



Pattern Menu Grade 9-12

Introduction

This pattern menu contains three different activities making space for students to visualize, identify, and generalize patterns. There are three different patterns in this activity so that students have an opportunity to choose which pattern they are interested in exploring.

Agenda

Activity	Time	Description/Prompt	Materials
Mindset Message	10 min	Play the mindset video.	Mindset Video
Launch	10 min	Students select the activity they want to explore and with whom they want to work.	<ul style="list-style-type: none"> Squares & More Squares Swirls Serious Squares
Investigate	30 min	Investigate the pattern and explore the questions.	<ul style="list-style-type: none"> Squares & More Squares Swirls Serious Squares Colored pencils
Discuss	15 min	Large group discussions organized by activity.	
Debrief Mindset Message	5 min	Debrief the mindset messages for this activity.	



Activity

Share with students that they will have an opportunity to think creatively about how a pattern is changing. Let them know they will choose which pattern, from a menu of three, they want to work on with their group, a partner, or individually. Provide each student a copy of each pattern and suggest that they keep them all to share and do with family and friends outside of class.

Give them time to read each problem and then choose with whom they are working so they can decide together which pattern they are doing. You might consider letting students work with someone from another group, as this is a day of choice.

While students work, enter conversations as they ask you questions. Invite them to start with what they have figured out so far and then share their confusion so that together you can make sense of the sticking point. You might think of this interaction with the group as an opportunity to share some insight that allows students to keep going from their own thinking.

Encourage students to use color to show how the pattern is changing. You might ask them questions about what is happening to specific parts of each case of the pattern to help them create detailed diagrams of the pattern at different cases. This is key to students building their understanding of generalizing patterns, a powerful skill for students to develop as mathematicians.

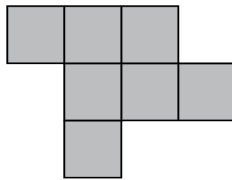
Have students form larger discussion groups with other students working on the same investigation. Tell students to bring their materials with them for the discussion. Invite the groups to start by sharing how they see the pattern.

Extensions

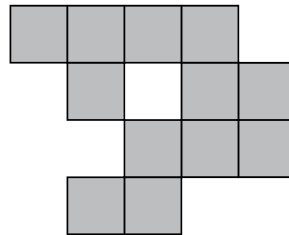
- Have students select another activity from the menu.
- As students discuss and highlight the ways they see the pattern growing ask them what this type of function is represented by this pattern and how they know.



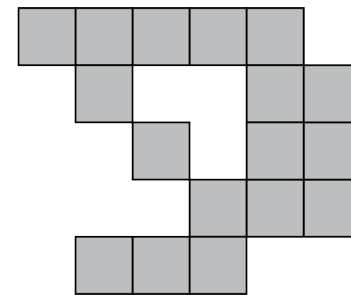
Squares & More Squares



Case 1



Case 2



Case 3

How do you see the pattern growing? What would the 5th case look like? What would the 100th case look like?

How many squares will be in the tenth case?

How many squares would be in any case?

Use at least three representations to show how the pattern is growing: words, graph, table, visual, or algebraic expression. Show the connections between the representations using color-coding, arrows, and words.



Swirls



Case 1



Case 2



Case 3

How do you see the pattern changing?

Draw case 4.

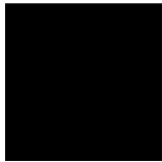
What does case 10 look like?

What is the area of the shaded region of case 4?

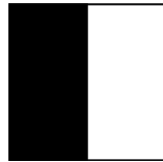
Use at least three representations to show how the pattern is growing: words, graph, table, visual, or algebraic expression. Show the connections between the representations using color-coding, arrows, and words.



Serious Squares



Case 1



Case 2



Case 3



Case 4



Case 5

How do you see the pattern changing?

Draw case 6.

What would case 10 look like?

What is the area of case 5?

Use at least three representations to show how the pattern is growing: words, graph, table, visual, or algebraic expression. Show the connections between the representations using color-coding, arrows, and words.