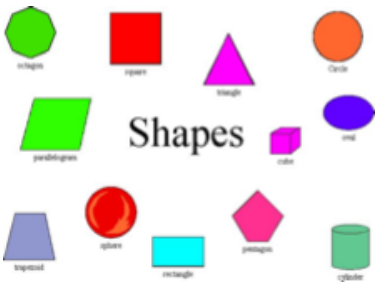
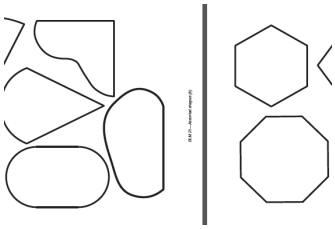


As you enter class: Sort the pile of shapes on your table and label and define each group



The Mathematics of Geometry and Measurement

Ancient Greek: Geo = Earth, Metric = measure

Geometry: The mathematics of the properties, measurement, and relationships of points, lines angles, surfaces and solids

Shape Sorts

- Regular Polygons (many sided shape)
- Curved shapes
- Irregular Shapes
  - ↳ # of ∠'s

- Curved shapes w/no defined ∠
- Curved w/ straight sides
- Curved Shapes

→ Polygons → broke up by counting sides
- 3 sides △
- 4 sides
  - Parallel sides
  - no parallel sides

symmetry of shapes

VENN DIAGRAM
Shapes that are in more than one category

What is due Today

Reading for Today's Discussion:
VDW Chapter 19: *Developing Measurement Concepts* (Angie)
and
Chapter 20: *Geometric Thinking and Geometric Concepts (Jess)*

And TCM article *Isometric Geometry (Gloria)*

1. Observation 2
2. Tangram investigation - bring to class

1 in ≈ 3cm

9cm x 1 in / 3cm = 3in

if you have this ruler and you want to convert 9 cm to inches what ratio could you multiply 9 cm by to find the same measurement in inches?

Measure these objects:

1 in 1 in
1 in

van Hiele Level to describe students geometric thinking

Level 1: Recognition - identify shapes and figures only on the basis of appearance
(no recognition or understanding of properties and orientation affects how they view shapes) - shape sort activity

Level 2: Analysis - analyze shapes based on properties and attributes, generalizations begin - properties of shapes

Level 3: Informal Deduction - generalize relationships between various shapes - justify using minimal facts - venn diagram for quadrilaterals

Level 4: Formal Deduction - justify using deductive reasoning, proofs (secondary) - do the diagonals split a rectangle into 4 congruent parts?

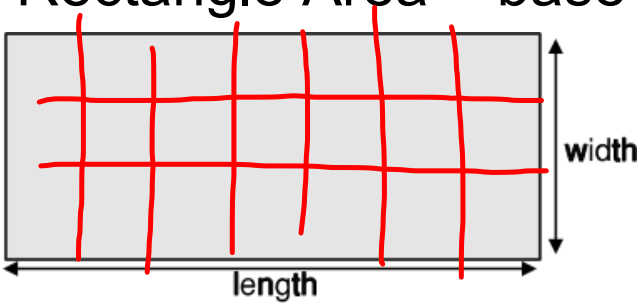
Level 5: Rigor - different types of systems of geometry and axiomatic systems (post - secondary)- the sum of the angles of a triangle are 180 degrees is this the same on a sphere?

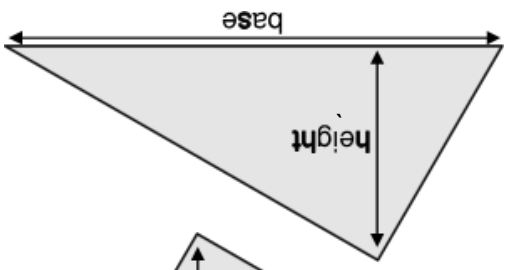
AREA FORMULAS - they do not come from the math gods

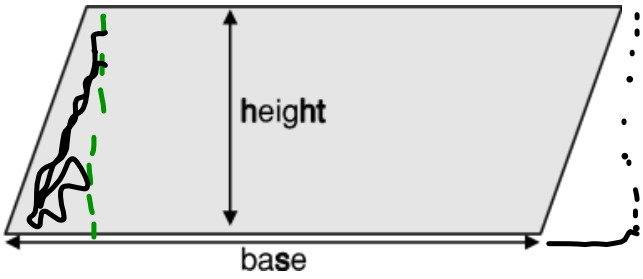
Children should never use formulas without participating in the development of those formulas (VDW)

Square units

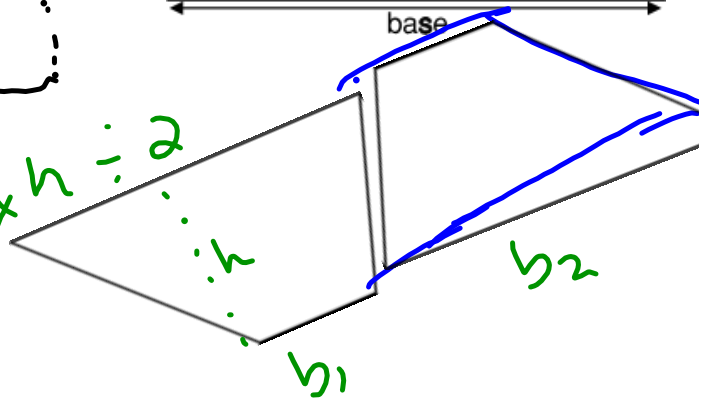
Rectangle Area = base x height







$(b_1 + b_2) \times h \div 2$



Chapter 19: Measurement

non standard to standard

Estimation and approximation

- length
- perimeter
- area
- volume
- weight
- time
- money
- angle

Chapter 20: Geometric concepts

Spatial Sense

Geometric Reasoning

Van Hiele Levels for Geometric thought;

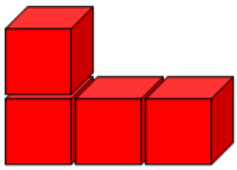
- learning about shapes, properties of shapes, definitions, proofs and justifications

Transformations - tangrams helped with this

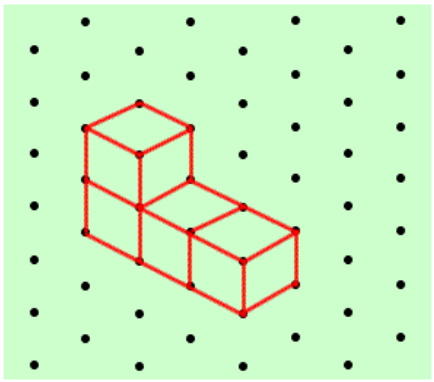
Location

Isometric Geometry

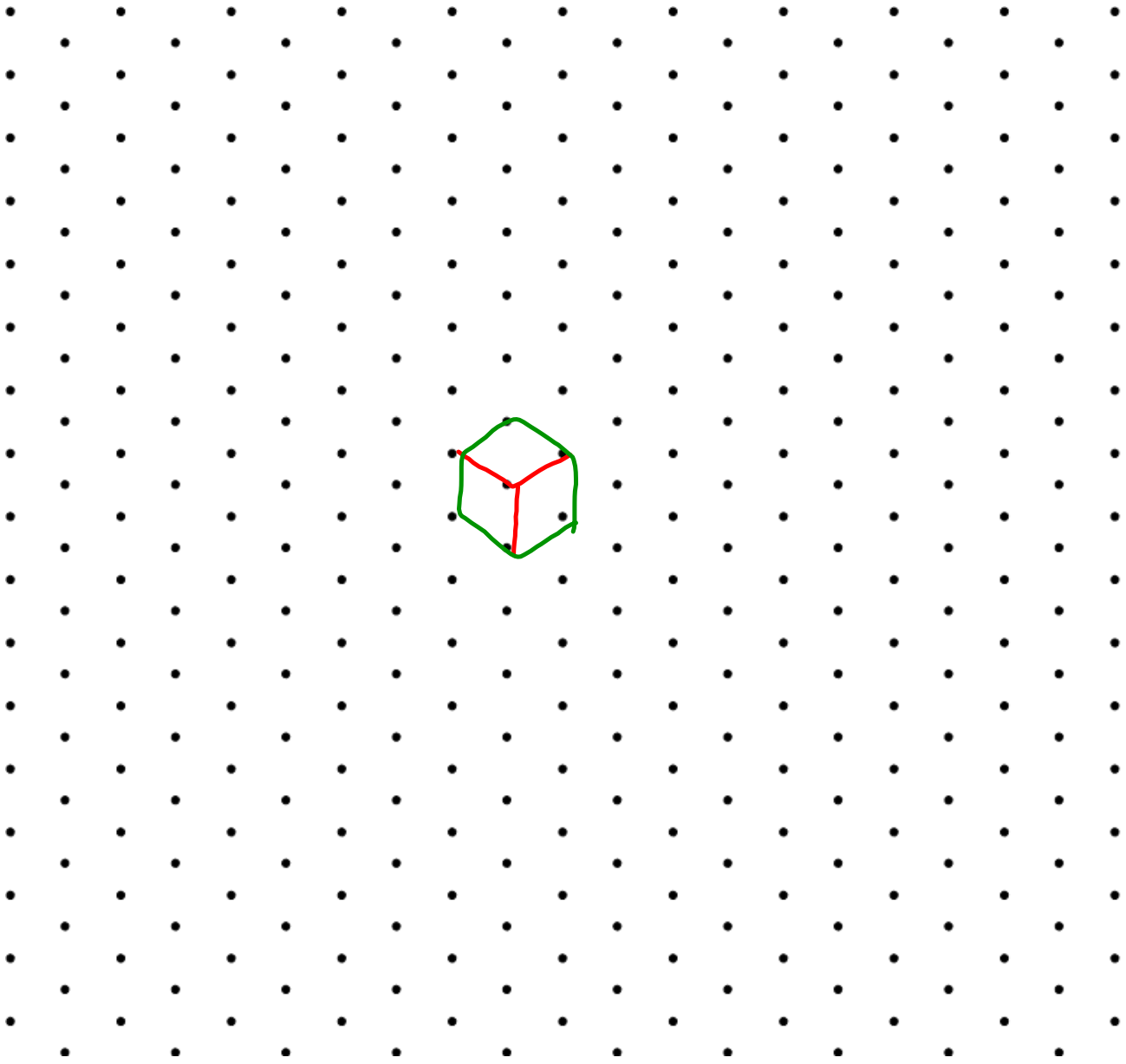
Here are four cubes joined together:



We can draw this arrangement of cubes on dotty paper (isometric paper) which gives us a way of drawing 3D objects more easily:

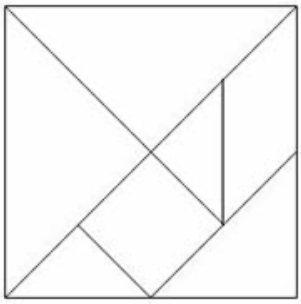


How many other arrangements of four cubes can you find?
Can you draw them on dotty paper? It's more difficult than it looks!
If you don't have any isometric paper, click here.



Math Forum - Problem of the

Tangrams [Problem #4531]



Tangrams have been a popular puzzle for a long time. A set consists of one small square, one parallelogram, and triangles of three different sizes. All seve pieces can fit together to form a large square.

1. How many of the small triangles would it take to cover the large square?
2. Pretend that each small triangle costs 5¢, based on its area. How much would each of the other pieces cost?
3. What would be the value of the complete set?

Be sure to explain how you solved the problem.

If you don't have a set of Tangrams to use for solving this problem, you can print and cut out the pieces at http://mathforum.org/pow/support/funpow/tangrampieces.html

You may wish to use the Virtual Tangrams from the National Library of Virtual Manipulatives to help you solve the problem.

Extras:

1. What fraction of the area of the large square is each piece?
2. What percent of the total area of the large square is made up of triangles? Explain.

TANGRAM HW Continued

1. In your opinion, what do you think is the goal of this task? Explain.

part whole relationship
equivalence

area as connected state
composition of shape
% ~ fraction ~ money
decimal

2. What grade do you think this task is for? Explain.

1 – 7th

3. Based on your answer on #2 and #3, identify a Common Core State Standard for Mathematics (CCSSM) that this problem task could be aligned to. Why did you choose that standard? Explain.

4. Based on your own understanding of assessment at this time – create a rubric or some kind of tool to assess this task and bring to class to share

Now using your tool/rubric: grade one of your classmates homework based on your tool/rubric and provide feedback.

Discuss:

what was being asked in the task
what content etc is important
Did they meet the requirements of the task
what details are important

What is due next week:

VDW Chapter 14: Algebraic Thinking: Generalizations, Patterns, and Functions

Nina

1. Observation 3
2. Triangle Trains

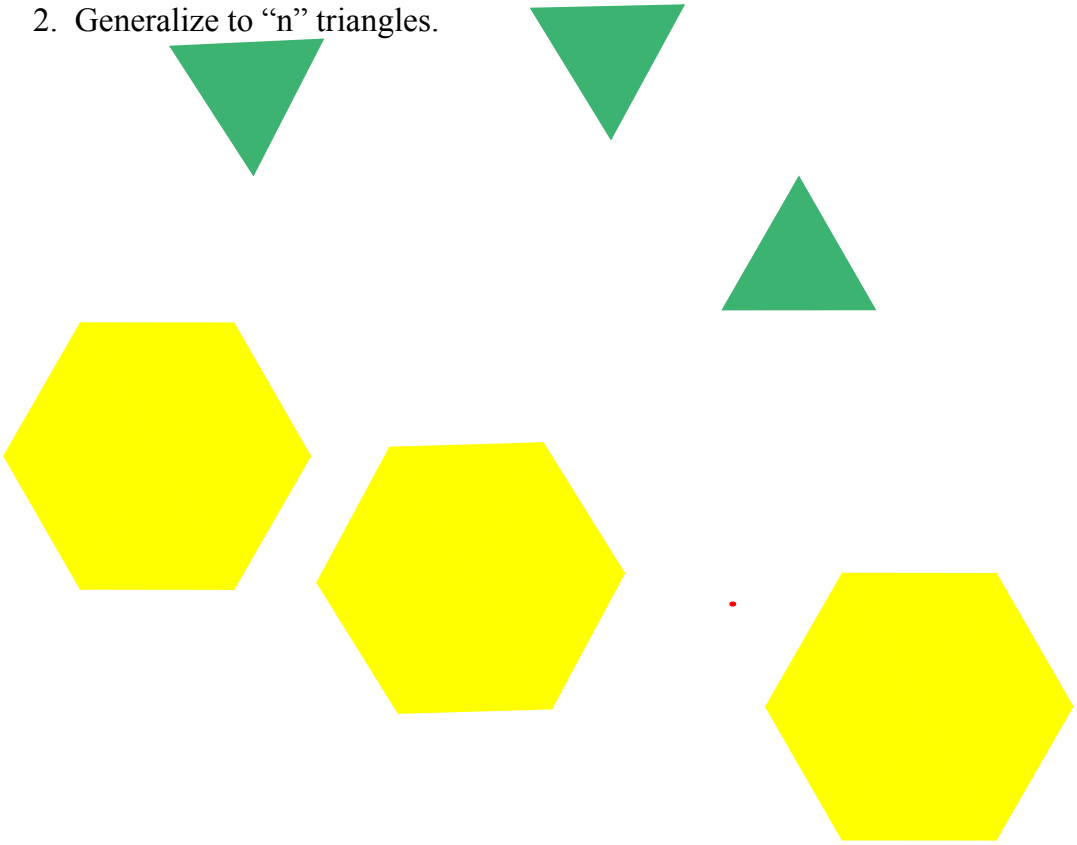
Triangular Trains

Using equilateral triangles, what would be the perimeter of a Triangle Train if it had "n" triangles in it?

Be systematic!

1. Build trains of various lengths and write a rule that you might use to calculate the perimeter of a train of 10 triangles, a train of 101 triangles.

2. Generalize to "n" triangles.



Project 2 is coming up
We are members of PS 320

You are teachers at this school doing planning
You comprise of different grade teams, working on different topics. You will work on a unit plan together which we will talk in more detail about next week and from that unit each teacher will teach one lesson snapshot.
Here are your teaching assignments

Your unit plan will include:
Part I (Completed with your GRADE TEAM)
a) Mathematics Learning Segment Overview (Template Provided)

- Central focus needs to be address – this is one of the big milestones from project 1 and should support students to develop conceptual understanding, procedural fluency, and mathematical reasoning/problem-solving skills.
- A connection to the New York State Common Core Standards for Mathematics
- Brief description of the lesson objectives for each lesson in the unit
- Instructional strategies and Learning tasks for each lesson in the unit – some of the instructional strategies may be connected to milestones mentioned in project 1
- Finally (Formative and/or Summative) Assessment must be described for each lesson in the unit
- There should be a connection to the milestones and big ideas from project 1

- b) A chart/outline/diagram that describes how much time the entire learning segment would take to complete
  > and how much time the individual lessons would take within this time frame

so we should have at least 1 team per grade
2 1st grade teams (*combinations, comparison), 1 2nd grade (graphs), 3rd grade (x equal sets, time), 4th grade (patterns), 5th grade (multiplication and division arrays - distributive property) - I need a fraction group.

For Next Week: Your Team will begin to Draft out the Learning segment overview

Learning Segment Overview

Identify a learning segment: Review the curriculum with your team and select a learning segment of 3–5 consecutive lessons (or, about 3–5 hours of connected instruction) The student formative assessment will be included in this segment.

Identify a central focus along with the content standards and objectives taught in the learning segment and assessed in this task. The central focus should support students to develop conceptual understanding, procedural fluency, **and** mathematical reasoning/ problem-solving skills.

Learning Segment Overview Template.docx

Part I of Redesigning a Unit Plan

a) Mathematics Learning Segment Overview (Template Provided)

- Central focus needs to be address – this is one of the big milestones from project 1 and should support students to develop conceptual understanding, procedural fluency, and mathematical reasoning/ problem-solving skills.
- A connection to the New York State Common Core Standards for Mathematics
- Brief description of the lesson objectives for each lesson in the unit
- Instructional strategies and Learning tasks for each lesson in the unit – some of the instructional strategies may be connected to milestones mentioned in project 1
- Finally (Formative and/or Summative) Assessment must be described for each lesson in the unit
- The milestones from project 1 **should be connected** to the individual lessons of your unit.
- b) A chart/outline/diagram that describes how much time the entire learning segment would take to complete and how much time the individual lessons would take within this time frame

Attachments

Anaylsis of Math Lesson 2013.doc

Anaylsis of Math Lesson 2014.doc

math-g2-m5-topic-b-lesson-10.docx

6100C_Anaylsis of Math Lesson 2015.doc

Anaylsis of Math Lesson 2015.doc

Elementary_Education_-_Mathematics_Context_For_Learning (2).doc

Learning Segment Overview Template.docx