

Engaging Families for Math Success

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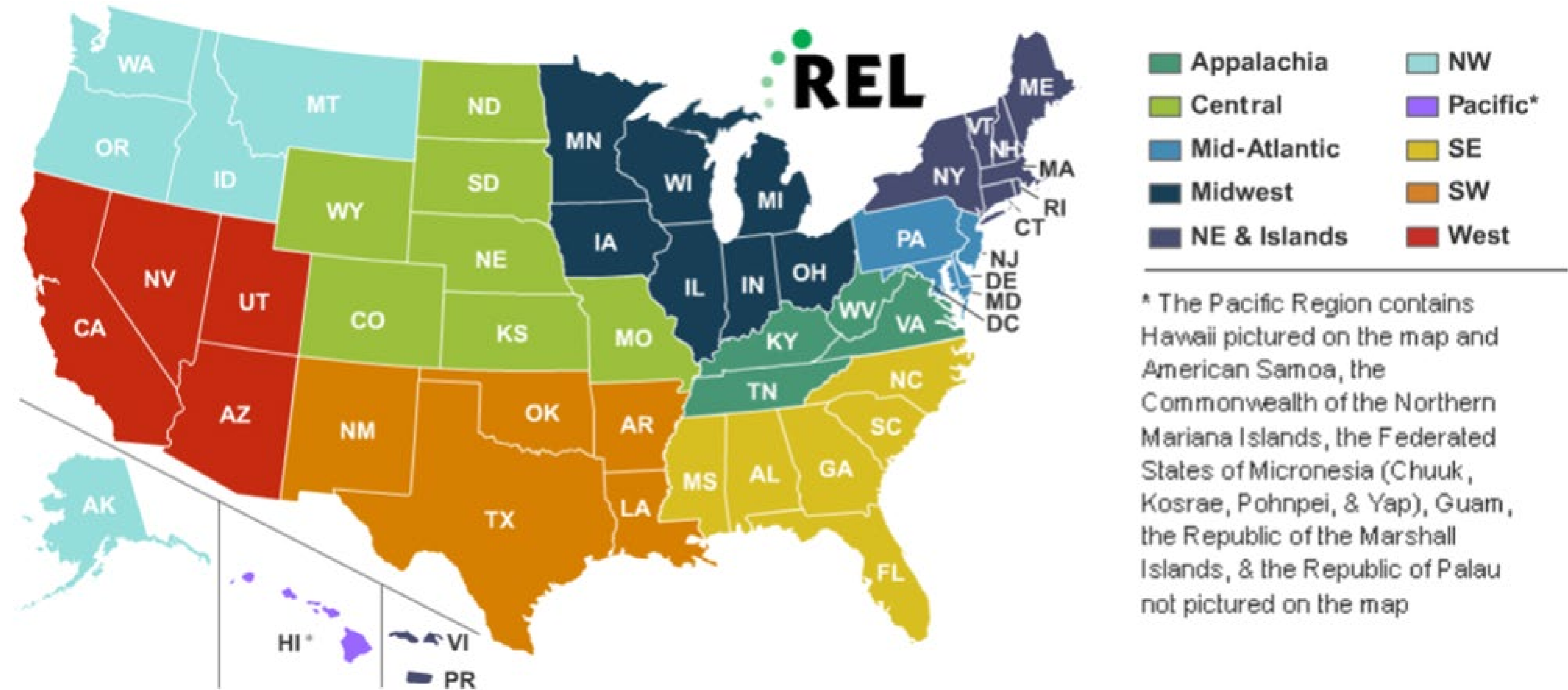
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SRI International

For our 60 minutes together...



Time	Agenda item
5 min	Welcome and introductions
10 min	Math, family, and mindset
15 min	The Kentucky Family Math Night experience
20 min	Math station activities
10 min	Wrap up

The Regional Educational Laboratories



The **10 RELs** work in partnership with stakeholders to **support a more evidence-based education system.**


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 Regional Educational Laboratory Appalachia
 At SRI International
 REL 2020-017
 U.S. DEPARTMENT OF EDUCATION


What Tools Have States Developed or Adapted to Assess Schools' Implementation of a Multi-Tiered System of Supports/Response to Intervention Framework?

A Publication of the National Center for Education Evaluation and Regional Assistance at IES




Supporting Your Child in Developing Math Skills For Future Success

Math success opens doors to college and careers.
 The technical and professional jobs of the future demand more mathematical knowledge and problem solving skills.



Children who believe they can be successful in math are more willing to put in effort, even when they struggle, and this results in better performance.¹

Success in elementary school math predicts future achievement in middle and high school math and other subjects.^{2,3}

Students who complete higher-level math in high school earn higher incomes in the future.⁴

The number of STEM (science, technology, engineering, and mathematics) jobs is growing and half of all STEM jobs are available to workers without a four-year college degree. STEM jobs pay 10% more than other jobs available to these workers.⁵

Families can support children in developing math skills for the future by⁶:

praising effort and modeling positive math attitudes.

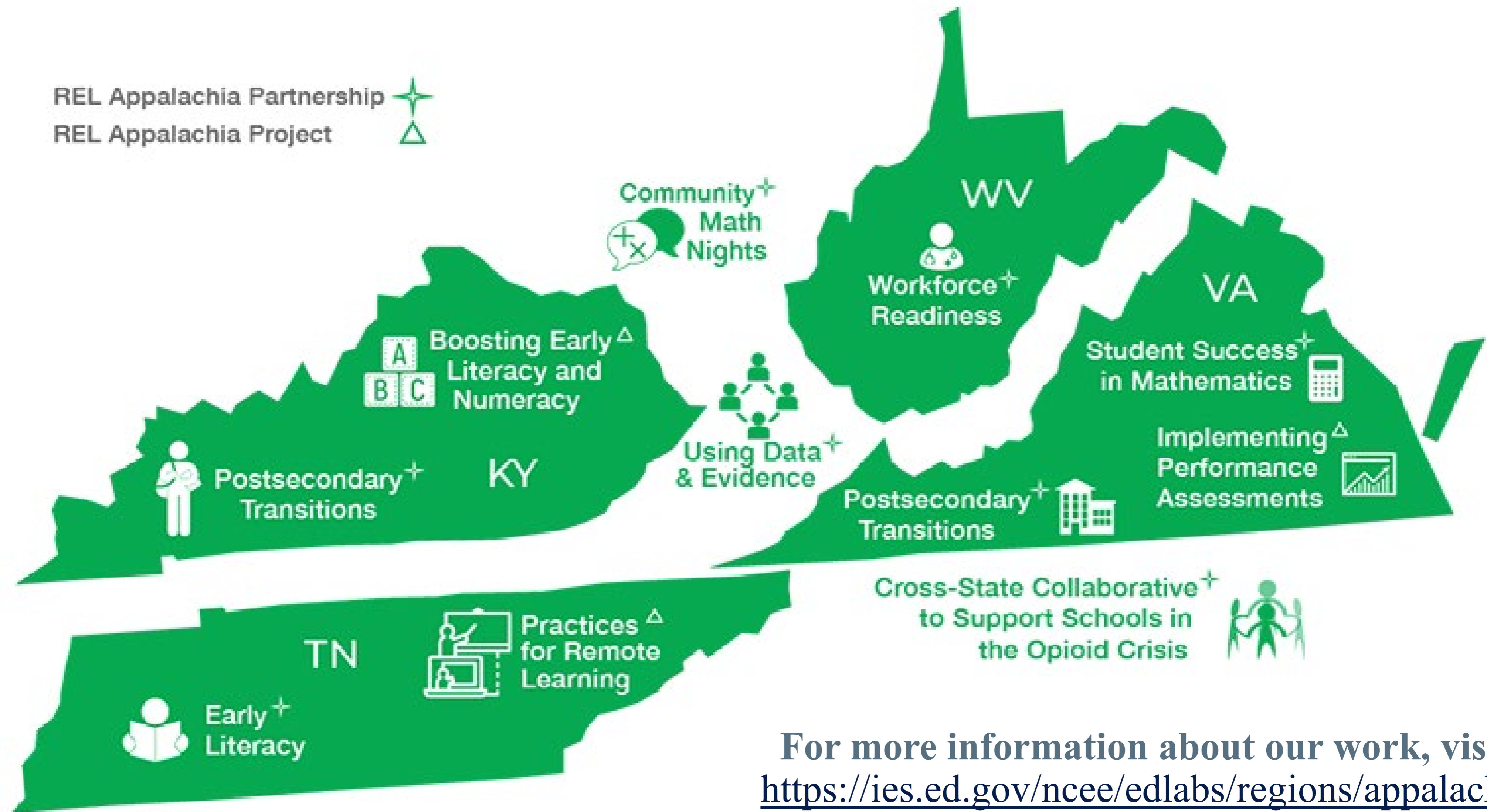
encouraging children to seek help and try new strategies when they are stuck.

confronting stereotypes about who is good at math.

1. Butler, J. (2015). Mathematical mindsets: Unleashing students' potential through creative math, inspiring messages and innovative teaching. San Francisco, CA: John Wiley & Sons.
 2. Claessens, A., & Engel, M. (2013). How important is where you start? Early mathematics knowledge and later school success. Teachers College Record, 115(6), 1-29. <http://erfc.ad.gov/ind-E/1102017/>
 3. Siegler, R. S., Duncan, G. J., Davis-Kean, P. E., Duckworth, K., Claessens, A., Engel, M., ... & Chen, M. (2012). Early predictors of high school mathematics achievement. Psychological Science, 23(7), 691-697.
 4. Achieve, Inc. (2006). Closing the expectations gap: An annual 80-state progress report on the alignment of high school policies with the demands of college and work. Washington, DC: Author.
 5. Rothwell, J. (2013). The Hidden STEM Economy. Brookings Institution: Washington, DC.
 6. Epstein, J.L. (2001). School, family, and community partnerships [1st ed.]. Boulder, CO: Westview Press.

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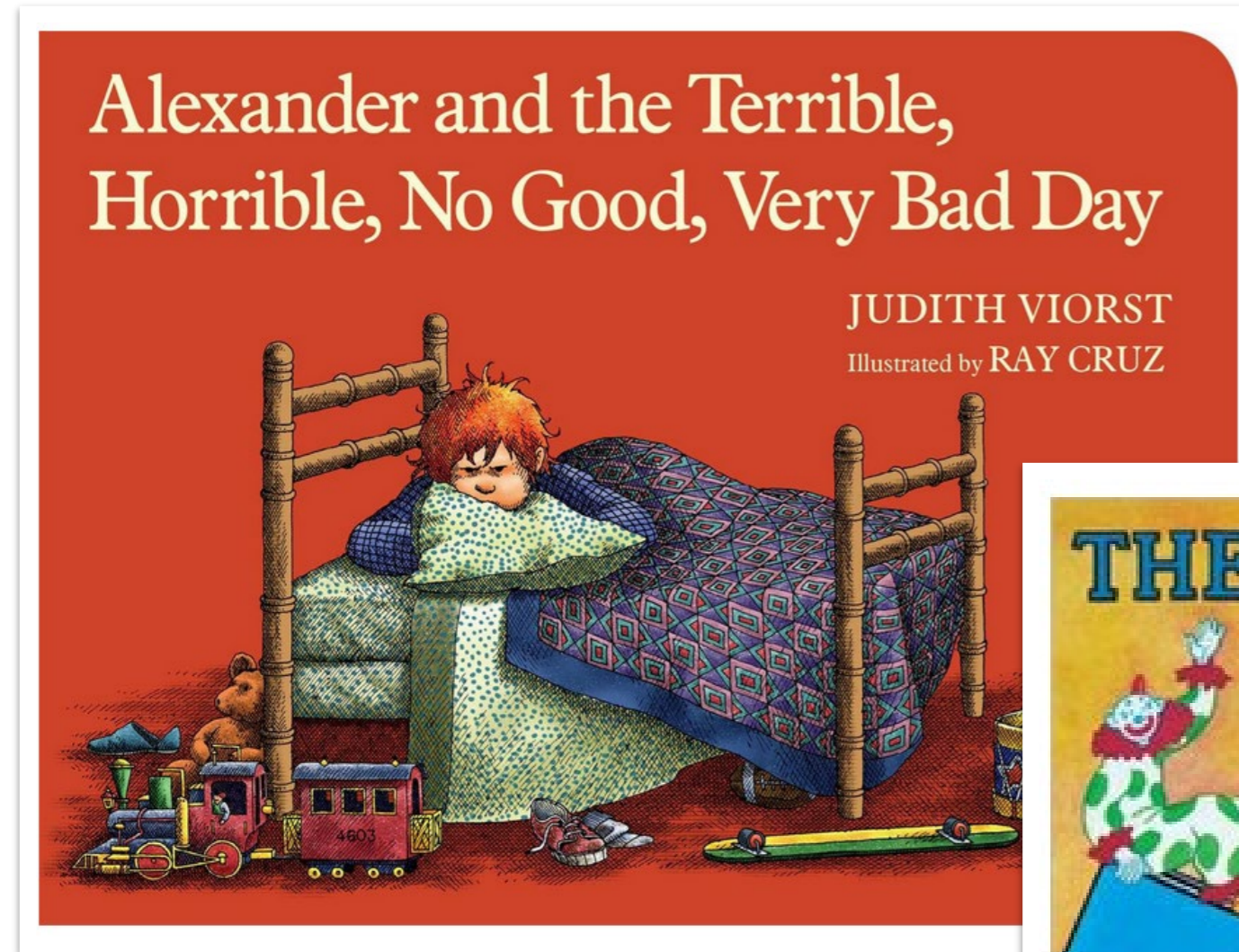
REL Appalachia Partnership 
REL Appalachia Project 



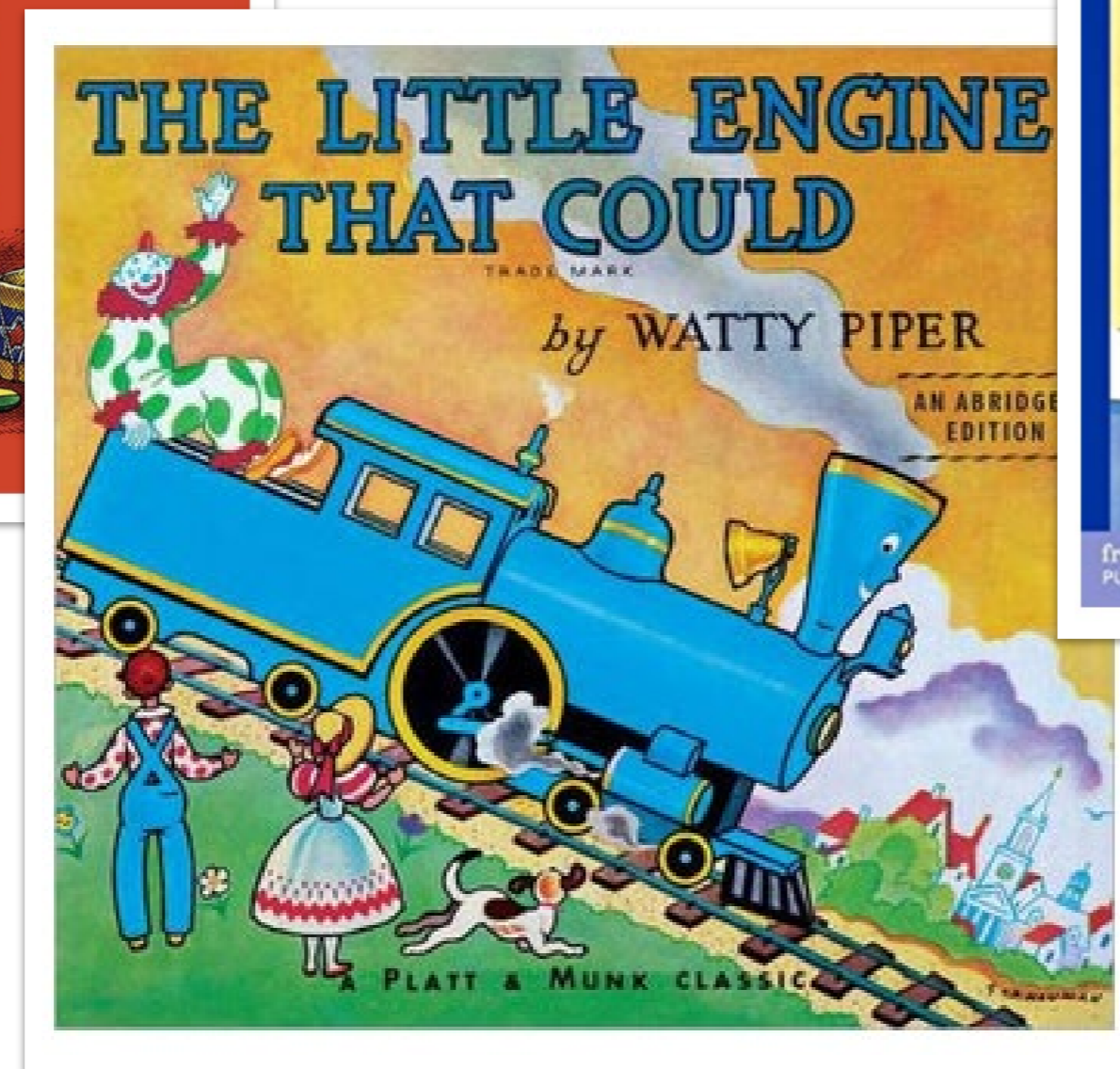
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When you think about math learning, which book is most like you?

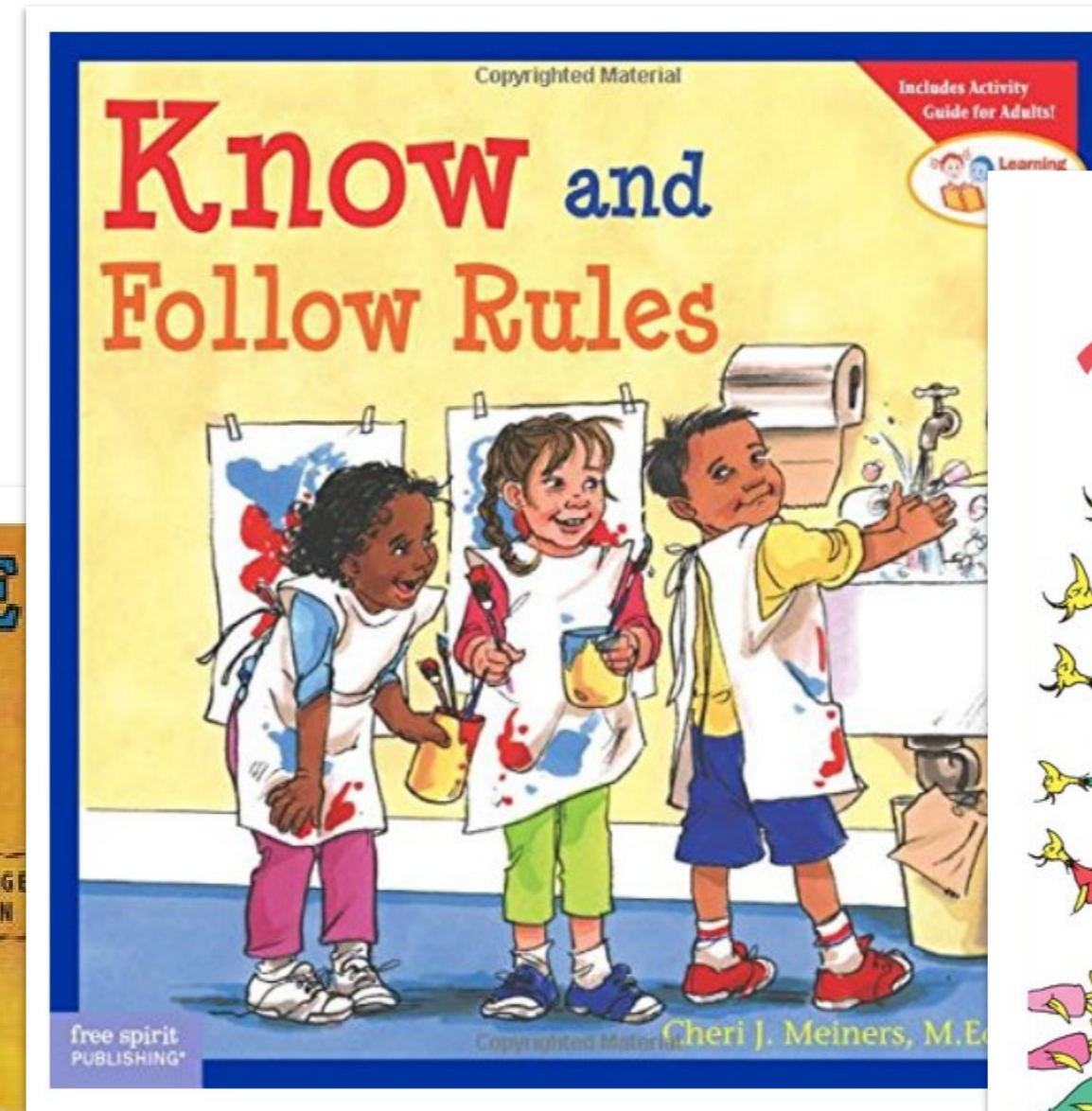
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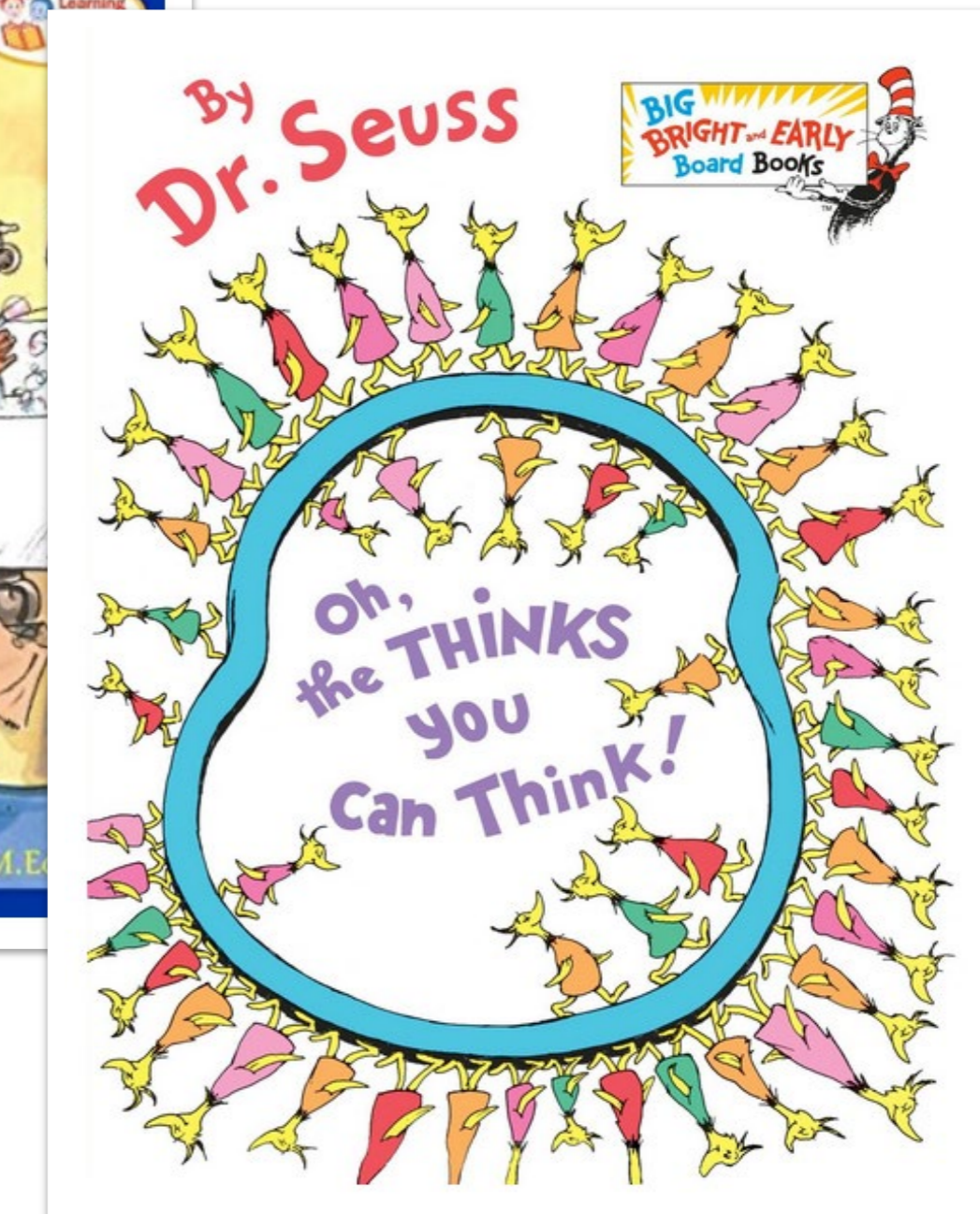
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C



D



Math, Family, and Mindset

Why host a Community Math Night?

Community Math Nights partnership

- Emerged from a need for **families** and the **broader community** to recognize the importance of math for future education and workforce success.
- Aimed to build the capacity of **educators** to implement evidence-based math practices, strategies to promote positive attitudes and growth mindset, and effective family engagement.



Benefits of hosting a Community Math Night

Educators engage with research and learn interactive math activities and family and community outreach strategies.

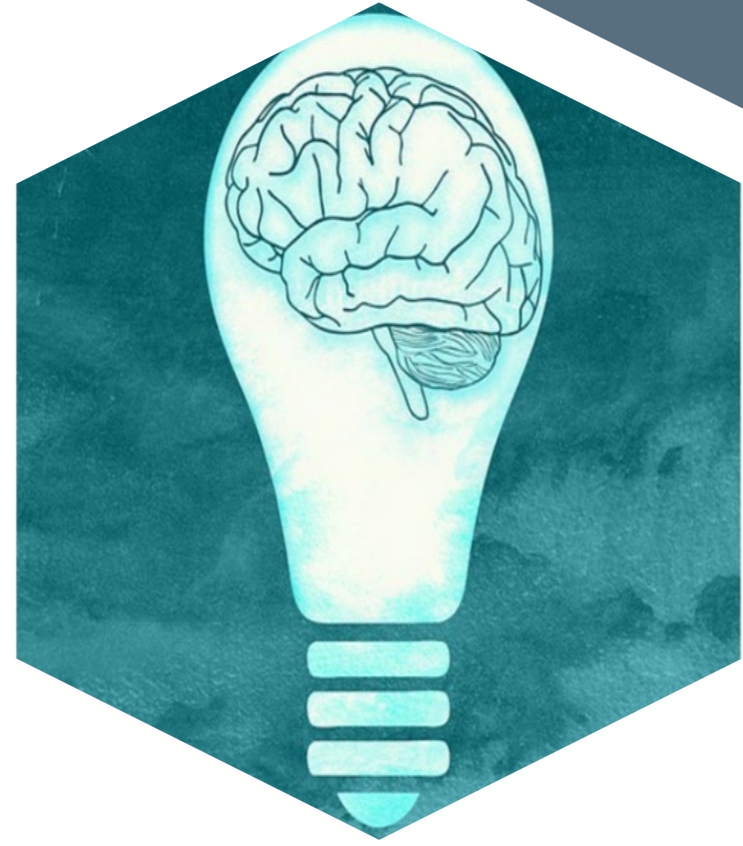
Educators build and strengthen relationships with families and community members.

Family and community members leave with a greater understanding of the importance of mathematics and strategies to support math learning that can help children become stronger mathematicians in the classroom.



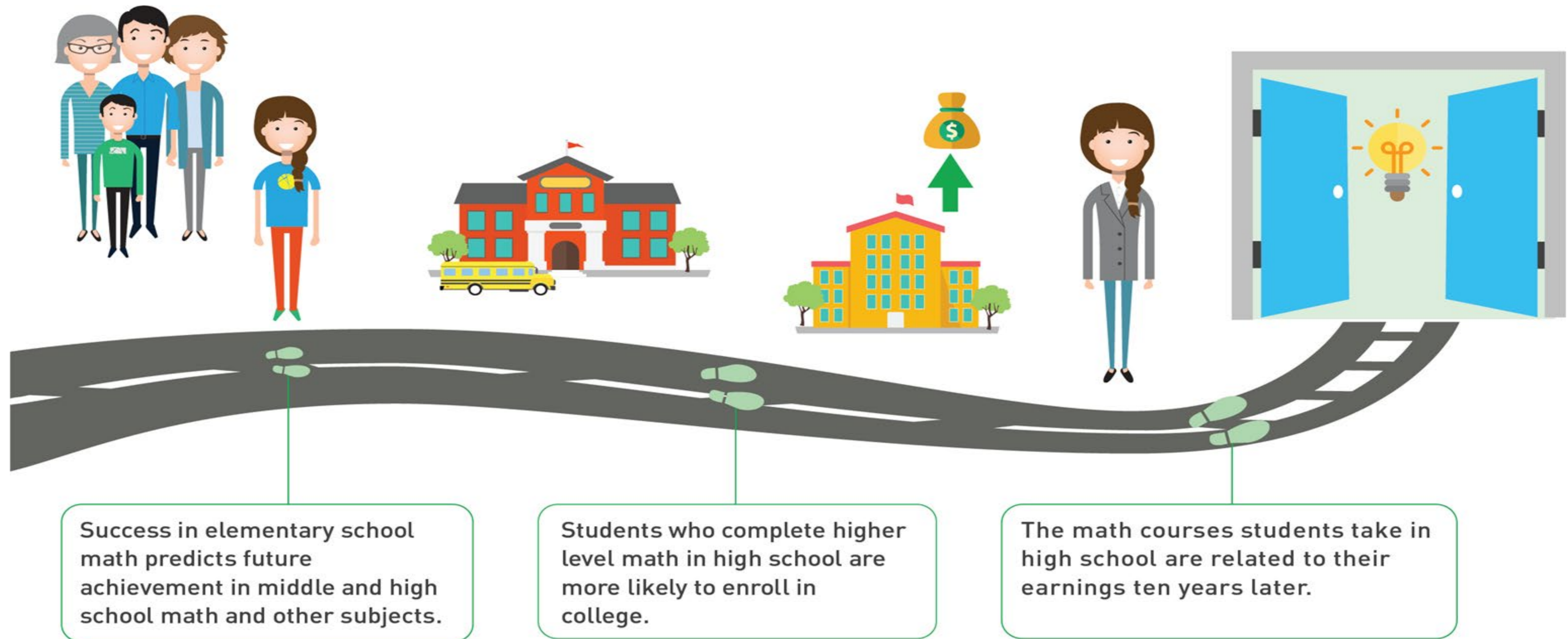
Math

Family



Mindset

Math matters



(Byun et al., 2015; Claessens & Engel, 2013; Cuoco et al., 1996; Rose & Betts, 2004; Siegler et al., 2012)



Research tells us that student **learning is greatest** when activities and tasks encourage **high-level thinking** and least when tasks are procedural.

(Boaler & Staples, 2008; Van de Walle, 2004)

Families matter

We use the word **family** to honor **all adult caregivers who make a difference in a child's life**. Families can be biological or nonbiological, chosen or circumstantial. They are connected through cultures, languages, traditions, shared experiences, emotional commitment, and mutual support.

National Center on Parent, Family and Community Engagement

(U.S. Department of Health and Human Services, 2018)

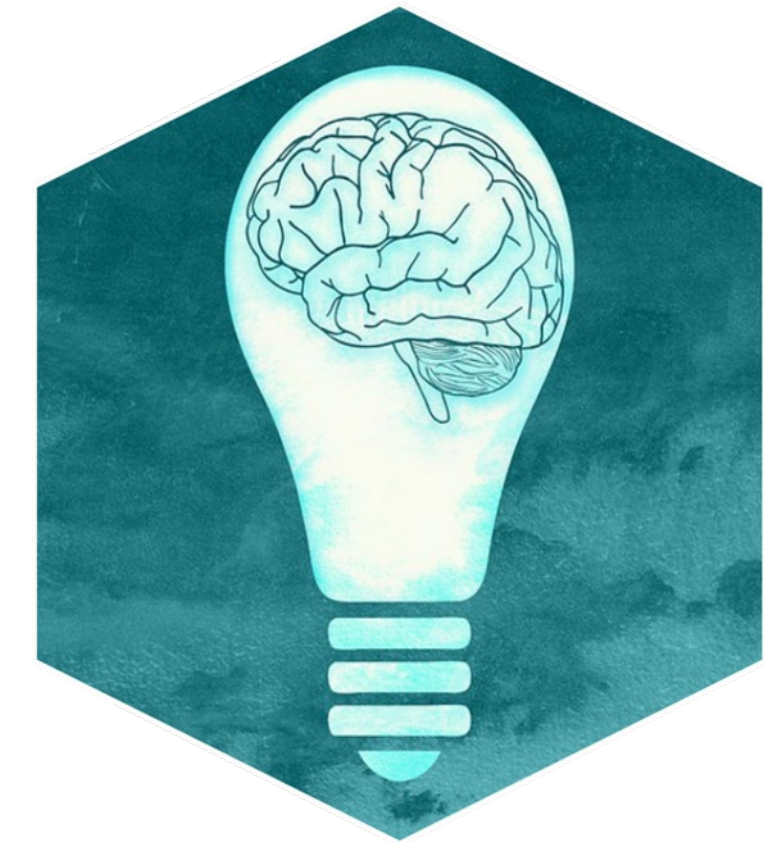
Families matter (cont.)



- Family involvement is a **strong predictor of school success**, particularly in literacy and math.
- Well-designed parent-family-community partnerships that involve parents and family members in their children's learning are associated with **increased student self-confidence and achievement** generally and in math specifically.

(Epstein et al., 2018; Harris et al., 2017; VanVoorhis et al., 2013; Weiss et al., 2009)

Mindset matters



- Students who **believe they can be successful in math** are more likely to put in effort, even when they struggle, and this can result in better performance.
- **Math anxiety and negative attitudes towards math** can affect students' success in math.
- Math anxiety can be counteracted by **normalizing feelings about math, modeling positive math attitudes, and supporting development of a growth mindset.**

(Boaler, 2015; Blazer, 2011; Chang & Beilock, 2016; Maloney et al., 2015; Ramirez et al., 2016; Ramirez et al., 2013)



I can learn anything I want to.
When I'm frustrated, I persevere.
I want to challenge myself.
When I fail, I learn.
Tell me I try hard.
If you succeed, I'm inspired.
My effort and attitude determine everything.



I'm either good at it, or I'm not.
When I'm frustrated, I give up.
I don't like to be challenged.
When I fail, I'm no good.
Tell me I'm smart.
If you succeed, I feel threatened.
My abilities determine everything.

Created by: Reid Wilson @weyfaringspath ©️🇺🇸🇨🇦 Icon from: thenounproject.com

*(Blackwell et al., 2007; Dweck, 2008;
Dweck, 2014; Epstein et al., 2006;
Gunderson et al., 2018; Ma, 1997)*

Questions?





The Kentucky Family Math Night Experience

Kentucky Family Math Night components



Gather

- Participants arrive, check in, socialize, and enjoy a meal or refreshments

Mindsets and Math Presentation

- Educators present on the importance of math, positive math attitudes, and growth mindset

Station Activities

- Participants rotate through stations led by educators
- Stations are aligned to Kentucky Academic Standards

Closing

- Educators share closing remarks and conclude with feedback survey, raffle, and other optional activities

Adapting the Community Math Night



Each math station identifies:

- Related math content standards AND practice standards from the *Kentucky Academic Standards (KAS) for Mathematics*
- Family prompts that can be utilized before, throughout or after the station to foster mathematical discussion and deepen mathematical understanding

Kentucky Academic Standards

This learning experience offers students and families opportunities to engage with the Standards for Mathematical Content and the Standards for Mathematical Practice within the *KAS for Mathematics*.

Standards for Mathematical Practice

MP.6 Attend to precision.

MP.7 Look for and make use of structure.

Kindergarten

Cluster: Analyze, compare, create and compose shapes.

KY.K.G.6 Compose simple shapes to form larger shapes.

First grade

Cluster: Reason with shapes and their attributes

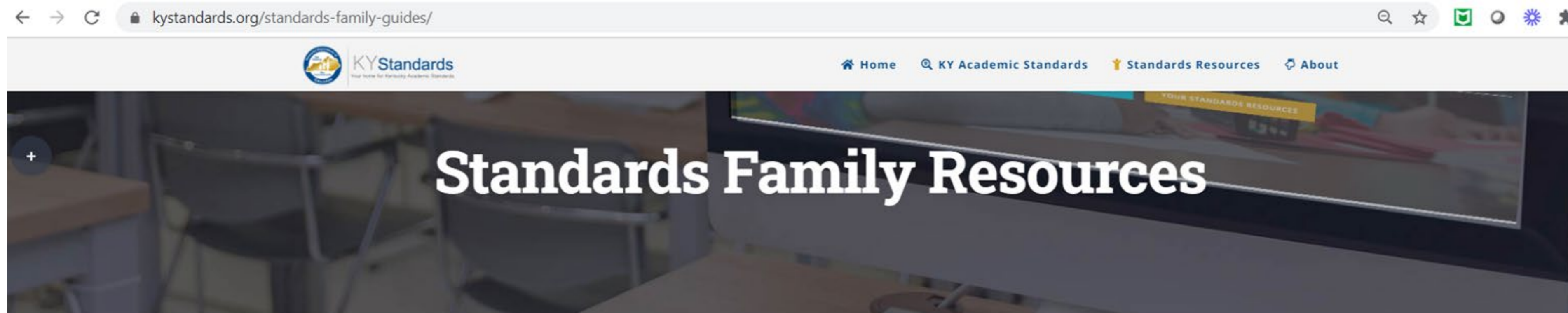
KY.1.G.2 Compose shapes.

a. Compose two-dimensional shapes to create rectangles, squares, trapezoids, triangles, half-circles, quarter-circles and composite shapes to compose new shapes from the composite shapes.

b. Use three-dimensional shapes (cubes, right rectangular prisms, right circular cones and right circular cylinders) to create a composite shape and compose new shapes from the composite shapes.

Standards Family Guides

The *Kentucky Academic Standards (KAS)* Family Guides have been developed to help families familiarize themselves with the content of each set of grade level standards. Each guide contains a standards overview for Mathematics, Reading & Writing, Science and Social Studies.



Standards Family Guides

The *Kentucky Academic Standards (KAS)* Family Guides have been developed to help families familiarize themselves with the content of each grade level's standards. Each guide contains a standards overview for Reading & Writing, Mathematics, Science and Social Studies.

- Kindergarten KAS Family Guide
- Kindergarten KAS Family Guide (Spanish)
- Grade 1 KAS Family Guide
- Grade 1 KAS Family Guide (Spanish)
- Grade 2 KAS Family Guide
- Grade 2 KAS Family Guide (Spanish)
- Grade 3 KAS Family Guide
- Grade 3 KAS Family Guide (Spanish)
- Grade 4 KAS Family Guide
- Grade 4 KAS Family Guide (Spanish)
- Grade 5 KAS Family Guide
- Grade 5 KAS Family Guide (Spanish)
- Grade 6 KAS Family Guide
- Grade 6 KAS Family Guide (Spanish)
- Grade 7 KAS Family Guide
- Grade 7 KAS Family Guide (Spanish)
- Grade 8 KAS Family Guide
- Grade 8 KAS Family Guide (Spanish)
- High School KAS Family Guide
- High School KAS Family Guide (Spanish)

Standards Family Guides

- ▶ Each content area contains the following sections:
 - Why are the Kentucky Academic Standards important?
 - How are the standards organized?
 - Overview of the grade level content
 - Examples of your child's work at school
 - How to help your child at home
 - Questions you can ask your child
 - Questions you can ask your child's teacher



A Family's Guide to Understanding Student Assessment



a Family's Guide to Understanding Student Assessment

This guide was made to help families understand how assessment can support student learning. You will find information about different types of assessment your student might engage in and how each can help your student meet learning goals. This guide includes questions that you can ask your student and their teacher to help you support learning at home. When teachers and families work together, students can develop the skills they will need for life after graduation. *If you have questions about this information, please contact your student's teacher.*

What Is Assessment?



Assessment is not just a test — we use a lot of different assessment tools and strategies to get different kinds of information about learning for each child, school, and district.



There are different types of assessment that are designed for different purposes and support different decisions about student learning.

Why Do We Assess?



School leaders, teachers, parents, and students need information that gives a full picture of how students are doing so that they can make good decisions about student learning.

• School leaders need information to understand how a classroom, school, or district is doing so that they can make decisions about things such as professional development and staffing.

• Teachers need information about the progress their class is making toward end-of-year expectations so that they can make decisions about what they might need to change in upcoming instruction.

• Students and teachers need ongoing information in the classroom to help them decide where to go next in learning.

Understanding the types of assessment your student engages in and what the information provided tells you about your student's learning can support you to have meaningful conversations with your student and their teacher about supporting learning at home.



This resource provides:

- information about different types of assessment your student might engage in;
- how each type of assessment can help your student meet learning goals;
- questions that you can ask your student;
- questions you can ask your student's teacher to help you support learning at home.



Cohort Two - The Show Must Go On

Throughout the pandemic, Kentucky schools, like others across the country had to shift and find creative ways to support students and families.

That meant Kentucky Family Math Nights were held:

- ▶ Where:
 - In person
 - Virtual
 - Hybrid
 - Drive thru
- ▶ When:
 - Single nights
 - Multiple nights
- ▶ How:
 - Synchronous
 - Asynchronous



Cohort Two - The Show Went On

- ▶ Updated national toolkit supported a deeper learning experience for facilitators
- ▶ Updated and expanded library of games
 - Including expanding the library of games offered in Spanish
- ▶ Included books that contribute to strengthening students' mathematical identities, encouraging the exploration of the contributions diverse cultures have made to mathematics
- ▶ Included thoughtful and creative uses of technology
 - Webpages
 - Video tutorials
 - Synchronous virtual play (breakout rooms)
 - Jamboards



Cohort Two - The Show Keeps Going

[KDE's Summer Support Family Math Games page](#)



KENTUCKY DEPARTMENT OF EDUCATION
Our Children, Our Commonwealth

- Assessment/Accountability ▾
- Career and Technical Education ▾
- Commissioner of Education ▾
- Communications ▾
- District/School Support ▾
- Educational Programs ▾
- Educator Development and Equity ▾
- Exceptional Children ▾
- Federal Programs ▾
- Kentucky Board of Education ▾
- School Improvement ▾
- Standards/Content Areas ▾
- Kentucky School for the Blind
- Kentucky School for the Deaf

Home > [Standards/Content Areas](#) > [Content/Program Areas](#) > Summer Support: Kentucky Family Math Games

Career Studies Standards Resources

Computer Science

English/Language Arts ▾

Financial Literacy Standards Resources

Health Education and Physical Education ▾

Mathematics ▾

Preschool/Primary ▾

Science ▾

Social Studies ▾

Visual and Performing Arts ▾

World Languages ▾

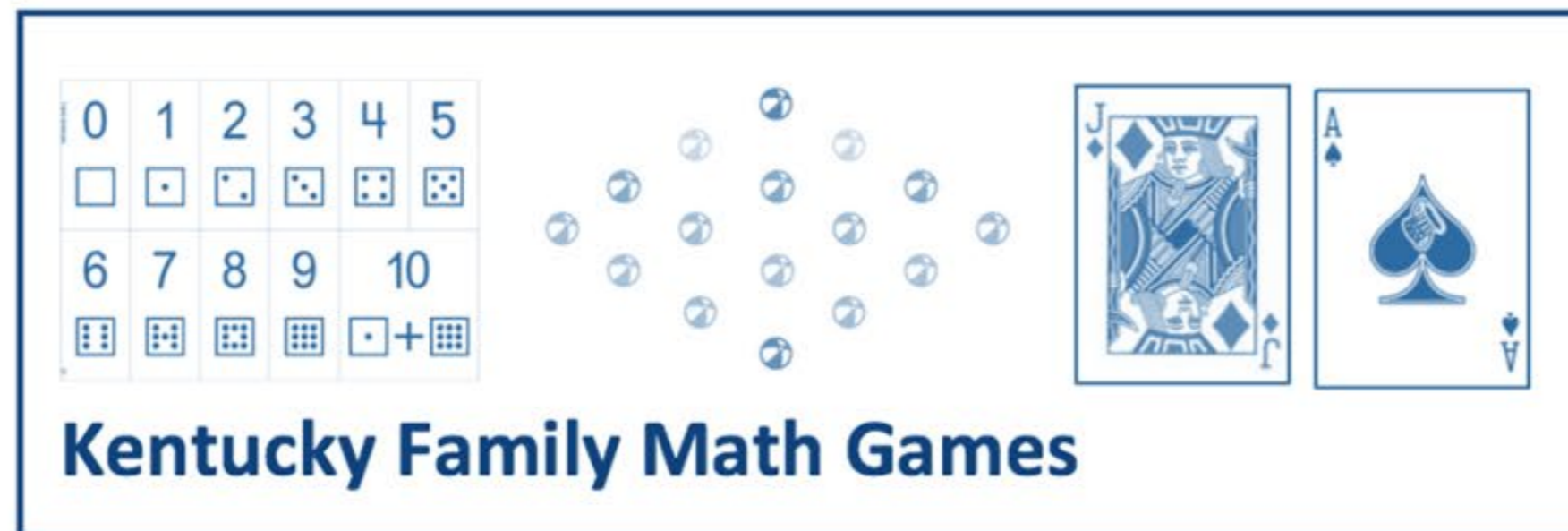
Writing ▾

Summer Support

CONTENT/PROGRAM AREAS

Summer Support: Kentucky Family Math Games

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Kentucky Family Math Games

The Kentucky Family Math Games webpage is a collection of simple yet engaging games families can play over and over again at home to build mathematical thinking. To help families know which games may be more appropriate for their aged child, they are organized by grade level bands.

<https://education.ky.gov/curriculum/conpro/Pages/FinLit.aspx>



Family Learning Night 2020 (Cohort 1)



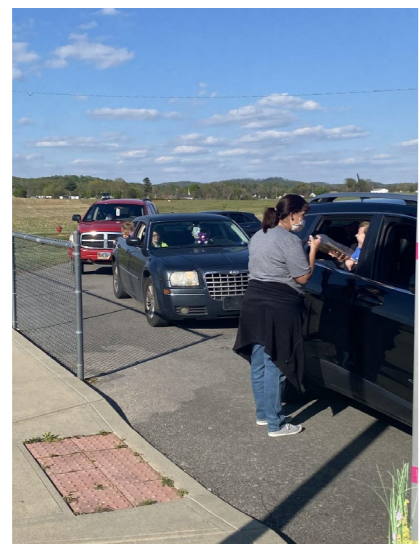
This was a Drive thru event. Due to Covid restrictions, we had to hold it on a Saturday at the Public Library. There were 5 stations set up: Math, Reading, Science, Public Library, and The County Extension Office. We served over 300 students and parents.



Students received math games and parent-friendly standards for both reading and math. We included cards, dice and games that families could play and learn together. Each station gave away items to students. Also, our local FFA gave each student a pumpkin.

Family Learning Night 2021 (Cohort 2)

This year's event was held at our school and was our biggest turnout ever! We served over 400 students and parents. Students again were given lots of math activities to do at home with families along with dice, cards, and games. Family Math Standards were sent home to help parents understand what is expected from their 1st and 2nd graders. We also partnered with our Family Resource Center who gave pizza kits, Wayne County Extension Office gave students seeds and planting materials, and KY Reading Association provided books for students.



Access KDE Resources

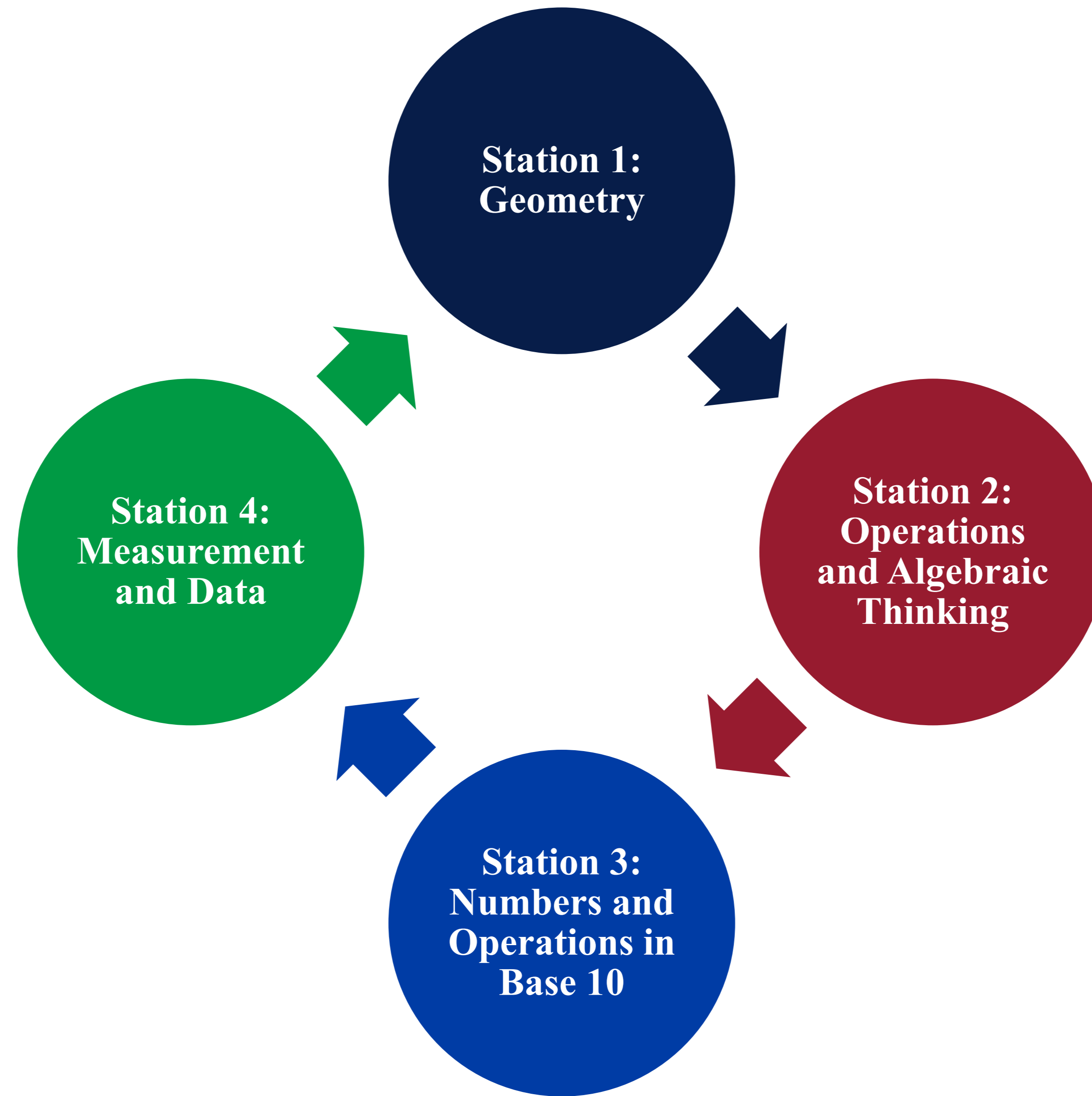
- ▶ [KDE's Family Math Night Resources \(Facilitator Materials\)](#)
- ▶ [KDE's Summer Support Page: Kentucky Family Math Games \(Family Materials\)](#)
- ▶ [KDE's Standards Family Guides](#)
- ▶ [KDE's A Family's Guide to Understanding Student Assessment](#)
- ▶ [Kentucky Center for Mathematics Jamboard Adaptations of Kentucky Family Math Games](#)



Math Station Activities

Let's try a few activities!

Station rotation



Facilitator guide for each activity

Activity 1a: Fill the Shapes

Goal

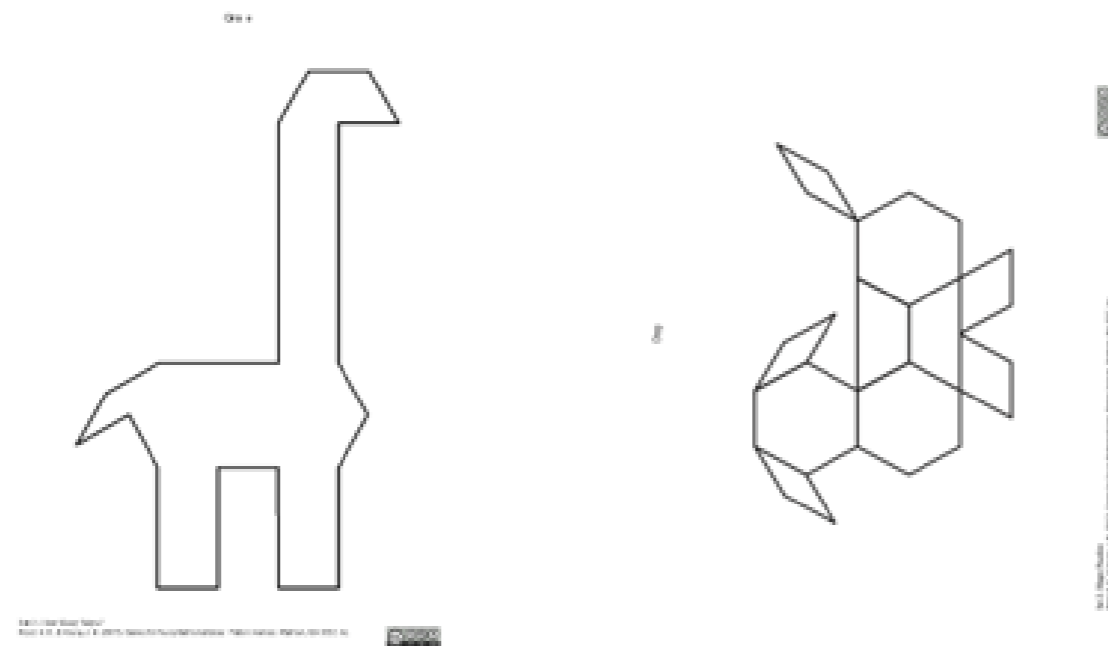
Families use pattern blocks to compose and decompose shapes and make composite shapes.

Recommended grade levels

Kindergarten through grade 1

Activity instructions

1. Select an outline. Easier outlines are scaffolded with the inside component shapes drawn, while more challenging outlines have no inside component shapes drawn.
2. For fun, take the same outline as someone else and see how you can fill it out differently.



Family prompts

- What shape is this? (Point to any of the pattern block shapes.)
- How many sides does it have? How many corners?
- How many [triangles, hexagons, parallelograms, trapezoids] are there in this drawing?
- Can you use other shapes to fill in the [hexagon, square, trapezoid]?
- How many other ways can we fill in this outline? Or how many shapes can be replaced by other shapes?

Materials in toolkit

- Instructions and family prompts
- Printed outlines to be filled in with blocks
- Geometry glossary

Materials to gather

- A container of pattern blocks

Facilitator notes

- Show families how they can use the prompts, model asking questions (e.g., Can you fill in the same outline but with different shapes? Why?) and point out the location of the geometry glossary poster or handout for easy reference.
- Model using the correct vocabulary for shapes, but do not correct families if they use color names instead.
- If you are integrating technology into your math night, the Math Learning Center offers [virtual pattern blocks](#) that families can use to complete the activity.

Related standards

CCSS-Math and AERO Standards

- [CCSS.MATH.CONTENT.K.G.B.6](#)/ [AERO.K.G.6 DOK 2,3](#): Compose simple shapes to form larger shapes. For example, "Can you join these two triangles with full sides touching to make a rectangle?"
- [CCSS.MATH.CONTENT.1.G.A.2](#)/ [AERO.1.G.2 DOK 2,3](#): Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. Note: Students should apply the principle of transitivity of measurement to make indirect comparisons, but they need not use this technical term.

NCTM Related Standards from PreK–8 Curriculum Focal Points

- Recognize, name, build, draw, compare, and sort two-dimensional shapes.
- Investigate and predict the results of putting together and taking apart two-dimensional shapes.
- Recognize and represent shapes from different perspectives.
- Describe attributes and parts of two-dimensional figures.

Activity instructions, materials, family prompts, and other resources

Activity 1a: Fill in the Shapes

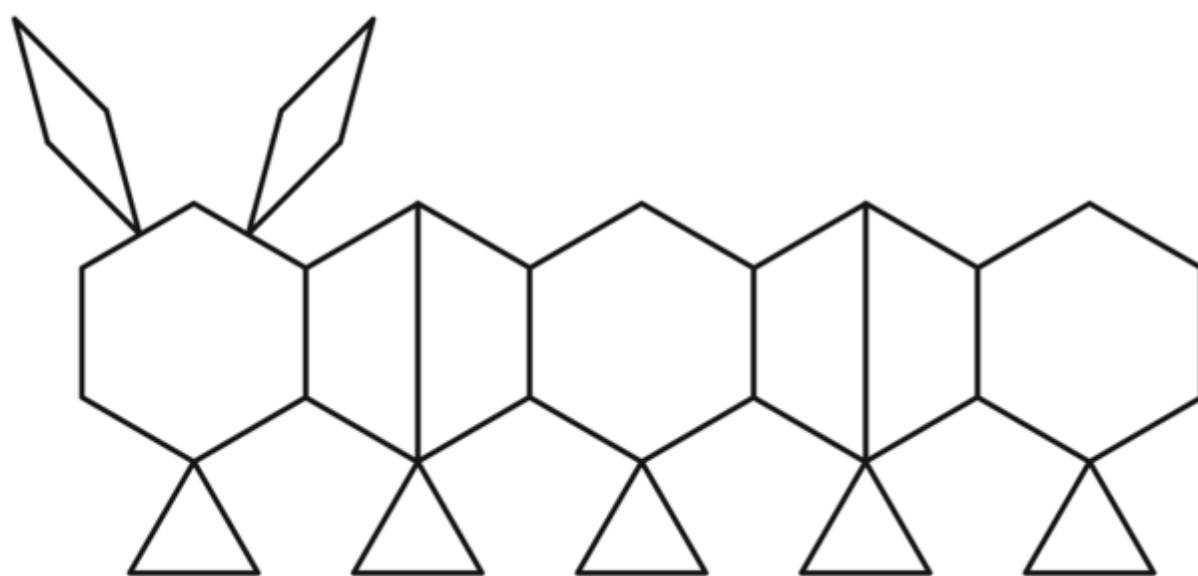
Instructions

1. Select an outline.
2. Use the pattern blocks to fill in the outline.
3. For fun, take the same outline as someone else and see how you can fill it out differently.

Players:
One or more

Goal:
Fill in the shapes

Caterpillar



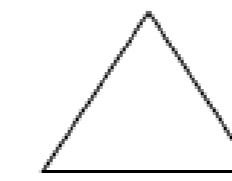
Activity 1a: Fill in the Shapes

Family Prompts

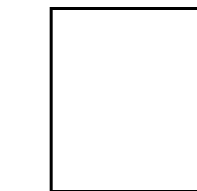
Ask any of the following questions:

- What shape is this? (Point to any of the pattern block shapes.)
- How many sides does it have? How many corners?
- How many [triangles, hexagons, parallelograms, trapezoids] are there in this drawing?
- Can you use other shapes to fill in the [hexagon, square, trapezoid]?
- How many other ways can we fill in this outline? Or how many shapes can be replaced with other shapes?

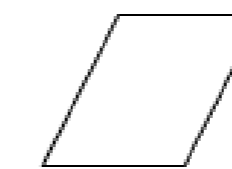
Geometry Glossary



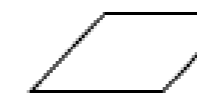
Count the sides and the corners.
If there are three of each, it is a triangle.
If the sides are all the same length, then it is an equilateral triangle.



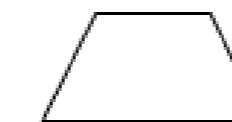
Count the sides and the corners.
If there are four of each, it is a quadrilateral.
If it has two pairs of parallel sides, then it is a parallelogram.
If it also has four equal angles, then it is a rectangle.
If the sides are also all the same length, then it is a square.



Count the sides, count the corners.
If there are four, it is a quadrilateral.
If it has two pairs of parallel sides, then it is a parallelogram.



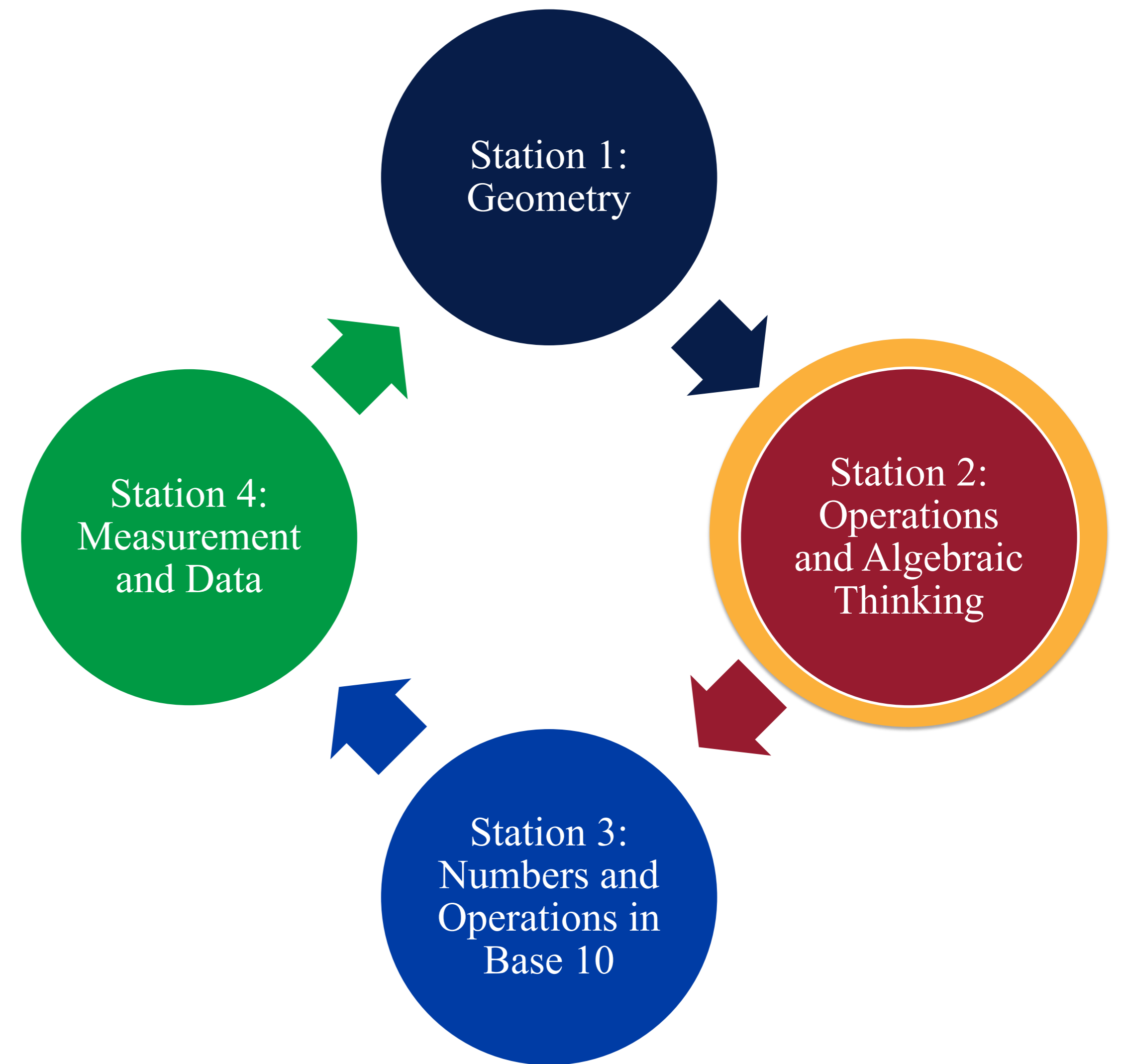
Are the four angles equal? No? Then, it is not a rectangle.
Are the sides the same length? Yes? Then it is a rhombus.



Count the sides, count the angles.
If there are four, it is a quadrilateral.
Does it have two pairs of parallel sides? Yes? Then it's a parallelogram.
Does it have only one pair of parallel sides? Yes? Then it is a trapezoid.
This is a special case called an isosceles trapezoid because the angles at the base are the same measurement.

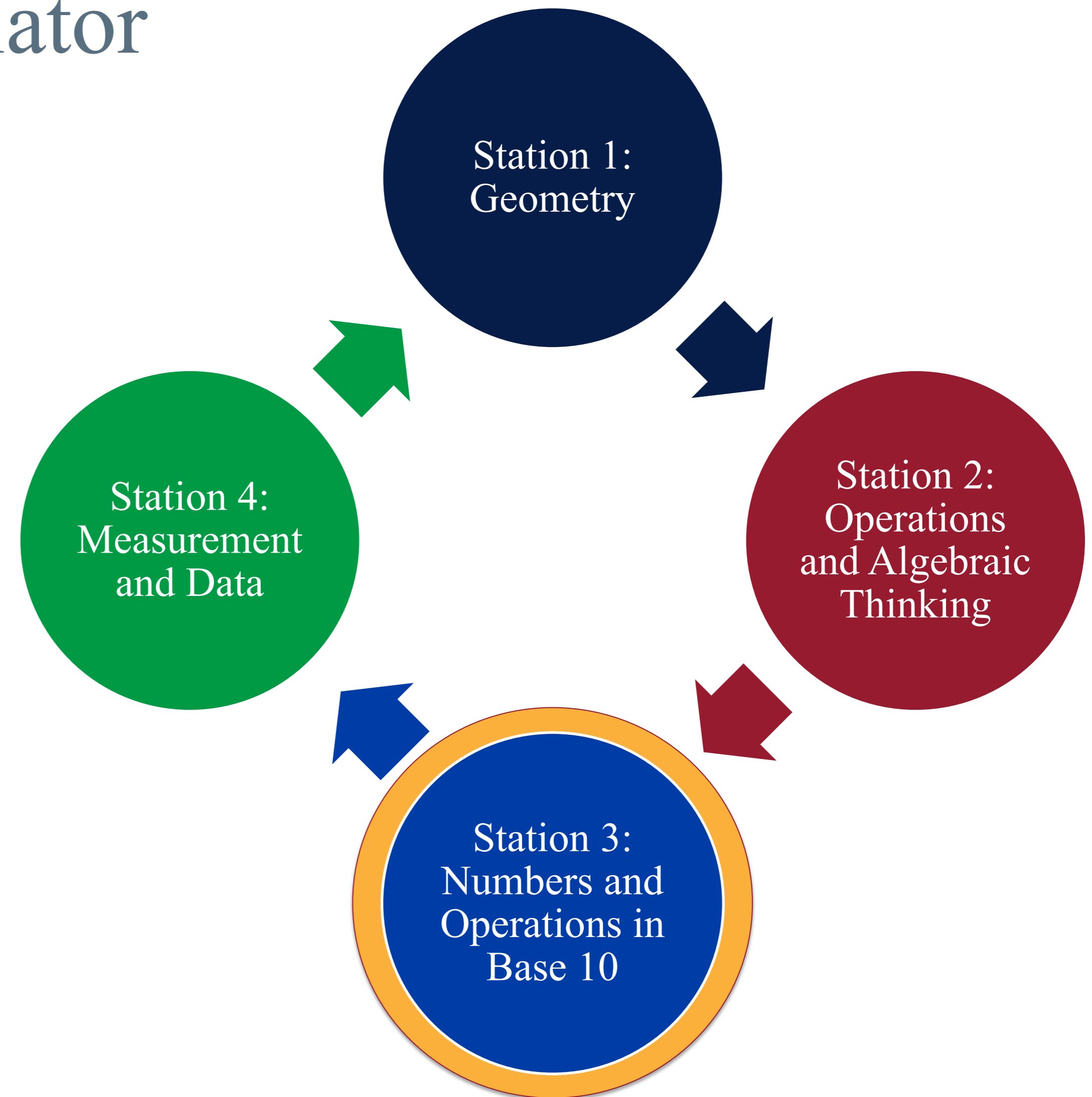
Sample activity 1: Flip the Cards

- Review and practice the activity with your group.
- Consider:
 - How will family members engage with the activity? Will they find them engaging? Challenging?
 - Is there anything that you think will be confusing or unclear for families in your community?
 - How could you implement the activity in your school setting? Consider virtual, hybrid, and in-person implementation.



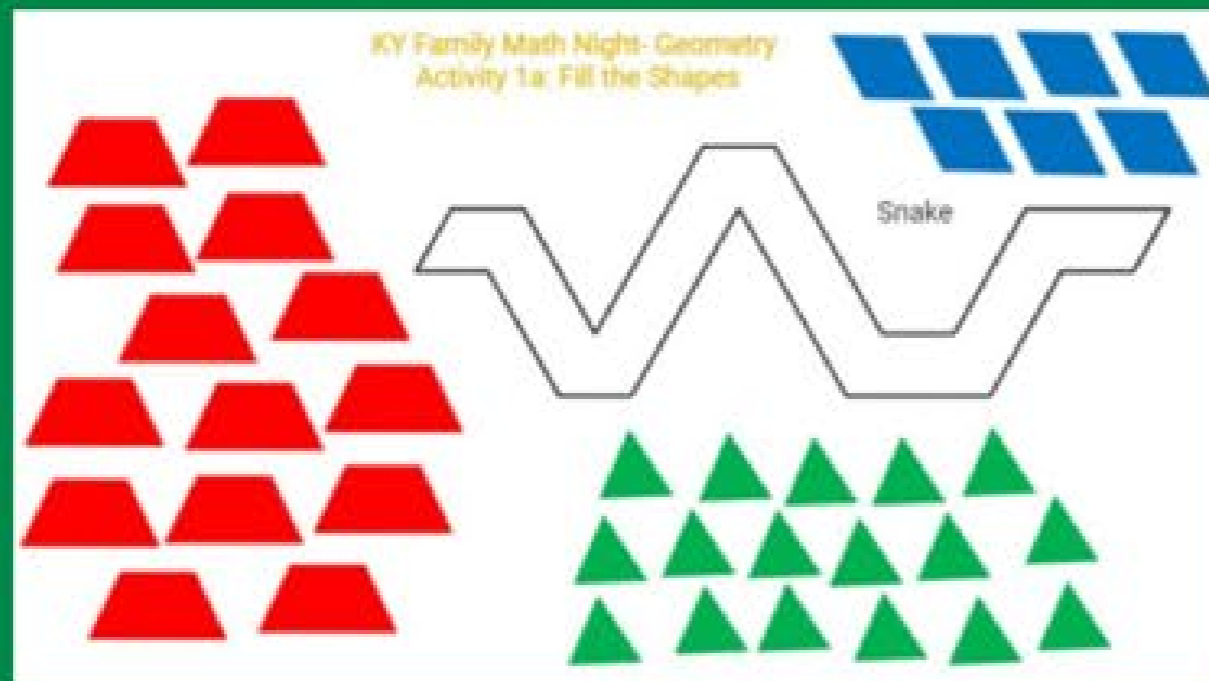
Sample activity 2: Broken Calculator

- Review and practice the activity with your group.
- Consider:
 - How will family members engage with the activity? Will they find them engaging? Challenging?
 - Is there anything that you think will be confusing or unclear for families in your community?
 - How could you implement the activity in your school setting? Consider virtual, hybrid, and in-person implementation.



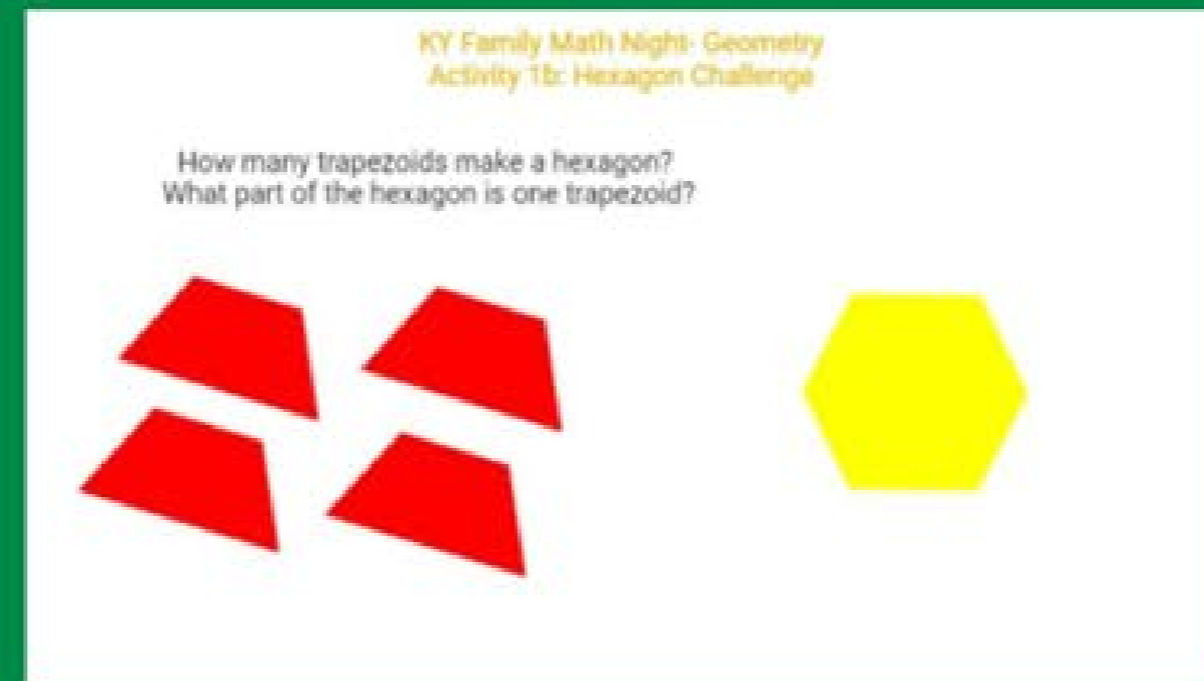
KY FAMILY MATH NIGHT

Jamboard Resources



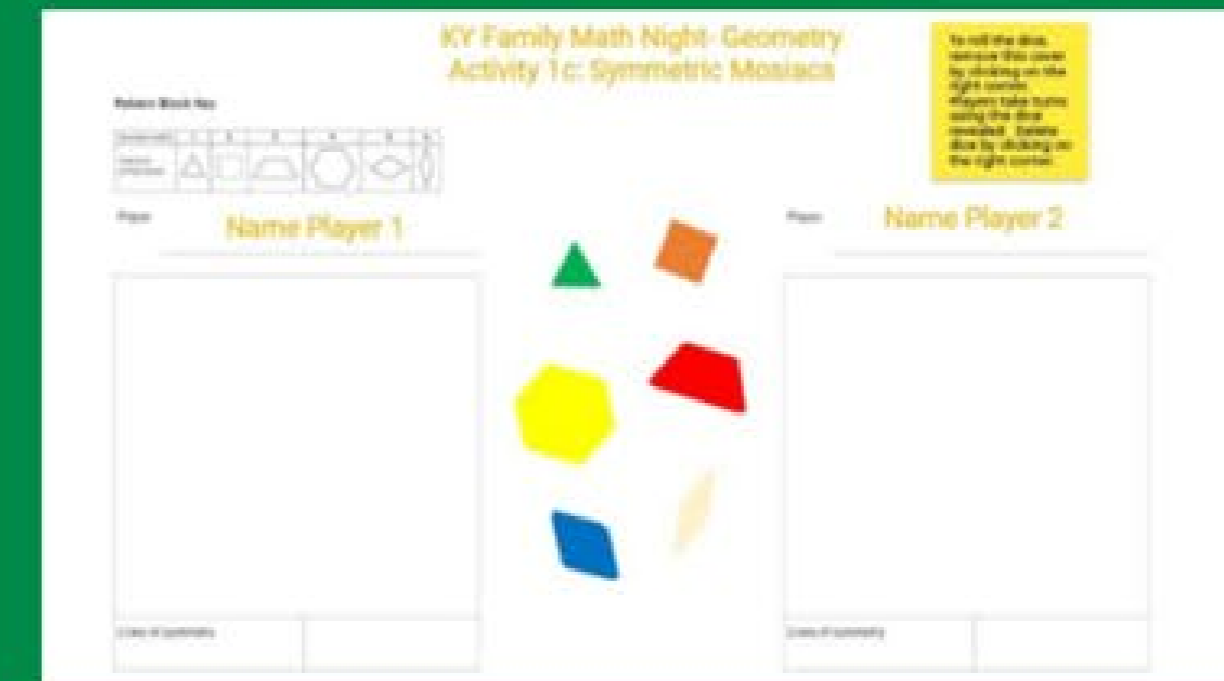
ACTIVITY 1A

Fill the Shapes



ACTIVITY 1B

Hexagon



ACTIVITY 1C

Symmetric



Wrap Up

What's next?

Coming soon! Community Math Night Facilitators' Toolkit

- The Community Math Night Facilitators' Toolkit includes:
 - Workbook to explore and reflect on the research underpinning the Community Math Night.
 - Planning supports, such as timelines, templates, and considerations.
 - All activities and materials needed to host a Community Math Night.



Next steps



- What are your next steps in planning a Community Math Night for your school?
- Who will you engage in planning and hosting the event?

Questions?



Thank you!



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