

Project A³

Awesome Advanced Activities



A New Curriculum Series to Challenge and Engage Talented Math Students

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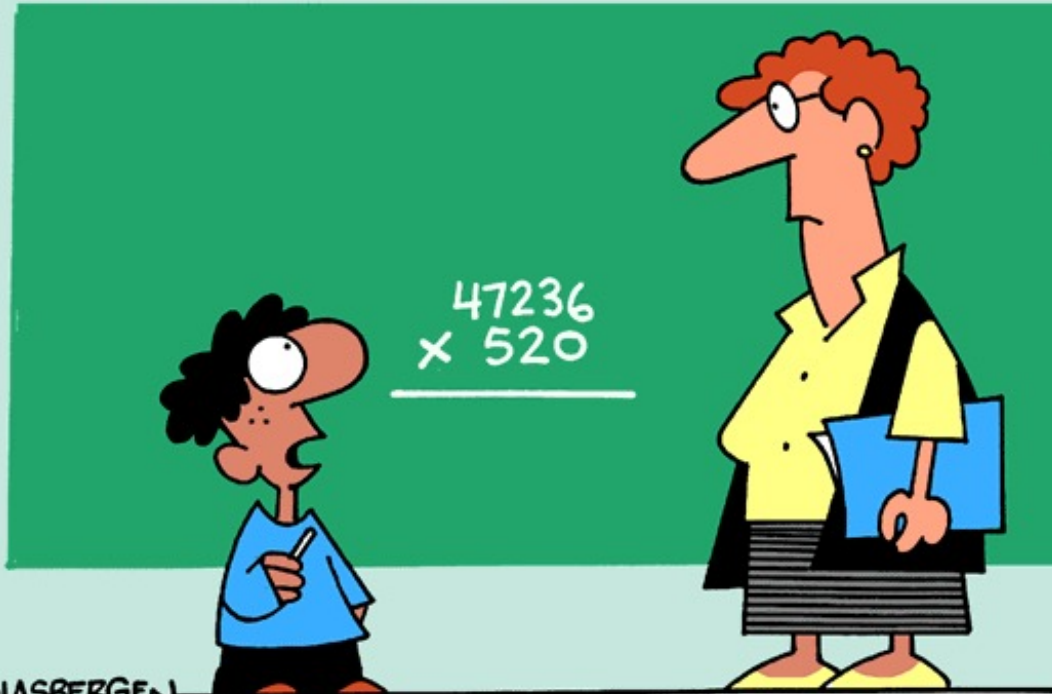
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Math Curriculum For Talented Students

- What it Is NOT about...

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"AREN'T THERE ENOUGH PROBLEMS IN THE WORLD ALREADY?"

Enrichment ?

Name _____ Date _____

2-4 **Enrich**
Area Code Sums

Cities in California have different area codes. Use the chart below to answer the questions.

Area Code	City
209	Modesto
310	Venice
408	Milpitas
415	Sausalito
510	Castro Valley
559	Fresno
619	Bonita
626	Pasadena
707	Napa
714	Anaheim
805	Ventura
818	Tarzana
909	Alta Loma
916	Sacramento

- What is the sum of the area codes for Modesto and Alta Loma?

- Find the sum of the area codes for Sacramento, Pasadena, and Milpitas.

- What is the sum of the area codes for the cities with two syllables?

- Which group has a greater value, the area codes that start with 4 and 7 or the area codes that start with 5 and 6?

Name _____ Date _____

FUN MULTIPLICATION TO 5x5 SHEET 4
THE CODEBREAKER!

E	C	O	T	L	S	M	R	P	I	U	H	A	N
1	2	3	4	5	6	8	9	10	12	15	16	20	25

Work out these multiplications, then find the coded message!

The first letter is done for you.

Letter	S												
Number	6												
Fact	2 x 3	3 x 5	5 x 2	1 x 1	3 x 3		2 x 1	1 x 3	3 x 1	5 x 1			

Letter													
Number													
Fact	4 x 2	5 x 4	2 x 2	4 x 4		2 x 4	5 x 3	1 x 5	2 x 2	4 x 3			

Letter													
Number													
Fact	2 x 5	5 x 1	3 x 4	1 x 2	5 x 4	4 x 1	4 x 3	1 x 3	5 x 5				

Letter													
Number													
Fact	5 x 2	3 x 3	4 x 3	3 x 2	2 x 4	2 x 3		5 x 4	3 x 3	1 x 1			

Letter													
Number													
Fact	3 x 2	5 x 2	1 x 1	2 x 1	2 x 2	4 x 5	1 x 2	5 x 3	5 x 1	5 x 4	3 x 3		

Acceleration ?

Adding With NO Regrouping (A)

Name: _____ Date: _____

Calculate each sum.

$\begin{array}{r} 220 \\ + 709 \\ \hline \end{array}$	$\begin{array}{r} 336 \\ + 100 \\ \hline \end{array}$	$\begin{array}{r} 10 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 4 \\ \times 8 \\ \hline \end{array}$	$\begin{array}{r} 120 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 0 \\ \times 9 \\ \hline \end{array}$	$\begin{array}{r} 11 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$
$\begin{array}{r} 715 \\ + 214 \\ \hline \end{array}$	$\begin{array}{r} 70 \\ + 10 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 12 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 10 \\ \times 7 \\ \hline \end{array}$	$\begin{array}{r} 12 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 10 \\ \times 1 \\ \hline \end{array}$	$\begin{array}{r} 2 \\ \times 8 \\ \hline \end{array}$
$\begin{array}{r} 432 \\ + 525 \\ \hline \end{array}$	$\begin{array}{r} 12 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 11 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 4 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 2 \\ \times 7 \\ \hline \end{array}$	$\begin{array}{r} 10 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 4 \\ \times 3 \\ \hline \end{array}$	
$\begin{array}{r} 322 \\ + 676 \\ \hline \end{array}$	$\begin{array}{r} 1 \\ \times 1 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 11 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ \times 7 \\ \hline \end{array}$	
$\begin{array}{r} 710 \\ + 106 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times 0 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 0 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 12 \\ \times 1 \\ \hline \end{array}$	$\begin{array}{r} 11 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ \times 6 \\ \hline \end{array}$	
	$\begin{array}{r} 4 \\ \times 7 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 10 \\ \times 8 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ \times 7 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times 8 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ \times 2 \\ \hline \end{array}$	

3rd Grade

Addition Drill

Name: _____ Date: _____

$\begin{array}{r} 53 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 64 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 72 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 63 \\ \times 3 \\ \hline \end{array}$
$\begin{array}{r} 84 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 90 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 52 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 43 \\ \times 2 \\ \hline \end{array}$
$\begin{array}{r} 70 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 80 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 94 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 61 \\ \times 2 \\ \hline \end{array}$
$\begin{array}{r} 51 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 41 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 50 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 74 \\ \times 2 \\ \hline \end{array}$

2,935

$\begin{array}{r} 5,609 \\ + 1,243 \\ \hline \end{array}$	$\begin{array}{r} 2,945 \\ + 8,654 \\ \hline \end{array}$
$\begin{array}{r} 950 \\ + 160 \\ \hline \end{array}$	$\begin{array}{r} 2,468 \\ + 5,731 \\ \hline \end{array}$
$\begin{array}{r} 6 \\ + 1 \\ \hline \end{array}$	$\begin{array}{r} 9,543 \\ + 1,789 \\ \hline \end{array}$
$\begin{array}{r} 6,824 \\ + 4,571 \\ \hline \end{array}$	
$\begin{array}{r} 5,409 \\ + 2,697 \\ \hline \end{array}$	

4th Grade

Math Curriculum For Talented Students

What it IS about...

- **New advanced content**
 - Developed with focus, coherence and rigor
- **Critical thinking**
 - Think deeply about simple ideas
 - Question the answers, not just answer the questions
- **Creative thinking**
 - Posing original problems and/or solutions to problems

NEW!

Student Mathematician's Journal

Student Mathematician's Journal

Student Mathematician's Journal



AWESOME ADVANCED ACTIVITIES

for Mentoring Mathematical Minds



M. Katherine Gevin | Suzanne H. Chapin | Linda Jensen Sheffield

FROM THE AUTHORS OF
Project M's Mentoring Mathematical Minds



Level 3-4	Level 4-5	Level 5-6
<ul style="list-style-type: none"> • Shape Sleuths • Amazing Algebra • Multiplication Madness • Pentomino Project 	<ul style="list-style-type: none"> • Notable Numbers • Fantastic Fractions • Sensational Shapes • Flag Design Project 	<ul style="list-style-type: none"> • Adventures In Algebra • Playing with Proportions • Intriguing Integers • Boxes by Kids Project

- Aligned with core Math Standards
- Anchor Activity with 5-6 follow-up activities
- Engaging games and puzzles
- Discussions and Journal Writing for critical and creative thinking

Call for Differentiated Activities

- Regular Classroom Settings
 - With Push-In Model
 - With Compacting for Advanced Students during Math class
- Enrichment Pull-Out Programs
- Gifted Math Classrooms
- Hybrid/Remote Settings
- Enrichment Beyond the Classroom Setting



Students Acting as Practicing Professionals in the Field

THINKING LIKE A MATHEMATICIAN*

Here is a list of skills mathematicians use every day. See how many you can use in your Student Mathematician's Journal.

- 1 Make sense of problems and keep trying until you solve them.
- 2 Understand quantities, their relationships, and how to represent them.
- 3 Build logical reasons to defend your thinking. Consider the reasoning of others and ask useful questions to help make sense of the reasoning. Explain why you agree or disagree with another's reasoning.
- 4 Use the math you know to help solve problems in everyday life. Use physical models, drawings, tables, graphs, and/or equations to help you.
- 5 Choose and use the appropriate math tools to help solve each problem.
- 6 Communicate explanations clearly using correct math vocabulary and symbols.
- 7 Look closely and use patterns to help solve problems.
- 8 Notice if you are using the same math again and again and look for short cuts.
- 9 Solve a problem in a new way. Ask new questions to investigate.**

A Look at
Our Core
Philosophy

Mathematical Discourse



Discussions

Writing



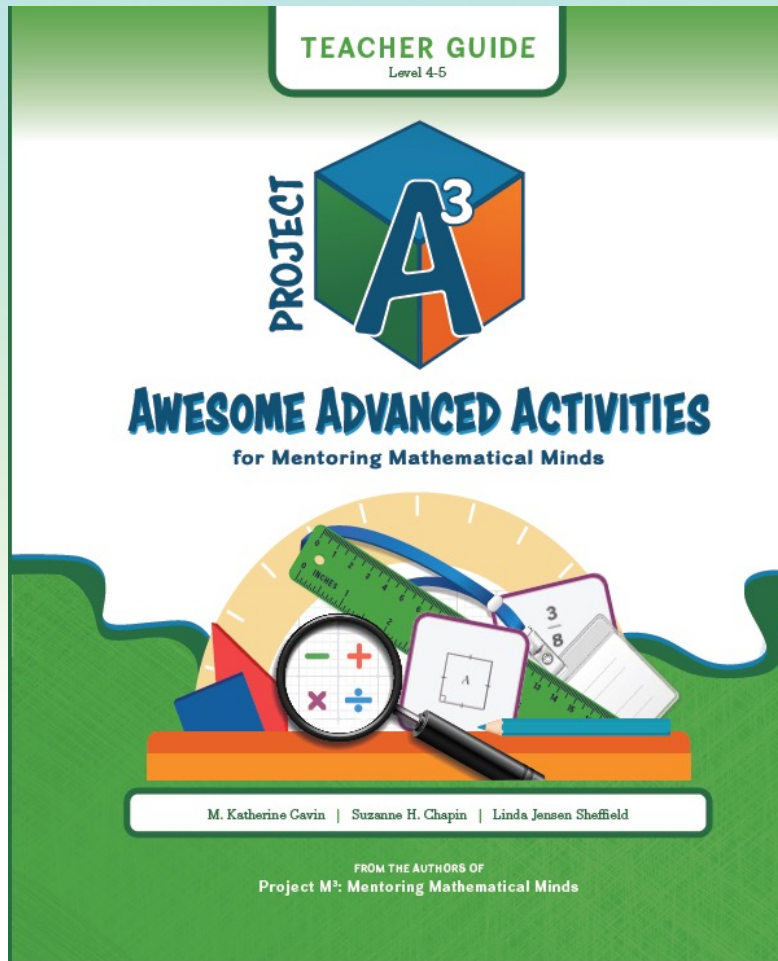
A Look at
Our Core
Pedagogy

Project M^3

Project M^2

Project A^3

Level 4-5 Preview



Level 4-5

- Notable Numbers
- Fantastic Fractions
- Sensational Shapes
- Flag Design Project



ACTIVITY PLANNING PAGE

Spending Time with Primes

Description

Students analyze The Sieve they have created looking for patterns. They reason why they could stop at multiples of 7 and find all the prime numbers. They play *What's on My Back?* again using the term "prime" in their questions. They reflect on how their new knowledge helped them improve their play, perhaps using fewer questions. From the definition of a prime number and analyzing the patterns they found on The Sieve, they can deduce and explain why 2 is the only even prime number.



Eratosthenes

Mathematics Standards

Content

- Find factor pairs for a whole number in the range 1–100.
- Recognize that a whole number is a multiple of each of its factors.
- Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number.
- Determine whether a given whole number in the range 1–100 is prime or composite.
- Analyze patterns and relationships (to discover the definition of a prime number).
- Understand and use the place value system. (Be able to use the place value of the digits to help determine an unknown number.)

Practices

- Students are encouraged to use the mathematical habits of mind that mathematicians practice found on *Thinking Like a Mathematician* on p. 1 of their *Student Mathematician's Journal*.

Materials

- 1 deck of *What's on My Back?* Game Cards (pp. 11–18; copied on cardstock and cut out)
- 1 lanyard per student or tape
- *SMJ* pp. 28–33

Length

- One class period (approximately 60 minutes)

Differentiating Instruction

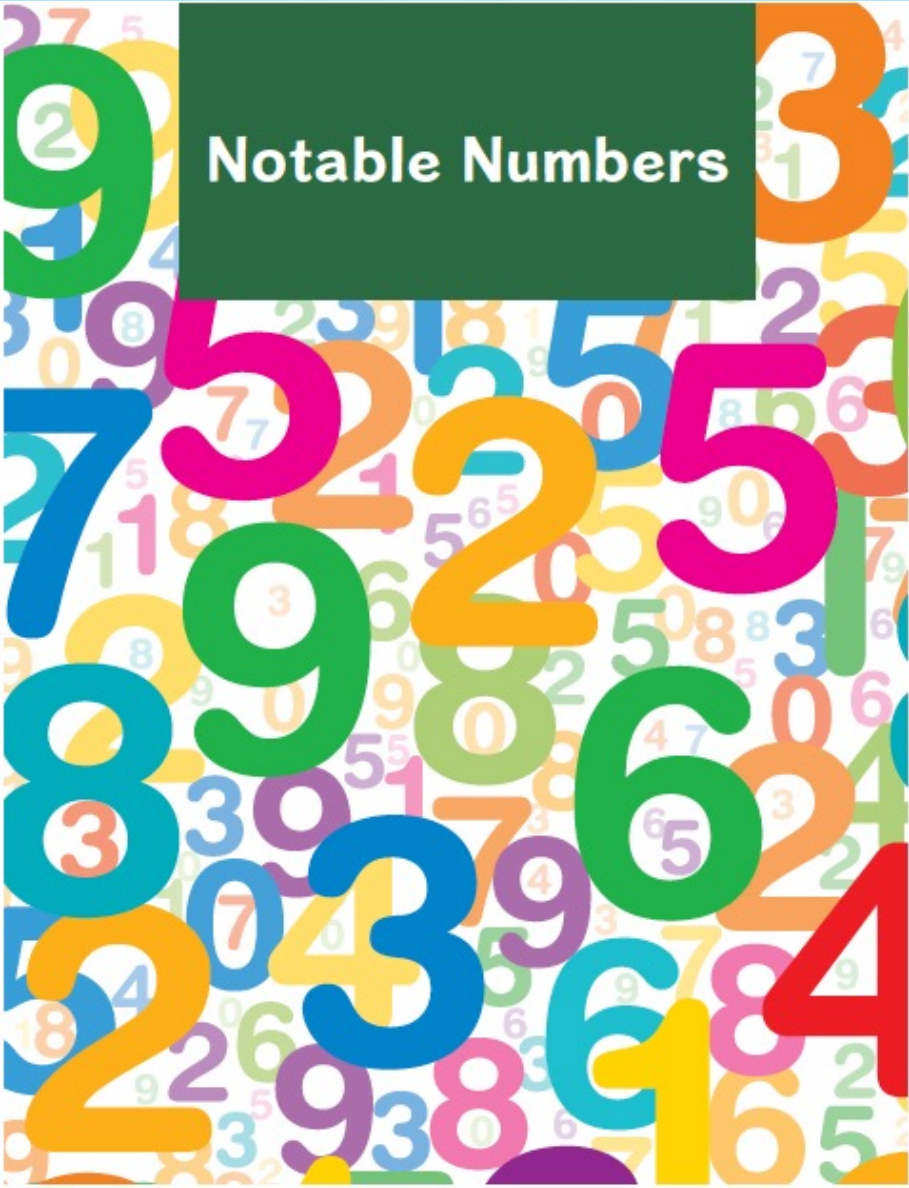
Since you have observed students playing the game twice before, this might be a good time to differentiate among your students by giving them different numbers to figure out when they play the game during this activity. Prime numbers, because they only have two factors, are sometimes easier to figure out than numbers that have many factors. You might allow students to also have access to their completed Sieve worksheet to help them develop questions and eliminate possibilities.

! Teaching Tips !

✓ To extend student's understanding and practice with multiplication, factoring, and prime factorization, there is an engaging and challenging board game called *Prime Climb*. Check out how to play and more online.

<https://mathforlove.com/games/prime-climb/how-to-play/>

✓ Prior to launching this activity, make sure to read the answers to all the questions and problems within the student pages that follow. Sometimes the mathematics are explained in more detail and may provide ways for you to differentiate either by giving hints or increasing the challenge.



AWESOME ADVANCED ACTIVITIES



Anchor Activity

What's On My Back?




AWESOME ADVANCED ACTIVITIES



Anchor Activity

What's On My Back?

Student Mathematician: _____ Date: _____

What's on My Back? Recording Sheet 

Your Question	The Answer
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Use the back of this sheet if needed.

11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	

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Project A³ Awesome Advanced Activities
for Warming Mathematical Minds

43

Florida Standards
Multiples of 3 Are a Breeze





Anchor Activity

What's On My Back?



- Two-Digit Number
- Only Yes or No Questions
- NO Less than, Greater Than, or In-Between Questions
- Use Fewest Number of Questions Possible



Thinking About What's On My Back?

Wrap It Up

- What do you think is the best first question to ask? Why?
- What are other good questions? Explain why they are good.



Talk About It!

LET'S TALK!

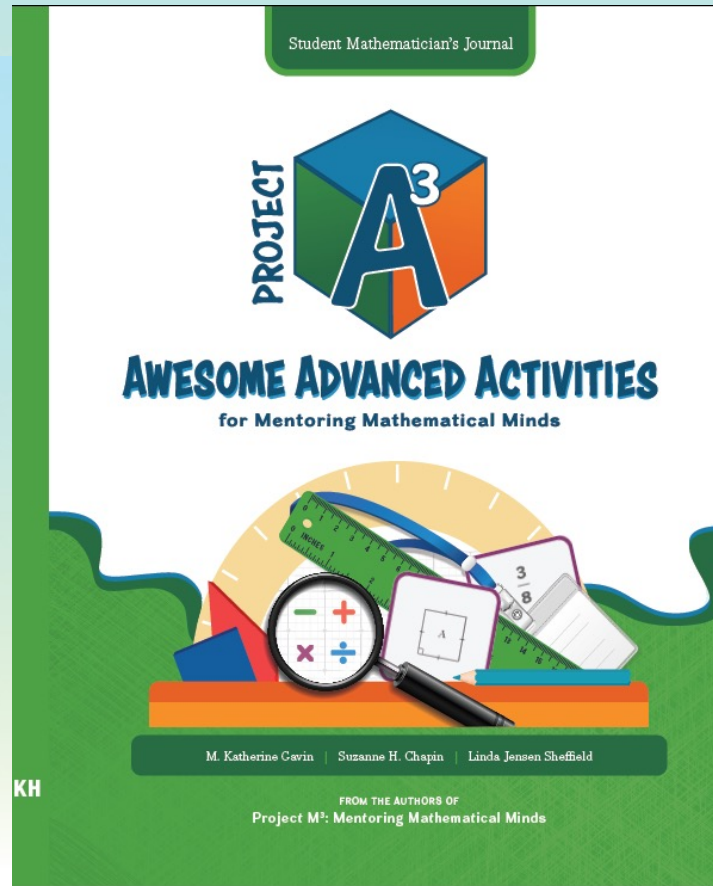


The goal in discussions is to share your ideas to help you understand math better. These talk prompts are tools to use to help you discuss your math ideas. They are questions and sentence starters like the ones mathematicians use. As student mathematicians, the talk prompts will help you have good discussions too.

- Would you repeat what you just said?
- Would you help me understand what you are saying?
- I agree/disagree with your idea because ...
- Would you give me an example or show me a model or drawing?
- Why do you say that?
- I want to add on to what you are saying. I think _____ because _____.
- Let's see if that always works.
- How is this like problems we have solved before?
- How might we solve this another way?
- Is there a related problem or idea we might explore?



Student Mathematician's Journal



Student Mathematician: _____

Date: _____

What's on My Back? (continued)

Wrap It Up

- What do you think is the best first question to ask? Why?
- What are other good questions? Explain why they are good.

See how many mathematician skills you can use from Thinking Like A Mathematician on p. 1. Talk together to your partner/group/ teacher about these questions.



Remember to use our talk prompts on Let's Talk, p. 2.



Write your response below.

A good question to ask is "Is my number even?" because it eliminates half of the numbers. Other good questions are about if the number is a multiple of another number (on a digit one place or the tens place). These questions eliminate more numbers.

Further Explorations

- Learn some new mathematics
- Replay the game using this new knowledge
- Sample Activities in Notable Numbers
 - ✧ Multiples of 3 are a Breeze
 - ✧ Sifting for Primes and Spending Time with Primes
 - ✧ Finding Factors: Too Many, Too Few, Just Right
 - ✧ Clued In



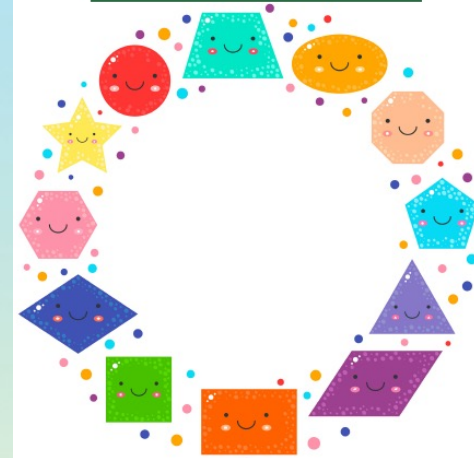
AWESOME ADVANCED ACTIVITIES

Additional Level 4-5 Sections

Fantastic Fractions

1	$\frac{2}{2}$	$\frac{3}{3}$	$\frac{7}{7}$
$\frac{1}{2}$	$\frac{2}{4}$	$\frac{4}{8}$	$\frac{5}{10}$

Sensational Shapes



Project Create Your Own Flag Design



AWESOME ADVANCED ACTIVITIES

Teaching Virtually

I routinely offered student choice - I DISCOVERED TALENT! Suddenly student thinking became visible and often a student went into a challenge level that I might not have predicted

Each Project A³ game is highly engaging and easily adaptable to the distance learning environment.

The rich tasks made math discussions come alive in my virtual classroom.

My virtual students continued to play the games long after school ended." this is 100% true. With the game platform that I use I can monitor the game play and I saw the students playing all through the night!

I was able to engage my students remotely through high level tasks that had students discussing and debating in-depth concepts while experiencing the joy of mathematics.

Shirley Fortenbaugh
Gifted Resource Teacher - Virginia



AWESOME ADVANCED ACTIVITIES

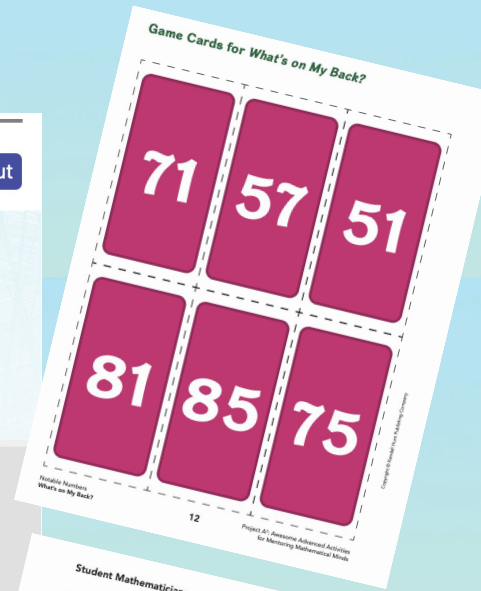
Online Resources

Flourish

Welcome, Linda [Products](#) [Admin Home](#) [Edit User Info](#) [Log Out](#)



AWESOME ADVANCED ACTIVITIES
for Mentoring Mathematical Minds



Project A³

Select a Level

Level 4-5

Student Response Pages

Notable Numbers

Anchor Acctivity: What's on My Back

Fantastic Fractions

Select...

Sensational Shapes

Select...

Additional Online Resources

Select...

Activity Cards

Notable Numbers

What's on My Back

Fantastic Fractions

Select...

Sensational Shapes

Select...

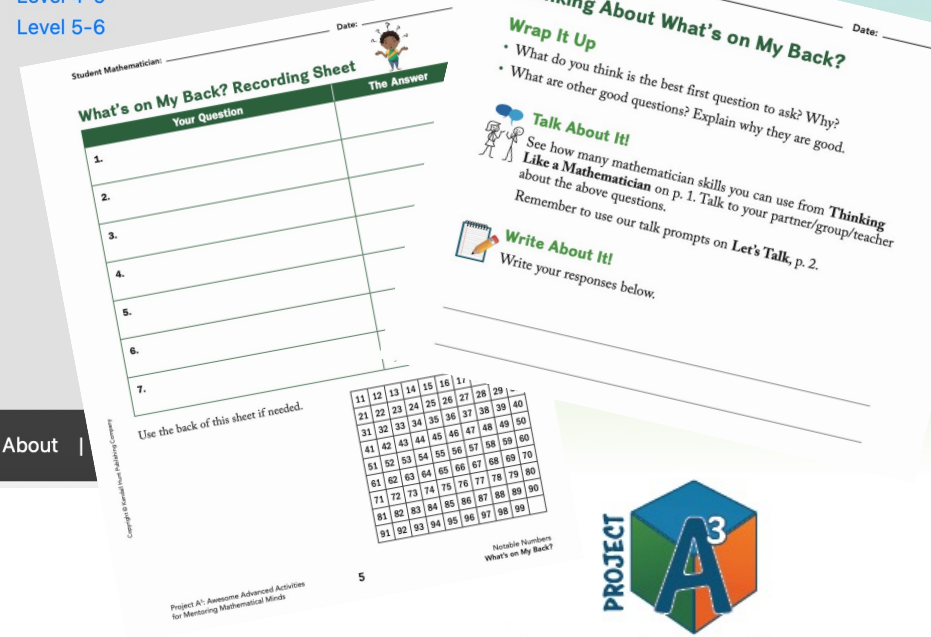
Manipulatives

Select...

Teacher Guide eBooks

Level 4-5

Level 5-6



What's on My Back? Recording Sheet

Your Question	The Answer
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Use the back of this sheet if needed.

11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	



Additional Online Resources



AWESOME ADVANCED ACTIVITIES
for Mentoring Mathematical Minds

LEVEL 4-5
Online Resources

Notable Numbers

Digital Manipulatives:

- [Multiplication Chart](#)
- [Hundreds Chart](#)
- [Number Chart 1 to 30](#)
- [Random Number Generator](#)

Free online resources that support this unit:

- [Factor Game](#)

Fantastic Fractions

Digital Manipulatives:

- [Fraction Strips](#)
- [Fraction Bars](#)
- [Fraction Circles](#)
- [Number Line](#)
- [Cuisenaire Rods](#)
- [Tangrams](#)

Free online resources that support this unit:

- [Comparing Fractions](#)
- [Equivalent Fractions](#)
- [Adding Fractions to Equal 1](#)

Sensational Shapes

Digital Manipulatives:

- [Polygons](#)
- [Quadrilaterals](#)
- [Triangles](#)
- [Sorting Geometric Figures](#)
- [Geoboard](#)
- [Tangrams](#)
- [Pattern Blocks](#)

Free online resources that support this unit:

- [Explore Lines with GeoGebra](#)
- [Explore Symmetry](#)
- [Sort Geometric Shapes](#)

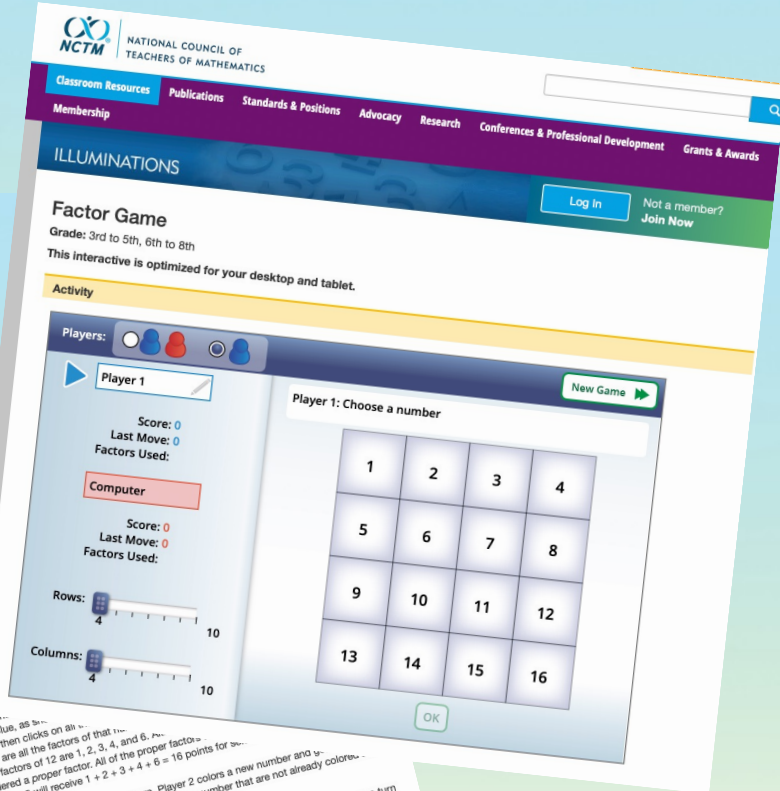
Project: Create Your Own Flag

Free online resources that support this unit:

- [Free Drawing Shapes](#)

Kendall Hunt

1-800-542-6657 | k12.kendallhunt.com



Instructions



- Player 1 clicks on an uncolored blue, as in...
- Player 2 then clicks on all uncolored factors of that number. The factors of 12 are 1, 2, 3, 4, and 6. All of these factors are considered a proper factor. All of the proper factors of 12 are 1, 2, 3, 4, and 6. Player 2 will receive 1 + 2 + 3 + 4 + 6 = 16 points for those factors.
- Players reverse roles. On the next turn, Player 2 colors a new number and uncolored factors. Player 1 colors all the factors of the number that are not already colored. Player 1 receives the sum of those numbers in points.
- The players take turns choosing numbers and coloring factors.
- If a player chooses a number with no uncolored factors remaining, that player loses a turn and does not get the points for the number selected.
- The game ends when there are no numbers remaining with uncolored factors.
- The player with the greater total when the game ends is the winner.

Exploration

- Questions for Students**
1. Which number has the most factors?
 2. Which numbers should you avoid and why?
 3. What is the best first move, and why?
 4. What is the worst first move, and why?
 5. What are some real life scenarios that require knowledge about factors?

- Objectives and Standards**
- NCTM Standards and Expectations**
- Number and Operations
 - 3-5
 - 6-8
 - Number and Operations



AWESOME ADVANCED ACTIVITIES

Teacher Comments

“What an ideal way to teach high-level math students in heterogeneous groups!”
Push-In Enrichment Teacher

“Wrap It Up questions were great! They pulled at student understanding of Big Ideas.”
6th Grade Math Teacher

“This was a FANTASTIC UNIT for me as a teacher and for the students. We loved it!!
Thank you!!!”
Math Enrichment Specialist

“I feel strongly that this unit highlights what true "enrichment" means...challenging students with engaging, meaningful activities that incorporate multiple Standards for Mathematical Practice.”

5th Grade Math Teacher



AWESOME ADVANCED ACTIVITIES

Program Materials



Visit k12.kendallhunt.com

Level 3-4

- Student Mathematician's Journal
- Teacher Guide + 3 Year License on Flourish
- Teacher 3 Year eBook License
- Game Cards

Level 4-5

- Student Mathematician's Journal
- Teacher Guide + 3 Year License on Flourish
- Teacher 3 Year eBook License
- Game Cards

Level 5-6

- Student Mathematician's Journal
- Teacher Guide + 3 Year License on Flourish
- Teacher 3 Year eBook License
- Game Cards



For More Information

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For free trial access to *Project A³:
Awesome Advanced Activities*

www.flourishkh.com/request-trial

Additional Resources

- *Project M²: Mentoring Young Mathematicians*: www.projectm2.org
(for K-2)
- *Project M³: Mentoring Mathematical Minds*: www.projectm3.org
(for 3rd – 6th grade)
- *Math Innovations*: <https://k12.kendallhunt.com/subject/gifted-and-talented-education> (for middle school through pre-algebra)

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12th International Group for Mathematical Creativity and Giftedness Conference



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Expertise and Innovation*

When?

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Where?

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Resort and Conference
Center, Las Vegas, NV,
USA



<https://www.igmcg.org>