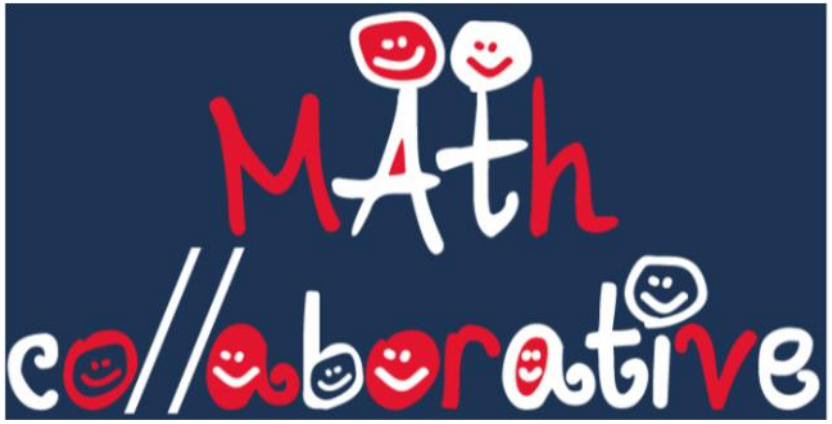
Measurement and Data

Hello!!!

<u>1 per Sticky Note - Put on board</u>

What are 3 things you find challenging about teaching measurement and/or data?

Karen Hensen
Resource Teacher
CRMC
Columbus State University



WODB

A

B

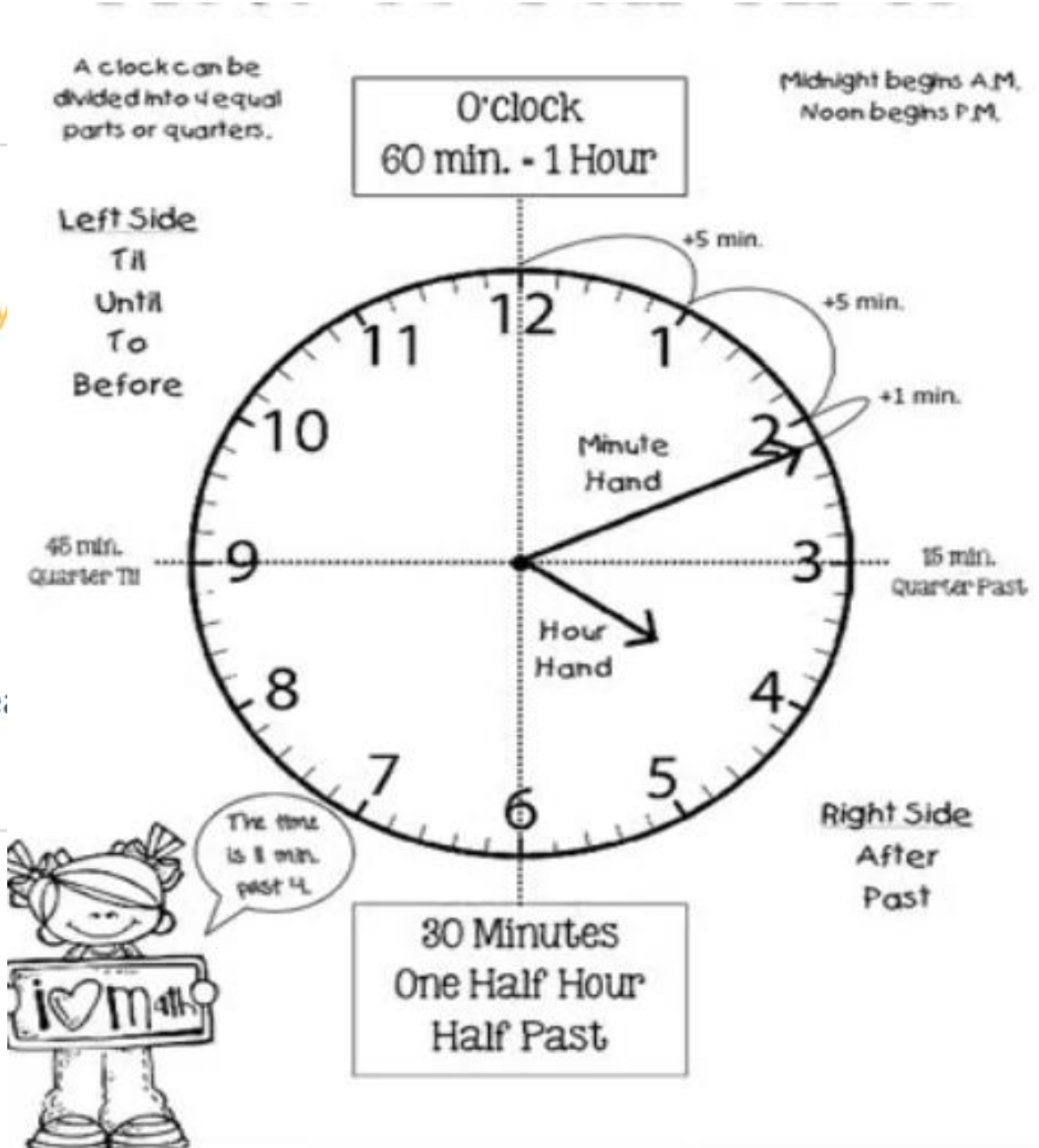
C

D

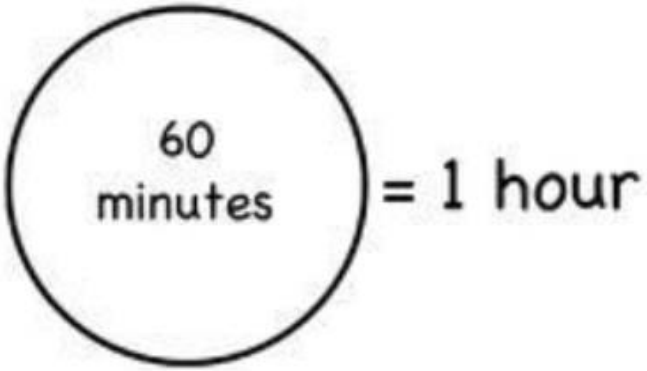
Connections

Domains

- Counting and Cardinality
- Operations and Algebra
- Numbers and Base Ten/ Fractions
- Measurement (other area
- Geometry



Connections



Domains

- Counting and Cardinality
- Operations and Algebra
- Numbers and Base Ten/ Fractions
- Measurement (other areas)
- Geometry

What is elapsed time?

I tell my students a guest speaker will be coming in, in 30 minutes. When will he arrive?

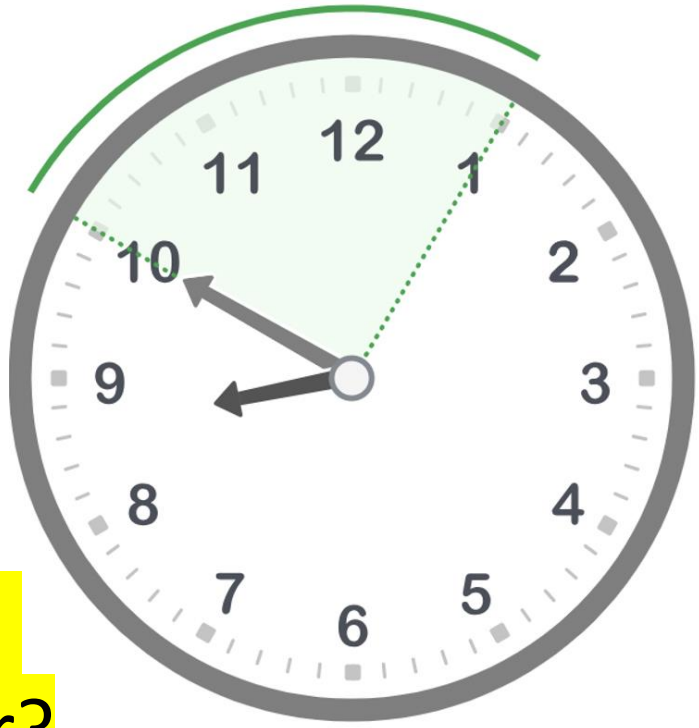
STOP! Make them look at the clock and figure it out!

Domains

- Counting and Cardinality
- Operations and Algebra
- Numbers and Base Ten/ Fractions
- Measurement (other areas)
- Geometry

We left the house at 9:05 for an appointment. We were running late by about 15 minutes. What time were we suppose to leave to get to our appointment on time?

What time was it 15 minutes ago?



Notice?
Wonder?

groups

How many professional learning hours will you receive for this workshop?

Session

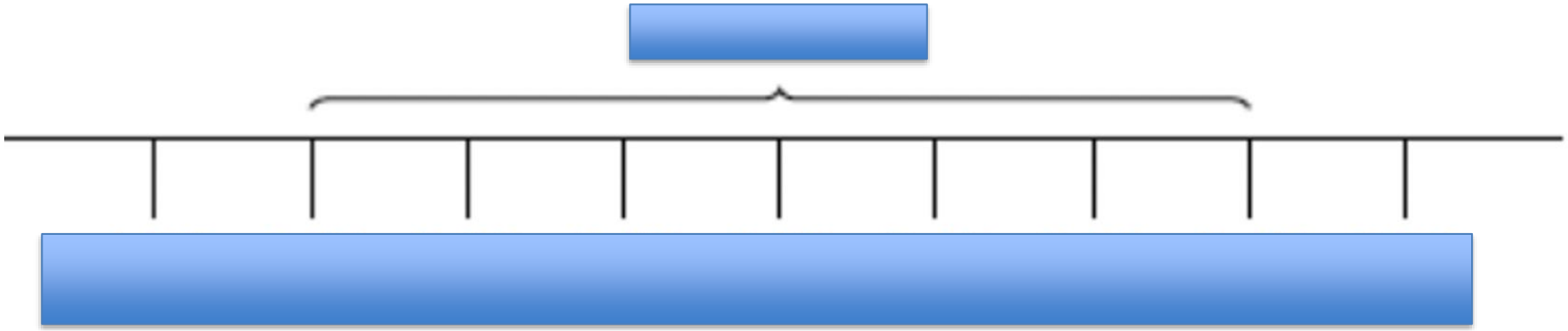
8:30 - 3:00

Lunch 11:30 – 12:30

Time

Number Line Diagram

- Easier
- Consider movement of the hour and minute hands



What time does Marla have to leave to be at her friend's house by a quarter after 3 if the trip takes 90 minutes?

Do

Elapsed time on the number line

Maria started reading at 3:30. She read for 1 hour and 15 minutes. At what time did Maria stop reading? Use a number line to find out.

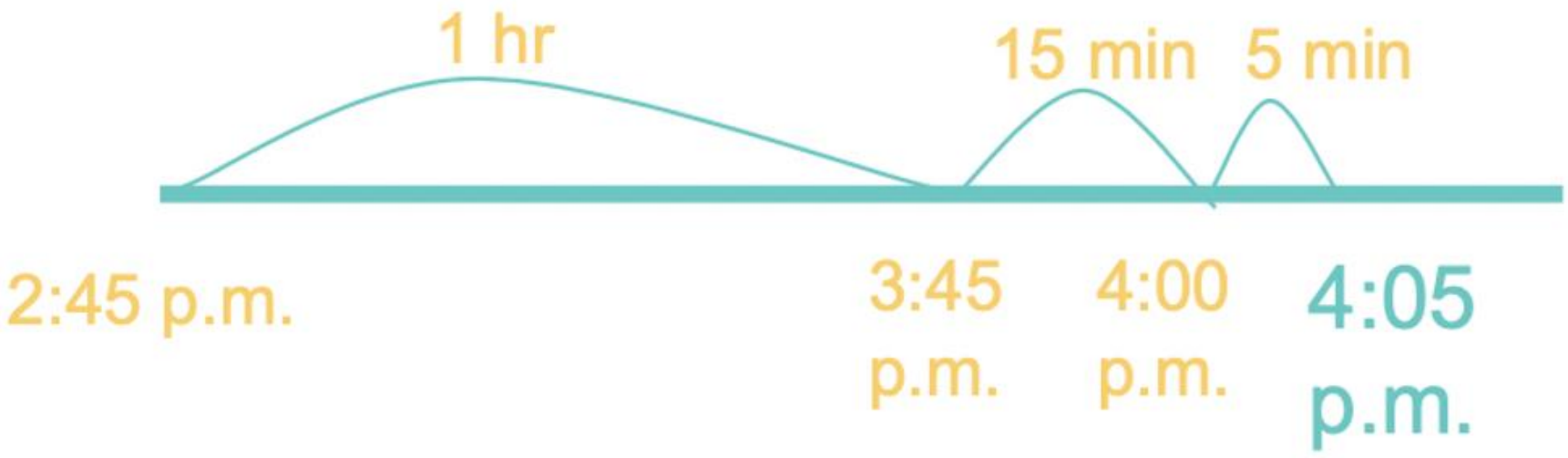
Maria stopped reading at ____.

Connection

Domains

- Counting and Cardinality
- Operations and Algebra

A movie began at 2:45p.m. and lasted 1 hr. and 20 min. What time was it when the movie over?



Connections

1 hr = 60 min.

Domains

8 77

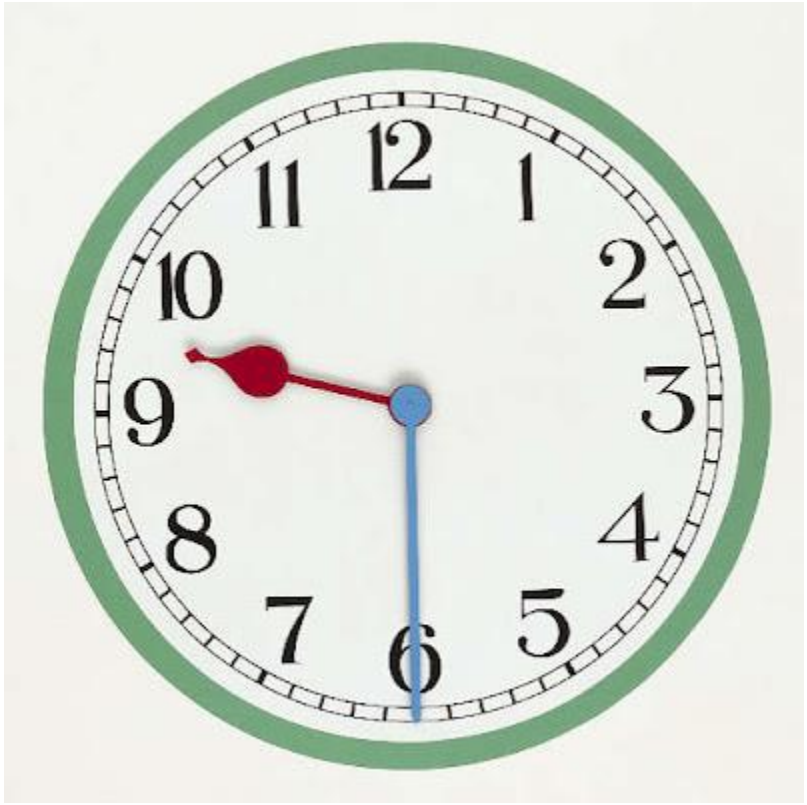
~~9~~ hrs ~~17~~ min

- 7 hrs 30 min

1 hr 47 min

On holiday, we are driving from Columbus, GA to Virginia Beach. We are all tired because we have been in the car for 7 ½ hrs. According to our GPS (Global Positioning System) the trip will take 9 hrs. 17 min. How much longer do we have to endure being in the car?

Break 10 minutes



★ Snacks and drinks

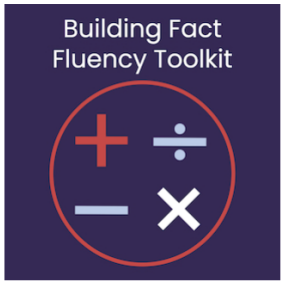
★ Restroom? Bottle Filling Station?

- To the right at the end of hall.

3 Act Tasks https://gfletchy.com/3-act-lessons/

GFletchy Home Tasks and Resources Professional Learning About SUBSCRIBE TO NEWSLETTER

I SUPPORT TEACHERS AND STUDENTS IN DEVELOPING A CONCEPTUAL UNDERSTANDING OF MATH THROUGH INNOVATIVE IDEAS AND ENGAGING TASKS.



Build Fluency through Context and Purposeful Practice.

Problem-based lessons that will foster students' curiosity.

Short videos that show content across grade levels.

Learn more about Graham's workshops

Act 1

- What do you notice? wonder?

- How long will it take to fill up the 4 pickle jars? Estimate

- Write an estimate you know is too high and too low.

https://youtu.be/OqJez7-ai-A

Act 2

Name: _____ https://gfletchy.com/dill-er-up/

1. What did you notice?	2. What do you wonder?

3. Main Question:

How long will it take to fill up the 4 pickle jars?

4. Estimate:	5. What information do you need?

6. Show your thinking:

How long to fill up the small jar

Size of the small pickle jar

Size of the 4 jars

Act 3 https://gfletchy.com/dill-er-up/

Wait to play the reveal

Name: _____

1. What did you notice?	2. What do you wonder?
3. Main Question: How long will it take to fill up the 4 pickle jars?	
4. Estimate:	5. What information do you need?
6. Show your thinking:	

Would you Rather...

Have Cheez-It's® to cover a rectangle with..

A length of 9 and
a perimeter of 22

A length of 5 and
a perimeter of 20

FOOTBALL

HOW MANY BLADES OF GRASS ARE ON A FOOTBALL FIELD?

School Area

Van de Walle's Approach

- ground students' data analysis in a real-world context that is relevant and engaging for them
- encourage them to interpret data meaningfully, helping them develop an understanding of data concepts in a hands-on, practical way

Attributes

The first and most critical goal is for students to understand the attribute they are going to measure.

Van de Walle

- Measurable attributes are quantifiable characteristics of objects or events.

- What is the measurable attribute we are looking for?

Googol = 10^{100}

(not even a googol grains of sand are found on all the beaches in the world)

Millions Period			Thousands Period			Ones Period		
Millions			Thousands			Ones		
hundreds	tens	ones	hundreds	tens	ones	hundreds	tens	ones
6	5	0 ,	0	8	4 ,	9	7	0

Before Estimation

Place Value Chart

Periods in the

- Duodecillions
- Undecillions
- Decillions
- Nonillions
- Octillions
- Septillions
- Sextillions
- Quintillions
- Quadrillions
- Trillions
- Billions
- Millions
- Thousands
- Units

Collect Data

How are we going to determine how many pieces of grass are on the school's football field?

POSSIBLE TO COUNT THEM ALL?

HOW MANY BLADES OF GRASS ARE ON A FOOTBALL FIELD?

Strategies to make a 'Good' Estimation

Good = close as we can get = REASONABLENESS

Break 10 minutes

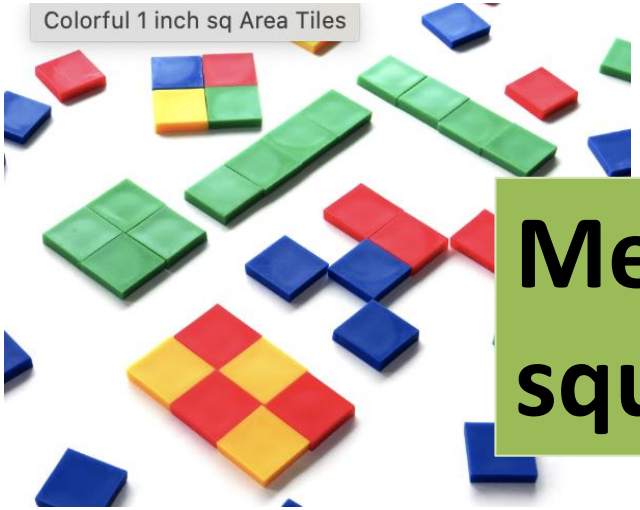
★ Snacks and drinks

★ Restroom? Bottle Filling Station?

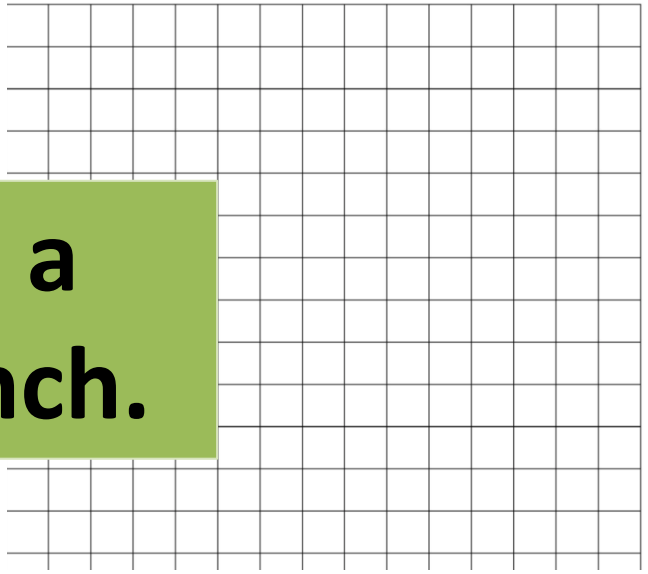
Do

Discover Area

Square Tiles



Graph Paper



Measure a square inch.

Construct a model of a square foot.

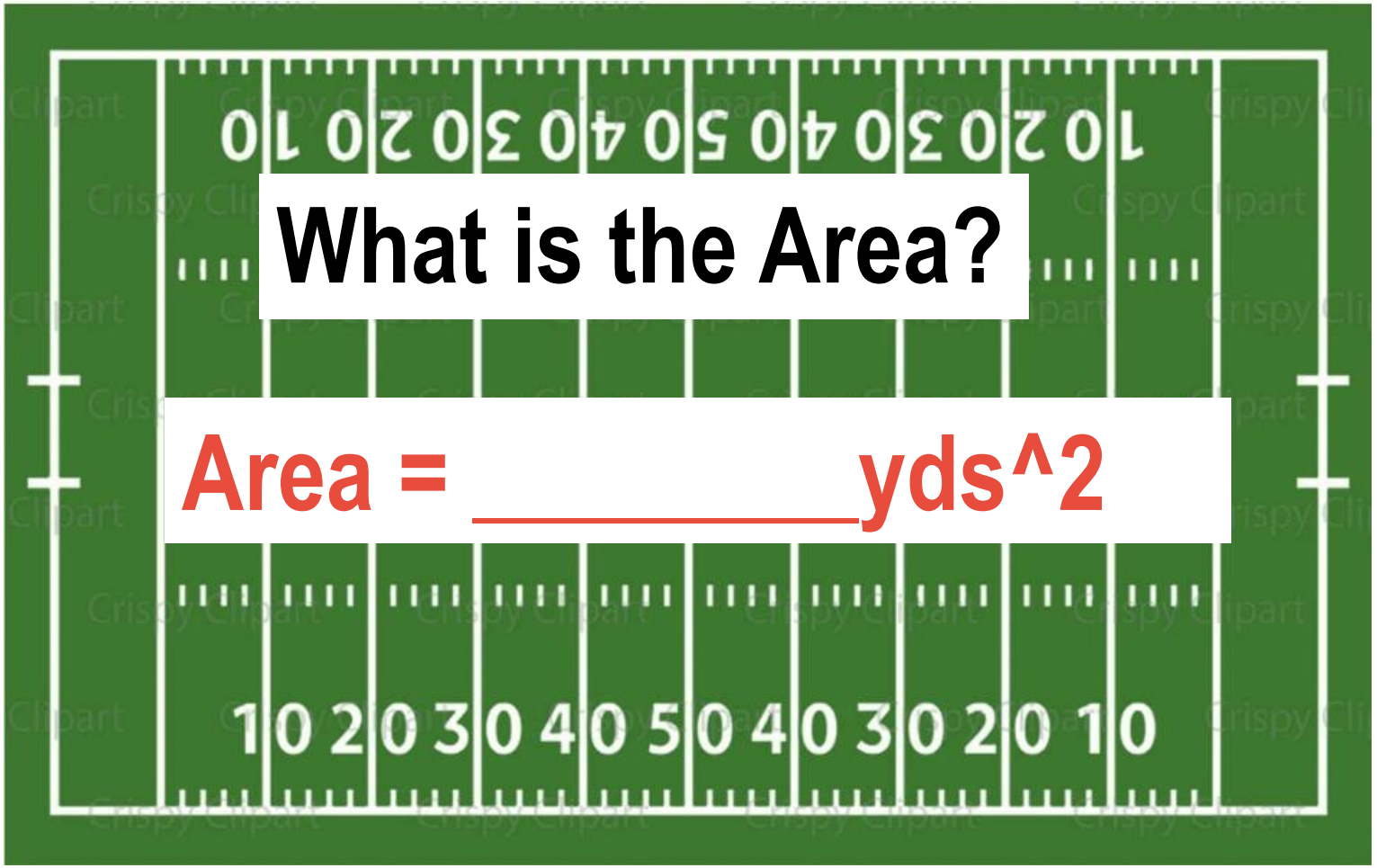
- square yard

- square meter

Do

Dimensions: Tell/**Discover**

Length (known): **100 yards** (120yds)



Width: **50** yards

Calculate Dimensions

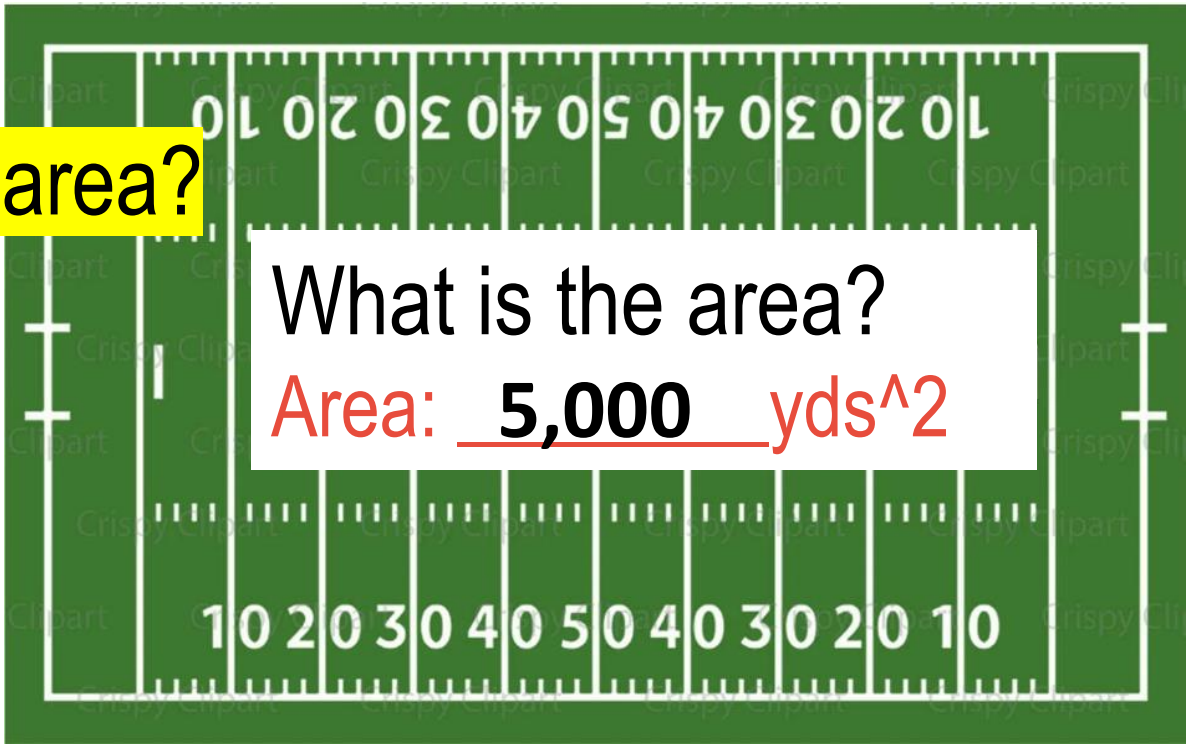
Length
1 foot (ft.) = 12 inches (in.)
1 yard (yd.) = 3 ft.
1 mile (mi.) = 1,760 yd.
1 mi. = 5,280 ft.

Length: 100 yds (playing field)
Width: 50 yds

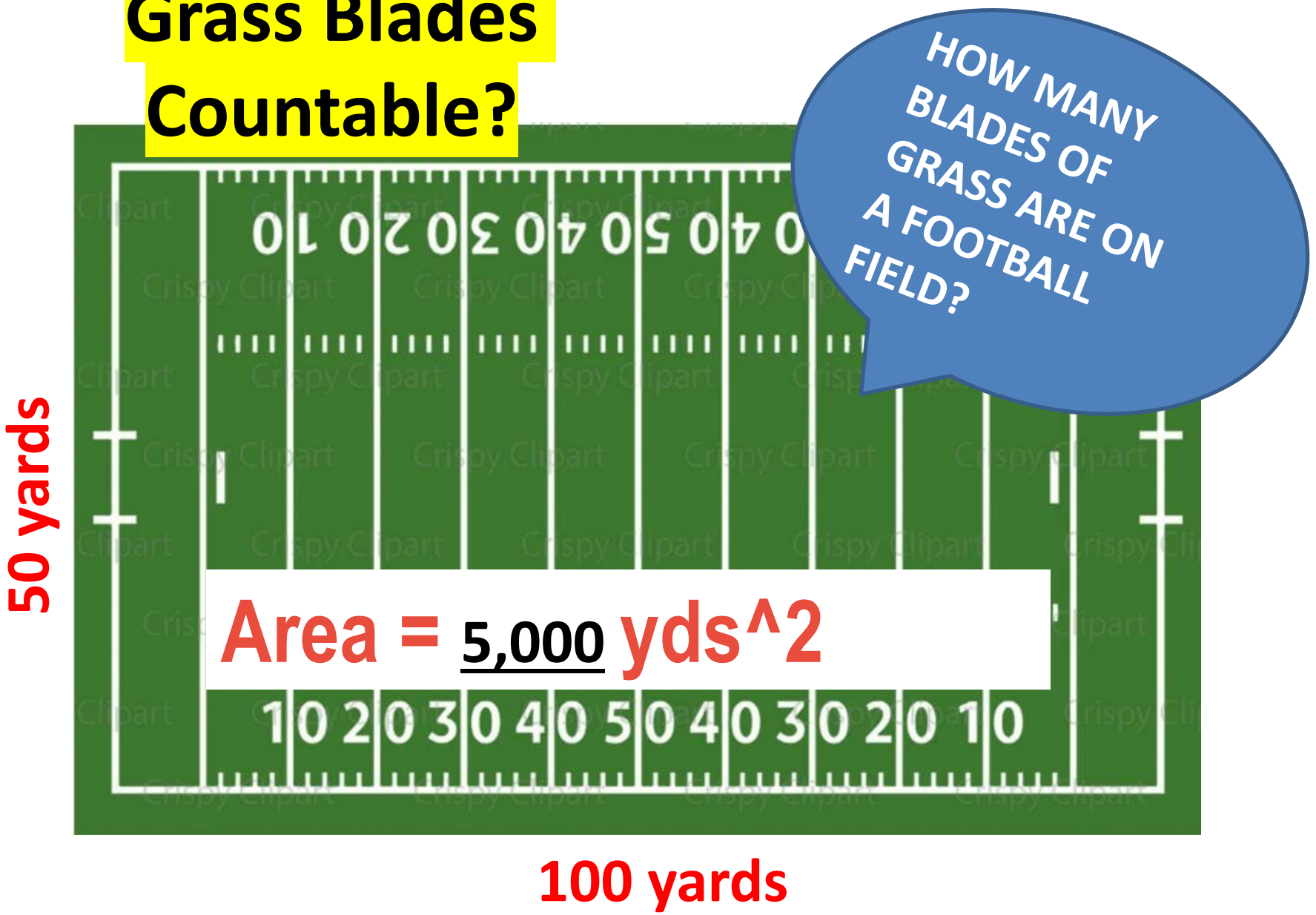
How do we find the area?

L x W

100 x 50



Grass Blades Countable?



Do

How Can We Collect the Data?

square inch frame

HOW MANY BLADES OF GRASS ARE ON A FOOTBALL FIELD?

- Put over the grass to count the blades.

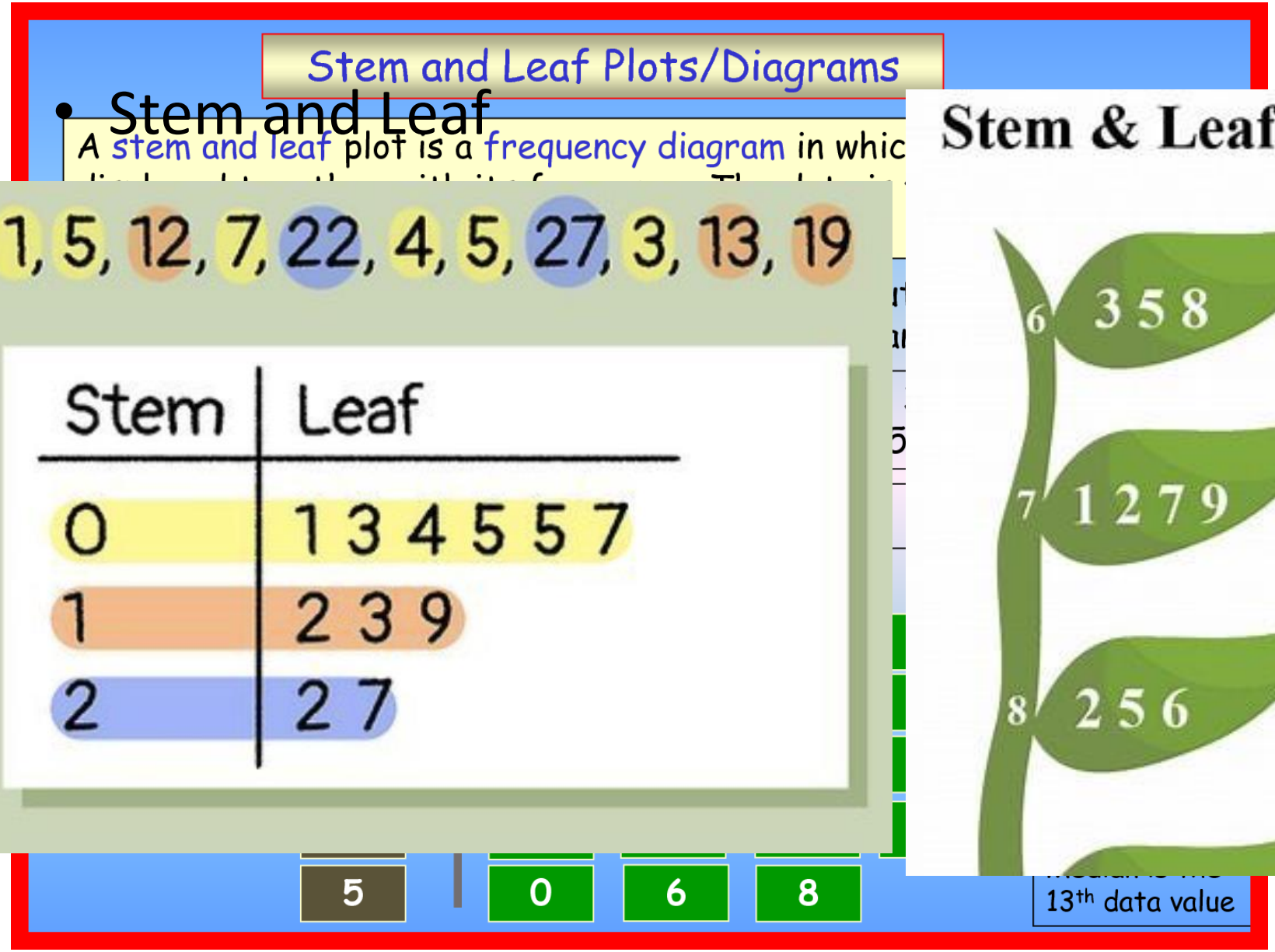
chart

Collecting & Recording Data

Group	Number of Blades

chart

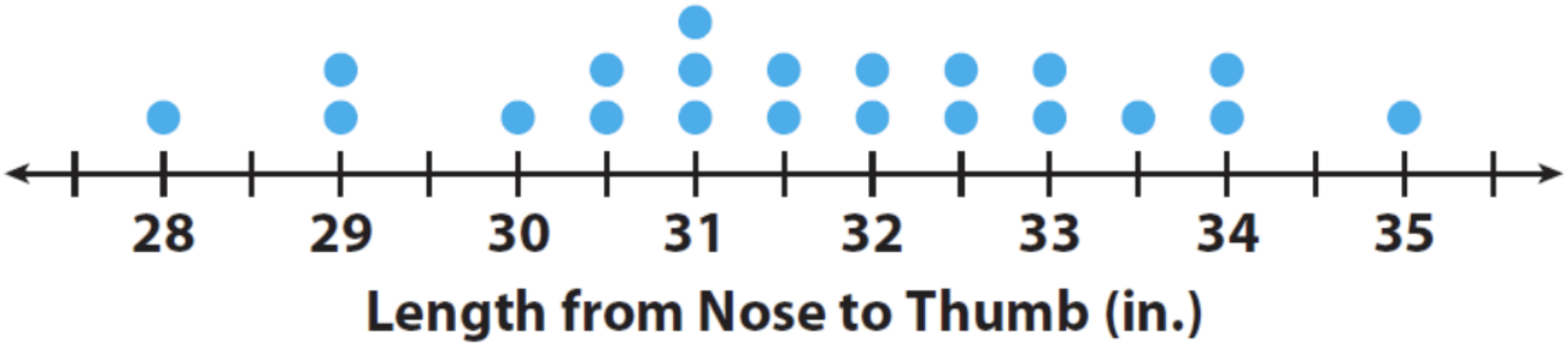
Organize the Data



chart

Graph the Data

- Line Plot



chart

Analyzing Data

Why the differences in count?

Range?

What number do we use?

Averages:

- Mean?
- Median?
- Mode?

11:30 – 12:30

Do

Review Information

Length
1 foot (ft.) = 12 inches (in.)
1 yard (yd.) = 3 ft.
1 mile (mi.) = 1,760 yd.
1 mi. = 5,280 ft.

- ✓ Football field is 5000 yd^2
- ✓ 1 sq. in. has _____average blades of grass

Now What?
How do we figure it out?

Calculate Dimensions

Length: 100 yds
Width: 50 yds

What is the Area?

Area: 5,000 yds^2

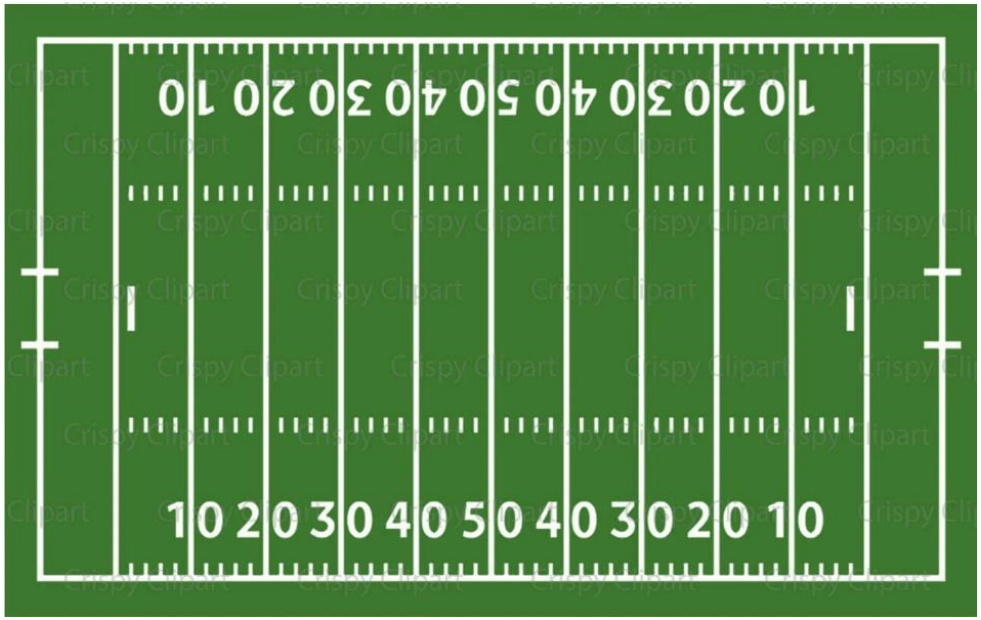
15,000 ft^2

180,000 in^2

4,181 m^2

Length
1 foot (ft.) = 12 inches (in.)
1 yard (yd.) = 3 ft.
1 mile (mi.) = 1,760 yd.
1 mi. = 5,280 ft.

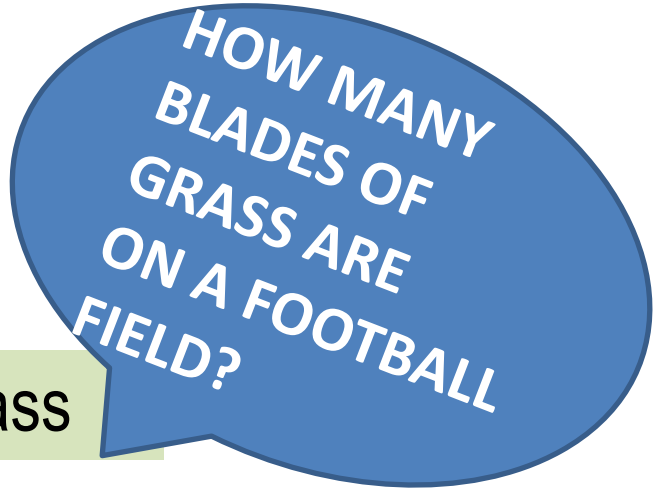
1 yard = 0.914 meter



do

Review Information

- ✓ Football field is 5000 yd^2
- ✓ 1 sq. in. has _____average blades of grass



ONE WAY

How many square inches are in a football field?

1 sq. ft. = 144 sq. in.

1 sq. yd = 1296 sq. in.

Now What?

Length
1 foot (ft.) = 12 inches (in.)
1 yard (yd.) = 3 ft.
1 mile (mi.) = 1,760 yd.
1 mi. = 5,280 ft.

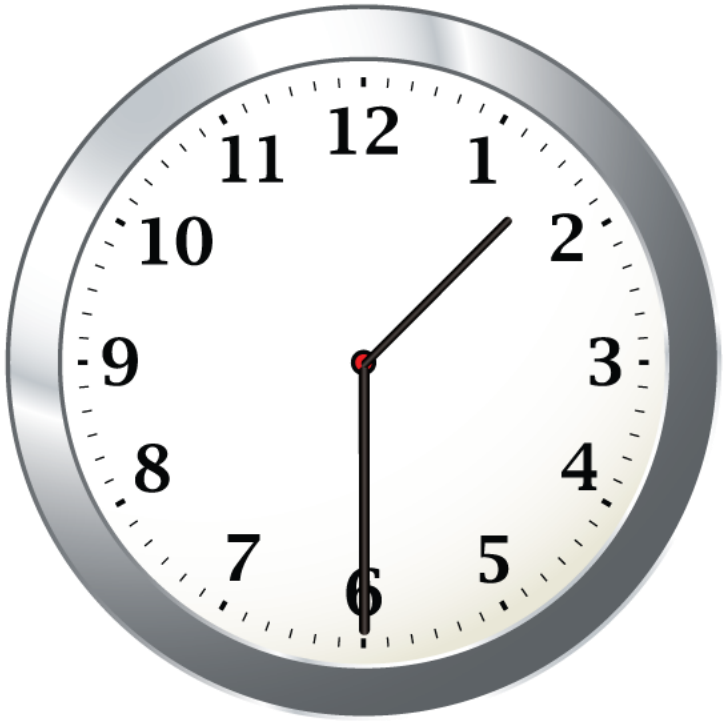
Report - Share Findings

- Writing to explain mathematical thinking.
- Teach writing process!
- Write a letter to a football team/grounds keeper and tell what did and see what they say.
  - Who cares how many blades of grass are on a football field?
    - Groundskeepers (a small # of blades might indicate not doing job well)
    - Football players (types of shoes)

Writing Process

- Explanation
  - Brainstorm the process to solve the problem
    - Individual
    - Large group
  - Match the steps of the process to with the reasons for those steps
  - Brainstorm whole group
  - Rough drafts
    - Include all steps
    - Reasons for choosing the steps
    - Pictures, diagrams that explain their thinking
    - Number sentences in explanations
  - Revise
    - Peer revise (groups of 3-4)
    - 1 criterion at a time using different colors
      - Number steps listed
      - Underline the whys
      - Circle number sentences
      - Circle picture/diagram
  - Teacher Writing conference based on rubric
  - Final draft
  - Mail

Break 10 minutes



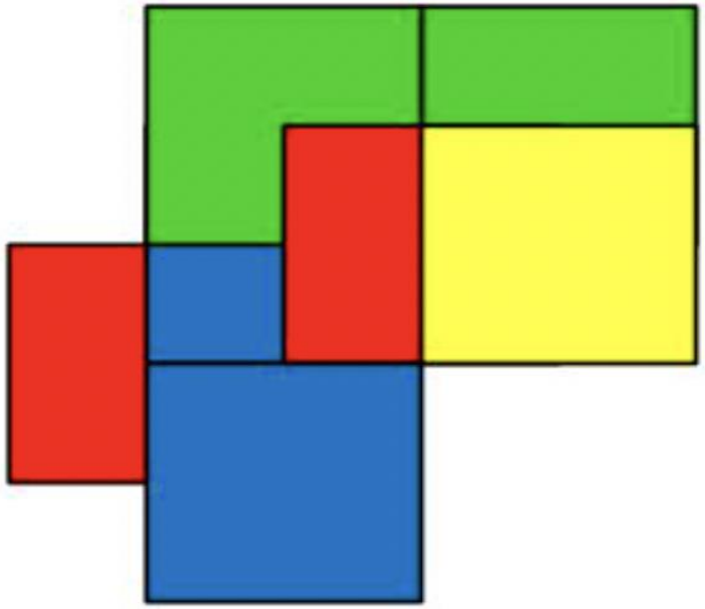
★ Snacks and drinks

★ Restroom? Bottle Filling Station?

Tiled Area

https://stevewyborney.com/2017/01/tiled-area-questions/

What is the area of this shape?



Connections

Domains

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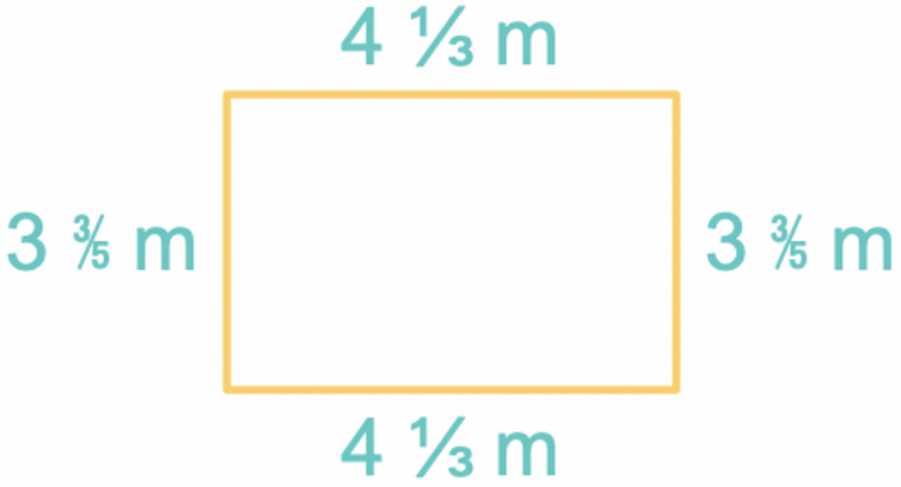
- Numbers and Base Ten/ Fractions
- Measurement (other areas)
- Geometry

Perimeter and Area



The area of my garden is 20 feet. It is 4 feet long. How wide is my garden? (Factor unknown)

3 Act Task – Area with Fractional Units

- https://gfletchy.com/the-big-pad/

Connections

Domains

- Counting and Cardinality
- Operations and Algebra
- Numbers and Base Ten/ Fractions
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- Geometry

Is Capacity and Volume the same? Give an example.

https://www.youtube.com/watch?v=GKCE8ohIBqE

The total amount of space an object occupies
– hollow or solid

Volume Vs Capacity

The amount of a container can hold.
– only hollow
- Amount of something that can fit into a container
- Solid, liquid or gas

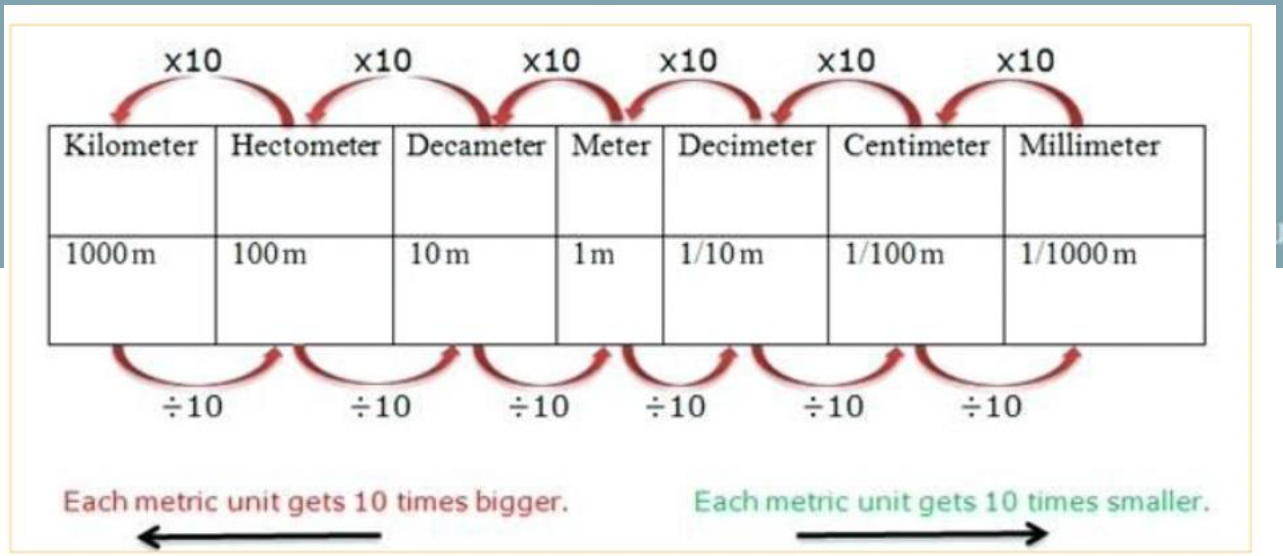
Would you rather have Option A or Option B?

OPTION A

A pitcher of 2 liters of lemonade

OPTION B

4 juice boxes with 250 mL of lemonade in each



Connections

Domains

- Counting and Cardinality
- Operations and Algebra
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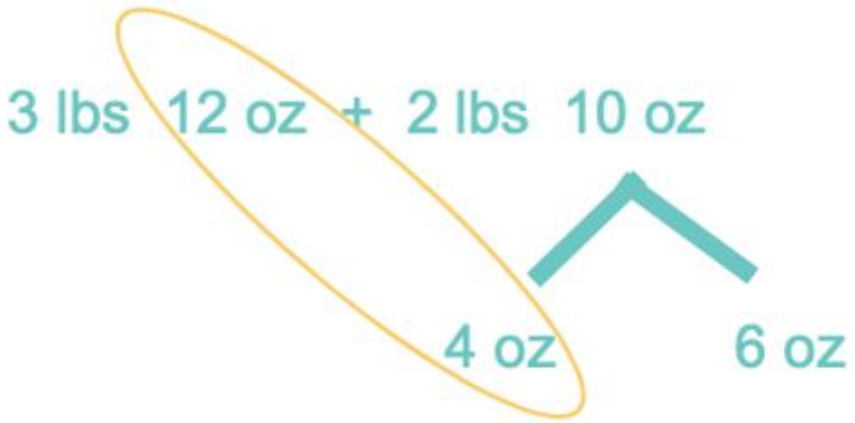
- Geometry

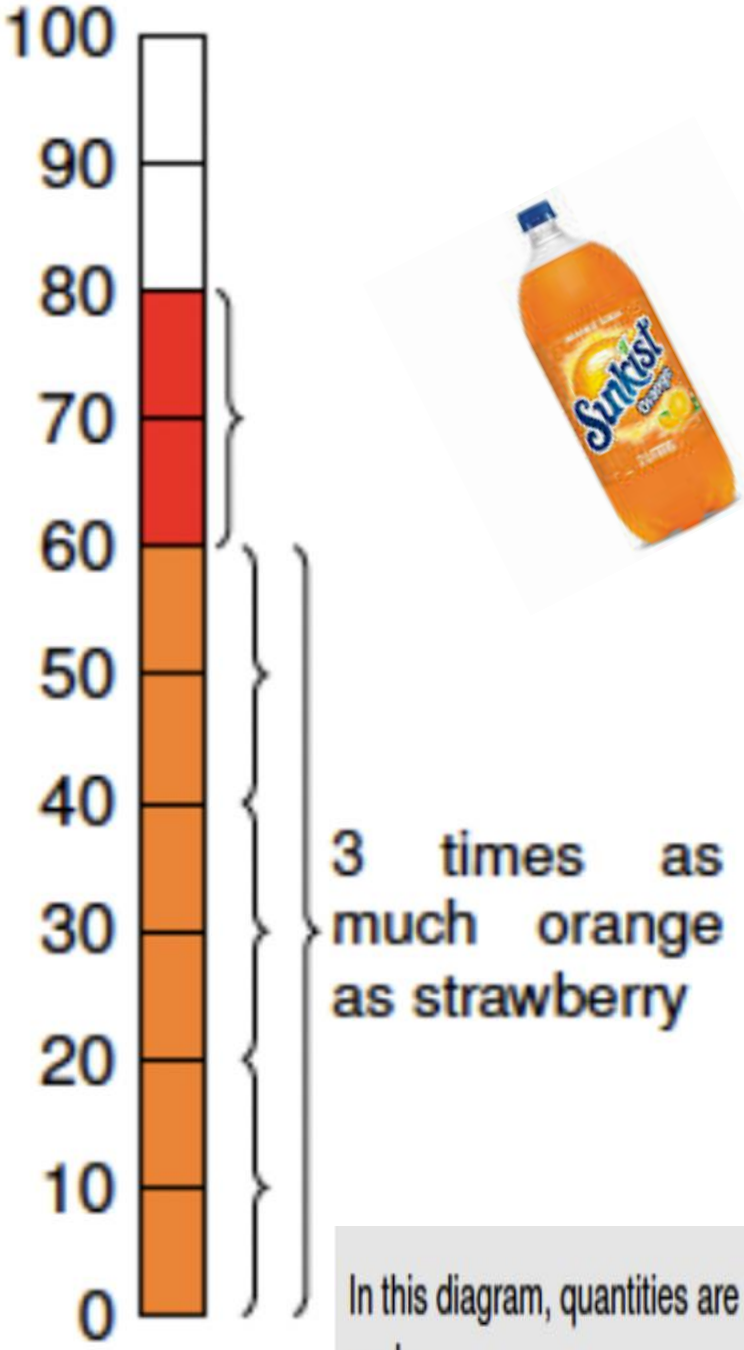
1 .lb = 16 .oz

A baker is making a cake and needs to combine 3 pounds 12 ounces of flour with 2 pounds 10 ounces of sugar. How many pounds and ounces of flour and sugar will they have?



6 lbs 6 oz

Context matters!!! Do



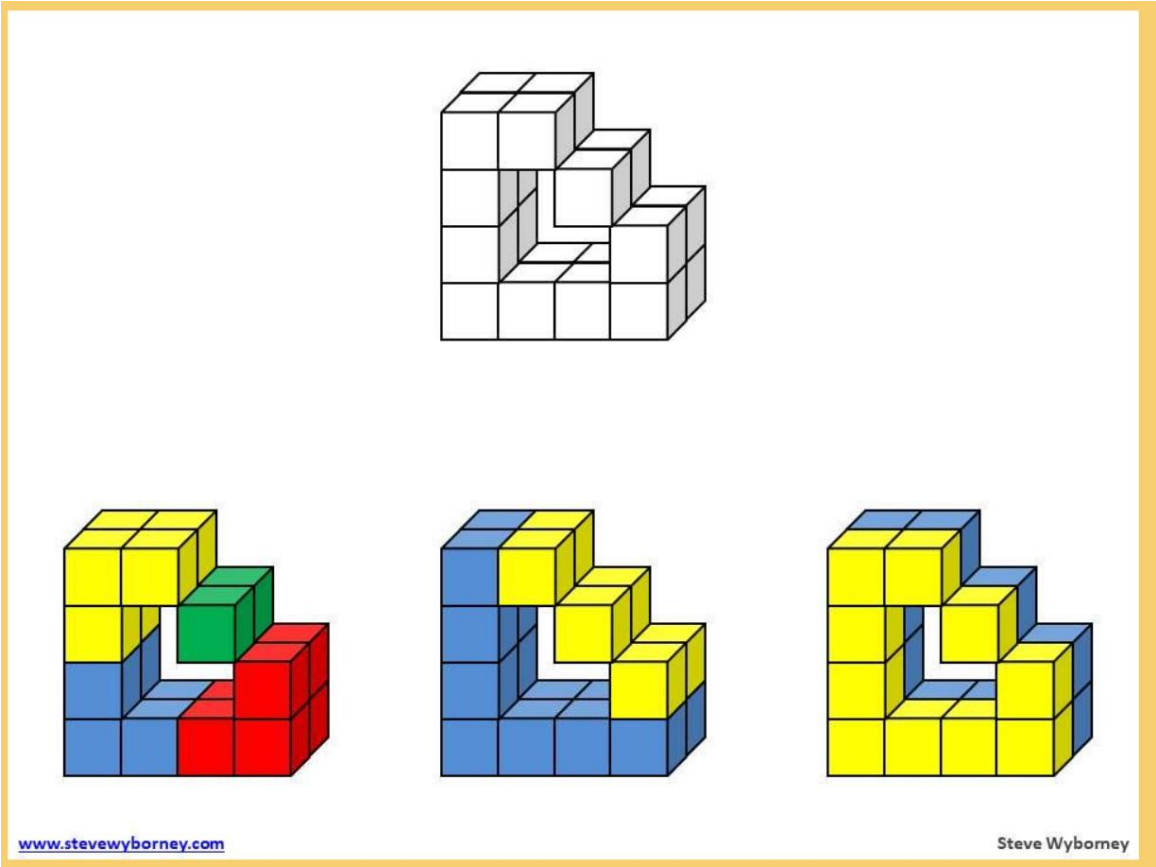
Lisa put two flavors of soda in a glass. There were 80 ml of soda in all. She put three times as much orange drink as strawberry. How many ml of orange did she put in?

Prove it.

In this diagram, quantities are represented on a measurement scale.

Cube Conversions

https://stevewyborney.com/?s=cube+conversations



Short Video to Explain

https://www.humix.com/video/KW4dz6aQBz2

Share 1 take away.

What Questions do you have?

Thank you

for

Making Connections with me!

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NOTES to NERDS

The official newsletter of the Collaborative

reflect

One or two key idea(s) or essential understanding that you hope to implement?