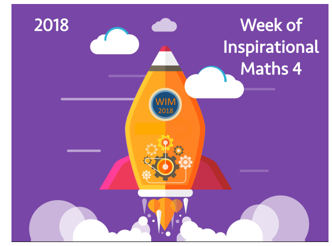


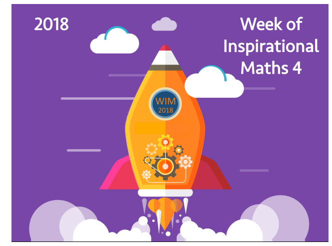

# Crossing a Rectangle
# Day 3

## Introduction

This activity provides an integrated opportunity for students to visually explore and create pathways on a grid. Students use their creativity and the activity's design constraints when making the different pathways. They work together to share different counting strategies to find the lengths of their pathways and compare solutions.

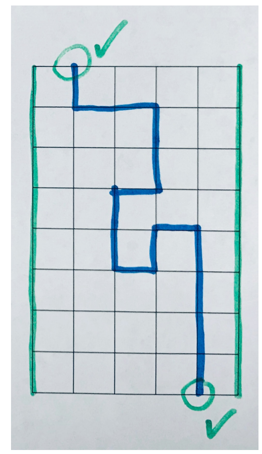
## Agenda

| Activity | Time | Description/Prompt | Materials |
|---|---|---|---|
| Mindset Message | 10 min | Play the mindset video, ***Speed is not Important***, https://youcubed.org/weeks/week-4-grade-3-5/ | Mindset Video day 3, *Speed is not Important* |
| Introduce | 5 min | Introduce the problem using the Crossing a Rectangle handout. Show students the constraints and ask them to model some paths that fit the constraint and ones that don't. | • Crossing a Rectangle handout<br>• Colored markers |
| Explore | 15 min | Ask students to find the longest pathway on a 5x8 and 8x5 grid. | • Crossing a Rectangle handout<br>• 5x8 grid handouts<br>• Colored pencils or pens |
| Share | 15 min | Students share their strategies and solutions | |
| Explore | 10 min | • Ask students to try different rectangle sizes and explore the paths that are possible<br>• Invite students to make more conjectures and refine their thinking for a rectangle of any size | • Graph paper handout<br>• Colored pencils |
| Debrief Mindset Message | min | Ask students to reflect on the idea discussed in the video that math is NOT about speed. What is important in math is to think carefully, deeply, and to make connections. | |



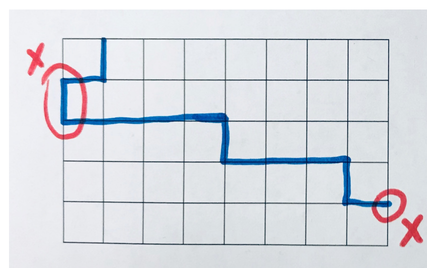

Activity

Project a 5x8 grid; ask students what they notice about the grid. Then introduce them to the problem. Set them up to work in groups emphasizing the importance of having others to collaborate with during this exploration. You can share examples of how mathematicians might work together: ask questions, share ideas, clarify constraints and compare methods.



Distribute the Crossing a Rectangle handout and the 5x8 and 8x5 grid handouts and have students get started. Students will most likely need more than one copy as they explore and create.

When students think they have found the longest path ask them how they know. Ask them to make a convincing argument to justify their conjecture. Ask them to convince you by sharing the pathways they have created and reasons why it would not be possible to include specific gridlines in the path. Look for whether or not students are following the constraints of the pathway.

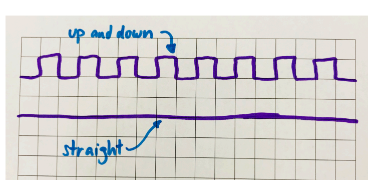


When the students are ready as a class to discuss their findings, collect answers as if you are doing a number talk. Record each answer shared on the whiteboard. Ask the class if any group or group member would like to defend their answer. Have students share until they are convinced about the length of the longest pathway.

Consider being open to all pathways students create that hold the constraints (entering from the top edge, exiting from the bottom edge, and not touching either side edge). You might also consider allowing the class to decide additional constraints for their groups, or for the class, if they can convince each other why it should be something allowed or not.

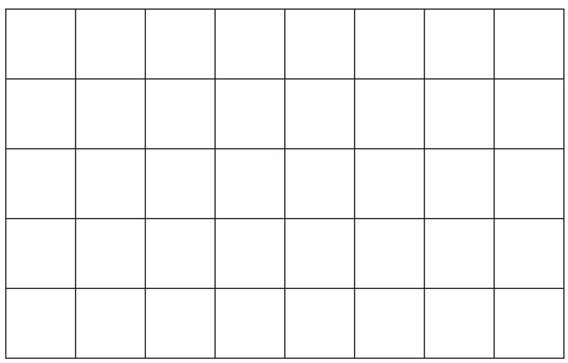
Move students to exploring the pathways for grids of any size. Encourage groups to start by asking each other what they are curious about and what size grids they want to explore. Let them know this is an opportunity to brainstorm the different sized grids they want to think about but not something they need to agree on. Distribute the grid handout so that students can make their grids and explore.

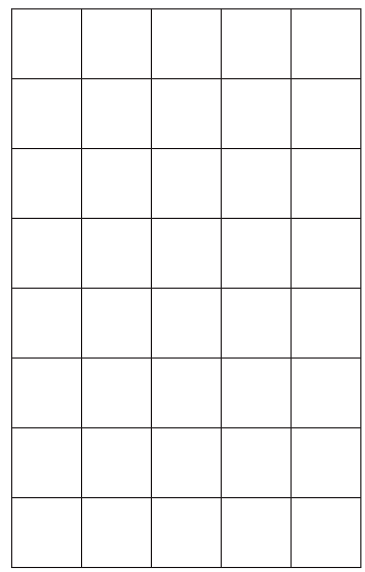
Invite students to share their discoveries and strategies for making the pathway longer. Encourage students to be specific about the difference in the pathways that use straight lines and those that use up and down lines, pictured here.



# Crossing a Rectangle

What is the longest pathway along the lines of a grid you can create that starts at the top of a 5x8 grid and ends at the bottom without touching either of the sides?





What is the longest pathway you can create in grids of other sizes? Design your different sized grids on the grid paper provided by your teacher.