Growing a Strong STEM

Jenna Shea Mobley

Springdale Elementary School, Community Farmers Markets, The Wylde Center, Stewart Center, Forever Family

Planning a Year of Science Lessons in the Garden

Lesson Format in the Garden Classroom

Essentials Tools for a Garden Classroom

Management in a Garden Classroom

Science Connections in the Garden

Planning a Year of Math Lessons in the Kitchen Classroom

Lesson Format in the Kitchen Classroom

Essentials Tools for a Kitchen Classroom

Management in a Kitchen Classroom

Math Connections in the Kitchen

Data Collection

Planning a Year of Science Lessons in the Garden

1. District Pacing Guide
2. Planting Calendar

Science Pacing Calendar

Atlanta Public Schools – Fall 2014

	8/4	8/11	8/18	8/25	9/1	9/8	9/15	9/22	9/29	10/6		10/13	10/20	10/27	11/3	11/10	11/17		12/1	12/8	12/15
K	Scientific Inquiry Skills		Living and Non-Living			Plants					Fall Break	Animals						Break	Matter		
1			Plants and Animals									Magnets							Magnets		
2			Life Cycles									Seasonal Changes							Properties of Matter		
3			Habitats									Interdependence of Man							Heat Energy		
4			Ecosystems									Sound and Light							Forces and Motion		
5			Cells and Microorganisms				Genetics					Classification							Chemical and Physical Changes		

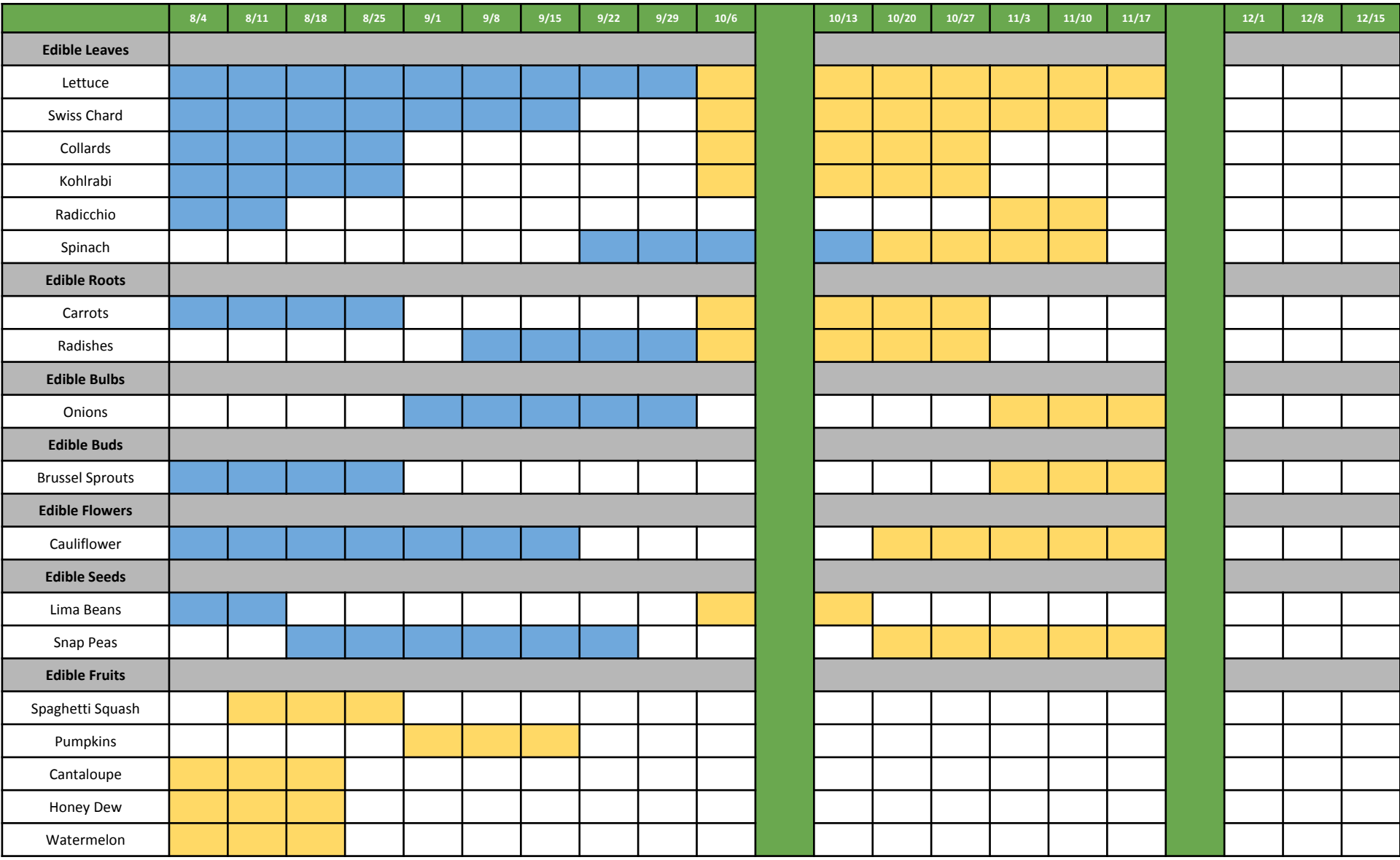
Science Pacing Calendar

Atlanta Public Schools – Spring 2015

	1/5	1/12	1/19	1/26	2/2	2/9	Break	2/16	2/23	3/2	3/9	3/16	3/23	3/30	Spring Break	4/13	4/20	4/27	5/4	5/11	5/18
K	Gravity and Motion							Day and Night								Rocks and Soils				*Review*	
1	Sound							Light and Shadows				Weather and Seasons				Water				*Review*	
2	Energy							Pushes and Pulls								Night Sky				*Review*	
3	Magnets							Rocks and Soils				Fossils				*Review*					
4	Stars and Solar System							Weather								*Review*					
5	Electricity and Magnetism							Earth								*Review*					

Planting Calendar

Atlanta Public Schools – Fall 2014



Planting Calendar

Atlanta Public Schools – Spring 2015

	1/5	1/12	1/19	1/26	2/2	2/9	2/16	2/23	3/2	3/9	3/16	3/23	3/30	4/13	4/20	4/27	5/4	5/11	5/18
Edible Leaves																			
Lettuce																			
Swiss Chard																			
Collards																			
Kohlrabi																			
Radicchio																			
Spinach																			
Edible Roots																			
Carrots																			
Radishes																			
Edible Bulbs																			
Onions																			
Edible Buds																			
Brussel Sprouts																			
Edible Flowers																			
Cauliflower																			
Edible Seeds																			
Lima Beans																			
Snap Peas																			
Edible Fruits																			
Spaghetti Squash																			
Pumpkins																			
Cantaloupe																			
Honey Dew																			
Watermelon																			

Lesson Format in a Garden Classroom

The research conducted by Dr. Madeline Hunter showed that effective teachers use a methodology when they are planning and presenting a lesson. She discovered that no matter what the teacher's style, grade level of students, the subject matter being taught, or economic background of the students, an organized lesson consists of these elements that enhances and maximizes student learning.

Engage

Explore

Explain

Extend

Evaluate

Management in a Garden Classroom

Expectations
Boundaries
Differentiated Groups
Rewards / Consequences
Student Selection

Essential Tools for a Garden Classroom

Clipboards

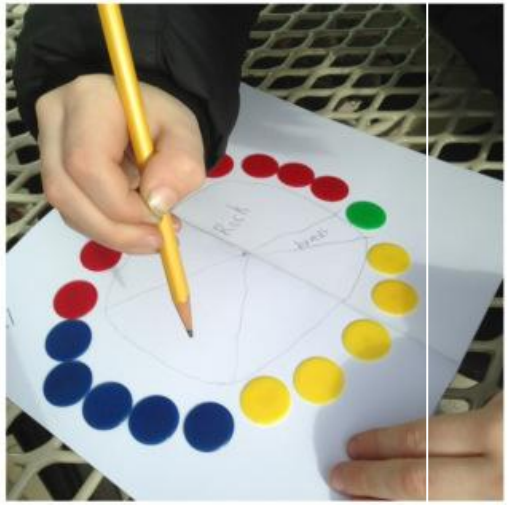
Pencils

Journals

Magnifying Glasses

Tape Measures

Thermometers



Science Connections in the Garden

Earth Science

- Astronomy (K, 2, 4, 6)
- Rocks and Soils (K, 3, 5, 6)
- Weather and Seasons (1, 4, 6)

Life Science

- Features of Plants and Animals (K, 1, 3, 5, 7)
- Life Cycles (K, 1, 2, 5, 7)
- Habitats and Ecosystems (3, 4, 7)

Physical Science

- Matter (K, 2, 5, 8)
- Energy - Motion (K, 2, 4, 8)
- Energy - Sound (1, 4, 8)
- Energy - Light (1, 4, 8)
- Magnets (1, 3, 5, 8)

Georgia Performance Standards (By Domain, K-12)

	Earth Science	Life Science	Physical Science
K	• Day and night sky • Rocks and soils	• Living and non-living • Plants and animals • Parents and offspring	• Physical attributes, 5 senses • Composition of materials • Motion
1	• Weather patterns • Seasons	• Characteristics of living things • Basic needs of living things	• Sound • Shadows • Magnets
2	• Motion and patterns of celestial bodies • Changes of the earth's surface	• Life cycles	• Changing attributes of materials • States of matter (solid, liquid, gas) • Motion, pushes and pulls
3	• Rocks and minerals of Georgia • Soils and weathering • Fossils	• Habitats • Features of organisms in Georgia • Pollution and conservation	• Heat energy • Magnets
4	• Stars and star patterns • Solar system • Weather - data and forecasting	• Ecosystems • Food web / food chain • Adaptation - survival / extinction	• Light and sound • Force, mass, and motion (simple machines) • Effects of gravity
5	• Landforms of Georgia • Effects of constructive and destructive forces • Role of technology in control	• Classification of organisms • Inheritance of traits • Learned behaviors • Cells and microorganisms	• Conservation of matter • Physical changes • Chemical changes • Electricity and magnetism
6	• Meteorology • Oceanography • Earth materials • Earth in space • Human impact on Earth • Energy sources		
7		• Diversity of living things • Dichotomous key • Structure and function of cells • Tissues, organs, and organ systems • Purpose of human body organ systems • Heredity and genes • Ecosystems • Cycling of matter and energy • Biological evolution • Natural selection and fossil record	
8			• Nature of matter • Atomic theory / periodicity • Conceptual acid / base - phase changes • Law of conservation of matter • Law of conservation of energy • Conceptual laws of motion and forces • Conceptual energy transformation • Wave properties • Electrical / magnetic forces

High school students choose from a variety of in-depth courses including: Astronomy, Biology, Botany, Chemistry, Earth Systems, Ecology, Entomology, Environmental Science, Epidemiology, Forensic Science, Geology, Human Anatomy and Physiology, Meteorology, Microbiology, Oceanography, Physical Science, Physics, Zoology.

Earth Science


Weather and Seasons

- 1 - Weather patterns and seasons
- 4 - Weather data and forecasting

Astronomy

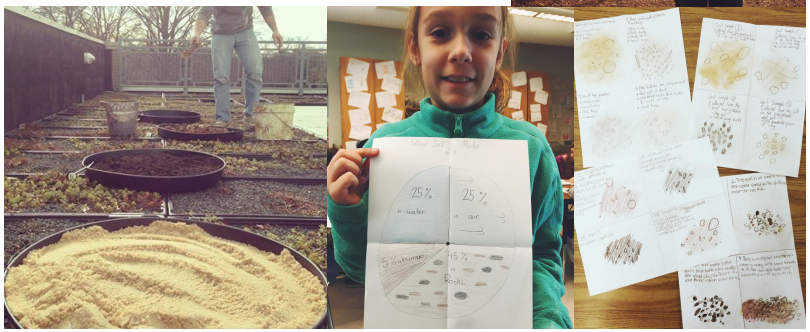
- K - Day and night sky
- 2 - Motion and patterns of celestial bodies
- 4 - Solar system, stars, and star patterns

Silent Reflection Time Outside *(to bring awareness to the season and the changes)*

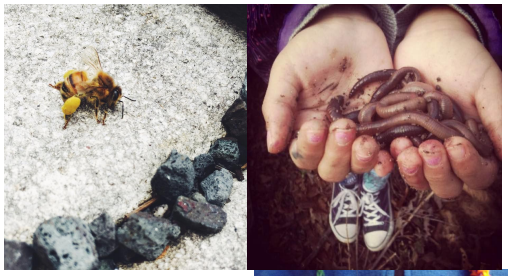
- What is happening with the weather? What is the temperature? What is the recent rain fall? (Track on a line graph)
- What is happening in the sky? Where is the sun/moon positioned? What do the clouds look like? (Model)
- What is happening with the trees? (Illustrate)
- What is happening in the garden? (Illustrate)
- What is happening with the people? What are people wearing? What are people doing? (Illustrate)
- What is happening with the animals? (Illustrate)

Rocks and Soils

- K - Rocks and soils
- 3 - Rocks and minerals, weathering, soils, fossils
- 5 - Constructive and destructive forces, landforms of Georgia

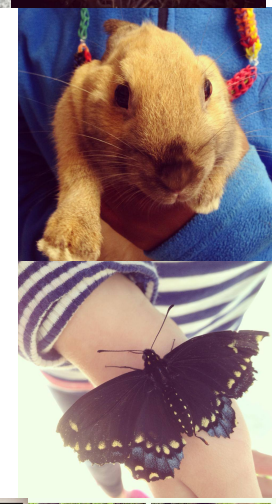


Life Science



Features of Plants and Animals

- K - Living and non-living / plants and animals
- 1 - Characteristics of living things
  - Plant parts - root, stem, leaf, flowers
  - Animal characteristics - appearance, motion, growth, basic needs
- 3 - Adaptations of living things
- 5 - Classification of living things
  - Animals - vertebrate/invertebrate; fish, amphibian, reptile, bird, mammal
  - Plants - families, genus



Life Cycles

- K - Parents and offspring
- 1 - Plant and animal needs to grow and thrive
- 2 - Life cycles of mammal, bird, amphibian, insect, tree, fungi
- 5 - Inheritance of traits

Habitats and Ecosystems

Physical Science

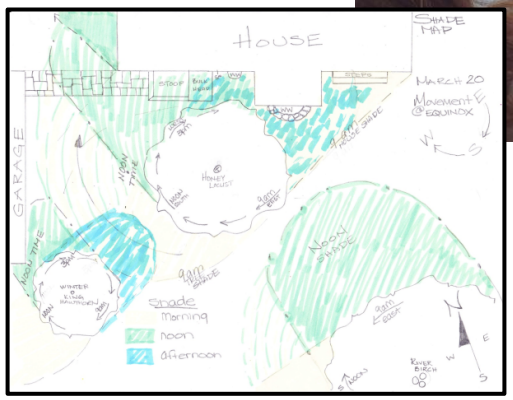
Matter

- K - Physical attributes and composition of materials
- 2 - Changing states of matter
- 5 - Physical and chemical changes

Energy - Motion

- K - Motion
- 2 - Pushes and pulls
- 4 - Force, mass and motion (simple machines)

Energy - Sound (1, 4, 8)



Energy - Light (1, 4, 8)

Magnets (1, 3, 5, 8)

Planning a Year of Math Lessons in the Kitchen Classroom

1. District Pacing Guide
2. Harvesting Calendar

Math Pacing Calendar

Atlanta Public Schools – Fall 2014

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K	Geometry			Counting and Cardinality							Fall Break	Numbers and Operations in Base Ten						Break	Operations and Algebraic Thinking		
1	Numbers and Operations in Base Ten											Operations and Algebraic Thinking							Operations and Algebraic Thinking		
2	Numbers and Operations in Base Ten							Operations and Algebraic Thinking				Operations and Algebraic Thinking			Measurement and Data				Measurement and Data		
3	Numbers and Operations in Base Ten							Operations and Algebraic Thinking				Operations and Algebraic Thinking							Operations and Algebraic Thinking		
4	Numbers and Operations in Base Ten							Fractions				Fractions							Fractions		
5	Operations and Algebraic Thinking											Numbers and Operations in Base Ten							Fractions		

Math Pacing Calendar

Atlanta Public Schools – Spring 2015

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K	Operations and Algebraic Thinking							Operations and Algebraic Thinking								Measurement and Data					
1	Numbers and Operations in Base Ten							Geometry				Measurement and Data				Measurement and Data					
2	Numbers and Operations in Base Ten							Operations and Algebraic Thinking								Geometry					
3	Geometry				Fractions			Fractions				Measurement and Data				Review					
4	Fractions		Operations and Algebraic Thinking					Geometry				Measurement and Data				Review					
5	Fractions		Measurement and Data					Geometry								Review					

Harvest Calendar

Georgia Organics Harvest Calendar
www.georgiaorganics.org

Community Farmers Market
www.farmatl.org

Lesson Format in a Kitchen Classroom

Raw Taste Tests

Demonstration

Teacher models the creation of a recipe.

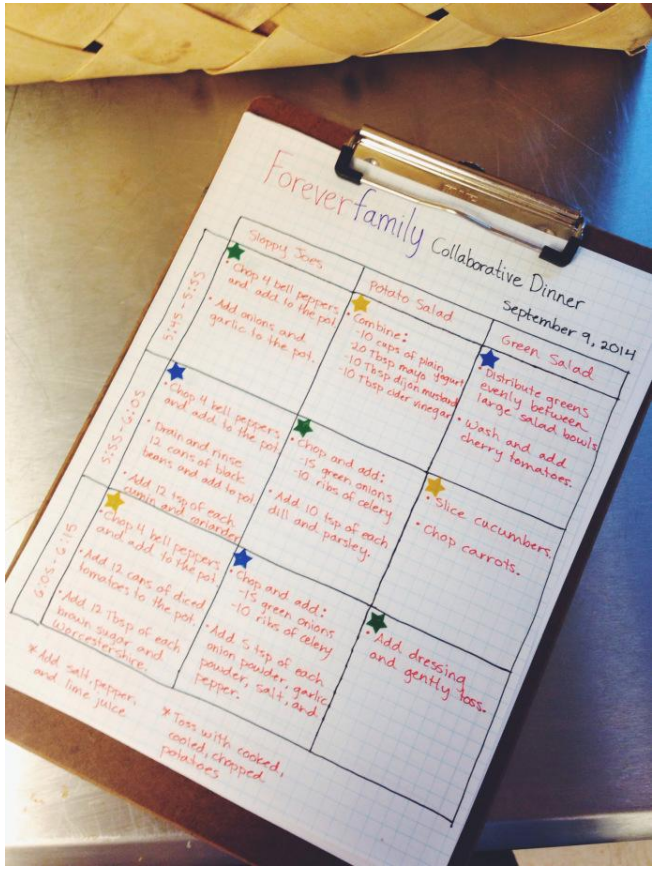
Interactive Lesson

Teacher guides the students in the creation of a recipe.

1. Each group with a specific task (for a class dish)
2. Each member of each group with a specific task (for a group dish)

Cooking Show

Student(s) independently create a recipe.



Management in a Kitchen Classroom

Expectations
Boundaries
Forming Community
Differentiated Groups
Rewards / Consequences
Student Selection

Essential Tools for a Kitchen Classroom

<u>Hand Tools</u>

Knives
Choppers
Graters
Salad Spinners

<u>Appliances</u>

Blender
Induction Burner
Countertop Oven

Math Connections in the Kitchen Classroom

Counting and Cardinality (K)

Numbers and Operations in Base Ten (K-5)

The Number System (6-8)

Operations and Algebraic Thinking (K-5)

Expressions and Equations (6-8)

Numbers and Operations with Fractions (3-5)

Measurement and Data (K-5)

Geometry (K-8)

Ratios and Proportional Relationships (6-8)

Statistics and Probability (6-8)

High school students delve deeper into statistics and probability, number and quantity, algebra, and functions.

Counting and Cardinality (K)

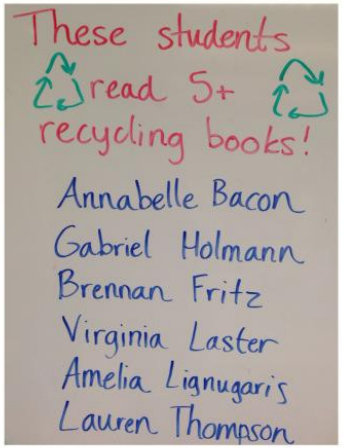
know number names and sequence, count to tell the number of objects, compare numbers

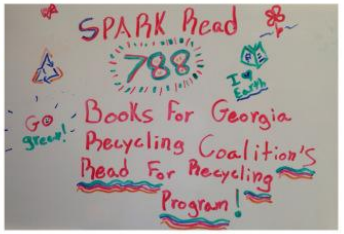
Numbers and Operations in Base Ten (K-5)

understand place value system, use place value understanding and properties of operations to add and subtract, multiply and divide

The Number System (6-8)

compute fluently with multi-digit numbers and find factors and multiples





Operations and Algebraic Thinking (K-5)

represent and solve problems involving addition and subtraction

represent and solve problems involving multiplication and division

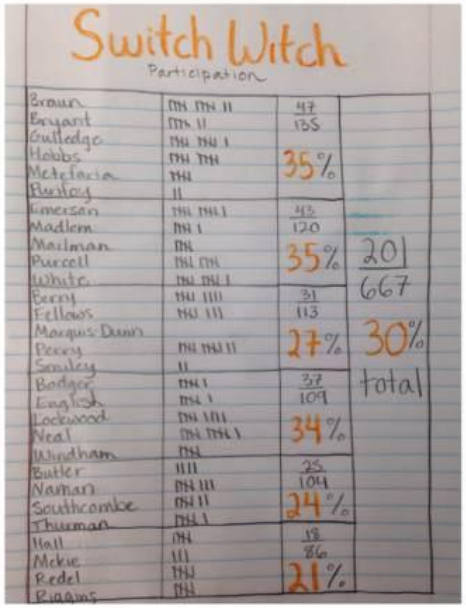
understand properties of and relationships between operations

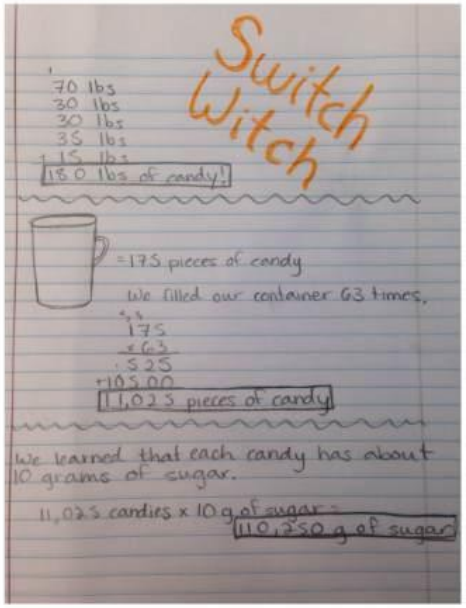
Expressions and Equations (6-8)

apply and extend understanding of arithmetic to algebraic expressions

solve real-life mathematical problems using numerical and algebraic expressions and equations

understand the connections between proportional relationships and linear equations





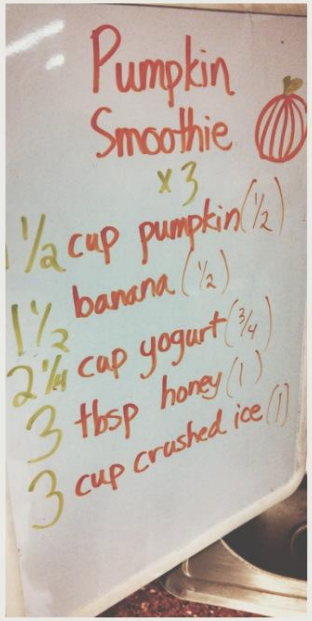
Numbers and Operations with Fractions

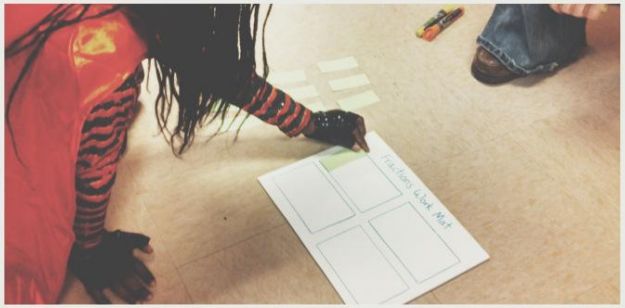
develop understanding of fractions as numbers

extend understanding of fraction equivalence and ordering

understand decimal notation for fractions

add and subtract fractions





Measurement and Data: Length

measure and estimate lengths, solve problems with measurement and estimation

Measurement and Data: Time and Money

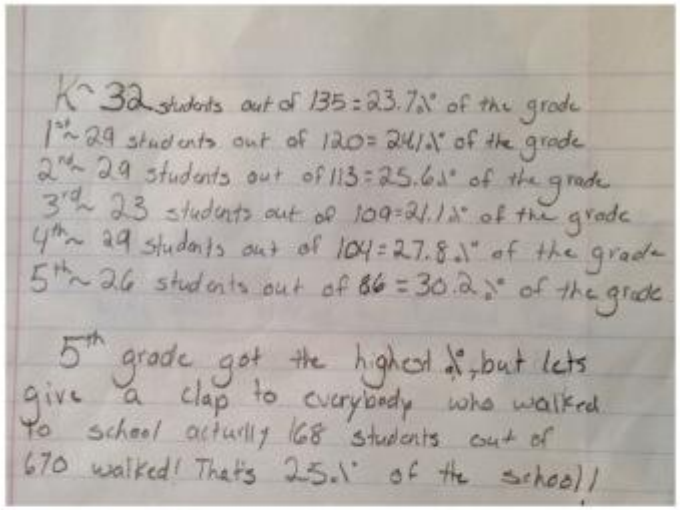
tell and write time, work with money

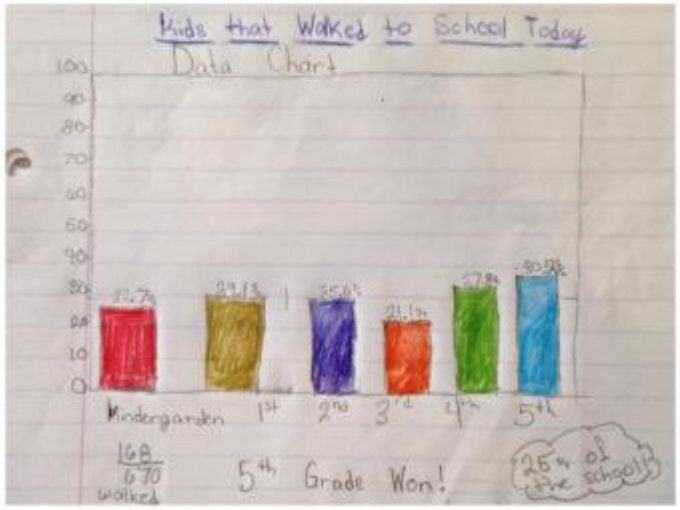
Measurement and Data: Volume

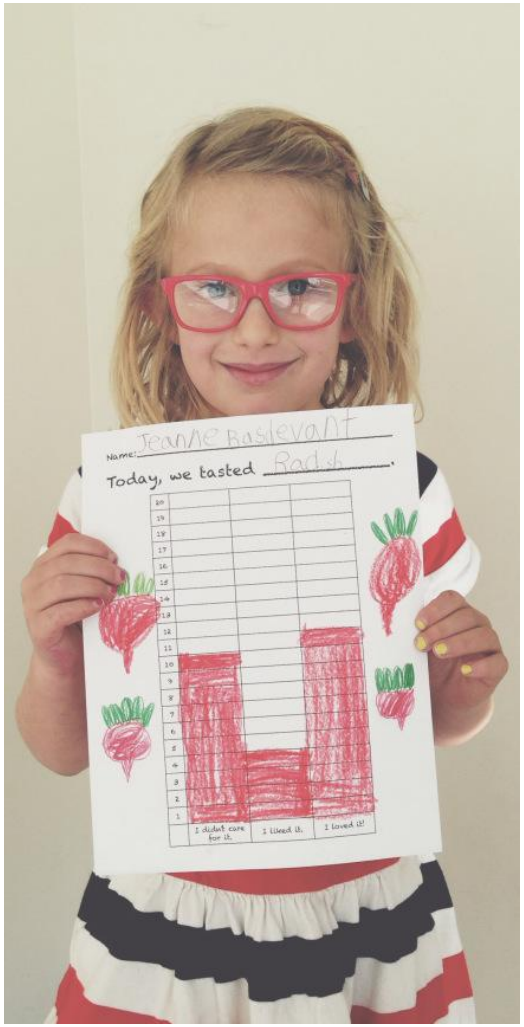
understand concepts of volume

Measurement and Data: Graphing

represent and interpret data







Geometry

identify, describe, analyze, compare, create, compose shapes

reasons with shapes and their attributes

draw and identify lines and angles

understand concepts of area, recognize perimeter

Ratios and Proportional Relationships

understand ratio concepts and use ratio reasoning to solve problems

analyze proportional relationships and use them to solve real-world problems

Tasting: Dill Dressing

Posted on October 20, 2013 by Jenna Shea Edit

Serving vegetables with a tasty dressing is a great way to get kids to try something new for the first time. This dill dressing from Schoolyard Sprouts is one of our favorites. I like it because it's a big idea more than a recipe so kids can be creative and mix it perfect to their taste.

First, combine 1 part plain yogurt (or sour cream) with 2 parts mayonnaise.

Then, squeeze in some lemon juice and add some fresh dill to taste.

Statistics and Probability

develop understanding of statistical variability

summarize and describe distributions

use random sampling to draw inferences about a population

draw informal comparative inferences about two populations