

# Measurement - Volume

## Curriculum Expectations

Math Processes:

Reasoning:

\* develop and apply reasoning skills (e.g., classification, recognition of relationships, use of counter-examples) to make and investigate conjectures and construct and defend arguments

Connecting:

\* make connections among mathematical concepts and procedures, and relate mathematical ideas to situations or phenomena drawn from other contexts (e.g., other curriculum areas, daily life, sports);

## Measurement:

\* determine, **through investigation** using a variety of tools and strategies (e.g., decomposing rectangular prisms into triangular prisms; stacking congruent triangular layers of concrete materials to form a triangular prism), the *relationship between the height, the area of the base, and the volume of a triangular prism*, and generalize **to develop the formula** (i.e., **Volume = area of base x height**) (Sample problem: Create triangular prisms by splitting rectangular prisms in half. For each prism, record the area of the base, the height, and the volume on a chart. Identify relationships.);

## Criteria:

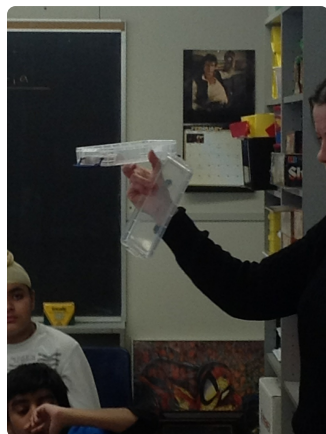
**\*Math words/symbols**

**\*Diagrams/numbers to show thinking**

**\*Strategy is logical**

**\*Easy to read**

## Minds On:



Setting the context: "There is a 'candy guessing contest' being held at the school. "It's not just about guessing, you can apply your mathematical thinking to help you win that contest.

Teacher prompts:

"How might your math skills help you win?"

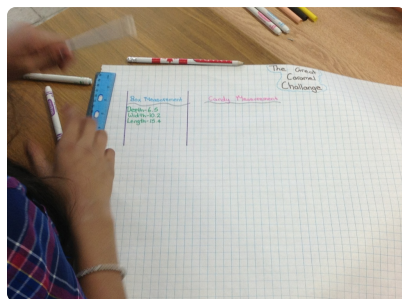
"Let's think about some math vocabulary that you might include."

"When you create your strategy what math concepts might you consider?"

"How might your knowledge of area, surface area and volume might help you in developing your strategy?"

\* Generate vocabulary and record on a chart paper/chalkboard

## Action:



**Challenge: Develop a mathematical strategy to solve how many caramels will fit in your container.**

\*teachers provide students with one caramel and one empty container.

\*students are directed to develop a strategy as to how they might determine how many candies will fit

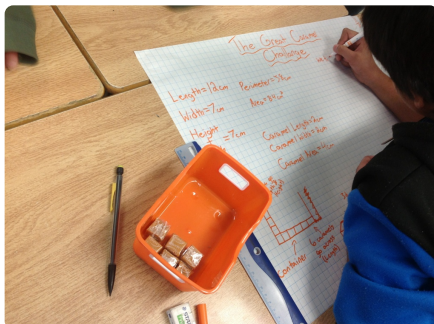
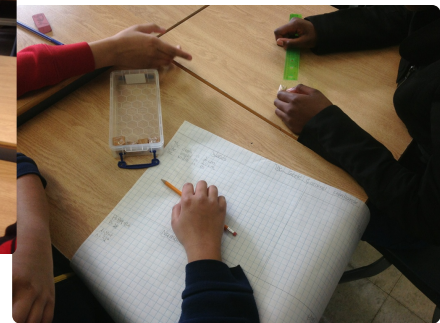
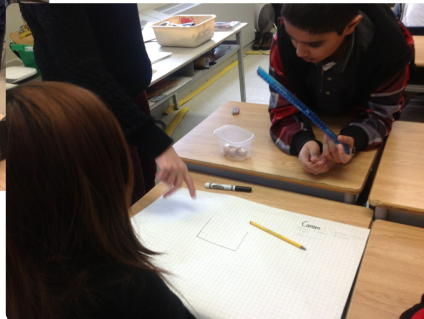
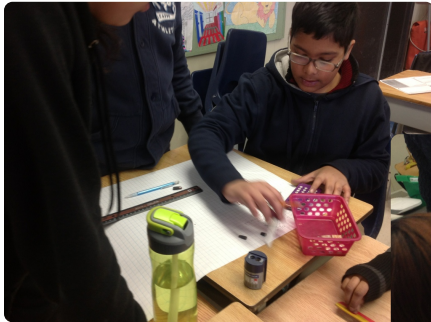
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## Materials:

rulers  
large cm grid paper  
empty container  
Kraft caramels  
calculators  
markers  
optional use of iPads

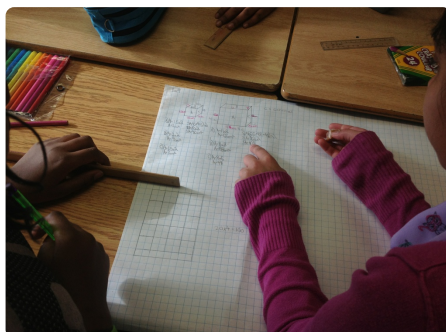
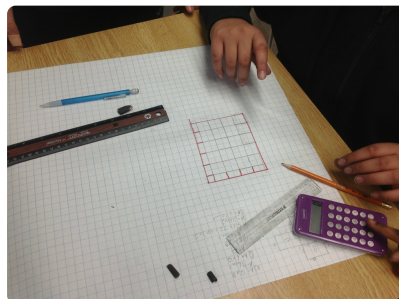


Student discovery and building understanding by questioning each other..."Why are you measuring the caramel?"



Students begin to discover strategies by calculating volume of container and area of caramel

Teacher prompting through questioning



Recording dimensions



Calculating dimensions

**Debrief:** *Gallery Walk (Timed activity - 10 minutes)*

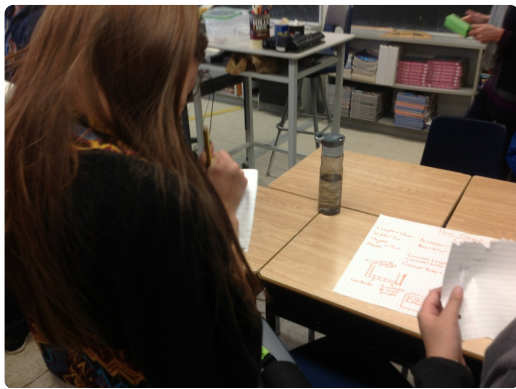
**Purpose:** *Assessment as Learning and Building Understanding*

\*Students build understanding by reviewing the work of peers: Groups are given the opportunity to review each others' work and record ideas that they would like to apply to their own work

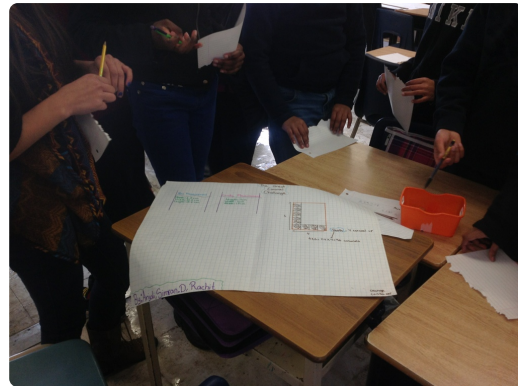
\*Students record ideas from work observed and bring ideas back to group (note: students may travel individually, with a partner or as a small group).

\*Students return back to group and share ideas in a Round Robin fashion

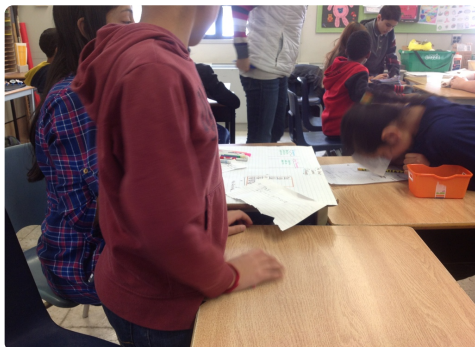
\*Students use their observations and ideas from others to make improvements to their work.



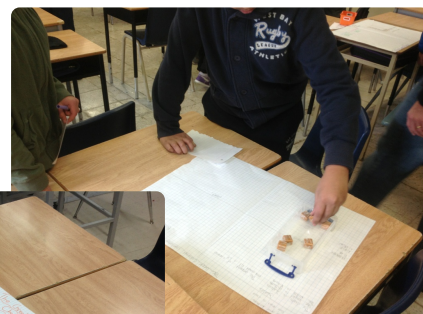
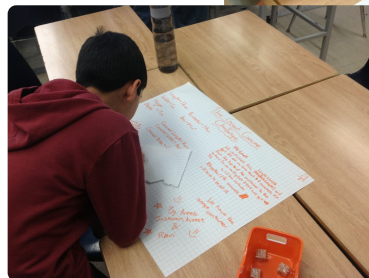
Students independently record ideas on lined paper to bring back to their work.



Students discuss others' ideas in Gallery Walk



Students return to home group to share ideas prior to making changes to their own work.





## **Our Theory of Action:**

**If** we provide the opportunity for the students to use assessment as learning strategies (i.e. co-constructed criteria; building understanding by viewing the work of others) **to** have them reflect on their own work and give them the opportunity to make their work better, **then** students will communicate their mathematical thinking in a thorough and logical way.

## **Follow up Activity:**

Students will present their findings, in teams, to determine which group has the best strategy to win the contest.

Students and teacher can co-construct the criteria for "*What makes the best math strategy for the Great Caramel Challenge*"

**e.g.**

- \*strategy includes math words related to measurement
- \*strategy logically explains how the candies will fit into the container
- \*includes a full explanation of the volume of the container and relates that to the volume of the caramel.

## **Where to go next:**

- \*compare rectangles to triangles - How are they alike? How are they different?
- \*compare triangles, rectangles and parallelograms
- \*connect area of a rectangle to area of a triangle and parallelogram (using manipulatives to show relationship between a triangle and a rectangle; relationship between parallelogram and a rectangle)

