

## Overview:

The activities included in this packet are provided to you, mathematics education leaders, as examples of the types of activities that can be used with teachers during professional development sessions.

**Handout # 1, the Mathematics Accessibility Planner for Patterns Task**, is an example of how a lesson or activity can be selected from your local mathematics curriculum then used with teachers. First, teachers are asked to complete the task as a student. After teachers have completed the task, they can use the accessibility planner to identify the task goals and demands it places on students; focus on a specific student and consider their strengths and difficulties that could impact their ability to complete the task; identify potential barriers that the specific math task could pose for that student; and identify accessibility strategies aligned with particular student’s needs.

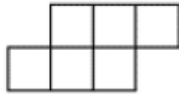
## #1: Mathematics Accessibility Planner for Patterns Task

<b>Consider the Mathematics Task</b>		
<p><i>What are the mathematics goals?</i></p> <ul style="list-style-type: none"> <li>• Analyze and extend a visual pattern</li> <li>• Represent a visual pattern by using an algebraic expression</li> </ul> <p><i>What kinds of demands does the task place on students?</i></p> <ul style="list-style-type: none"> <li>•</li> <li>•</li> </ul>		
<b>Consider the Student(s)</b>		
<b>Learning Areas</b>	<b>Strengths</b>	<b>Difficulties</b>
Conceptual Language Visual/Spatial Organization Memory Attention Other		
<b>Identify Potential Barriers</b>		
<p><i>What <b>potential barriers</b> does this math task pose for your student? What specific difficulties do you anticipate?</i></p>		
<b>Align Accessibility Strategies</b>		
<p><i>What <b>strategies</b> would be a good match with the mathematics goals <b>and</b> the student’s strengths and needs? Use the strategy cards to find <b>two</b> approaches that would be particularly helpful.</i></p>		

**Handout # 2, Patterns Task**, is a great task to use in professional learning sessions with teachers because there are several different ways to see the pattern. This type of problem can lead to rich discussions among teachers about different approaches to complete the task.

## #2: Patterns Task

1. Andy used small squares to make each of the figures shown in the pattern below.



**Figure 1**



**Figure 2**



**Figure 3**

**Figure 4**

- If the pattern continues in the same way, how many small squares will be in Figure 4?
- Build the pattern with tiles, or make drawings above or on grid paper, to show or describe how the pattern grows.
- If the pattern continues, how many small squares will be in Figure 10?
- How could you find the number of small squares in any figure number in this pattern? Write an expression to find the number of squares in **Figure  $n$** .
- Andy used 54 small squares to make a figure in this pattern. What was the figure number? Show or explain how you found your answer.

**Handout # 3: Sample Students** and **Handout # 4: Mathematics Accessibility Strategies to Consider** are intended to be used by teachers completing the Mathematics Accessibility Planner (handout 1) as part of a professional learning activity. Teachers can select one of the sample students described below and reflect on how their strengths and difficulties could impact their ability to complete a sample task, like the Patterns task (handout 2). Then, teachers can review and discuss the accessibility strategies (handout 4) that might be aligned with the sample student’s needs.

### #3: Sample Students

**Directions:** Each person in the group chooses a different student. Read about your student. List his/her strengths and difficulties.

<p><b>Celia</b></p> <p><b>Celia</b> works well with concrete tasks like making patterns with tiles. However, she tends to focus on individual cases and has trouble generalizing and coming up with rules. She also has difficulty making connections, so each problem looks new to her. She often doesn’t know how to get started and lacks confidence about taking a risk, so she typically waits for the teacher to help her. When Celia knows what to do, she works slowly but in an organized way.</p>
<p><b>Mandy</b></p> <p><b>Mandy</b> struggles with many geometric tasks, such as transforming shapes and interpreting 2-D representations. She also has difficulty seeing patterns in visual representations and in interpreting number lines. She often makes computational errors because she misaligns numbers and misinterprets symbols, such as addition and multiplication signs. She has a good understanding of math vocabulary terms. She tends to be better at solving problems that involve familiar, real-world situations than at solving those that are more abstract.</p>
<p><b>Trevor</b></p> <p><b>Trevor</b> has difficulty managing his time, gets distracted from the math task at hand, and often doesn’t complete his classwork within the designated time. When he is solving a multi-step problem, Trevor has difficulty organizing his work on the page and keeping track of steps. He also has difficulty using number sense to determine whether an answer is reasonable. During partner work, he is usually actively involved and able to talk about his math ideas. He likes to present his approaches to the class but finds it challenging to stay focused when other students present.</p>
<p><b>Owen</b></p> <p><b>Owen</b> feels overwhelmed by a lot of text on a page because he has difficulty with reading comprehension, particularly when the text includes math vocabulary terms. Since the wording of directions can confuse him, he is sometimes unsure of what he is being asked to do. He is hesitant to ask the teacher for help because he doesn’t want to seem as if he is having difficulty, and he rarely talks during class discussions. Owen is most comfortable when things are presented visually. Often, he draws pictures as a problem-solving strategy.</p>

## #4: Mathematics Accessibility Strategies to Consider

### ***Helping Students Understand Tasks***

- Reword directions or questions
- Have students paraphrase directions and questions
- Provide visual *and* auditory directions
- Clarify vocabulary
- Have students highlight important info
- Change context to make it more familiar or appealing to students
- Show examples of the finished product

### ***Helping Students Access Math in Varied Ways***

- Build on students' prior math knowledge
- Make connections across math topics
- Move from concrete to semi-concrete to abstract and explicitly connect these levels
- Use multiple representations
- Provide additional examples
- Offer manipulatives
- Use technology strategies
- Use visuals
- Offer alternative ways for students to show what they know
- Provide kinesthetic learning opportunities

### ***Building Student Independence***

- Teach *and* model strategies for:
  - Organization
  - Self-questioning and self-monitoring
  - Problem-solving
- Teach highlighting & color-coding strategies
- Use “think alouds” and other metacognitive strategies

### ***Providing Tools and Handouts***

- Provide templates for tables, graphs, writing, and other tasks
- Use graphic organizers
- Provide practice problems
- Provide or have students create a word bank with vocabulary words and visuals
- Provide study guides with key information to reduce copying and note-taking
- Offer calculators and multiplication charts
- Provide resource sheets

### ***Promoting Understanding through Discourse***

- Have students work in pairs or small groups
- Use cooperative learning
- Keep class discussions short and focused
- Provide timely and constructive feedback
- Check in frequently with students
- Use questions, prompts, and hints

### ***Helping Students Manage Tasks and Organization***

- Reformat handouts to provide more work space
- Reduce amount of copying
- Provide a checklist
- Provide time management cues
- Set up a notebook organizational system
- Provide project organizers to help the students keep track of tasks
- Offer tools such as highlighters and Post-its to help students focus

### ***Adjusting Tasks to Student Needs***

- Adjust level of difficulty
- Use friendlier numbers
- Adjust amount of time for tasks
- Adjust amount of work
- Create multiple versions of a problem, in order to offer alternatives to a range of learners
- Adjust pacing to optimize attention

### ***Creating a Supportive Environment***

- Post and reinforce classroom expectations
- Seat students strategically, based on needs like vision or hearing. Seat distractible students away from windows or doors.
- Use nonverbal signals to cue attention or behavior
- Use consistent and familiar routines
- Provide easy access to manipulatives, templates, and other tools in the classroom

**Handout # 5, Collaboration Scenarios**, is a tool to support discussions about teacher collaboration. Using the collaboration scenarios, teachers and mathematics leaders can discuss issues that may arise and brainstorm solutions. This activity can be conducted in pairs or small groups then solutions can be shared with members of the full group of participants.

## **#5: Collaboration Scenarios**

Choose *one* to discuss.

### **Thelma and Louise**

Louise and Thelma have been newly teamed this year. Louise has been teaching math now for 11 years. She has co-taught before and liked the arrangement. Thelma is unfamiliar with the math program and co-teaching. For the past seven years, Thelma taught in a self-contained special education classroom. Thelma doesn't want to step on Louise's toes, so she tends to sit back and wait to be told what to do. Both women feel somewhat frustrated. Louise wants Thelma to be more involved, and Thelma wants to feel more like a professional than an aide.

### **Felix and Oscar**

Felix and Oscar are in their first year of co-teaching an inclusion math class. Each week, they have a scheduled time for co-planning. Felix, the special educator, is a careful planner who wants to go over the lessons in detail in order to plan accommodations for students with disabilities. However, Oscar, the math teacher, doesn't feel the need to plan, because he has taught the curriculum for several years. His style is to "wing it." During co-planning times, Oscar talks through the lessons very quickly, focusing primarily on logistics, such as the materials needed. Both teachers are finding the co-planning times frustrating. Tensions are starting to carry over into the classroom.

### **Laverne and Shirley**

Laverne is a grade 7 math teacher who teaches five math sections. Shirley is a special educator with a large caseload who provides in-class support (twice a week) to students with disabilities in one of Laverne's sections. One morning, Laverne asks Shirley to make accommodations for a test she plans to use the next day. Although Shirley is pleased that Laverne wants her help, she is also bothered by the short turnaround time. Shirley also feels unclear about the mathematics goals of the assessment. When Laverne gets the adapted test, she is disappointed and concerned that Shirley has cut out some of the important mathematics. With no time left to consult Shirley, Laverne decides not to use the adapted test.

### **Discuss:**

1. What are the issues for each teacher in the scenario?
2. What suggestions do you have for addressing these issues?
3. Imagine that you are one of the teachers. What would you say to start a conversation about these issues with the other teacher?