

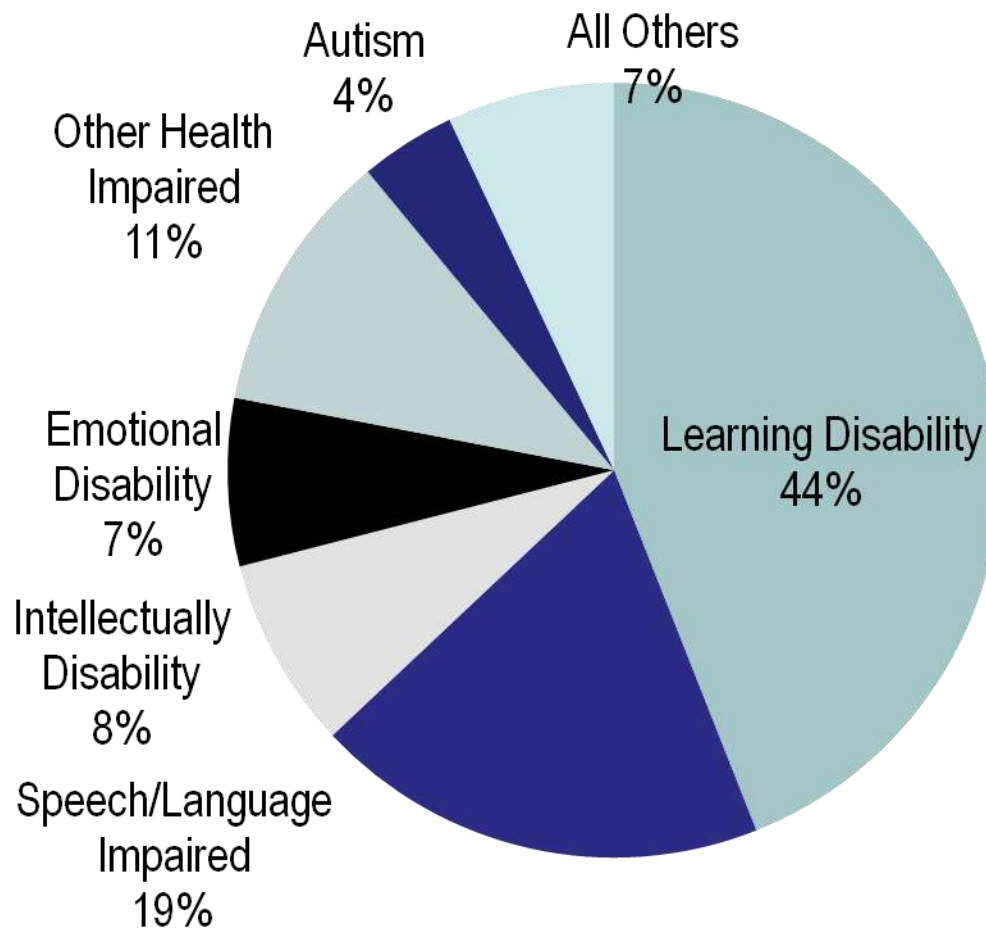


Building Blocks of Mathematics: Remember to see it from their perspective.

**Georgia Department of Education
Divisions for Special Education Services and Supports
1870 Twin Towers East
Atlanta, Georgia 30334**

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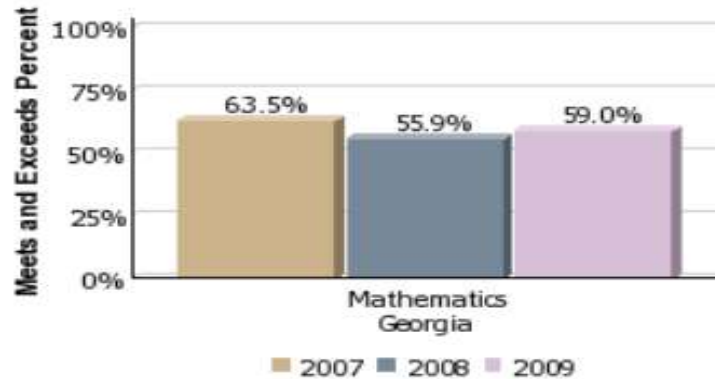
Georgia Special Education Students by Disability Category



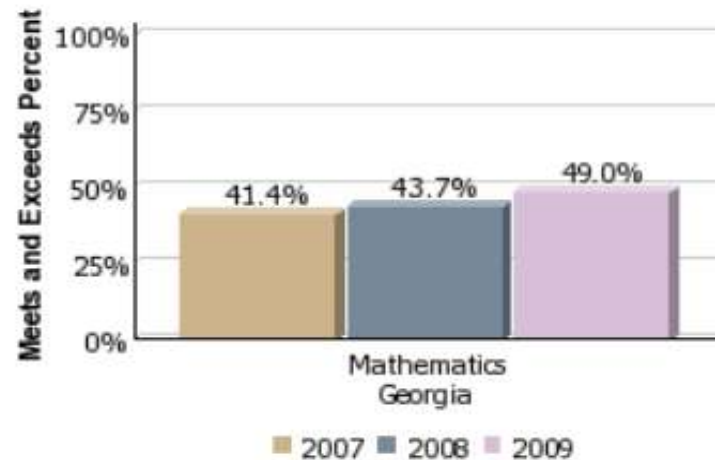
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CRCT - Mathematics

Grades 1-5

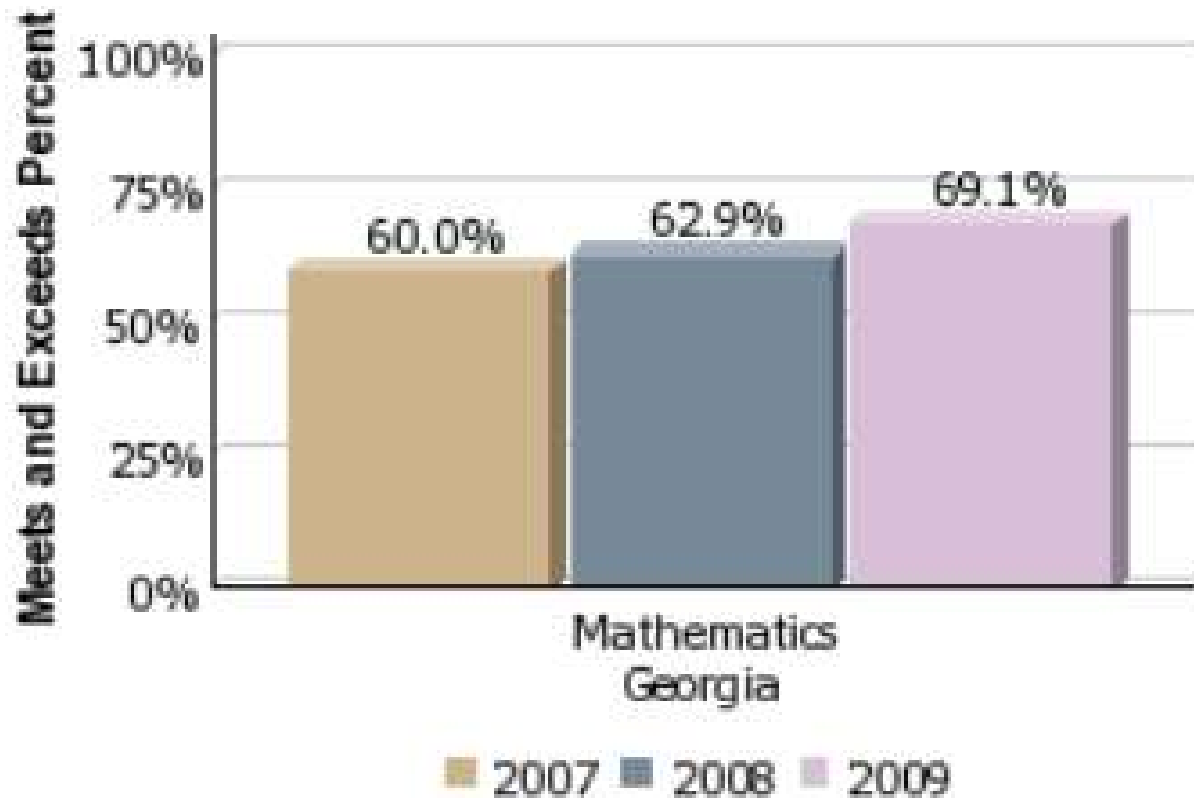


Grades 6-8



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GHSGT - Mathematics



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APR - CRCT and Enhanced GHSGT

Percentage of Students Meeting
or Exceeding Standards

Georgia

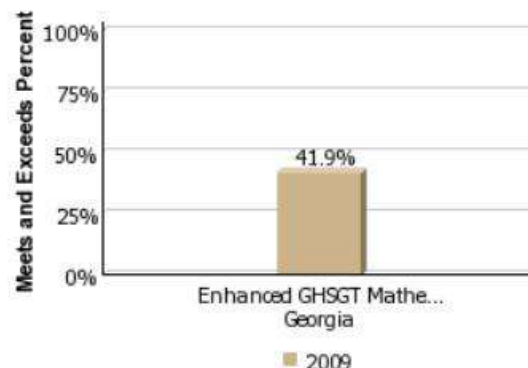
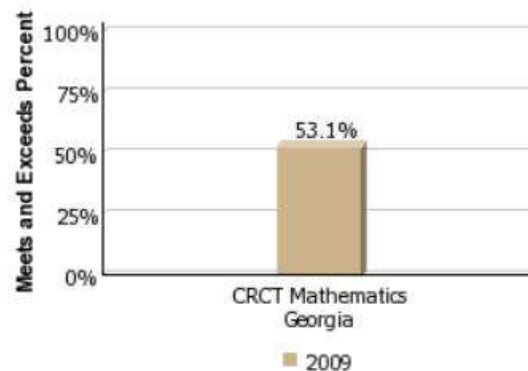
2009

CRCT Mathematics

53.1%

Enhanced GHSGT Mathematics

41.9%



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Students with Disabilities?

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The Essential Questions

- A. What's behind the struggle?
- B. Why does acceleration work?
- C. How can we best transform SWD into capable math students?
- D. What resources are available?

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Processing

- **Processing Deficits** are problems with the processes of recognizing and interpreting information taken in through the senses.
- The two most common areas of processing difficulty associated with learning disabilities are **visual** and **auditory perception**.
- Other processing difficulties are **memory** (working, factual, and procedural), **distractibility**, **attention**.

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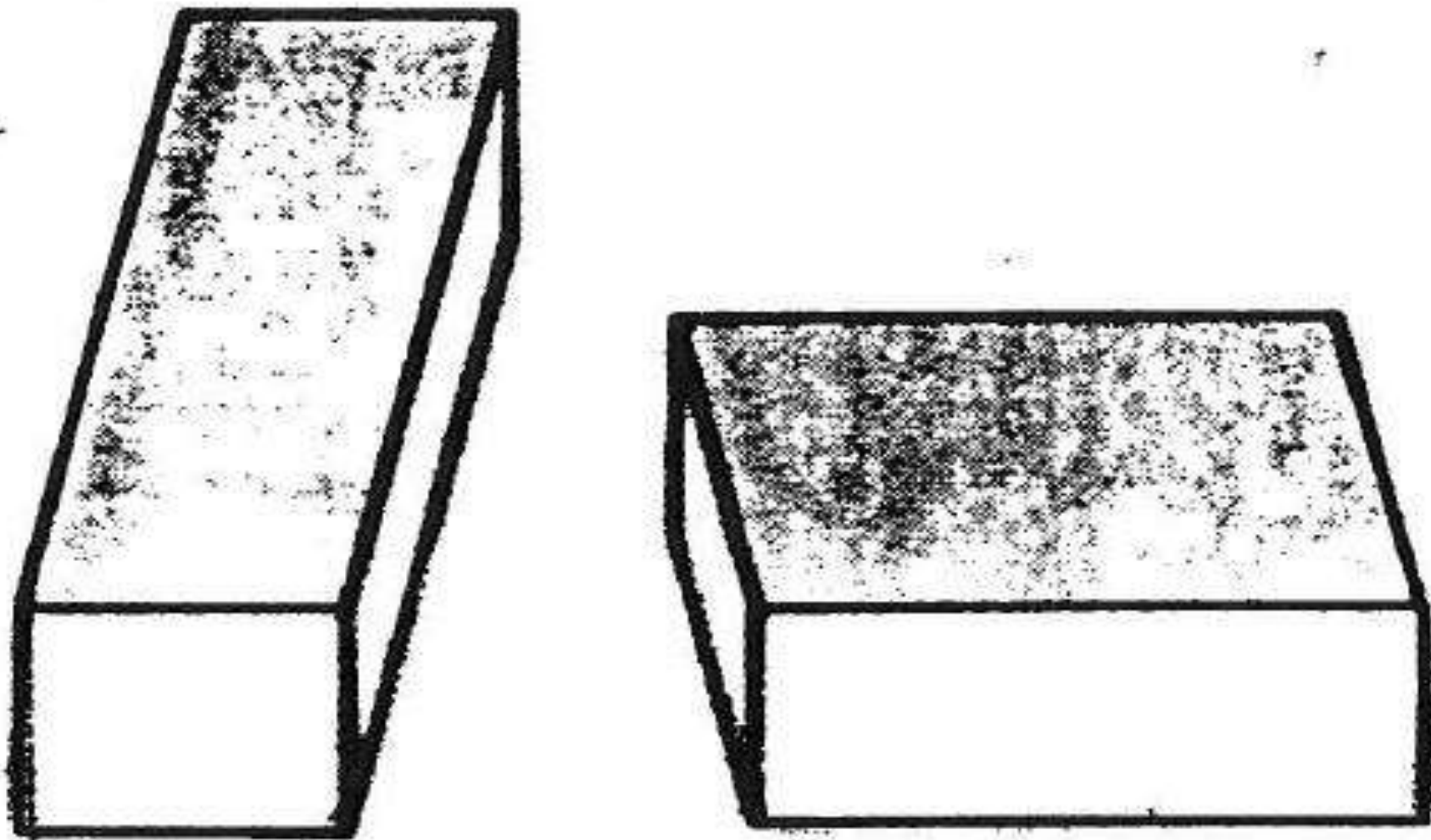
Visual Processing Disorder

- Spatial relation
- Visual discrimination
- Visual closure
- Visual agnosia
 - (object recognition)
- Whole/part relationships
- Visual motor integration



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Which block has the larger dimension?



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Which letter is it? Which number is it?

b d p q

14 1 4 41

4 + 1

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Activity

- Misunderstood Minds
 - Spatial activity
 - <http://www.pbs.org/wgbh/misunderstoodminds>

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Auditory Processing Disorder

- Phonological awareness
- Auditory discrimination
- Auditory memory
- Auditory sequencing
- Auditory blending



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Got Memory?

- Working Memory
- Factual Memory
- Procedural Memory



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Try This

- 6 5 8 7 4 5 6 8 4
- 3 2 1 9 5 6 4 2 1
- 6 5 1 5 1 3 2 3 5

- A. Multiply the third number in the first row by the seventh number in the third row.
- B. Add this result to the fifth number in the second row.
- C. Add to this total ten times the fourth number in the third row.
- D. Subtract the eighth number in the first row from the result.

www.pbs.org/wgbh/misunderstoodminds

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Distractibility vs Attention

- Distractibility
 - Visual distractibility
 - Auditory distractibility
 - Tactile distractibility
- Attention

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Activity

- Misunderstood Minds
visual
auditory

<http://www.pbs.org/wgbh/misunderstoodminds>

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Got the Vocabulary?

93%

of teachers assume if you read the word in the passage you will understand the paragraph.

COMPREHENSION

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Foundations for Success

National Mathematics Advisory Panel
Final Report, March 2008

- Children's goals and beliefs about learning are related to their mathematics performance.
 - Children's beliefs about the relative importance of effort and ability can be changed.
 - Experimental studies have demonstrated that changing children's beliefs from a *focus on ability* to a *focus on effort* increases their engagement in mathematics learning, which in turn improves mathematics outcomes.

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Motivational Research Indicates

- “...the beliefs that individuals create and develop and hold to be true about themselves...are vital forces in their success or failure at school.”

Frank Pajares, *Self-efficacy Beliefs in Academic Contexts*, 2002

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Self-efficacy & Tasks

- “...those who feel self-efficacious about learning or performing a task competently are apt to participate more **readily**, **work harder**, **persist longer** when they encounter difficulties, and achieve at higher levels.”

Schunk & Meece, Self-Efficacy Beliefs of Adolescents, 2005

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Foundations for Success

National Mathematics Advisory Panel

Final Report, March 2008

- Scientific Knowledge on Learning and Cognition Needs to be Applied to the classroom to Improve Student Achievement:
 - To prepare students for Algebra, the curriculum must **simultaneously** develop conceptual understanding, computational fluency, factual knowledge and problem solving skills.
 - Limitations in the ability to keep many things in mind (working memory) can hinder mathematics performance.

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The challenge is...

- To create an environment that fosters math self-efficacy, support processing deficits while utilizing instructional strategies that maximize math potential.

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So? Where do we start?

- “You see, in life, lots of people know what to do, but few people actually do what they know. Knowing is not enough! You must take action.”

Anthony Robbins

- “Too often we give our children answers to remember rather than problems to solve.”

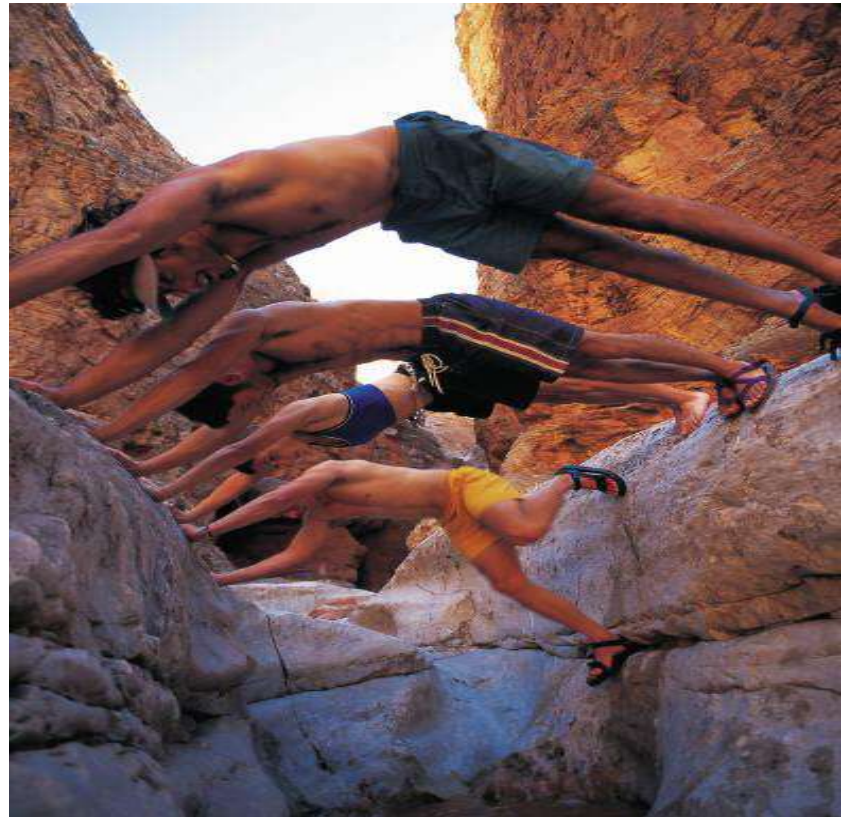
Roger Lewis

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Critically Important

These gaps have to be closed in tandem:

1. Self-efficacy
2. Processing deficits
3. Math knowledge
4. Strategies



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Acceleration can close both gaps

- Students move forward, not backward
- Gaps in math education filled in context while moving forward
- The largest indicator of student success is self-efficacy, not I.Q. Acceleration builds success!
- Scaffolding, vocabulary, & remediation “Just in time,” not “Out of Context”
- Two days ahead, not years behind
- Remediation in context when they need the skill, rather than in isolation.

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Characteristics of an Environment that Builds Self-Efficacy

- Choices (Provides a sense of autonomy & control)
- Non-competitive (evaluated on task, not compared to other students.)
- Accommodate processing deficits (Stimulate all the senses , but not necessarily all at once)
- Descriptive, quick feedback
- Builds success early
- Promote an active participant rather than a passive observer.

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Co-Teaching

- General Educators have knowledge of the curriculum
- Special Educators have knowledge of instructional processes for students who learn atypically

Blending Co-Teaching structures
with Research based Instruction

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What makes Co-Teaching SPECIAL?

- Collect student data, monitor and support student behavior
- Jigsaw instruction
- Think-out-louds
- Explicit instruction – Solve It! Program.
- CRA
- Cover, Copy, Compare technique
- Visual Mnemonic technique

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Research shows the biggest gains with the following strategies:

1. Systematic and explicit instruction (large effect)
2. Student think-alouds (large effect)
3. Visual and graphic depiction of problems (moderate effect)

Effect size of .80 = Large

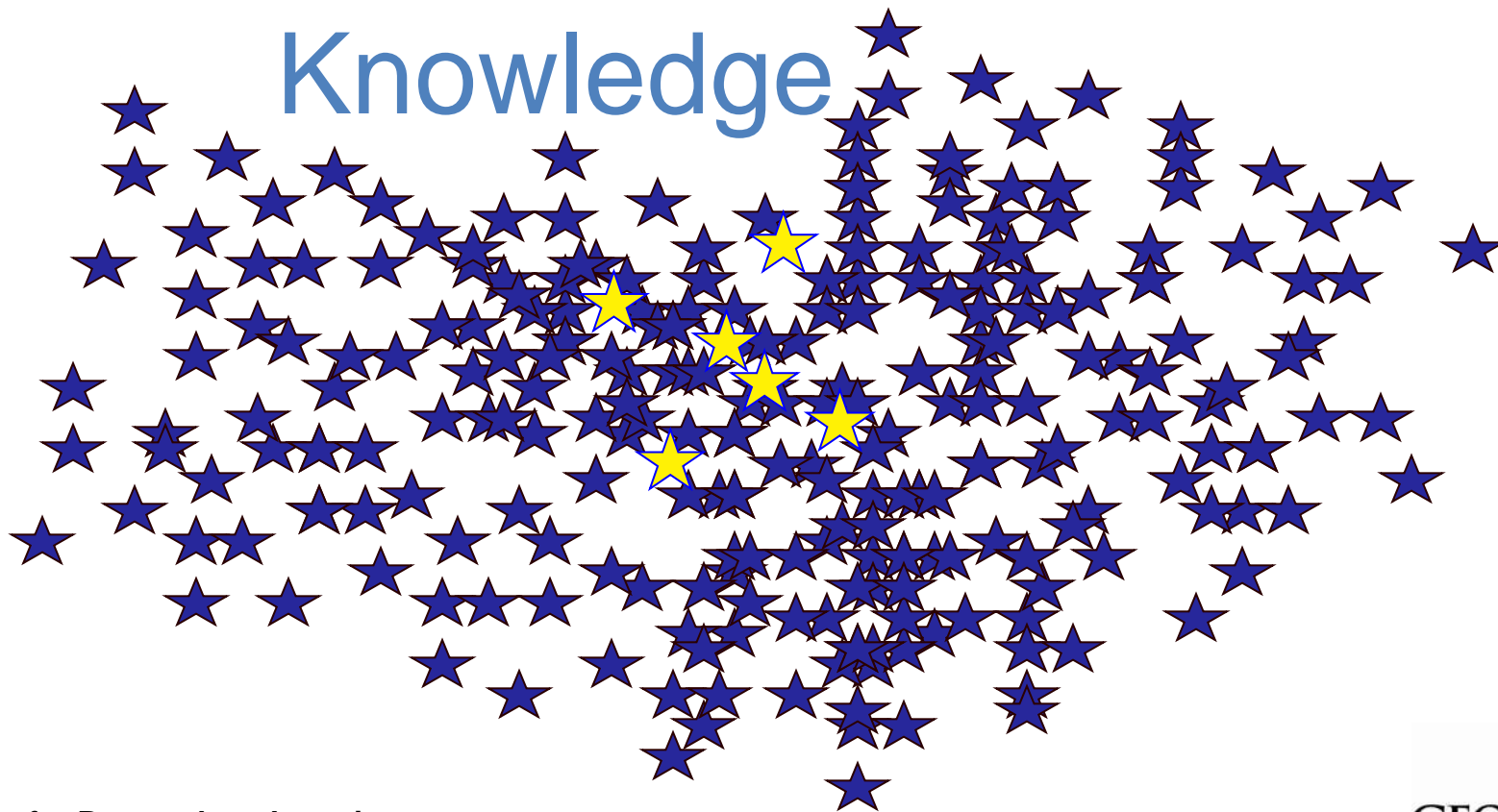
Effect size of .50 = Moderate

Effect size of .25 = Small

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Thinking about the curriculum:

Knowledge



Center for Research on Learning

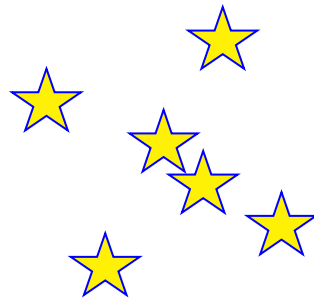
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Thinking About the Curriculum...

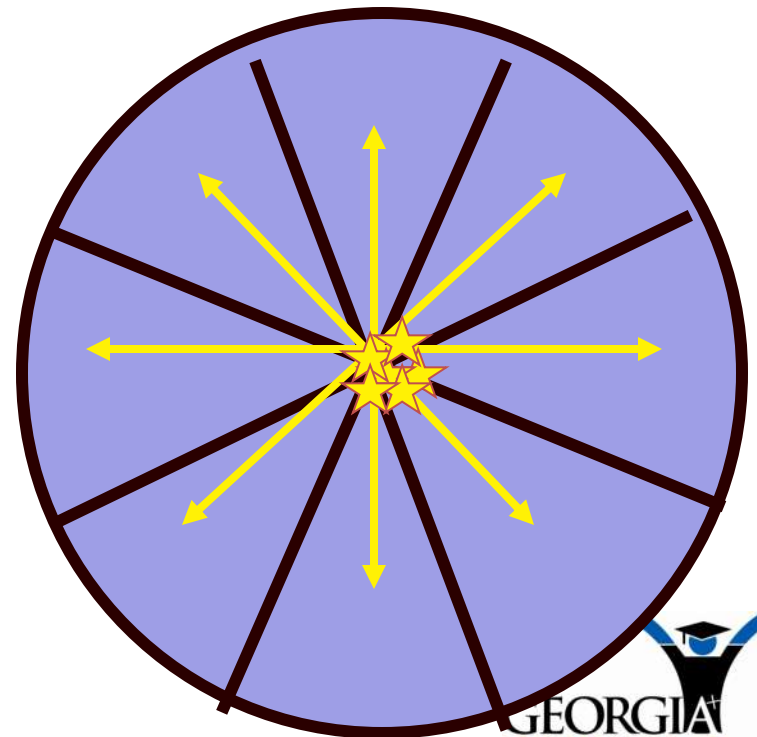
Knowledge



Critical Content



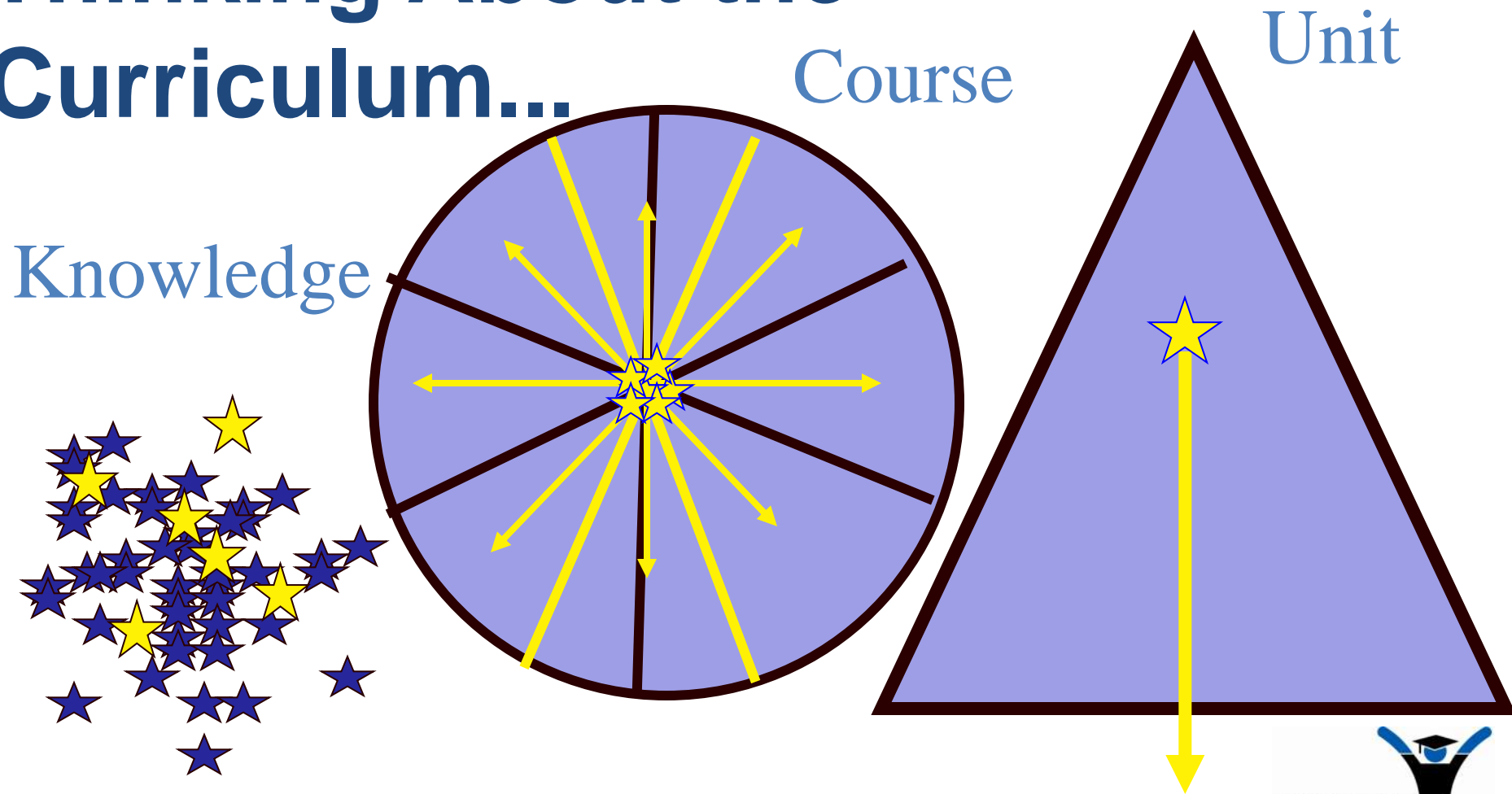
Course



Center for Research on Learning

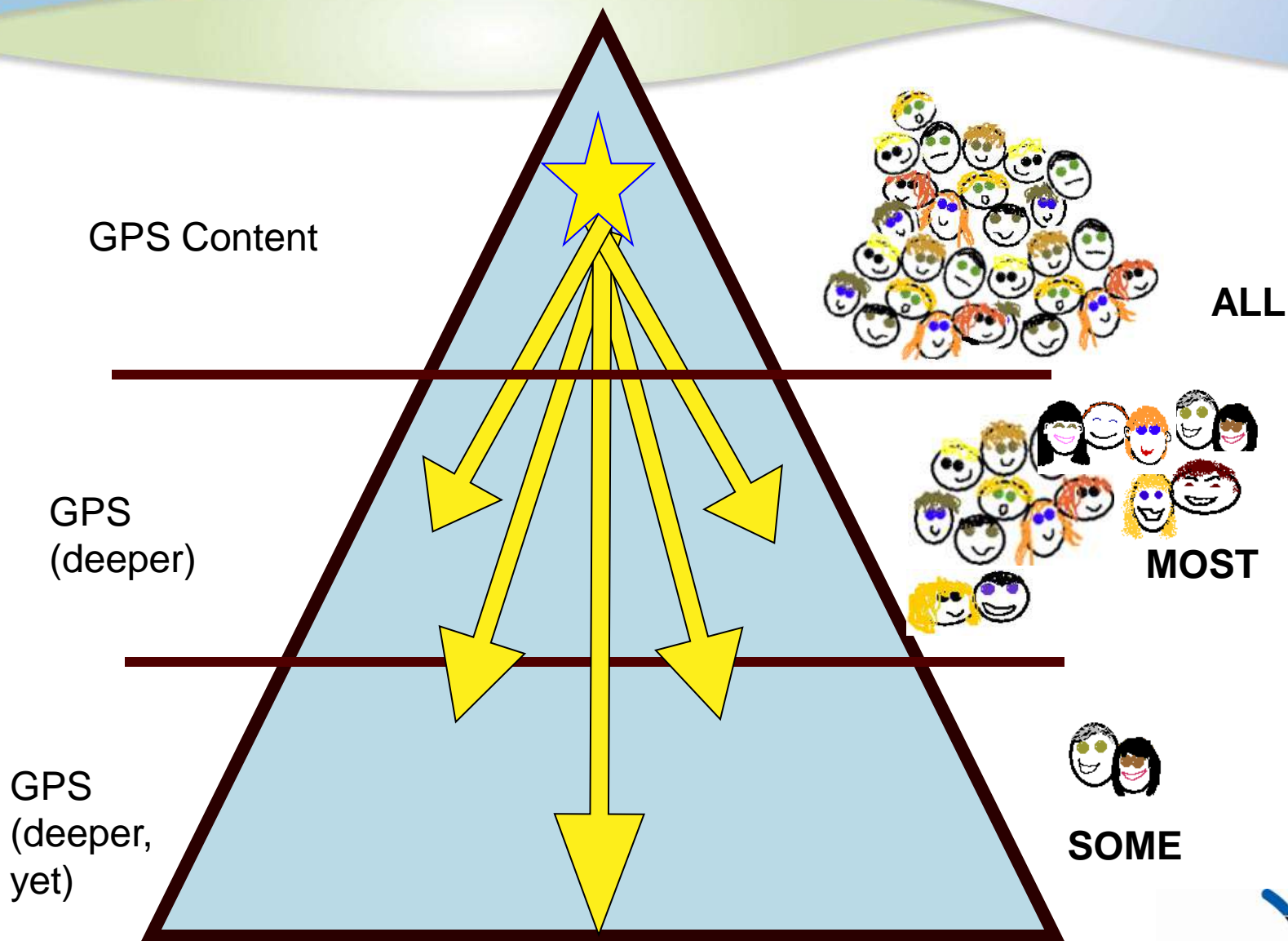
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Thinking About the Curriculum...



Center for Research on Learning

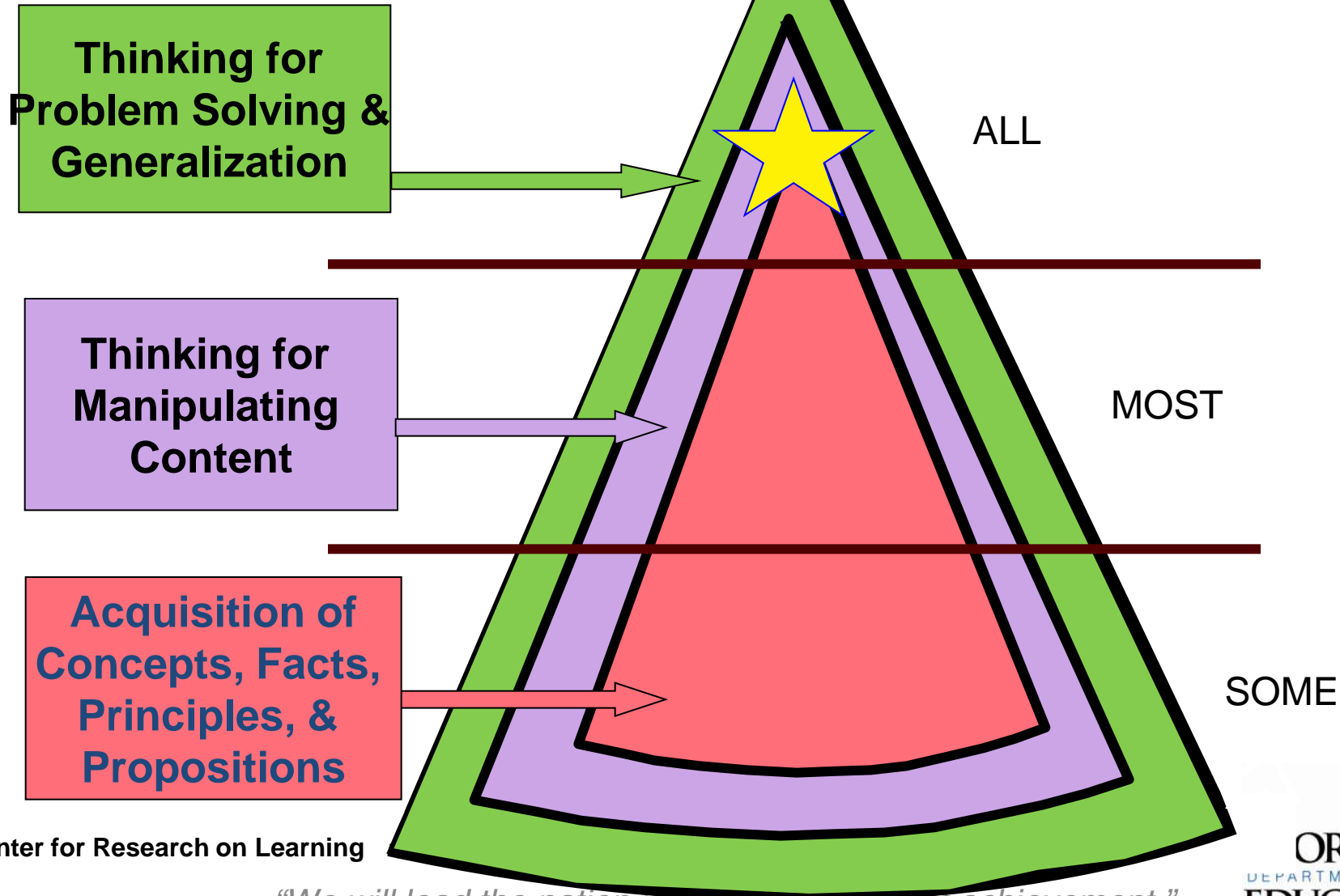
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Adapted from Center for Research on Learning

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A Unit



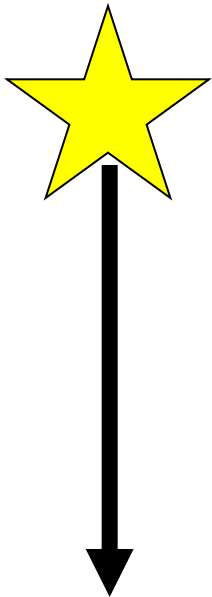
Center for Research on Learning

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Backward Design

What is sufficient evidence for demonstrating understanding of the critical content?

Start with the end in mind



- **Start with unit/lesson questions that are derived from standards and benchmarks.**
- **Design assessment procedures.**
- **Select/construct teaching devices, activities, and routines that ensure students meet assessment criteria.**

Map the critical content

“If I stopped one of your students in the hall way as they left your class after taking the unit test and asked, “What was that unit about?” What would you want them to say?”



RESOURCES

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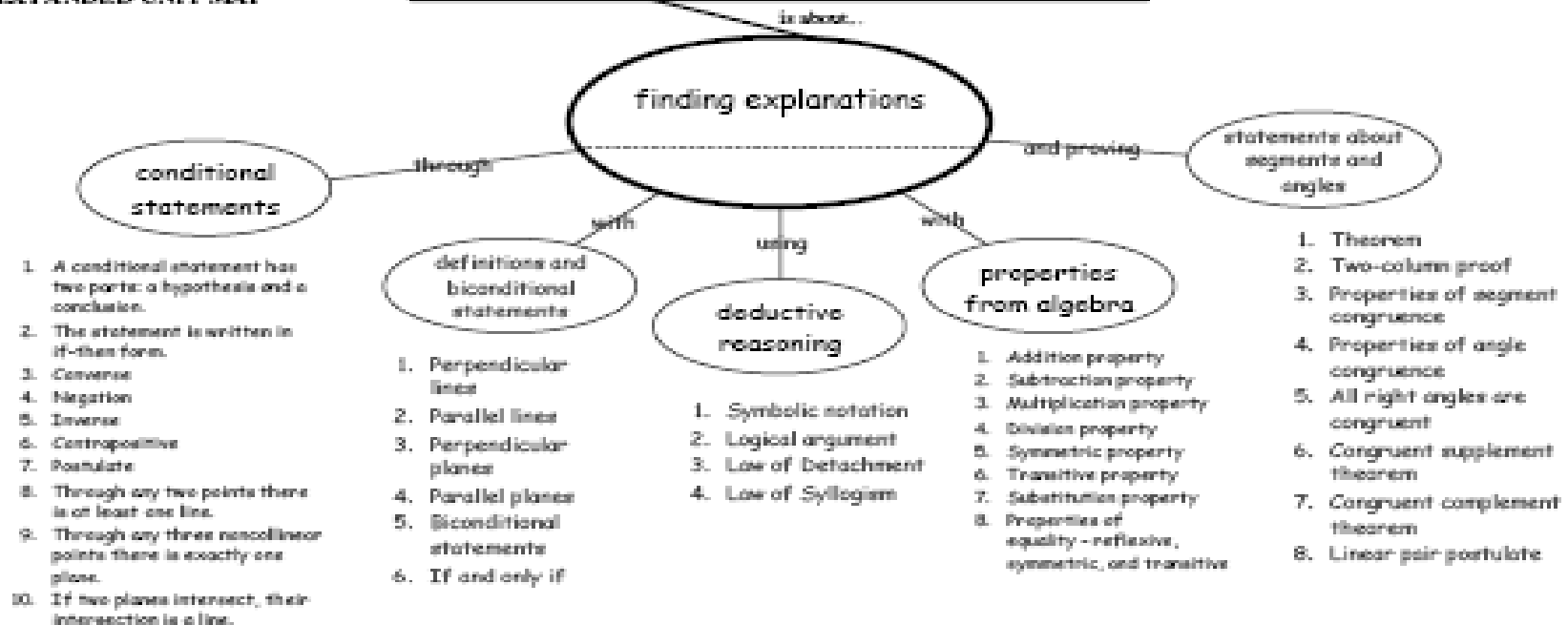
Graphic Organizers

The Unit Organizer

NAME Geometry

DATE Unit Two - Reasoning and Proofs

9 EXPANDED UNIT MAP



10 NEW UNIT SELF-TEST QUESTIONS

1. How do you use deductive reasoning to prove that lines are parallel or perpendicular?

COMPARISON TABLE

② OVERALL CONCEPT

Triangles

① CONCEPT

Congruent Triangles

① CONCEPT

Similar Triangles

③ CHARACTERISTICS

Corresponding angles are congruent
Corresponding sides are congruent
Logic
CPCTC
Four ways of proving the triangles are congruent: SSS, SAS, ASA, AAS, HL
Theory

③ CHARACTERISTICS

Corresponding angles are congruent
Corresponding sides are proportional
Scale Factor
Three ways to show the triangles are similar: SSS, AA, SAS (Similarity Theorems)
Applications
Find the measure of the missing side
Proportions

⑨ EXTENSIONS

FRAME : One proof and one measurement problem

④ LIKE CHARACTERISTICS

Corresponding angles are congruent

⑤ LIKE CATEGORIES

Corresponding angles

⑥ UNLIKE CHARACTERISTICS

Corresponding sides are congruent
Four ways to prove the triangles are congruent
CPCTC

Corresponding sides are proportional
3 ways to prove similar
Similarity Theorem

⑦ UNLIKE CATEGORIES

Sides
Ways to prove Theorems

⑧ SUMMARY

Congruent and similar triangles both have congruent corresponding angles, but they differ in their sides (congruent vs. proportional), ways to prove, and theorems.

Step 1: Communicate targeted concepts

Step 2: Obtain Overall Concept

Step 3: Make lists of known characteristics

Step 4: Pin down Like Characteristics

Step 5: Assemble Like Categories

Step 6: Record Unlike Characteristics

Step 7: Identify Unlike Categories

Step 8: Nail down a summary

Step 9: Go beyond the basics

MATH FRAME

Key Topic Deductive Reasoning

is about...

process of reasoning in which the argument supports the conclusion based on a rule
(making conclusions based on known facts).

☐ Main Idea
Symbolic notation

☐ Main Idea
Logical argument

☐ Main Idea
Law of Detachment

☐ Main Idea
Law of Syllogism

Essential details

conditional statements
 $p \rightarrow q$
converse $q \rightarrow p$

Essential details

using if-then statements

Essential details

if $p \rightarrow q$ is a true statement and
 p is a true statement, then we
can conclude that q is true.

Essential details

if $p \rightarrow q$ and $q \rightarrow r$ are both
true, then we can conclude that
 $p \rightarrow r$.

\sim
negation
 $\sim p$

using givens

Example: If Jon gets 2 weeks
of vacation, he will go to Europe.

Example: If Susan earns
her course credits, she will
graduate.

biconditional statements
 $p \leftrightarrow q$

using algebra concepts
and properties

He gets 2 weeks of
vacation.

If she graduates, she
will go to college.

p is hypothesis
 q is conclusion

using postulates and
theorems

Therefore, we can conclude
that Mark is going to Europe.

Therefore, if Susan earns her
course credits, she will go to
college.

So What? (Whats important to understand about this?)

When we use deductive reasoning, we can make logical arguments in geometry.

Paul Riccomini

- Workshops
 - Building Strategies to Help Students with Disabilities Graduate: Improving Academic Success in Math (SPDG)
 - Strategies for Making AYP for Math (SPDG)
- Elluminates
 - Error Analysis Procedures
- Video

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Elluminates

- ❖ **Teacher Talk** (Talking about Learning and Kids)
 - Grade level
 - Math Support I bi-monthly talks
- ❖ **Special Education with General Education**
 - 10-15-08 Improving Academic Performance of SWD's for Elementary Mathematics
 - 11-12-08 Improving Academic Performance of SWD's for Secondary Mathematics
 - 01-14-09 SIA Mathematics Vocabulary & Interleave Strategies
 - 02-11-09 SIA Mathematics 1 and Mathematics Support, Space Learning
 - 03-18-09 SIA Mathematics: Graphic representation & Flexible groups (PAL)

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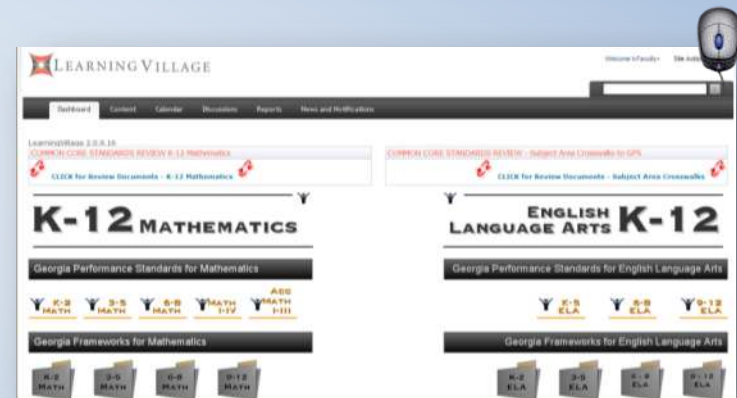


LEARNING VILLAGE

Learning Village, a resource in alignment to the Georgia Performance Standards, has been designed to achieve a balance among concepts, problem solving, and skill development in Georgia's Mathematics classrooms. This resource stresses rigorous concept development, presents realistic and relevant tasks, and keeps a strong emphasis on computational skills.

This website includes:

- standards
- REVISED framework units
- classroom and training videos
- mathematics parent letters
- vertical alignment charts
- webinars
- middle school mathematics webcasts
- PowerPoint unit overviews (coming soon)



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GeorgiaStandards.org...

Kathy Cox, State Superintendent of Schools

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teachers administrators parents

Please Pardon Our Progress

The Advanced Search feature has been temporarily disabled. Any search currently performed on this site will not return relevant results, including use of the search engine above. We apologize for any inconvenience this may cause. Please review these helpful links:

- How to Access Standards
- How to Access Frameworks

Quick Links

ExPreSS Thinkfinity | Verizon Foundation PBS TeacherLine Lexile GALILEO OAS LEARNING VILLAGE

Announcements

- NEW CTAE Middle School Instructional Resources
- NEW Lexile Framework for Reading in Action
- NEW Fine Arts Performance Standards
- NEW Health Education Standards
- Proposed REVISED Performance Standards for Eight High School CTAE Courses
- Proposed NEW Science Performance Standards

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Accessing Learning Village

The screenshot shows the Georgia Department of Education website. At the top, it says "Kathy Cox, State Superintendent of Schools". Below this is a navigation bar with links: Home, Georgia Performance Standards, Frameworks, Resources & Videos, Training, GSO Builder, About Us, Teachers, Administrators, Parents, and Contact Us. A banner image shows a man with his hands clasped, with the word "teachers" below it. To the right of the banner is a "Please Pardon Our Progress" message. The main content area features the "MyGaDOE" header. Below this is a "Please Log In" section with fields for Username and Password, a "Login" button, and a link for "I forgot my passphrase!". To the right of the login section is a "Helpful links" box with links to: MyGaDOE Online Guide, GaDOE Public Website, Information Systems, AYP & NCLB, Georgia Standards, Data Collections, Financial Reports, and Report Card. Below the login section is a link that says "Or sign up for an account". A green callout bubble points to this link with the text: "If you do not have a GaDOE portal login, please click on the 'sign up for an account' link to gain access to Learning Village." At the bottom of the page, there is a message: "This website requires JavaScript enabled in your browser." and a footer with the Georgia Department of Education logo and the text "Kathy Cox, State Superintendent of Schools".

Kathy Cox, State Superintendent of Schools

Home | Georgia Performance Standards | Frameworks | Resources & Videos | Training | GSO Builder

About Us | Teachers | Administrators | Parents | Contact Us

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MyGaDOE

Please Log In

Username:

Password:

[I forgot my passphrase!](#)

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Helpful links

- ◆ [MyGaDOE Online Guide](#)
- ◆ [GaDOE Public Website](#)
- ◆ [Information Systems](#)
- ◆ [AYP & NCLB](#)
- ◆ [Georgia Standards](#)
- ◆ [Data Collections](#)
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teachers

Quick Links

ExPreSS

LEXILE

OAS Georgia's Online Assessment System


This website requires JavaScript enabled in your browser.

Copyright

GEORGIA
DEPARTMENT OF
EDUCATION
Kathy Cox, State Superintendent of Schools

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Dashboard of Instructional sources ...

 LEARNING VILLAGE

Welcome IvFaculty+ Site Actions

Dashboard Content Calendar Discussions Reports News and Notifications

LearningVillage 2.0.9.16

COMMON CORE STANDARDS REVIEW K-12 Mathematics






CLICK for Review Documents - K-12 Mathematics

COMMON CORE STANDARDS REVIEW - Subject Area Crosswalks to GPS





CLICK for Review Documents - Subject Area Crosswalks

K-12 MATHEMATICS

Georgia Performance Standards for Mathematics




 K-2 MATH  3-5 MATH  6-8 MATH  MATH I-IV  ACC MATH I-III

Georgia Frameworks for Mathematics





 K-2 MATH  3-5 MATH  6-8 MATH  9-12 MATH

ENGLISH LANGUAGE ARTS K-12

Georgia Performance Standards for English Language Arts

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

Georgia Frameworks for English Language Arts

 K-2 ELA  3-5 ELA  6-8 ELA  9-12 ELA

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Revised Elementary Frameworks

Revised frameworks include:

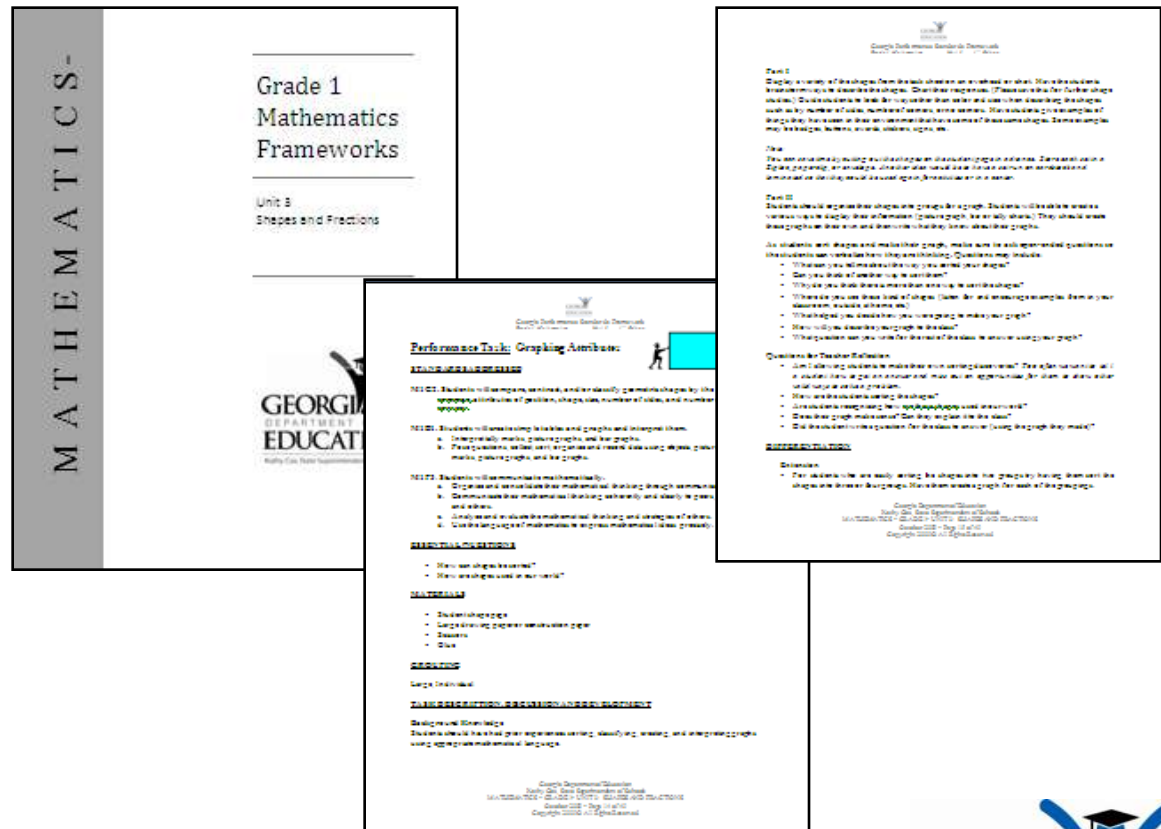
Updated Standards

Differentiation

Essential Questions

Updated Tasks

Background Knowledge



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Revised Middle School Frameworks

Revised frameworks include:

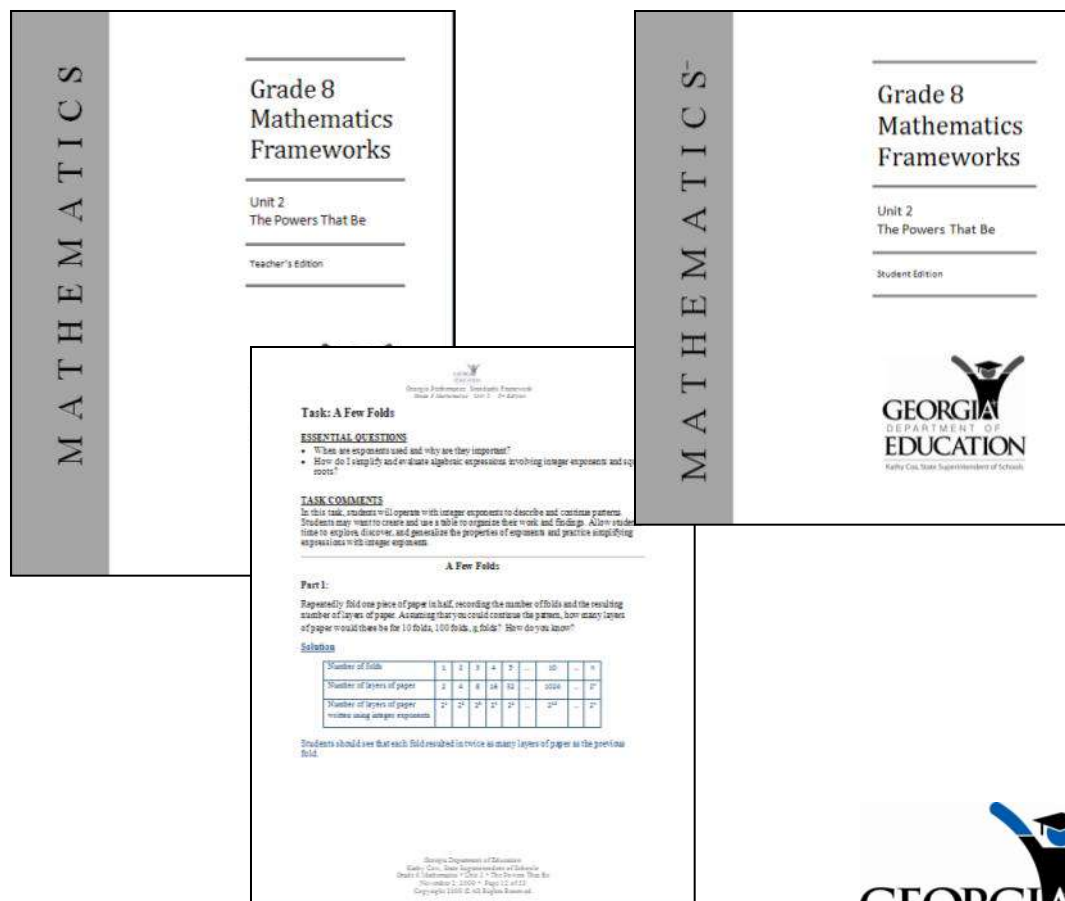
Teacher's Edition

Student Edition

Essential Questions

Updated Tasks

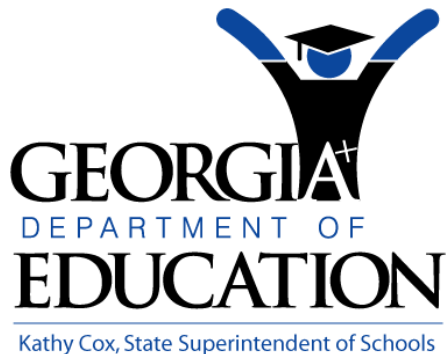
Background Knowledge



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PBS TeacherLine

PBS TeacherLine is an online tool that offers low-cost, high-quality professional development classes to teachers so they can improve their abilities and earn the Professional Learning Units -- or PLUs -- they need to maintain their certification.



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Mathematics Newsletters

Mathematics Newsletters include:

Content Articles

Resources

Illuminate Calendar

Professional Learning Opportunities

Assessment Articles

Instructional Articles



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Mathematics Newsletters

To subscribe to the bi-monthly newsletter, send an email with no message to the appropriate email address listed below:

<mailto:join-mathematics-k-5@list.doe.k12.ga.us>

<mailto:join-mathematics-6-8@list.doe.k12.ga.us>

<mailto:join-mathematics-9-12@list.doe.k12.ga.us>

<mailto:join-mathematics-districtsupport@list.doe.k12.ga.us>

<mailto:join-mathematics-administrators@list.doe.k12.ga.us>

<mailto:join-mathematics-resa@list.doe.k12.ga.us>



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Parent Letters

Mathematics Parent Letters include:

Each letter provides glimpses of the content investigated in class, suggestions for activities to explore at home, vocabulary used in the unit, grade-appropriate readings related to the math content, and links to websites that contain additional background information or practice opportunities for skills development.

CSI Unit Diagram

Further Investigations
In this section, the reader can find activities that parents can do with their students at home to extend or enrich the learning from the classroom.

Terminology
Vocabulary for the unit is defined in this section of the Unit.

Book 'em
Non-math books (or chapters in higher grades) are listed in this section. These references provide pictures of the math content being used, or they suggest the need or usefulness of the mathematics.

Related Files
If the user clicks on this section (or enters the address in his browser), he will be referred to links for student practice and background information for topics addressed in the unit.

Classroom cases and Case closed-evidence
These sections provide sample problems or activities that might be investigated in class along with typical solutions or results.

Clues
In the Clues section are hints for understanding and appreciating the mathematics. For example, this section tells the reader that circle graphs are often called pie charts.

CSI: MATHEMATICS Curriculum Support Information
A mathematics resource for parents, teachers, and students

Further Investigations:
Offer your family a chance to explore the math content of the unit at home. This section provides a list of activities that parents can do with their students at home to extend or enrich the learning from the classroom.

Terminology:
Circle graphs are a useful way to represent a whole and its parts. They are often used to show the relative size of different parts of a whole.


Classroom Cases:
1. A circle graph shows the results of a survey. The circle is divided into 8 equal sectors. 3 sectors are shaded red, 2 sectors are shaded blue, and 3 sectors are shaded green. What fraction of the circle is shaded red?

Case Closed - Evidence:
The circle is divided into 8 equal sectors. 3 sectors are shaded red, 2 sectors are shaded blue, and 3 sectors are shaded green. The fraction of the circle that is shaded red is $\frac{3}{8}$.

Clues:
A circle graph is a picture of a whole divided into parts. The parts are called sectors. The size of each sector represents the size of the part it represents. For example, if a circle graph is divided into 8 equal sectors, and 3 sectors are shaded red, then the shaded sectors represent $\frac{3}{8}$ of the whole.

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GPS Mathematics Classroom Videos



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Kathy Cox, State Superintendent of Schools

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- English Language Arts and Reading
- **Mathematics**
 - Administrator's Math Toolkit
 - Instructional Videos
 - Webcasts: Using Manipulatives, Gr. 6-8
 - GPS for K-5 Math Polycom
 - Math I: Algebra/Geometry/Statistics
 - Math I: Assessing for Math Success
 - Math II: Geometry/Algebra II/Statistics
 - Effective Math Instruction for Students with Diverse Needs
 - GPS in Action
 - Tips from the Trenches
- Science
- Social Studies
- Special Education
- Career, Technical, and Agricultural Education (CTAE)
- GSO to GO Videos & Podcasts

Home » Resources & Videos » Browse Videos » Mathematics » Georgia

Georgia Classroom Instructional Videos

Kindergarten

- Chrysanthemum is My Name (Unit 4)
- How Heavy Is It? (Unit 4)
- It's All in the Bag (Unit 6)
- Take It to the Store! (Unit 6)
- Math Tubs
- Calendar

Grade 1

- Jelly Bean Grab (Unit 1)
- Creating Story Problems (Unit 2)
- Which One Doesn't Belong! (Unit 3)
- It's Time (Unit 4)
- Measurement Masters (Unit 4)
- How Many Ways? (Unit 5)

Grade 3

- Shopping for Healthy Snacks (Unit 1)
- Making "Cents" of Division (Unit 2)
- Twenty-four Kids All in Rows (Unit 2)
- A Giraffe Named Stretch (Unit 2)
- Family Reunion (Unit 2)
- Guess Who's Coming to Dinner (Unit 3)
- Math Centers

Grade 4

- Grocery Shopping (Unit 1)
- Using Arrays to Multiply Bigger Number 2)
- Kilogram Scavenger Hunt (Unit 3)
- Quadrilateral Challenge (Unit 4)
- Flag Fractions (Unit 5)
- Balance Scales (Unit 6)
- Balance Scale Algebra (Unit 6)

Grade 6

- Arrays, Factors, and Number Theory (Unit 2)
- Cupid Targets Fractions and Recipes (Unit 3)
- Re-carpeting the Classroom (Unit 7)

Grade 7

- The "eyes" I'vee It! (Unit 1)
- A Second Challenge (Unit 4)
- A Final Challenge (Unit 4)
- Sessaw Nickels (Unit 6)

Grade 8

- Is it Fair? (Unit 1)
- Expanding Space Station (Unit 3)
- Walk the Graph (Unit 5)
- Cara's Candles & DVD Club (Unit 7)



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Mathematics Videos

www.georgiastandards.org

- Administrator's Mathematics Toolkit
- Georgia Classroom Instructional Videos
- Webcasts: Using Manipulatives, Gr. 6-8
- GPS for K-5 Math Polycom, March, 2009
- Mathematics I: Algebra/Geometry/Statistics
- Mathematics I: Assessing for Mathematics Success
- Mathematics II: Geometry/Algebra II/Statistics
- Effective Mathematics Instruction for Students with Diverse Needs
- Georgia Performance Standards In Action
- Tips From the Trenches

"We will lead the nation in improving student achievement."

What is georgiamath.org?

From
<http://www.gadoe.org>

Look for the calculator!

Or go directly to:
georgiamath.org



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What can you find at the georgiamath.org page?

- ❖ Introductory Video by Kathy Cox
- ❖ Comparison of QCC and GPS Course Content
- ❖ Information about learners requiring acceleration and learner requiring support
- ❖ Resources for Parents, Teachers and Educators
- ❖ General Information
- ❖ Link to GeorgiaStandards.org

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Year 3

- Mathematics III
- Mathematics Support III (optional)

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Fourth Year Mathematics Courses

- Mathematics IV
- Advanced Mathematical Decision Making
- Advanced Mathematical Decision Making in Industry and Government
- Advanced Mathematical Decision Making in Finance
- AP Statistics
- AP Calculus AB/BC

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State Board Rule 160-4-2-.20	Course Numbers
Mathematics Support III	27.04600
Advanced Mathematical Decision Making	27.08500
Advanced Mathematical Decision Making in Industry and Government	27.08600
Advanced Mathematical Decision Making in Finance	27.08700

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Thanks to:

Richard D. Lavoie How Difficult Can This Be? A Learning Disabilities Workshop (1989)

Dr. Mel Levine <http://www.pbs.org/wgbh/misunderstoodminds>

<http://www.eyetricks.com/illusions.htm>

Center for Research on Learning
Kansas Content Enhancements

Sileo, Jane M and van Garderen, Delinda (2010) Creating Optimal Opportunities to Learn Mathematics: Blending Co-Teaching Structures With Research-Based Practices. *Teaching Exceptional Children*, Vol.42, No. 3, pp.14-21.

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Final Thought...

- “A man who doubts himself is like a man who would enlist in the ranks of his enemies and bear arms against himself. He makes his failure certain by himself being the first person to be convinced of it.”
- Alexandre Dumas

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