Name: Hillary Bumgardner Leesburg 5th Grade

***Mathematics: The Language of STEM***

Area of Trapezoids

## CONTENT AND TASK DECISIONS

**Grade Level(s): 5th Grade**

**Description of the Task:** Students are presented with two desks with differently shaped workspaces. One is rectangular and the other is trapezoidal. Students will find the area of both desk tops to determine which has more workspace (has the greater area).

**Indiana Mathematics Content Standards: 5.M.3: Develop and use formulas for the area of** triangles, parallelograms and **trapezoids**. Solve real-world and other mathematical problems that involve perimeter and area of triangles, parallelograms and trapezoids, using appropriate units for measures.

**Indiana Mathematics Process Standards: PS.7: Look for and make use of structure.**
*Mathematically proficient students look closely to discern a pattern or structure. They step back for an overview and shift perspective. They recognize and use properties of operations and equality. They organize and classify geometric shapes based on their attributes. They see expressions, equations, and geometric figures as single objects or as being composed of several objects.*

**Mathematics Content Goals:** Students will develop strategies that lead to a formula for finding the area of a trapezoid.

**Language Objectives**: Students will discuss/converse (compare and contrast) about traits of shapes and methods to find area of shapes. Students use the terms height and base.

**Materials**:
A variety of materials for student trapezoid and rectangular shaped desks or a visual to represent each workspace and its measurements

## THE LESSON

**Before:**
**Student Actions**— Students listen to the problem and wonder which desk offers more space. Students conjecture which desk has a larger area and consider ways to prove their initial suspicion.

**Teacher Actions -Activate prior knowledge:** Teacher talks about how "sacred" desk space is and relates to students valuing their desk area. Teacher explains a desire to offer the largest desk area to the student teacher (or other person or group). Which desk offers more area? The desk with a rectangle work space or trapezoid workspace?

**Be sure the problem is understood –** students identify where the workspace is for each desk. What do students notice about the two options? Which desk do students initially expect to have more workspace?
**Establish clear expectations:** Each group will be responsible for an answer to, "which desk has more

area?" and the area of each work space to prove which desk offers the most space.

**During:**
**Student Actions**— Students work in teams of 2 or 3 to find the area of both desks to determine which is larger. Students use tools and develop strategies. Student actions are based on student background knowledge and intuitive strategy.

Describe specifically what the students will be doing in this phase. Include a description of how the students will record their mathematical thinking in writing or drawing throughout the investigation.

**Teacher Actions**:
- Notice students' mathematical thinking
- Ask questions/Prompt sharing (Tell me about this. Explain this to me. How do you know this will lead to the area of this shape? What made you think this?)
- Assist groups with desired resources and tools
- Find 3 strategies that will be shared (beginning with strategies that are primitive and on the right track and leading into more elegant/standard)

**After:**
**Student Actions**— 3 (previously selected groups) present their findings. Groups share how they found the area of both workspaces to prove which is the largest and therefore the best for the student teacher (or other student or group) to use.
Listening students notice trends between shared strategies and their own thinking.
Students share noticings as they listen to peer presentations.

**Teacher Actions**— Teacher facilitates presentations and discussions.
Teacher asks questions/ leads to noticing in student strategies.
Teacher facilitates use of common terms (ex. Height and base)
Teacher summarizes strategies.
Teacher records strategies for reference for phase 2 with additional trapezoid shapes.

**ASSESSMENT**

**Observe:** What misunderstandings are still in place? What shapes are students confident in and using to find the area of trapezoids?

**Ask**:

Phase 2:
Give additional trapezoid shapes. Students use created strategies to find area. Groups