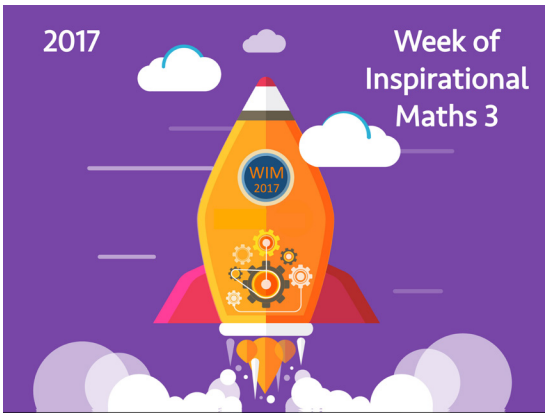
youcubed®



Messing with Pascal

Grades 6-8

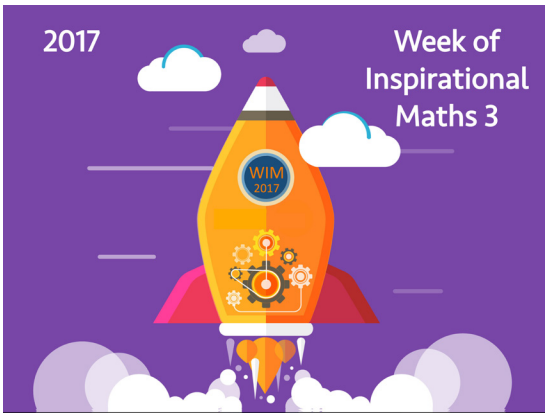
Introduction

This activity allows students to explore number patterns within Pascal's Triangle. They will investigate and ask questions about what happens as constraints are changed. This task is an example of ways mathematicians explore and adapt patterns.

Agenda for the activity

Activity	Time	Description	Materials
Introduce Pascal's Triangle	10 min	Give students a copy of Pascal's Triangle and ask them to color code patterns that they see. Ask students: What numbers would be in the next row? How do you know? What do you notice?	• Pascal's Triangle Handout • Colored pens/ pencils
Students work on Messing with Pascal	20 min	• Give students the Pascal's triangle with the number along the side changed. Let them think about the questions below with a partner: - What do you notice? - What patterns do you see? - What numbers would be in the next row? • With a partner, invite students to look at the second triangle where the numbers along the side have been changed and consider the same questions above. • What do you wonder? What do you want to explore next? Give students time to explore changing the sides of the triangle to different numbers and creating their own patterns.	• Messing with Pascal Handout (pg. 3) • Colored pens/ pencils • Empty Triangle Handout
Whole class debrief	10 min	Invite students to share the patterns they noticed and the things they wondered. Encourage them to share the new triangles they created and what they noticed in those triangles. What are their wonderings?	

youcubed®



Activity

Introduce students to Pascal's triangle. Give them a Pascal's Triangle Handout with several rows left unfinished. This is a famous pattern of numbers where there are still things that have not been discovered. Students enjoy working on tasks that are unfinished. Ask students to explore the triangle and color code any patterns that they see. Ask them the following,

- What do you notice?
- What patterns do you see?
- What numbers would be in the next row?

Give students time to explore the triangle with a partner and then invite students to share their findings with the class. Record their discoveries on the board.

Next, show students the Pascal's triangle that has been 'messed with' (pg. 4). What do they notice? What patterns do they see? What numbers would be in the next row? Give students time to explore the next two triangles with a partner. They can use colored pens to highlight what they are noticing. As they are exploring these two triangles ask them what it makes them want to explore further.

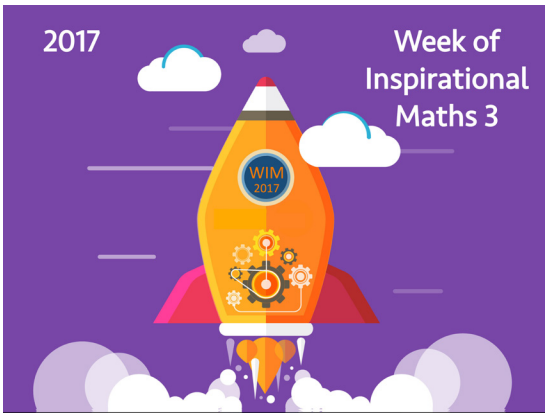
As a whole class, invite students to share what patterns they are seeing in the two new triangles. What did they notice? What does it make them wonder? What do they want to explore next? Remind students that the work of mathematicians is to explore patterns and ideas and to ask questions. Mathematicians ask questions and then decide which questions they want to investigate further.

Give students a chance to create their own triangle patterns. Students can share their triangles with the class or another group and ask them to find, continue and explore the patterns inside their triangle.

Materials

- Pascal's Triangle Handout (pg. 4)
- Colored pens/pencils
- Messing with Pascal Handout (pg. 3)
- Empty Triangle Handout (pg. 5)

youcubed®



Messing with Pascal
Handout

What patterns do you see? What numbers would be in the next row? What do you notice?

What if we changed Pascal's Triangle to have a different number along one side of the triangle? What patterns do you notice? What do you wonder?

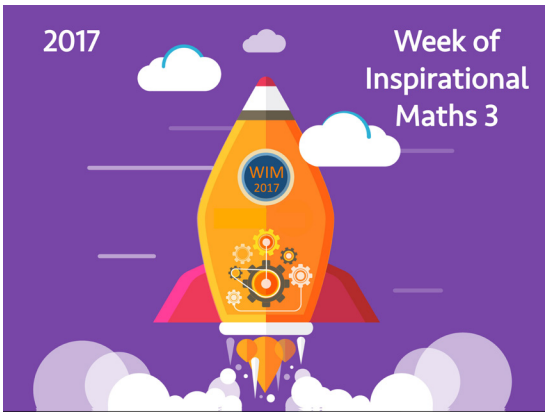
1 3
1 4 3
1 5 7 3
1 6 12 10 3
. . . .

Or, what if we changed it to look like this?

2 4
2 6 4
2 8 10 4
2 10 18 14 4
. . . .

Create some other 'messed with' Pascal Triangles. Share them with another group to see if they can figure out your pattern.

youcubed®

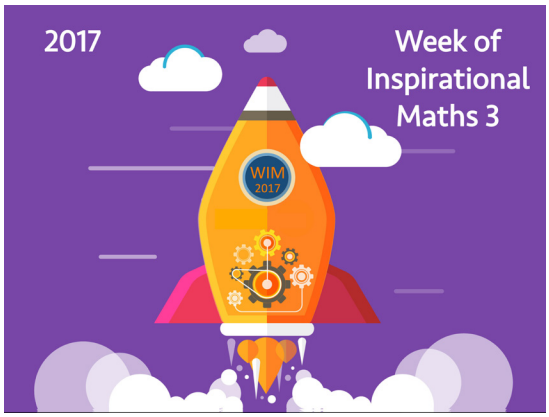


Messing with Pascal

Pascal's Triangle Handout

					1					
				1		1				
			1		2		1			
		1		3		3		1		
	1		4		6		4		1	
1		5		10		10		5		1

youcubed®



Messing with Pascal

Empty Triangle Handout