

All Things Mathematics



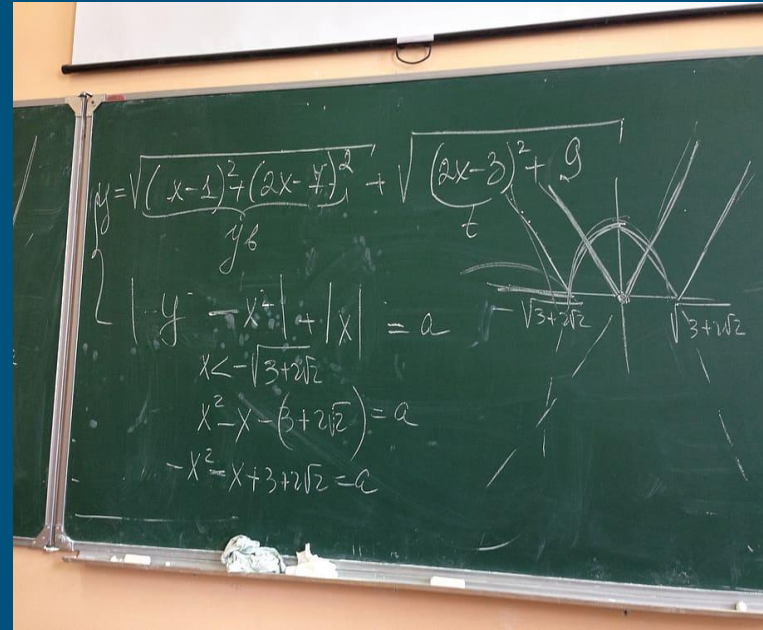
Effingham County Schools
August 2024

<https://bit.ly/3AN5qt7>

Two Types of Standards

Georgia's K-12 Mathematics Standards are content standards, which tell us what **teachers** are charged with teaching.

The Standards of Mathematics Practices are what you want to see **students** doing in the mathematics classroom.



GaDOE Mathematics Resources

www.georgiastandards.org

Health Education GSE

Voluntary for 2021-22

Full implementation begins 2022-23



Announcements

- Aligning State Literacy Policies & Practices Document - Reflects the approval of screeners by the State Board of Education, along with additional information on instructional supports.
- 🏆 Opportunity Grants have been awarded by the Georgia Department of Education [PDF]
- 🎧 Classroom Conversations Podcast - STE(A)M+READING: Don't be Afraid to Start
- State-funded Course List for K-8 Subjects and 9-12 Courses
- Summary of Changes (State-Funded List of K-8 Subjects and 9-12 Courses)

Georgia Standards of Excellence



Computer Science



CTAE



English Language Arts



Fine Arts



Georgia Home Classroom



Health Education



Mathematics



SuitCASE



Standards Structure, K-12

Georgia's K-12 Mathematics Standards 7TH Grade

Big Idea

– includes summary of concepts for grade level

Standard

– grade level/course key competency; represents what students should ultimately master

Learning objectives/expectations – “breaks down” the standard in an instructional progression

NUMERICAL REASONING – integers, percentages, fractions, decimal numbers					
7.NR.1: Solve relevant, mathematical problems, including multi-step problems, involving the four operations with rational numbers and quantities in any form (integers, percentages, fractions, and decimal numbers).					
Expectations		Evidence of Student Learning (not all inclusive; see Grade Level Overview for more details)			
7.NR.1.1	Show that a number and its opposite have a sum of 0 (are additive inverses). Describe situations in which opposite quantities combine to make 0.	Terminology <ul style="list-style-type: none">In the equation $3 + -3 = 0$, 3 and -3 are additive inverses of each other.	Example <ul style="list-style-type: none">Your bank account balance is - \$25.00. You deposit \$25.00 into your account. The new balance is \$0.00.		
7.NR.1.2	Show and explain $p + q$ as the number located a distance $ q $ from p , in the positive or negative direction, depending on whether q is positive or negative. Interpret sums of rational numbers by describing applicable situations.	Strategies and Methods <ul style="list-style-type: none">Students should be able to add and subtract integers and other rational numbers presented within relevant, mathematical problems, using strategic thinking and a variety of tools.	Example <ul style="list-style-type: none">$6 + (-4)$ is 4 units to the left of 6 on a horizontal number line or 4 units down from 6 on a vertical number line.		
7.NR.1.3	Represent addition and subtraction with rational numbers on a horizontal or a vertical number line diagram to solve authentic problems.	Strategies and Methods <ul style="list-style-type: none">Students should represent a variety of types of rational numbers on a number line diagram presented both horizontally and vertically.	Evidence of Student Learning		
7.NR.1.4	Show and explain subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference and apply this principle in contextual situations.	Examples <ul style="list-style-type: none">Find the distance between a submarine submerged at a depth of $27\frac{3}{4}$ feet below sea level and an airplane flying at an altitude of $1262\frac{1}{2}$ feet above sea level.$-\frac{1}{2} - (-2)$ is the same expression as $-\frac{1}{2} + -(-2)$, which is 2 units to the right of $-\frac{1}{2}$ on a horizontal number line or 2 units up from $-\frac{1}{2}$ on a vertical number line.			
7.NR.1.5	Apply properties of operations, including part-whole reasoning, as strategies to add and subtract rational numbers.	Fundamentals <ul style="list-style-type: none">Students should be allowed to explore the signs of integers and what they really mean to discover integer rules.	Strategies and Methods <ul style="list-style-type: none">Students should be able to use the Commutative and Associative properties to combine more than two rational numbers flexibly.	Terminology <ul style="list-style-type: none">Part-whole reasoning refers to how numbers can be split into parts to add and subtract numbers more efficiently.	Example <ul style="list-style-type: none">$(-8) + 5 + (-2)$ may be solved as $(-8) + (-2) + 5$ to first make -10 by using the Commutative Property.

Evidence of Student Learning
– instructional supports

GA DOE Mathematics Resources

<https://www.georgiastandards.org/Georgia-Standards/Pages/Math.aspx>

NEW! Mathematics Curriculum & Instruction Resources Now Available

- K-5
- 6-8
- 9-12

K-12 Instructional Support Resources

- Initial Implementation Year Transition Resource (all grade levels)
- Explanation of Changes and Improvements - Georgia's K-12 Mathematics Standards
- K-12 Mathematics Glossary
- K-12 Mathematics Course Descriptions
- K-12 Mathematics Learning Progressions
- K-12 Mathematical Practices
- K-12 Mathematical Modeling Framework
- K-12 Framework for Statistical Reasoning
- Fostering Positive Mathematical Mindsets
- K-12 Mathematics Curriculum Maps
- K-12 Comprehensive Course Overviews
- Mathematics Support Guide for English Learners
- Guides for Effective Mathematics Instruction (K-12)
- Georgia Mathematics Strategies Toolkit to Address Learner Variability for Grades K-5
- Georgia Mathematics Strategies Toolkit to Address Learner Variability for Grades 6-8
- Georgia Mathematics Strategies Toolkit to Address Learner Variability for High School
- K-12 Mathematics Manipulatives and Materials List
- K-12 Mathematics Parent Letters

GA DOE Mathematics Learning Progressions

K-12 MATHEMATICS LEARNING PROGRESSION - GEORGIA													
Key Concepts	ELEMENTARY SCHOOL (K-5)						MIDDLE SCHOOL (6-8)			HIGH SCHOOL (9-12)			
	K	1	2	3	4	5	6	7	8	Algebra: Concepts & Connections	Geometry: Concepts & Connections	Advanced Algebra: Concepts & Connections	Courses beyond Advanced Algebra
NUMERICAL REASONING													
Numbers	<ul style="list-style-type: none">Whole numbers to 100	<ul style="list-style-type: none">Whole numbers to 120Partition shapes into halves and quarters/fourths (fourths) with no shading	<ul style="list-style-type: none">Whole numbers to 1000Partition shapes into halves, thirds and quarters (fourths) with no shading	<ul style="list-style-type: none">Whole numbers to 10,000Unit fractions with denominators of 2, 3, 4, 6, and 8Represent fractionsEquivalence of simple fractionsIntroduce shading to identify and compare fractional parts	<ul style="list-style-type: none">Whole numbers to 100,000Non-unit fractions with denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100Fractions with like denominatorsDecimal fractions (tenths and hundredths)	<ul style="list-style-type: none">Multi-digit whole numbersFractions with unlike denominatorsFractions greater than 1Decimal fractions to thousandths	<ul style="list-style-type: none">Rational numbers as a concept<ul style="list-style-type: none">IntegersFractionsDecimal numbers	<ul style="list-style-type: none">All rational numbersSimple probability	<ul style="list-style-type: none">All rational numbersScientific notationNumerical expressions with integer exponentsApproximate rational and irrational numbers (radicals) on a number line	<ul style="list-style-type: none">All rational numbersOperations with radicals	<ul style="list-style-type: none">All numbers in The Real Number System	<ul style="list-style-type: none">All numbers in The Real Number SystemComplex numbers	<ul style="list-style-type: none">Application of all numbers in the real number systemThe Complex Number System (Precalculus and beyond)
Counting	<ul style="list-style-type: none">Counting forward to 100Counting backward from 20Counting objects to 20	<ul style="list-style-type: none">Counting forward and backward within 120Skip counting by 2s, 5s, and 10sCounting objects to 120	<ul style="list-style-type: none">Counting forward and backward within 1000Skip counting by 2s, 5s, 10s, 25s, and 100sCounting objects to 1000	<ul style="list-style-type: none">Counting unit fractions	<ul style="list-style-type: none">Counting non-unit fractions	<ul style="list-style-type: none">Counting decimal numbers	Students should apply the foundational knowledge of counting to make sense of other mathematical ideas related to numbers in The Real Number System.			Students should apply the foundational knowledge of counting to make sense of other mathematical ideas related to numbers in The Real and Complex Number Systems.			
Place Value	<ul style="list-style-type: none">Compose and decompose numbers within 20Identify and write numerals to 20	<ul style="list-style-type: none">Compose and decompose 2-digit numbers	<ul style="list-style-type: none">Hundreds, tens and ones in 3-digit numbers	<ul style="list-style-type: none">Round numbers to 1000 to nearest 10 or 100Read & write multi-digit whole numbers to thousands	<ul style="list-style-type: none">Magnitude of place valueMulti-digit whole numbers to 100,000Round multi-digit whole numbersFractions with denominators of 10 or 100	<ul style="list-style-type: none">Magnitude of place value extended to decimal numbersPowers of 10 to 10³Read & write decimal numbers to thousandths placeRound decimal numbers to hundredths place	Students should apply the foundational knowledge of place value to make sense of other mathematical ideas related to numbers in The Real Number System.			Students should apply the foundational knowledge of place value to make sense of other mathematical ideas related to numbers in The Real and Complex Number Systems.			
Comparisons	<ul style="list-style-type: none">Comparing objects up to 10Comparing numbers of objects in a set from 1-10	<ul style="list-style-type: none">Comparing numbers to 100	<ul style="list-style-type: none">Comparing numbers to 1,000	<ul style="list-style-type: none">Comparing numbers to 10,000Unit fractions	<ul style="list-style-type: none">Multi-digit numbersFractions less than 1Decimal fractions to hundredths place	<ul style="list-style-type: none">Decimal fractions to thousandths placeFractions greater than 1	<ul style="list-style-type: none">IntegersUnit ratesRatiosNumerical data distributionsMeasures of variationAbsolute valueDisplay and analyze	<ul style="list-style-type: none">Rational numbersProbabilitiesRandom sampling	<ul style="list-style-type: none">Rational and irrational numbers (radicals)Compare proportional relationships presented in different ways	<ul style="list-style-type: none">Rate of change (slope)InterceptDistributions of two or more data sets.		<ul style="list-style-type: none">Recognize the purpose of and differences among different types of studies.Population distributions, sample data distributions.	<ul style="list-style-type: none">Application of all numbers in the real number systemThe Complex Number System (Precalculus and beyond)

<https://www.ga.doe.org/Curriculum-Instruction-and-Assessment/Curriculum/Documents/Mathematics/Georgia-K-12-Mathematics-Standards-Learning-Progressions.pdf>

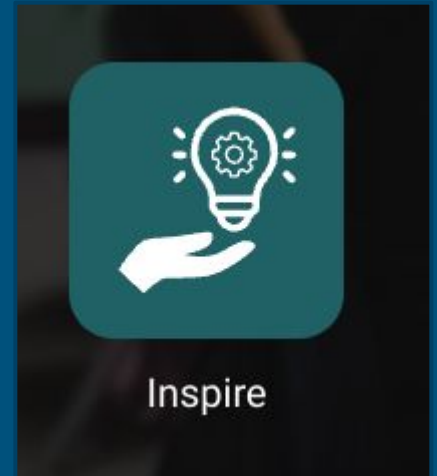
GaDOE Inspire

Log into Infinite Campus

Click SLDS

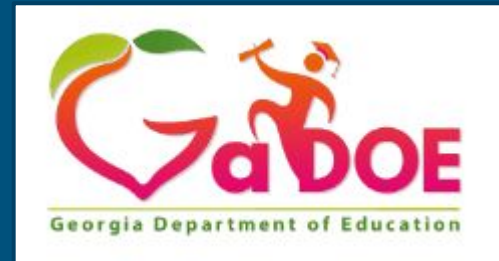
Click Ga Connects Preview

Click Inspire



GaDOE Inspire

- Courses
 - Standards
 - DOE Curriculum Maps and Pacing
 - Unit Overview
 - Interdisciplinary Connections
 - **Instructional Learning Plans**
 - Velocity (Interdisciplinary Activity)
- Resource Repository
 - Gifted Education
 - Cognitive Disabilities
 - Classroom Management
 - MTSS
- My Content Collections
 - To access Assessment Item Banks
 - Subscribe to a New Content Collection
 - [Enter Code](#)
- Standards





Teacher Guidance and Student Reproducibles

►► Unit 2 Building Fluency with Addition and Subtraction

In this unit, students will solve addition and subtraction problems within 100 using strategies based on place value, including decomposing a ten, the properties of operations, relationship between addition and subtraction, and part-whole strategies. Students will solve real-life addition and subtraction problems including problems involving charts and graphs. Students will continue to develop their understanding of the value of numbers to 1,000 by representing, ordering, and comparing. Students will demonstrate an understanding of counting sequences. Students will continue to develop fluency using mental math and strategies.

[COLLAPSE UNIT DESCRIPTIONS](#) ✕

 Resources (14)

 My Content (0)

Resources



TILE VIEW

LIST VIEW

Unit Resources (2 resources)

Learning Plans (11)

Grade 2 Unit 2 Learning Plan-Counting Collections

Grade 2 Unit 2 Learning Plan-Incredible Equations

Grade 2 Unit 2 Learning Plan- Doubles and Halves

Grade 2 Unit 2 Learning Plan - Planning a Pizza Party

Grade 2 Unit 2 Learning Plan - Represent & Solve Problems

Grade 2 Unit 2 Learning Plan-The Importance of Zero

Grade 2 Unit 2 Learning Plan- Composing a New Ten

Grade 2 Unit 2 Learning Plan- Building and Busting Towers of 10

Grade 2 Unit 2 Learning Plan-Counting Mice

Grade 2 Unit 2 Learning Plan- Different Paths/Same Destination

Grade 2 Unit 2 Learning Plan- Got Milk?


Velocity (1 resource)

▶▶ Unit 2 Building Fluency with Addition and Subtraction

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[COLLAPSE UNIT DESCRIPTIONS](#) ✕

 Resources (14)

 My Content (0)

You have not created or copied any resources for this unit.

[+ ADD CONTENT](#)

Effingham County School District (ECSD) Mathematics Resources

ECSD Pacing and Curriculum Maps for Mathematics

Google Drive Search Bar: Curriculum Guides and Pacing Dashboard

- Ga DOE Unit
- Standards within the units
- Days in unit
- Assessments to be given within each unit
- Expectations (Learning Targets) and Success Criteria
- Local and GaDOE resources



Standards of Mathematical Practice

1. Make sense of problems and persevere in solving them

6. Attend to precision

2. Reason abstractly and quantitatively

3. Construct viable arguments and critique the reasoning of others

4. Model with mathematics

5. Use appropriate tools strategically

7. Look for and make use of structure.

8. Look for and express regularity in repeated reasoning.

Reasoning and explaining

Modeling and using tools

Seeing structure and generalizing

SMP 1. Make Sense of Problems and Persevere in Solving Them

When presented a mathematics problem, students should ask:

- What does the problem mean?

- How can I represent and solve the problem?

- What is the most efficient way to solve the problem?

- Does my thinking and strategy for solving this problem make sense? Does my answer make sense?

- Is there another way to solve this problem?

Students should be given opportunities to struggle.

Mistakes should be embraced as part of the learning process.

SMP 6. Attend to Precision

Students should be

- using clear and precise language in their discussions and in their reasoning about mathematics.
- determining when it is appropriate to use estimation and when it is appropriate to give exact answers.
- determining appropriate units, draw pictures that represent problems and label parts of graphs correctly.
- articulating place value correctly and read numbers accurately.



A school is holding a carnival. The students determined ticket prices as shown in the picture.

Which ticket option is the best deal?

Which ticket option is the worst deal?

How would you suggest they change their prices?

Would You Rather...



Win \$500 a week for life

or

Win \$1,000,000

Work as a server at Restaurant A

OR

Work as a server at Restaurant B?

Restaurant A

\$18 per hour
No tipping allowed

(meals range from \$8
to \$25 each)

Restaurant B

\$10.50 per hour
Tipping encouraged

(meals range from \$8
to \$25 each)

What is a Number Talk

Classroom conversations and discussions around **purposefully crafted** computation problems

Designed to elicit specific strategies that focus on number relationships and number theory

A pivotal vehicle for developing **fluency**: flexibility, appropriate strategy, efficiency and accuracy

Problems are expected to be solved mentally while students share and defend solutions

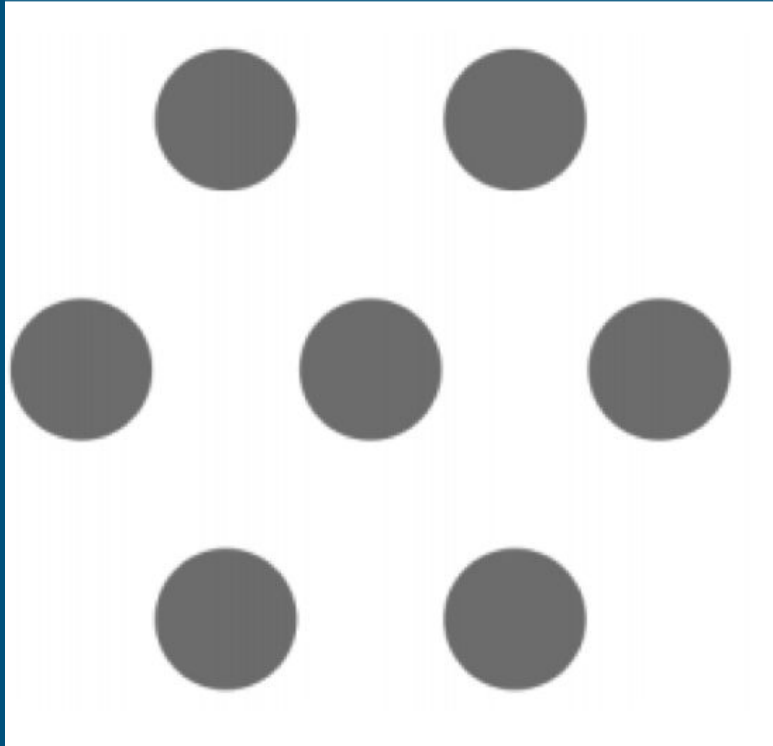
Limited to 5-10 minutes of instructional time, 2-3 times a week



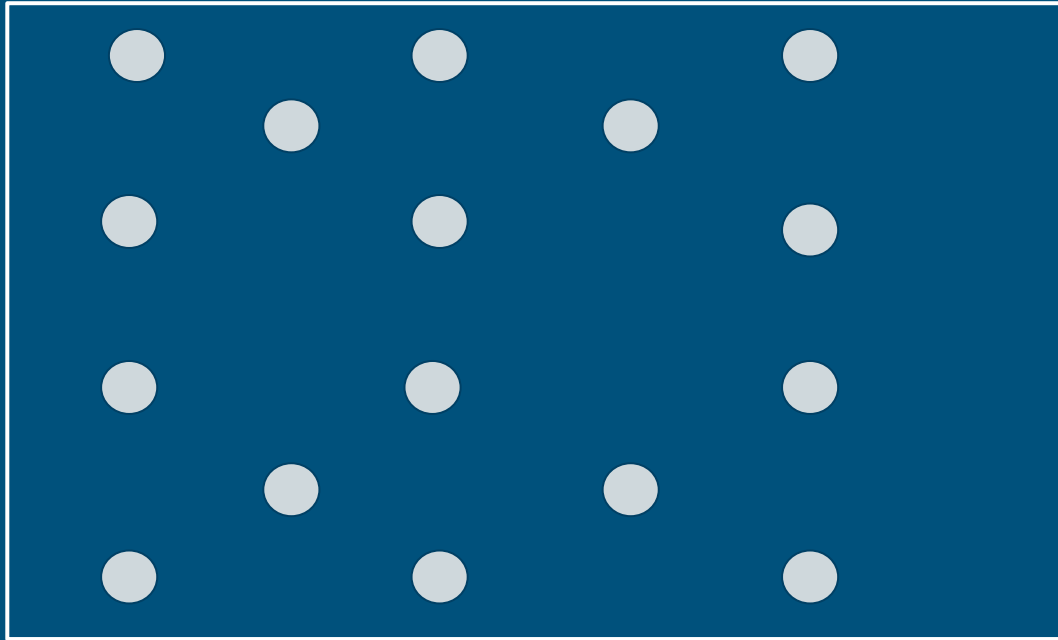
Number Talks

- Teacher presents a problem
- Teacher allows students time to think; students signal when they have an answer
- Teacher records students' answers for class to see
- Teacher asks individual students to share strategies used to derive their answers
- As students share strategies, teacher records on board for class to see
- Repeat with at least one more problem; ideally, this additional problem would allow students to use the same strategies

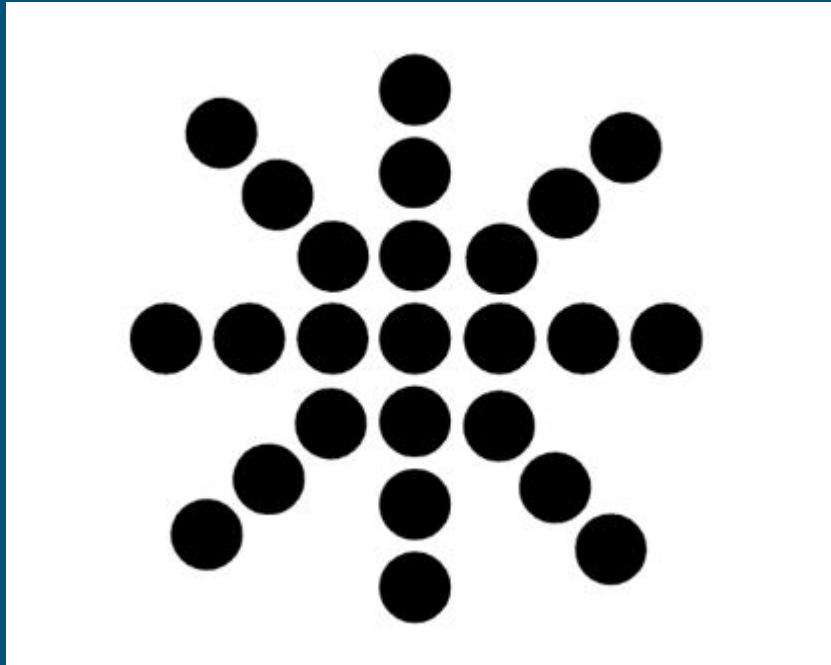
How many dots in total?

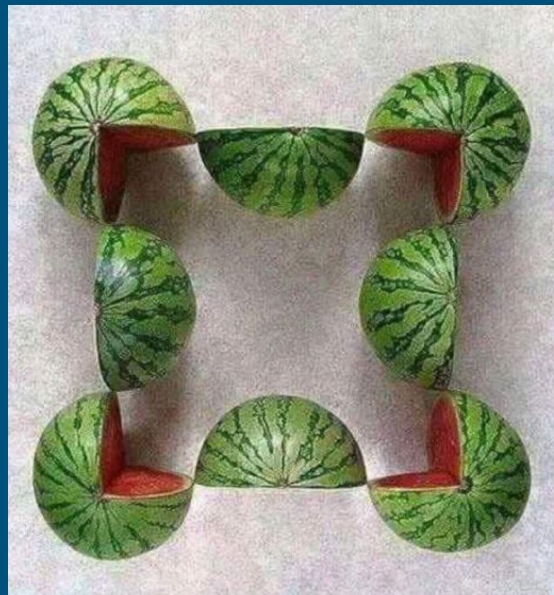
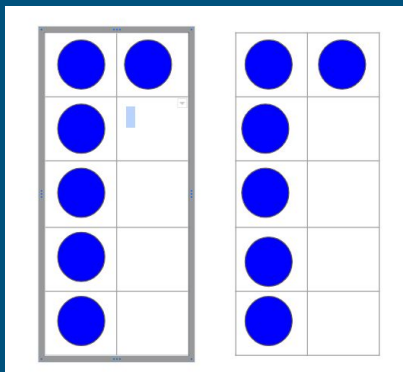
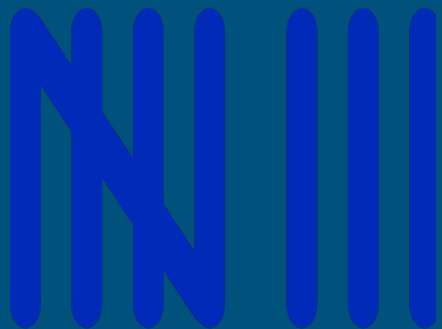


How many dots in total?



How many dots in total?





Find the sum.

$$2+6+8+3+4$$

Find the sum.

$$5 + 7 + 8 + 3 + 5$$

Find the sum.

$$19 + 17$$

Find the sum.

$$24 + 49$$

Find the sum.

$$85 + 98$$

Find the difference.

$$100 - 53$$

Find the difference.

$$120 - 44$$

Find the answer.

$$25 \times 6$$

Find the answer.

$$351 \div 9$$

Find the quotient.

$$6 \div \frac{1}{3}$$

Find the product.

$$\frac{3}{4} \times 2$$

Troubleshooting...

- Progress from easy problems to more difficult problems
- Assign problems that use similar strategies
- If students are having difficulty, allow them to talk with a partner and then share answers/strategies
- If students are not sharing a strategy that you intended, share the strategy with them disguised as “a student from another class” used this strategy
- Facilitate number talks in whole group and small groups (to allow participation of those who are hesitant to share)

Six Elements of an Effective Mathematics Lesson

The elements are Susan Halligan's synthesis of research in effective teaching practices by Hunter, Brophy, and others **applied specifically to mathematics instruction**. It includes the best practice findings of Marzano, Stiggins, Wormeli and others

Provides a template to increase attention to **all necessary components** of mathematics concept and skill acquisition

Builds a common language for collaboration

Framework, not a prescription

THE Six Elements

Instruction

Homework

Processing

Drill

Application

Review/Preview



Instruction

Teacher-Focused

Direct Instruction

Whole Group

Small Groups

I do-We do-You do (Gradual Release Model)

Differentiated Instruction

Modeling

Teach in pieces

Teach - Practice - Teach -

Practice - Mixed Practice

Chunking of content

Check for understanding

Processing

Student-focused

Independent or group assignment

Use of manipulatives

Time to make discoveries

Students draw pictures to represent thinking

Students explain their thinking to

Pairs

Small groups

Whole class

Be very intentional in assigning problems

Results in understanding of standard algorithms

Application

Student-Focused

Independent or group assignment

Mathematical Modeling

Connections to real world

More than one way to solve

More than one correct answer

What do you notice?

Traditional Problem:

If you have 1,000 pretzels and the class eats 100 pretzels each day, how many days can the class eat pretzels.

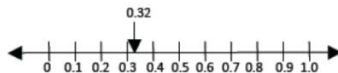
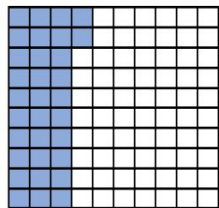
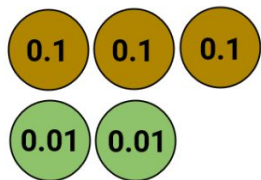
Modeling with Mathematics:

If a class has a bag of pretzels and they want it to last the whole week, how can we figure out how many pretzels to give each kid each day?

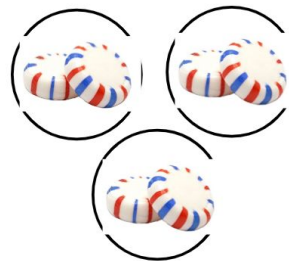
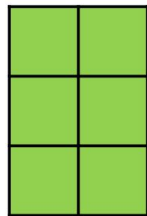
Match the type of mathematics problem

Mario's family is planning a vacation. They would like to visit three places in Georgia. Plan an itinerary and a budget for the trip.

C. Represent 0.32 with place value disks and decimal grids. Locate 0.32 on a number line.



Show two different ways to represent 3 groups of 2.



Sheryl was organising buses for a school trip. She had 171 children, 22 teachers & 13 parents. A bus could take 20 passengers. How many buses would she need and how many spare seats would be left for extra luggage?

$$\begin{array}{r} 3 \\ \times 2 \\ \hline \end{array}$$

The second recess in school is at 1 o'clock in the afternoon, which is 2 hours after the first recess. When is the first recess?

- Computation Problem
- Multiple Representations
- Word/Application Problem
- Mathematical Modeling Problem

Drill

Purpose is to increase speed of recalling facts

Basic facts that students need to immediately recall in order to be better mathematicians

Drill should be a maximum of 5 minutes daily

Can be choral, written or via technology and done individually or with groups of students

Math Facts Checks (Grades 1-5)

Effingham County School District Math Facts Progress Check 2024-2025

Students in Grades 1-5 will take the Math Facts Progress Check three times a year. Testing windows are as follows:

- Math Fact Check #1: October 21-25
- Math Fact Check #2: February 3-7
- Math Fact Check #3: May 2-16

Grade Level	Math Computation Information	# of Questions	Time Allotted	Goal
1	Addition and Subtraction: Single digit addends; sums and minuends to 10	60	4 minutes	By the last Math Facts Check, students will have met their goal if they have answered 90% or more of the questions correctly.
2	Addition and Subtraction: Single digit addends; sums and minuends to 18	60	4 minutes	
3	Multiplication: Single digit factors 0-9	90	4 minutes	
4	Multiplication: Single digit factors 0-9	90	3 minutes	For Grades 1-2, 54 of 60 is 90%. For Grades 3-5, 81 of 90 is 90%.
5	Division: Single digit factors 0-9; dividends through 81	90	3 minutes	

Grade Level Goals for Each School

Grades 1-3: 70% of students meet the 90% goal!

Grades 4-5: 80% of students meet the 90% goal!

Talk to a Neighbor



Consider the grade/course you teach, what mathematics topics could be included in Drill in addition to Math Facts?

Homework

Purpose is to keep learning warm so assignment should be **over firm learning only**

Should be a very short assignment given at the last moment possible, otherwise assignment is “classwork to be completed at home”

Provide support for those at home - online chat/teacher videos/answer keys/before-after school help

Have a plan for those who did not complete the homework assignment

Consider positive grading

Review/Preview

Purpose is to maintain old learning in order to build foundations for new learning.

Emphasis on essentials (End of Grade/End of Course)

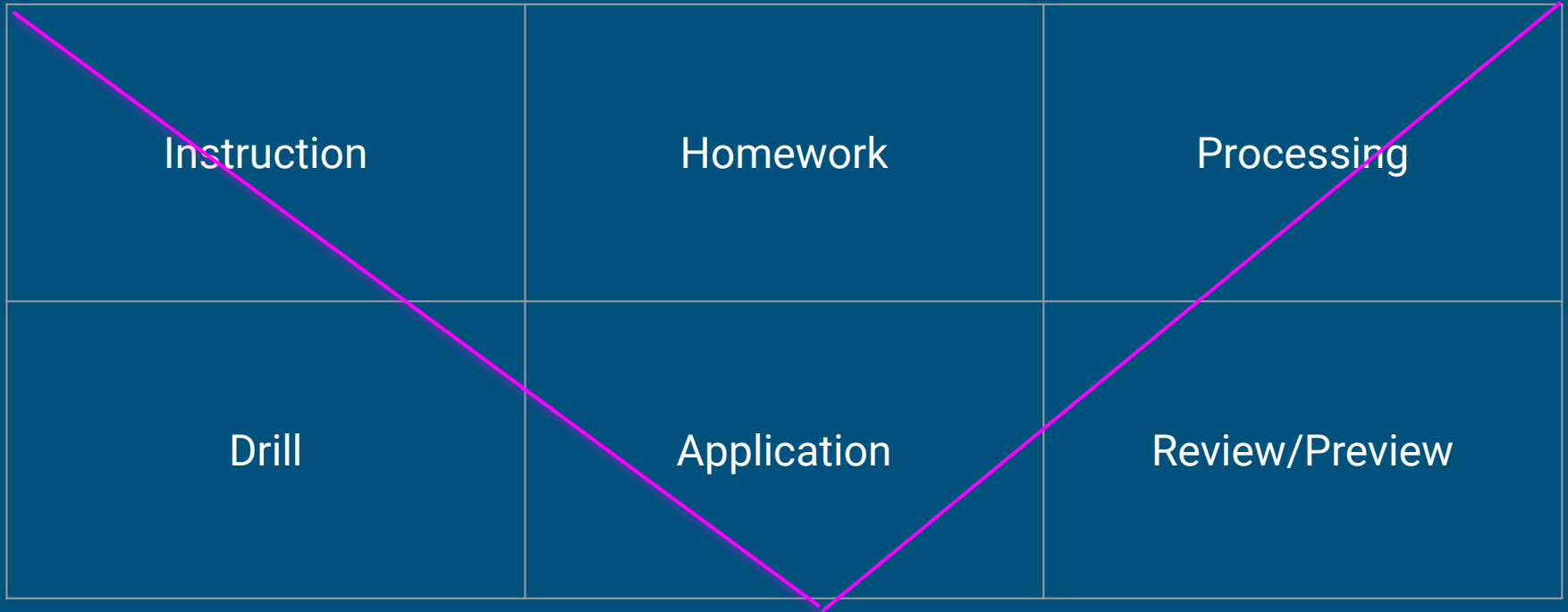
Student-focused

Spiral Reviews

Increase accuracy (not speed!!)

Daily (max 10 minutes)

Six Elements of an Effective Mathematics Lesson



Closure (Not one of the Six Elements, but important!)

Purpose is to reflect on day's learning

Review learning target and success criteria

Assess students progress towards meeting learning target

Will help with dismissal and transition to next class

Should be five minutes or less in length

Success Criteria?

Can you...

Locate and interpret Georgia's K-12 Mathematics Standards?

Access ECSD Mathematics resources?

Apply the Standards of Mathematical Practice?

Facilitate a Number Talk?

Plan and teach a lesson that includes the Six Elements?



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