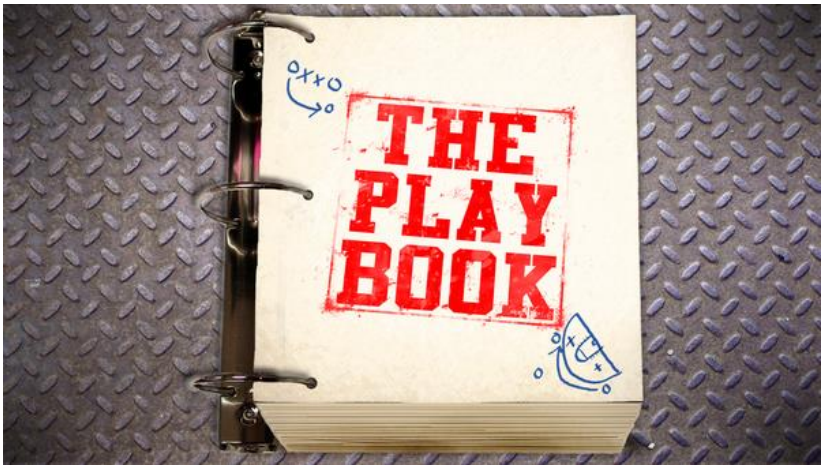
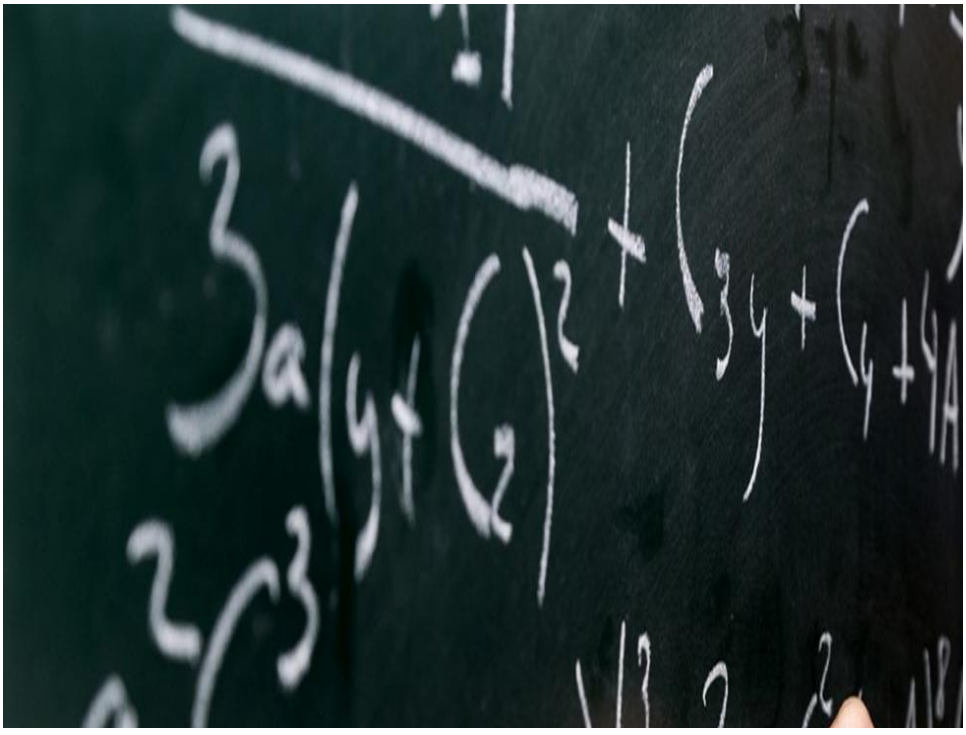



# MATHLETES UNITED



Persevere

Reason

Construct

Model

Strategize

Attend to Precision

Use Structure

Express Regularity

## II. Introduction

**Rationale:**

The title of this unit is Mathletes United. This is a unit about challenging students to use previously learned and/or new math skills to answer questions in order to earn points. This unit also includes fiction and informational reading as well as art. Each lesson includes a different type of lesson plan model and includes Bruner, Taba, Socratic Seminar, and Visual Thinking Strategies.

The process skills included in this unit are important for students to learn because students need to think critically in order to improve in math and other areas. When students practice analyzing, drawing conclusions, and supporting their answers, they become better problem solvers. In addition, learning about mathematical careers and the use of mathematical tools shows students the importance of mathematics. Finally, these skills are important to continue to support students' skills in reading fictional and informational text as well as to improve their skills in speaking and presenting information in a group setting.

The content included in this unit is important for students to learn because: students are expected to master adding, subtracting, multiplying, and dividing decimals and fractions by the end of $5^{th}$ grade. In addition, volume and geometry are $5^{th}$ grade mathematical skills that are important for students to master. Students need to be able to solve all of these problems using mathematical formulas and the algorithm. In addition, they need to be able to think deeply and persevere through problem solving in order to be better mathematicians.

The concepts included in this unit are important for students to learn because these concepts are critical to drive students toward mathematical excellence. Firstly, the concept skill of "structure elicits precision" helps students learn that they must use structure when they are working through math problems. For example, when they are completing decimal addition or subtraction, they are encouraged to use graph paper in order to line up the decimals and get the right answer. This concept skill helps students to recognize the need for precision in math. The other concept skill, "persistence impacts success," helps students consider the fact that their continued work during the struggle of problem solving will ultimately end in success. This concept skill further impacts students' mathematical practice with their focus on perseverance in problem-solving.

**Differentiation for Gifted Learners**

The elements of this unit that make it particularly beneficial or appropriate for gifted learners are art that this unit includes differentiation which is appropriate for gifted learners. This differentiation is shown in the lessons in the content, process, product, and learning environment.

The differentiation is seen in the **content** by using above grade level content for math and reading, so it is more complex. The differentiation is seen in the **process** in the following ways: students work with an open-ended problem-solving experience; students will participate in Socratic Seminar; students will facilitate the seminar, and their questions will be used; students will participate in Taba Concept Development; students will work in groups to identify categories for Michael Jordan's challenges; students will think critically; students will participate in Visual Thinking Strategy and will analyze the portrait deeply led by Higher Order Thinking Skill questions; and they will be using inference to create generalizations. The differentiation is seen in the **product** by allowing students a variety of ways to complete the performance task which challenges their creativity. The differentiation is seen in the **learning environment** where students will work independently, in partners, and in small groups.

This unit also shows differentiation of gifted learners shown in the complexity, challenge, depth, creativity, and acceleration. The **complexity** is evidenced by the variety of lesson models that students were used as well as the variety of readings and art that were used. The **challenge** is shown by the deep thinking and conversation that students applied to discussions and collaboration in completing daily activities. The **depth** is indicated by providing students math word problems that cause them to think deeply. The **creativity** is shown by the completion of the performance task which included options to make a Mathletes Playbook in which students would learn about math strategies. Students were allowed to complete this task in a variety of ways which included poster, book. PowerPoint, or Prezi. The **acceleration** is shown by giving students above grade-level work. Since the work that was provided was $5^{th}$ grade level, the students were challenged to complete reading and math work written one or two years above their grade levels. The performance task for this unit is: Your school has announced the establishment of a new Mathletes Team that will compete against other elementary schools in Winston-Salem. Because you are so gifted in Math, you have been selected to serve as the coach for your team, Mathletes United. Your task is to create a playbook for your team. The playbook will include strategies for our team to use to ensure they win and become the Winston-Salem Mathlete champions. Be sure to include at least five important strategies and mathematical examples.

## III. Goals and Outcomes

The goals of my unit include content goals, process goals, and concept goals. My broad content goal is *problem solving multi-step problems works out best when structure is used*. My broad process goal is to *analyze the math problems in order to find problems*. My broad concept goal is *structure elicits precision.*

While my overarching content goal was *problem solving multi-step problems works out best when structure is used*, I have additional content goals for this unit. The content skills included in this unit are:

- Adding decimals means lining up decimals to find the sum.
- Subtracting decimals means lining up decimals to find the difference.
- Multiplying decimals means that decimals are counted and added into the final product.
- Dividing decimals means that decimals are moved over the same amount of places as the divisor, then added into the quotient.
- Persistence is essential for mathematical problem solving.
- Volume is an attribute of a solid figure
- Volume is measured by counting cubes, using cubic cm, cubic in, cubic ft, and improvised units.
- Measuring volume involves counting as well as multiplying.
- the history of Michael Jordan's basketball career and drive to excellence through hard work and dedication.
- understand concepts related to fractions.
- use models to identify, order, and compare numbers.
- Structure is essential for mathematical precision.
- Drawing polygons requires using mathematical tools such as rulers and graph paper.

While my overarching process goal is to *analyze the math problems in order to find problems*, I have additional process goals for this unit. The process skills included in this unit are:

- evaluate the skills needed to be a mathematician.
- draw conclusions and make generalizations about using structure as a problem-solving skill.
- use problem solving to provide solutions.
- support your conclusions with examples from math.
- evaluate the skills needed be persistent.
- draw conclusions and make generalizations about using perseverance as a problem-solving skill.
- read informational text and identify challenges in Michael Jordan's life/career.
- use a variety of strategies in the problem-solving process.
- evaluate the challenges in Michael Jordan's life/career.
- draw conclusions and make generalizations about how persistence leads to success.
- support their conclusions about "categories" with Michael Jordan's challenges.
- evaluate the skills needed to be an architect
- analyze the needs of a town
- draw conclusions and make generalizations about using structure as a problem-solving skill.
- use tools to create a city and to provide a key.
- students will learn the tools and skills needed for an architect.

While my overarching concept goal was *structure elicits precision,* we also learned about the concept of *persistence impacts success.* In addition, these are goals that are aligned with the Common Core Standards.

- CCSS.MATH.CONTENT.5.NBT.A.4
  Use place value understanding to round decimals to any place.
- CCSS.MATH.CONTENT.5.NBT.B.7
  Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
- CCSS.MATH.CONTENT.5.MD.C.3
  Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
- CCSS.MATH.CONTENT.5.MD.C.4
  Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
- CCSS.MATH.CONTENT.5.MD.C.5
  Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
- CCSS.ELA-LITERACY.RL.5.2
  Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text.
- CCSS.ELA-LITERACY.RL.5.10
  By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 4-5 text complexity band independently and proficiently.
- CCSS.MATH.CONTENT.5.NF.A.1
  Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*
- CCSS.MATH.CONTENT.5.NF.A.2
  Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the

reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2*.

- CCSS.ELA-LITERACY.RI.5.1
  Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
- CCSS.ELA-LITERACY.RI.5.2
  Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.
- CCSS.MATH.CONTENT.5.G.A.1
  Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).
- CCSS.MATH.CONTENT.5.G.A.2
  Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
- CCSS.MATH.CONTENT.5.G.B.3
  Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
- CCSS.MATH.CONTENT.5.G.B.4
  Classify two-dimensional figures in a hierarchy based on properties.

## IV. Assessment Plan

The evidence that will show that students understand is their day-to-day work in the form of formative assessments along with their final product in their performance task which is their summative assessment. The formative assessments used in this unit are the daily tickets out the door along with their collaborative work with partners which includes creating graphic organizers, completing math word problems, and presenting information in class. The summative assessment for this unit is the performance task. The performance task will show evidence that the student has understood the content, process, and concept goals for this unit. The performance task helped students meet the goals and objectives in the following ways it showed that they understood and could explain the important mathematical skills a student should have. The performance task supported the essential understanding that "structure elicits precision" by causing students to consider this concept and to include this in their final product.

These assessments were used to monitor student progress in meeting established goals throughout the unit by the teacher looking at students' answers and feedback to inform instruction and to ask questions to "lead" students to discovering intended answers. A major part of this class was the "struggle" that students had to go through to answer word problems, complete tasks, and, ultimately, to complete their performance task in a timely manner.

From the students' work samples, I learned about their understanding of what they learned during this Practicum. I know the student understood the concept from the following evidence: the Power Points, Prezis, and posters that students completed showed that they understood the concept of what students should know to be good mathematicians. Some specific evidence from Mayah and Sydney's PowerPoint is that one of their points is to persevere through problem-solving, which was a big point in our week's lessons. Some specific evidence from Madison's PowerPoint is "Show your work" which was important with out concept that *structure elicits precision*. Some specific evidence from Dalton's Prezi is "Don't do math in your head" which echoed the idea that when we are aiming for precision, we must use the structure of actually writing down the problem and the steps to try to ensure we get the answer correct. Interestingly, each student mentioned collaboration in some way, which was an important aspect we had considered all week. Many times, gifted students are quick to work independently, but we emphasized that idea that we can learn and improve with the help of others. The performance tasks were clear evidence that the students understood the concepts and principles of the week. Dalton seemed to understand the team dynamic of Mathletes better than the others. I believe this is because he had been on Battle of the Books, which is a similar concept of teams competing in an academic competition. An interesting change I would like to make is to give the students the challenge of listing skills a Mathlete would need on the first day at the very beginning of class. Then, after teaching this class for 4 days, compare their performance task product with the list they made on the first day. I believe they would be very different because this class caused students to think about math problem-solving in a different way than they had thought of it before.

**Student Work Samples**


# Mathletes United Playbook

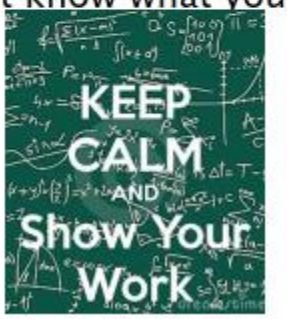
By: Mayah Ding and Sydney Yeboah

## Strategy #1: Show Your Work

You should show your work because:

- If you do your work on paper you can go back and check your work
- If you do your work in your head it is easy to make mistakes and you won't know what you did wrong
- Example:

$$\begin{array}{r} {\scriptstyle 1\phantom{00}} \\ 67.4 \\ +\ 6.321 \\ \hline 73.721 \end{array}$$



## Strategy #2: Check Your Work

- If you check your work you can catch any mistakes that you may make
- To check your work you can use the reverse operation or redo your work
- If you don't check your work you are more likely to make mistakes
- Example: 52+34=86
- To check: 86-34=52


## Strategy #3: Concentrate

- When you are competing it is important to concentrate because if you are distracted, you waste time and lose your train of thought
- You can concentrate by staying calm, sitting up straight, and avoiding distractions

## Strategy #4: Don't Get Nervous

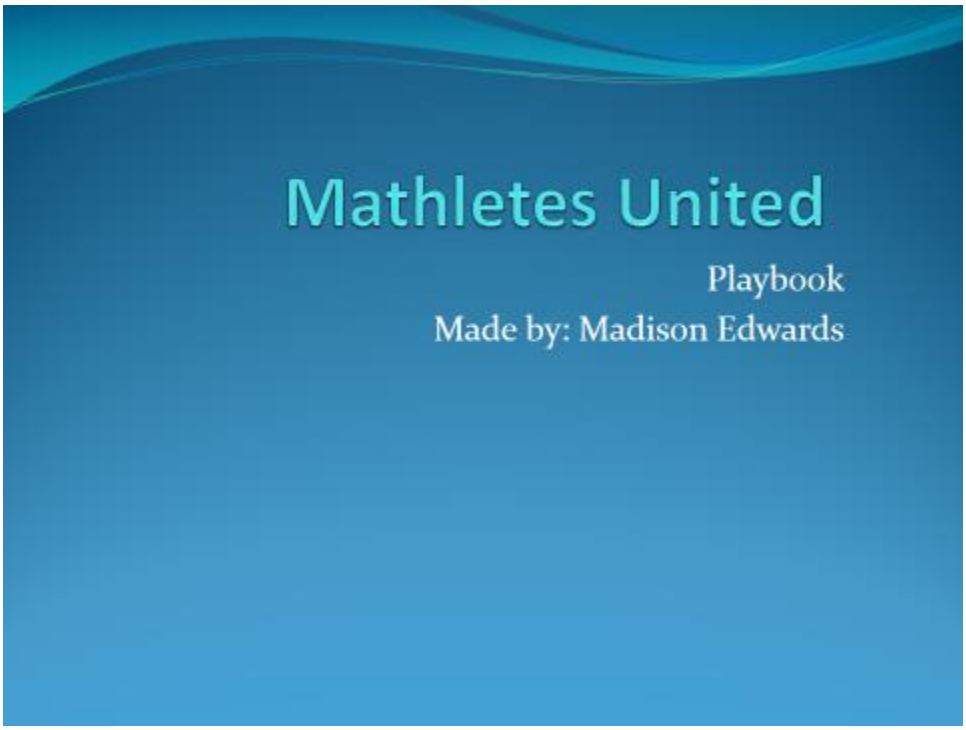
- If you get nervous you can't think properly and you will make more mistakes then you would if you were calm


## Strategy #5: Persevere

- Persevere: To keep on trying no matter what
- If you are given a math problem that you can't figure out, keep on trying and eventually you should get it
- If you just give up you won't learn anything and you will get the problem wrong

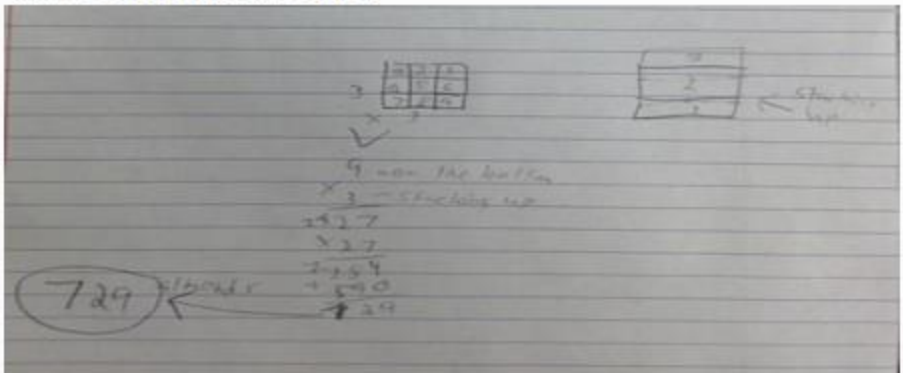
## Strategy #6: Collaborate

- If you work with others together as a team you are more likely to succeed because two heads are better than one
- If you are in a group and one person doesn't know something, there is a chance the other person will know it



# Show your work

Showing your work is like writing Down each step you take to Solve a problem like the person Who solved the problem in this picture.




# Step think and write

- Step thinking and writing is writing down important details from a word problem and you also have to show your work like this and this.
- Mariah played two games of checkers her brother. The first game took twelve minutes and the second game took eighteen minutes. They put the game away at 7:55 what time did they start.
  - S.t.a.w. on next page

# Extra

- Mariah played two games of checkers her brother. The first game took twelve minutes and the second game took eighteen minutes. They put the game away at 7:55 what time did they start.
- Mari played 2 games with bro
- #1 game took 12 min. 18+
- #2 game took 18 min. 12 7:55-
- Put game away @ 7:55 30 0:30
- answer 7:25

# Check your work

- After every problem you solve go back and solve it again just in case you miscalculated something

## Focus


- When you are trying to solve a problem try to block out everything that is going on around you like if there's a timer or there's a lot of noise just focus on what you are doing and don't get distracted.

## Collaborate

- Work with your friends/teammates when you are trying to figure out/solve a problem.

- see

**Transcript from Dalton's Playbook**

Check your self

If you don't check your elf you will get the answer wrong and no one likes a person who acts like they know everything

With this every mathlete will triumph over the others!

Study very very hard

The other team will have a breeze if you don't study. If you study hard and know your team you should be perfect!

Don't do math in your head!

It might be tempting to do math in your head but than you'll forget or get the answer wrong.

Help your team

Don't go solo! Your team can help you not make mistakes and make sure your on track.

Make sure everybody is on track.

Find the other teams weakness

It might be easier to go ahead of your team but than you might miss something the team is doing.

Every team has a weakness. So try to find the other teams weakness. Than tell your team about it.

By the way….Now that you know everything send me a copy of your trophy at dalton.r.goode@gmail.com.

| TEACHER NAME | Lesson # |
|---|---|
| Rebecca Montes de Oca | 1 of 4 |

| MODEL | CONTENT AREA | GRADE LEVEL |
|---|---|---|
| Bruner | **Math** | **5th grade** |

| CONCEPTUAL LENS | LESSON TOPIC |
|---|---|
| Structure | Mathematicians use specific tools and structure |

**LEARNING OBJECTIVES** *(from State/Local Curriculum)*

***Math***

CCSS.MATH.CONTENT.5.NBT.A.4

Use place value understanding to round decimals to any place.

**CCSS.MATH.CONTENT.5.NBT.B.7**

**Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.**

| THE ESSENTIAL UNDERSTANDING<br>*(What is the overarching idea students will understand as a result of this lesson?* | THE ESSENTIAL QUESTION<br>*(What question will be asked to lead students to "uncover" the Essential Understanding)* |
|---|---|
| structure elicits precision | *In what ways does structure elicit precision?* |

| CONTENT KNOWLEDGE<br>(What factual information will students learn in this lesson?) | PROCESS SKILLS<br>(What will students be able to do as a result of this lesson?) |
|---|---|
| Students will know that:<br>• Structure is essential for mathematical precision.<br>• Adding decimals means lining up decimals to find the sum.<br>• Subtracting decimals means lining up decimals to find the difference.<br>• Multiplying decimals means that decimals are counted and added into the final product.<br>• Dividing decimals means that decimals are moved over the same amount of places as the divisor, then added into the quotient.<br>• Problem solving multi-step problems works out best when structure is used. | Students will be able to. . .<br>• Evaluate the skills needed to be a mathematician.<br>• Analyze the math problems in order to find problems.<br>• Draw conclusions and make generalizations about using structure as a problem-solving skill.<br>• Use problem solving to provide solutions.<br>• Support your conclusions with examples from math. |

**GUIDING QUESTIONS**

***What questions will be asked to support instruction?***

***Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding***

| Pre-Lesson Questions: | During Lesson Questions: | Post Lesson Questions: |
|---|---|---|

| | | |
|---|---|---|
| What do mathematicians do?<br>What are spaces in which mathematicians might work?<br>What are some of the methods mathematicians use to gather information?<br>What are some of the tools that mathematicians s use?<br>What rules impact mathematicians work? | What methods did you observe the mathematicians in the video using?<br>What kinds of data did the mathematician use or come up with?<br>What characteristics did the mathematician possess?<br>What tools did she use?<br>How did the mathematicians act responsibly as she did her work? | What did you learn about being a mathematician?<br>What strategies and/or methods did you use during your observations?<br>How did you make inferences about your observations?<br>What rules did you impose on yourself and others working with you?<br>How did you decide on these rules?<br>How did you reach conclusions from your observations?<br>How important is observation when working as a mathematician?<br>In what ways does structure elicit precision? |

**DIFFERENTIATION**

***(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.***

| Content | Process | Product | Learning Environment |
|---|---|---|---|
| Content for this lesson uses above grade level content for this group of students, so it is more complex. | Students work with an open-ended problem-solving experience. They will be using inference to create generalizations. | | Students will work in a variety of learning environments…whole group, small group, and independently. |

**PLANNED LEARNING EXPERIENCES**

***(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)***

**Engage and Connect** - *This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.*

As students enter the classroom, there will be a picture on the interactive white board that states: "Mathematicians' with photographs/illustrations of famous mathematicians.

Students will be instructed to create independent lists/illustrations of mathematicians and/or what mathematicians look like. The list should include:
What mathematicians do?
What do mathematicians wear?
What tools might mathematicians use?
Where might mathematicians work?
Characteristics mathematicians should possess.

After five minutes of listing, students are asked share their thoughts with the class. The teacher will record responses so that the list is visible to the class. Students are asked to provide elaboration for their responses.

Teacher then asks pre-lesson questions. Students respond to questions orally as a whole group.

**Explore** - *In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.*

The teacher introduces the video, NASA Mathematician Katherine G. Johnson. . Students are instructed to view the video by focusing on Katherine G. Johnson, the mathematician. They are to focus on how the mathematician acts, what she does, and what characteristics she possesses using precision. Students will write their list on paper.

After the video, students are referred back to their original list. Teacher asks: What other things would you add to this list? She then asks during lesson questions. (see above list of questions)

After students have an adequate understanding of the role of mathematicians, students are then divided into groups. The teacher tells the students they are to be mathematicians. They will observe six stations where they will observe a "mathematical community." They are to observe this community as a mathematician might observe it. The teacher has sets up the mathematical community as a series of stations around the room on tablet paper.

Students will rotate to observe different examples of what mathematicians do:

- How they use theories and techniques (there will be tablet paper with an example of a theory/technique a mathematician would use)
- How they find mistakes/problems in math problems (there will be tablet paper with a math problem that has a mistake and then in a different color, the problem has been corrected with notes about the mathematical mistake)
- How they analyze and decipher encryption codes (there will be tablet paper with a cryptography example where the mathematician has cracked a code)
- How they use data (there will be tablet paper that has an example where the mathematician has used data to explain an occurrence)
- How they research (there will be tablet paper with how the mathematician used research to solve a problem)
- How they act responsibly (there will be tablet paper with how the mathematician acted ethically)

Students are provided: paper and pencils to diagram what they see; "journals" to record what they see and what they think these observations mean about their mathematical community. Students rotate from station to station. Students record their observations and their generalizations about what they see. After observation of each station, groups meet to record their findings and make their generalizations.

**Explain -** *Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.*

After students have completed all stations, the teacher provides time for groups to have one final meeting to draw conclusions based on all the observations. The teacher asks students to report their findings. Each group reports their conclusions and reasons for their conclusions. Students are encouraged to discuss conclusions of other groups and to contribute by questioning and adding their own conclusions.

Post-lesson questions are posed by the teacher. (see list above) Students respond to questions orally. Answers are discussed and elaborated.

**Elaborate** *—Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways*

Students now work in pairs and are provided with chart paper and markers. Students are instructed to create a graphic organizer that explains what mathematicians do. The poster should reflect what they have concluded about acting as a mathematician. Students should consider:
How they use theories and techniques
How they find mistakes/problems in math problems
How they analyze and decipher encryption codes
How they use data
How they behave when conducting research
How they act responsibly

(*As students work on posters, teacher will prepare classroom for performance task activity.)*

Posters are collected and posted. Students use a gallery walk strategy to view and comment on posters created by other groups. Comments are made on post-it notes provided by the teacher.

Ask if they have ever heard of Mathletes. Then explain that Mathletes is someone who takes part in a mathematical competition, usually middle and high school students. Tell students that just as there are coaches for athletics, there are also coaches for the Mathletes Clubs.

Students will be instructed to go around the room and make observations about some of their Mathletes most reason mathematical work with decimals. They are having some problems, and it is their job as the Mathletes Coach to identify the problems. Students are provided with paper to take notes. (There are 5-8 math problems around the room where students have made mistakes in their work. These include adding, subtracting, multiplying, dividing decimals.)

After students have collected information, we will discuss whole group and identify their mistakes. Teacher will ask what could have been done to have avoided these mistakes. Goal is for class to come up with being more careful/using structure.

Announce performance task:
Your school has announced the establishment of a new Mathletes Team that will compete against other elementary schools in Winston-Salem. Because you are so gifted in Math, you have been selected to serve as the coach for your team, Mathletes United. Your task is to create a playbook for your team. The playbook will include strategies for our team to use to ensure they win and become the Winston-Salem Mathlete champions. Be sure to include at least five important strategies and mathematical examples.

Students will then begin their Mathletes United Playbook entry one that will include SMP#7 Look for and Make Use of Structure. Students will be provided with laptops and/or paper to begin their projects.

**Evaluate:** *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

Students are provided index cards. As a ticket out the door, students are instructed to respond to the following question: After viewing the mathematicians' playbooks, in what ways does structure elicit precision?

Teacher will use their response to the question in order to inform instruction for next day's lesson. Were they able to understand that structure for mathematicians is essential? Were they able to see that structure for their "Mathletes" was missing and, therefore, caused them to make careless mistakes? Teacher will discuss answers with class the next day.

| TEACHER NAME | | |
|---|---|---|
| Montes de Oca | | |
| **MODEL** | **CONTENT AREA** | **GRADE LEVEL** |
| **Socratic Seminar** | **Math/Reading** | **5th** |

| CONCEPTUAL LENS | LESSON TOPIC |
|---|---|
| **Persistence** | **Persistence in problem solving in mathematics** |

**LEARNING OBJECTIVES** *(from State/Local Curriculum)*

CCSS.MATH.CONTENT.5.MD.C.3
Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

CCSS.MATH.CONTENT.5.MD.C.4
Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

CCSS.MATH.CONTENT.5.MD.C.5
Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

CCSS.ELA-LITERACY.RL.5.2
Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text.

CCSS.ELA-LITERACY.RL.5.10
By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 4-5 text complexity band independently and proficiently.

| **THE ESSENTIAL UNDERSTANDING** *(What is the overarching idea students will understand as a result of this lesson?* | **THE ESSENTIAL QUESTION** *(What question will be asked to lead students to "uncover" the Essential Understanding)* |
|---|---|
| **Persistence affects outcome** | ***How does persistence affect outcome?*** |

| **CONTENT KNOWLEDGE** (What factual information will students learn in this lesson?) | **PROCESS SKILLS** (What will students be able to do as a result of this lesson?) |
|---|---|
| Students will know that:<br>• Persistence is essential for mathematical problem solving.<br>• Problem solving multi-step problems works out best when persistence is used to find the answers.<br>• Volume is an attribute of a solid figure<br>• Volume is measured by counting cubes, using cubic cm, cubic in, cubic ft, and improvised units.<br>• Measuring volume involves counting as well as multiplying. | Students will be able to. . .<br>• Evaluate the skills needed be persistent.<br>• Analyze the math problems in order to identify steps.<br>• Draw conclusions and make generalizations about using perseverance as a problem-solving skill.<br>• Use problem solving to provide solutions.<br>• Support conclusions with examples from math. |

**GUIDING QUESTIONS**
***What questions will be asked to support instruction?***
***Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding***

| **Pre-Lesson Questions:** | **During Lesson Questions:** | **Post Lesson Questions:** |
|---|---|---|

| | | |
|---|---|---|
| • **What is persistence?**<br>• **What was happening in the video?**<br>• **What did you notice about the main character?**<br>• **How might the events in the video be changed if the main character were changed?**<br>• **What is the relationship between the main character's disability and his ability?**<br>• **What might be a theme of this video?**<br>• **What were some examples of persistence in this video?** | • **What was our story about? Setting? Main character?**<br>• **What is a fable? What is the purpose of a fable?**<br>• **What was the problem in the story? What was the solution?**<br>• **How was the crow challenged? What were his strategies?**<br>• **What was the resolution?**<br>• **What was the theme of this story?**<br>• **What were some examples of persistence in this story?** | • ***What was one them you discovered through the seminar?***<br>• **What was the one big theme of the story that you discovered through the seminar?**<br>• **What concepts did you explore?**<br>• **What generalizations can you make about the crow?**<br>• **How did this seminar experience help you deepen your opinions and interpretations of The Crow and the Pitcher?**<br>• **What is the impact of perseverance on problem solving?**<br>• **What challenges did you experience during the seminar?**<br>• **How did your role in the seminar (inner vs. outer) impact your feelings about the seminar?**<br>• ***How does persistence effect outcome?*** |

**DIFFERENTIATION**

***(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.***

| Content | Process | Product | Learning Environment |
|---|---|---|---|
| **Above grade level material will be used which is more complex.** | **Students will participate in Socratic Seminar. Students will facilitate the seminar, and their questions will be used.** | | **Students will work in various environments including small group, partners, and independently.** |

**PLANNED LEARNING EXPERIENCES**

***(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)***

**Engage and Connect** - *This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.*

**As students enter the classroom, they will see the word persistence on the board along with several illustrations showing persistence. Students are challenged to make a list of as many examples of persistence as possible. They have 5 minutes. Points will be awarded based on highest, next highest, etc.**

**Ask students: What is persistence?**

**Student will then watch video on board about Persistence (https://www.youtube.com/watch?v=qFn-C7aXNN0) .**
**As students watch, they will write down what they notice on the other side of the index card. Then ask:**

- **What was happening in the video?**
- **What did you notice about the main character?**
- **How might the events in the video be changed if the main character were changed?**
- **What is the relationship between the main character's disability and his ability?**
- **What might be a theme of this video?**
- **What were some examples of persistence in this video?**

**Explore** - *In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.*

**Students will be provided with Aesop's Fable *The Crow and the Pitcher.***
***( http://www.bbc.co.uk/schoolradio/subjects/english/aesops_fables/17-24/crow_and_pitcher)***
**Each student will be asked to read the story. They will be asked to use Close Reading skills to interact with text.**

**In groups of three or four, students will write questions about the story. Students should use HOTS to write questions. Explain these will be used in our Socratic Seminar.**

**Explain -** *Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.*

**When students have completed their questions, teacher ask:**

- **What was our story about? Setting? Main character?**
- **What is a fable? What is the purpose of a fable?**
- **What was the problem in the story? What was the solution?**
- **How was the crow challenged? What were his strategies?**
- **What was the resolution?**
- **What was the theme of this story?**

**Students respond to questions orally. Students will share their opinions/insight.**

**Elaborate** —*Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways*

**Students will be explained the "rules" of Socratic Seminar and expectations.**

**Students are divided into two groups (if possible). Students A will be in the inner circle of the Socratic Seminar. Students B will be taking notes in the outer circle. The leader, decided by the teacher, will begin the Seminar with one provocative question.**
**Students will follow expectations for the duration of the Socratic Seminar.**

**Some opening questions might include:**
**What is the significance of the Crow's cleverness to the story?**
**What is the theme of this story? How do you know?**
**How is this reading related to perseverance?**

**Students will dialogue for 10 minutes. Then the inner and outer circles will trade places and roles.**

**When students have completed the seminar (after 10 minutes), the teacher will pose several questions:**

**What was the one big theme of the story that you discovered through the seminar?**
**What concepts did you explore?**
**What generalizations can you make about the crow?**
**How did this seminar experience help you deepen your opinions and interpretations of The Crow and the Pitcher?**
**What is the impact of perseverance on problem solving?**
**What challenges did you experience during the seminar?**
**How did your role in the seminar (inner vs. outer) impact your feelings about the seminar?**

**First, let's brainstorm reasons this is important. Teacher makes a list on the board. Then teacher explains that we will do a "Gallery Walk" of several multi-step problem solving problems and we will write down all the steps we use to solve the problems. Then, when we go over the problems, we will talk about what our outcome would be if we stopped early.**

**Students will be placed into pairs. Students will go around and solve 8 problems with a partner.**
**Each pair will choose one problem to explain to class.**

**Evaluate:** *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

**Students will return to seats and respond on a "Ticket out the Door" to answer our questions: How does persistence affect outcome? What is your evidence? Give one example.**

**Students will work on the playbooks.**

| TEACHER NAME | Lesson # |
|---|---|
| Rebecca Montes de Oca | 3 of 4 |

| MODEL | CONTENT AREA | GRADE LEVEL |
|---|---|---|
| **Taba Concept Development** | **Math** | **5th grade** |

| CONCEPTUAL LENS | LESSON TOPIC |
|---|---|
| **Persistence** | **Persistence through Challenges;** Subtopic: Failures/Mistakes Can Drive Us Toward Success If We Don't Quit |

**LEARNING OBJECTIVES** *(from State/Local Curriculum)*

CCSS.MATH.CONTENT.5.NF.A.1

Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*

CCSS.MATH.CONTENT.5.NF.A.2

Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*

CCSS.ELA-LITERACY.RI.5.1

Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

CCSS.ELA-LITERACY.RI.5.2

Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

| **HE ESSENTIAL UNDERSTANDING**<br>***(What is the overarching idea students will understand as a result of this lesson?*** | **THE ESSENTIAL QUESTION**<br>***(What question will be asked to lead students to "uncover" the Essential Understanding)*** |
|---|---|
| ***Persistence impacts success*** | ***How does persistence impact success?*** |
| **CONTENT KNOWLEDGE**<br>**(What factual information will students learn in this lesson?)** | **PROCESS SKILLS**<br>**(What will students be able to do as a result of this lesson?)** |
| Students will know<br>• the history of Michael Jordan's basketball career and drive to excellence through hard work and dedication.<br>• understand concepts related to fractions.<br>• use models to identify, order, and compare numbers. | Students will be able to. . .<br>• read informational text and identify challenges in Michael Jordan's life/career.<br>• use a variety of strategies in the problem-solving process.<br>• Evaluate the challenges in Michael Jordan's life/career.<br>• Analyze the math problems in order and answer correctly through persistence.<br>• Draw conclusions and make generalizations about how persistence leads to success.<br>• Use problem solving to provide solutions.<br>• Support their conclusions about "categories" with Michael Jordan's challenges. |

**GUIDING QUESTIONS**

***What questions will be asked to support instruction?***

***Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding***

| **Pre-Lesson Questions:** | **During Lesson Questions:** | **Post Lesson Questions:** |
|---|---|---|
| *What are some things you noticed about the video about Michael Jordan's career?*<br>*What successes can you identify?*<br>*As you watched the commercial, what 3 numbers did you identify?*<br>*As you watched the commercial the second time, what did the number 9,000 represent?*<br>*What did the number 300 represent?*<br>*What did the number 26 represent?*<br>*What is a theme that you identified in this commercial?* | What theme can we identify in this passage?<br>What challenges do you see?<br>What areas of challenges belong together?<br>How can you label the groups you have formed?<br>Why did you group them this way?<br>What is the impact of these challenges on Michael Jordan?<br>What is another way you could regroup these?<br>What are some connections to these challenges and our own lives?<br>How would you describe Michael Jordan? | What is the relationship of the different areas of Michael Jordan's life/career?<br>How have these areas of challenge change over time?<br>How has Michael Jordan shown persistence?<br>How does persistence impact his success?<br>How does persistence impact success? (in general) |

**DIFFERENTIATION**

***(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.***

| Content | Process | Product | Learning Environment |
|---|---|---|---|
| **Above grade level material will be used for reading and math which is more complex.** | **Students will participate in Taba Concept Development. Students will work in groups to identify categories for Michael Jordan's challenges. This will benefit gifted learners to think critically.** | | **Students will work in various environments including small group, partners, and independently.** |

**PLANNED LEARNING EXPERIENCES**

***(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)***

**Engage and Connect** - *This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.*

*As students enter, a video will be playing about Michael Jordan's basketball career.* **Here is the link to the video: https://vimeo.com/42286578. (We will not watch the entire video, just 1-2 minutes.)**

Students will verbally share what they noticed about Michael Jordan and/or learned from the video. Teacher will elicit answers that lead us to the idea that Michael Jordan changed and that Michael Jordan pursued excellence and worked hard to attend to precision. Also, we will identify that he used structure to pursue his passion.

Students will then watch "Michael Jordan "Failure" Nike Commercial. (http://behindthehustle.com/2011/09/michael-jordan-succeeded-because-he-failed/) Announce that they will watch the video 2 times. For the first time, while watching, they are to write down the numbers that Michael Jordan Mentions in the commercial. (9,000, 300, 26) For the second time, they are to write down what the 9,000, 300, 26 specifically were (9,000 shots he missed. 300 games he lost. 26 times he missed the game winning shot.) Now ask: What was the theme or big idea of this commercial? Teacher elicits idea that Michael Jordan has had a lot of challenges, but continues to work hard to succeed.)

(Transcript of commercial*: I missed more than 9,000 shots in my career. I've lost almost 300 games. 26 times, I've been trusted to take the game winning shot, and I missed. I've failed over and over and over again in my life. And that is why I succeed.)*

*List of questions:*
*What are some things you noticed about the video about Michael Jordan's career?*
*What successes can you identify?*
*As you watched the commercial, what 3 numbers did you identify?*
*As you watched the commercial the second time, what did the number 9,000 represent?*
*What did the number 300 represent?*
*What did the number 26 represent?*
*What is a theme that you identified in this commercial?*

**Explore** - *In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.*

**Teacher will highlight some of the big ideas of the article "Michael Jordan Succeeded Because He Failed." http://behindthehustle.com/2011/09/michael-jordan-succeeded-because-he-failed/ .**

**Students will then be given copies of the passage: Air Jordan (from edhelper). Students will be instructed to read the the passage. When they finish, they will independently make a list where Michael persisted when confronted with challenges.**
***(Teacher should elicit these 20 at least: family moved, too slow, too short, too small, cut from varsity team, told not developed enough, left college, wasn't 1st draft pick, wasn't 2nd draft pick, broken foot, missed 64 games, team lost series, couldn't get far in playoofs, 1993 was tired, 1993 no longer wanted to play, father was murdered, average baseball career, part owner for Washington Wizards/ didn't go well, criticized, Wizards fired him.)***

**Teacher will make a list of challenges on the board. Teacher will ensure that there are 20 or more changes listed.**

**Here is the list of questions:**
What theme can we identify in this passage?
What challenges do you see?
What areas of challenges belong together?
How can you label the groups you have formed?
Why did you group them this way?
What is the impact of these challenges on Michael Jordan?
What is another way you could regroup these?
What are some connections to these challenges and our own lives?
How would you describe Michael Jordan?

**Explain -** *Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.*

Students will work together in collaborative grouping to create smaller word lists based on similarities in how they relate to persistence. Students will write down the list of 20 ideas on separate index cards. Groups work together to decide which items in the list are alike in some aspect of persistence (at least four different groups with 4 different areas) During this time, the teacher will move throughout the classroom to guide the students to a deeper understanding of how these areas are related by asking probing questions (asking, not telling to solicit thought provoking answers) where needed.

Students will determine the most precise label for each group when they have completed grouping. When students have had sufficient time to come up with their "groups" and "labels.", a representative from each group will share their groupings with whole class. We will discuss whole group the various thought processes involved in making these groupings.

**Elaborate** —*Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways*

Now, student groups will be challenged to regroup items into new categories. They will expand their new knowledge and make other connections with their lists. As they are working in their small groups trying to come up with new categories, teachers will move around the room within groups to guide and facilitate discussion. Teacher will make suggestions and ask thought-provoking questions to elicit thought and discussion. Students will place into 4 different groups with labels. Make sure each group has a precise label.

**Whole group discussion is facilitated by teacher. Teacher will relate findings together and elicit that answers to the essential question and essential understandings. How does persistence impact success?** ***What challenges did Michael Jordan go through to impact his success?***

***Students will now do a "Round Robbin" Activity with Partners where they will work on 6 Fraction Word Problems. They will be told to be persistent in order to be successful. As students work, teacher will circulate and ask questions to solicit correct answers.***

***When partners have completed each problem, we will go over the answers. Points will be awarded for correct answers.***

**Evaluate:** *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

*At the end of the lesson, students will watch another commercial about Michael Jordan ("Maybe It's My Fault"* [*https://www.youtube.com/watch?v=9zSVu76AX3I*](https://www.youtube.com/watch?v=9zSVu76AX3I) *).*
*Students will be respond to the following prompt: Based on your reading and discussion about the Michael Jordan today, answer the essential question: How does persistence impact success? Be sure to include four specific areas of challenges Michael Jordan faced and how his persistence impacted his success. Students' answers will be evaluated if they could (1) answer the EQ, (2) include four areas of growth, and (3) show understanding that MJ's persistence impacted his success and our persistence can impact our success.*
*Here are the questions:*
What is the relationship of the different areas of Michael Jordan's life/career?
How have these areas of challenge change over time?
How has Michael Jordan shown persistence?
How did persistence impact his success?
How does persistence impact success? (in general)

***Students will do a "gallery walk" with 8 fraction problems to solve for points.***
***Students will have approximately 20-30 minutes to continue to work on their Performance Task.***

| TEACHER NAME | Lesson # |
|---|---|
| Rebecca Montes de Oca | 4 of 4 |

| MODEL | CONTENT AREA | GRADE LEVEL |
|---|---|---|
| Visual Thinking Strategies | Math | 5 |

| CONCEPTUAL LENS | LESSON TOPIC |
|---|---|
| Structure | Mathematicians use specific tools and structure |

**LEARNING OBJECTIVES** *(from State/Local Curriculum)*

CCSS.MATH.CONTENT.5.G.A.1

Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).

CCSS.MATH.CONTENT.5.G.A.2

Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

CCSS.MATH.CONTENT.5.G.B.3

Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.

CCSS.MATH.CONTENT.5.G.B.4

Classify two-dimensional figures in a hierarchy based on properties.

| THE ESSENTIAL UNDERSTANDING<br>*(What is the overarching idea students will understand as a result of this lesson?* | THE ESSENTIAL QUESTION<br>*(What question will be asked to lead students to "uncover" the Essential Understanding)* |
|---|---|
| structure elicits precision | *In what ways does structure elicit precision?* |
| **CONTENT KNOWLEDGE**<br>**(What factual information will students learn in this lesson?)** | **PROCESS SKILLS**<br>**(What will students be able to do as a result of this lesson?)** |
| Students will know that:<br>• Structure is essential for mathematical precision.<br>• Drawing polygons requires using mathematical tools such as rulers and graph paper.<br>• Problem solving multi-step problems works out best when structure is used. | Students will be able to. . .<br>• Evaluate the skills needed to be an architect<br>• Analyze the needs of a town<br>• Draw conclusions and make generalizations about using structure as a problem-solving skill.<br>• Use tools to create a city and to provide a key.<br>• Students will learn the tools and skills needed for an architect. |

**GUIDING QUESTIONS**

***What questions will be asked to support instruction?***

***Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding***

| Pre-Lesson Questions: | During Lesson Questions: | Post Lesson Questions: |
|---|---|---|
| What types of pictures did you draw?<br>How did you decide what you would draw?<br>What meaning does your drawing have to you?<br>What meaning do you want others to get from your drawing?<br>What do you think any artist wants others to know by what is included in his/her artwork? | What do you think is going on in this picture?<br>What do you see that is happening?<br>What else is happening?<br>What makes you say that?<br>Does anyone see anything else?<br>What else can you find in this picture?<br>Who are the people in this picture?<br>What do you think they are doing?<br>When do you think this is taking place?<br>What season/time of year do you think it is?<br>What do you notice about the structure in this portrait?<br>Why do you think the artist chose to use the structure in this way?<br>What tools did the artist use to make this portrait? | What positions do the people in the picture hold?<br>What are the differences between the characters in the picture?<br>What does the picture tell us about architecture? Why do you say that?<br>What period of history is revealed in this picture?<br>What one character do you find most interesting?<br>Why do you think M.C. Escher painted this?<br>In what ways does structure elicit precision? |

**DIFFERENTIATION**

***(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.***

| Content | Process | Product | Learning Environment |
|---|---|---|---|
| Above grade level material will be used which is more complex. | Students will participate in VTS and will analyze the portrait deeply led by HOTS questions. | | Students will work independently, in partners, and in small groups. |

**PLANNED LEARNING EXPERIENCES**

***(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)***

**Engage and Connect** - *This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.*

As students enter they will see a message on the board that instructs them that they are doing artwork this morning. Each student will be provided with a sheet of white paper. They are to draw a portrait that incorporates 10 or more jobs for a Mathematician. They will be given time to draw all the jobs that they can think of that at Mathematician might have.

Points will be awarded for any student who comes up with 10 or more jobs.

Teacher asks questions:
After ten minutes of working, the teacher asks the pre-lesson questions.

What types of pictures did you draw?
How did you decide what you would draw?
What meaning does your drawing have to you?
What meaning do you want others to get from your drawing?
What do you think any artist wants others to know by what is included in his/her artwork?

**Explore** - *In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.*

The teacher reveals, Concave and Convex by M.C. Esher , (http://www.wikiart.org/en/m-c-escher/convex-and-concave) on the board.
The teacher gathers students around the picture and instructs them to observe the painting without speaking.

The teacher allows three minutes for students to observe the painting in silence.

**Explain -** *Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.*

After three minutes of observation, the teacher asks the during-lesson questions. Time is allowed for students to comment and to expand on comments made by their peers.
What do you think is going on in this picture?
What do you see that is happening?
What makes you say that?
What else is happening?
Does anyone see anything else?
What else can you find in this picture?
What do you notice about the structure in this portrait?
Why do you think the artist chose to use the structure in this way?
What tools did the artist use to make this portrait?
Who are the people in this picture?
What do you think they are doing?
When do you think this is taking place?
What season/time of year do you think it is?

Responses should identify that the picture reveals people, stairs, perhaps a city of lots of stairs and walkways. Some people look happy, some are working, some are sad/depressed. The time period is probably in the past.

**Elaborate** —*Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways*

Students are divided into groups. They are provided with cards which have the post-lesson questions. Students are instructed to read, discuss and record their responses to the questions on the cards. (see post –lesson questions.)

After 10 minutes, the teacher asks groups to share their responses, question by question. Discussion is facilitated by the teacher as she asks probing questions: Why do you say that? What else do you see that lead you to that decision?

What positions do the people in the picture hold?
What are the differences between the characters in the picture?
What does the picture tell us about architecture? Why do you say that?
What period of history is revealed in this picture?
What one character do you find most interesting?

**Evaluate:** *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

Summary of the lesson is provided by the teacher:
What do you think the artist is trying to tell us in this painting?
What is Escher (the artist) trying to communicate by showing the convex and concave images?
What is he trying to convey by showing the people in the image?

Since architecture is a mathematical career, you will practice being an architecture today. *You are an architect and the city council wants you to design a new town that is names Polygon Town. They have asked you to create a blueprint of the town using various polygon shapes to represent buildings. You need to present the blueprint, including a scale, at the city council meeting next week."* Students will work with **partners** to complete this activity and then present to class (approx.. 45 minutes). **Points will be awarded based on number of polygons included, scales, completing activity etc.**

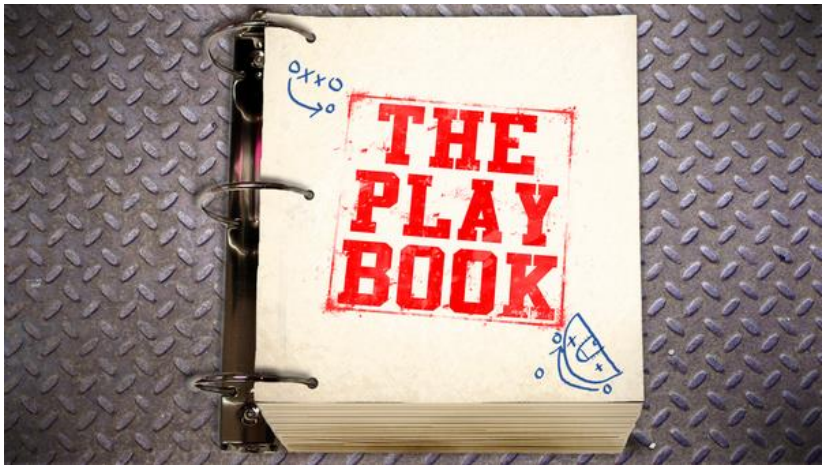
After students have presented, teacher will ask, what tools did you use to make your blueprint? (graph paper, ruler, protractor, pencil) "How does structure elicit precision" as seen in our work today? (painting as well as the blueprint) Students will reflect and respond on index cards. Teacher will collect and check for understanding based on student responses.

Then they will spend 30 minutes on their Performance Task.

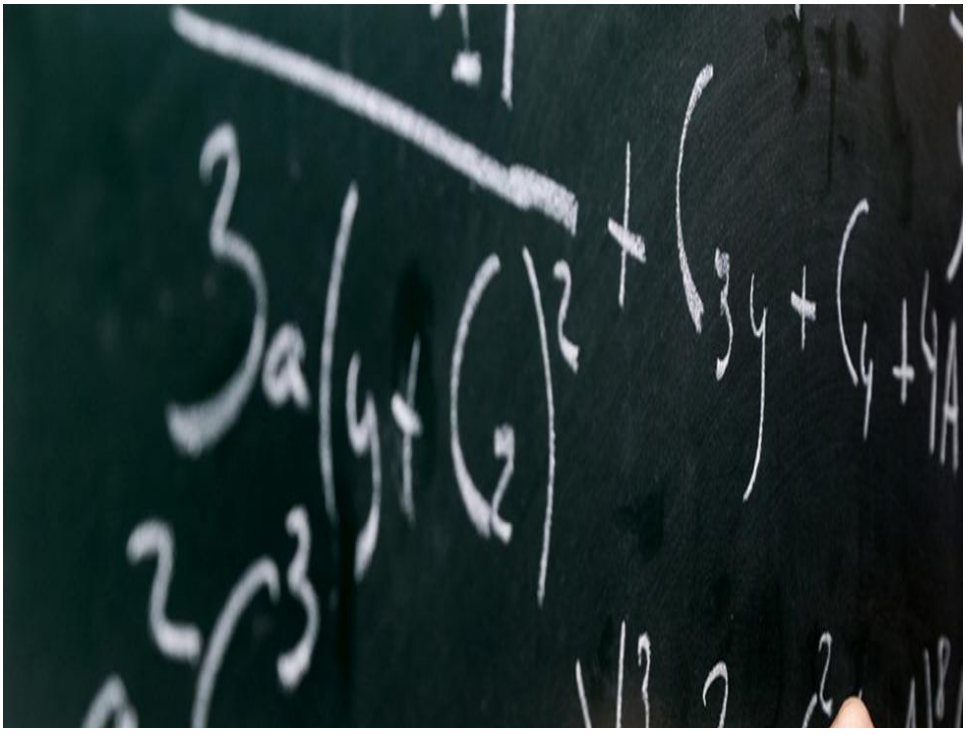
The following pages include the booklet that was provided for each child in the class called "Mathletes United." Students used these booklets each day to take notes, to work out math problems, to reflect, and to keep up with their daily points.

In addition, there are Power Points for each of the lessons.

Most of the math problems used in these lessons were taken from *50 Leveled Math Problems Level 5* by Anne M. Collins. Others were based on problems from *Motivation Math* published by Mentoring Minds. They are included after the Power Points.




# MATHLETES UNITED



Persevere

Reason

Construct

Model

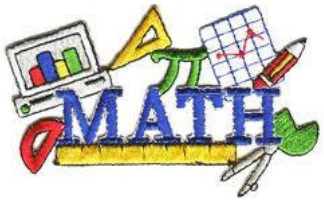
Strategize

Attend to Precision

Use Structure

Express Regularity

Mathlete




**Lesson 1:** Mathematicians use specific tools and structure

**I can use specific tools and structure to help me in math.**

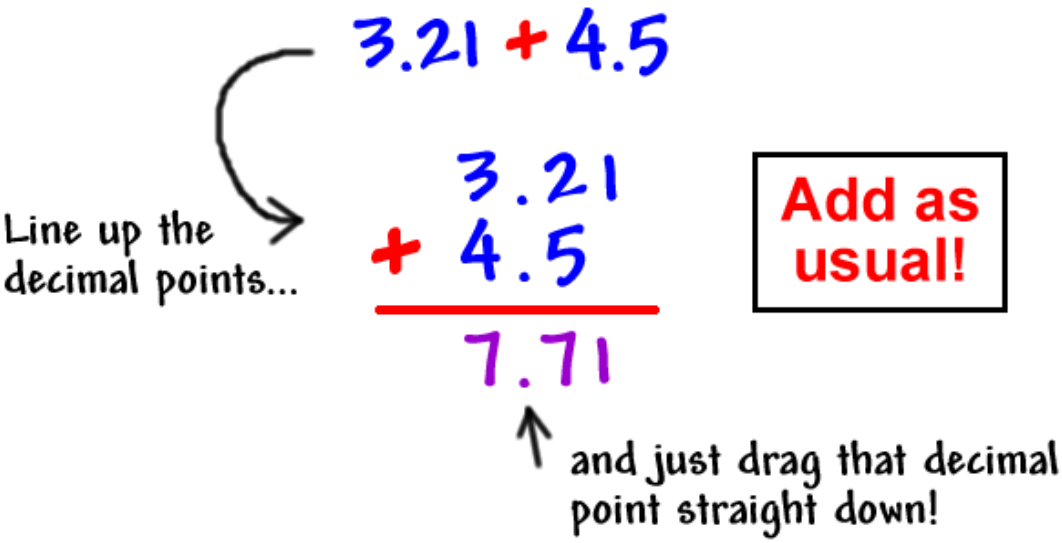
**I can add and subtract decimals.**

**To add decimals, follow these steps:**

Write down the numbers, one under the other, with the decimal points lined up.

Put in zeros so the numbers have the same length

Then add using column addition, remembering to put the decimal point in the answer.



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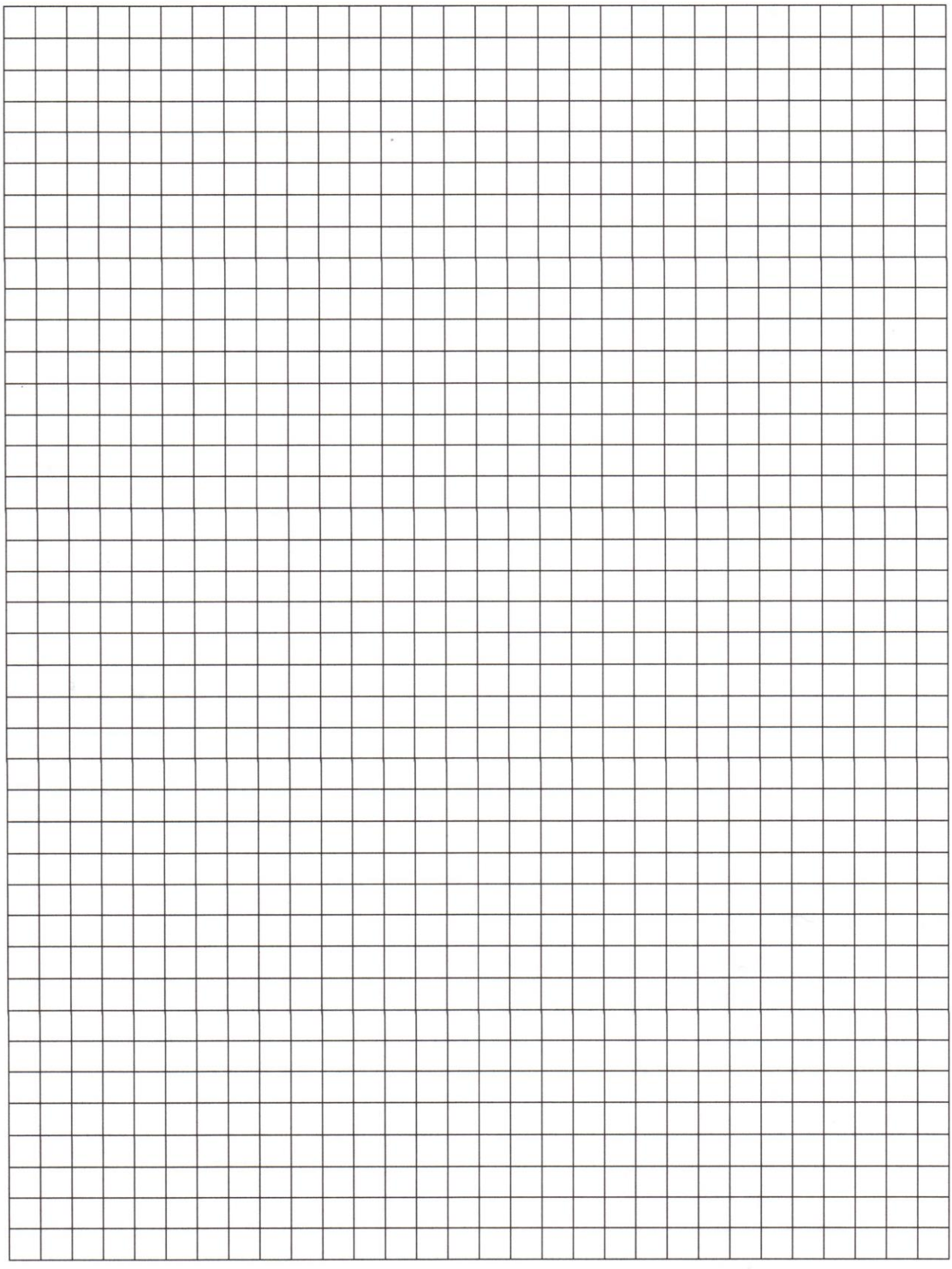


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MATHLETES
CHALLENGE

# My Mathletes United Points

**My Points for Today: _____**

**What I Earned: _____**

**Goal Points for Tomorrow: _____**

**Tomorrow's Prize: _____**

# My Playbook Planning Pages

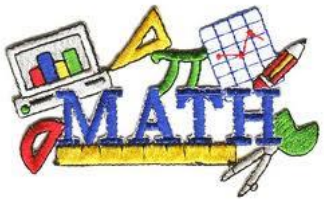
Performance Task for Mathletes United

Your school has announced the establishment of a new Mathletes Team that will compete against other elementary schools in Winston-Salem. Because you are so gifted in math, you have been selected to serve as the coach for your school's team, Mathletes United.

Your task is to create a playbook for your team. The playbook will include strategies for your team to use to ensure they win and become the Winston-Salem Elementary Mathlete champions! Be sure to include at lease five important strategies and mathematical examples for each one. Your playbook may be in the form of a PowerPoint, a Prezi, an Animoto, or series of posters, or an actual book.

We will develop a rubric together so that we are sure your playbook (and your Mathletes) are successful!

# My Playbook Planning Pages




# Lesson 2: Persistence Will Make Us Successful

## I can persist through challenges.

## I can add and subtract fractions with unlike denominators

**Here are the steps for adding and subtracting fractions with different denominators**

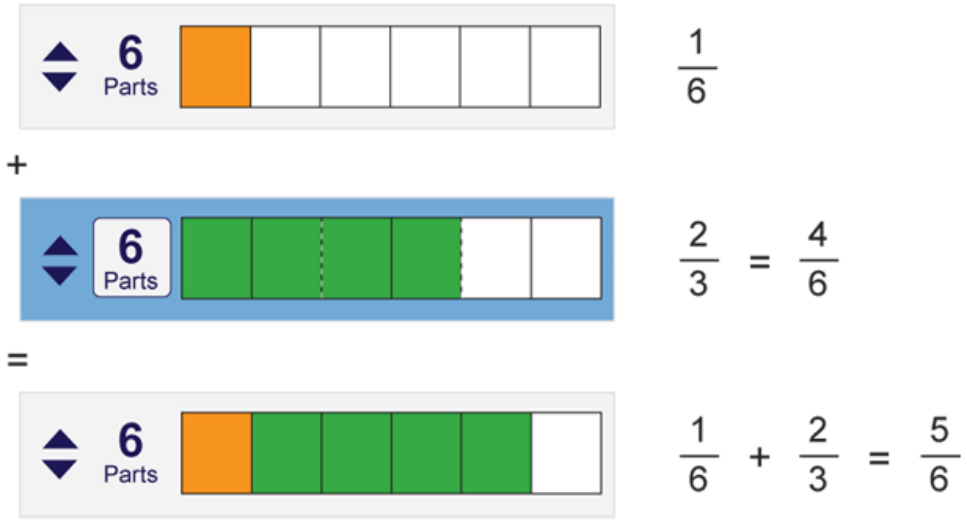
Re-write each equivalent fraction using this new denominator.

Now you can add or subtract the numerators, and keep the denominator of the equivalent fractions.

Re-write your answer as a simplified or reduced fraction, if needed.

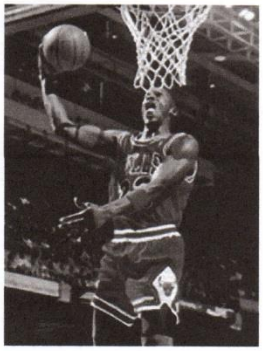
Use fraction boxes to show

$$\frac{1}{6} + \frac{2}{3}$$



# Air Jordan

**By Jane Runyon**



[1] In 1991, he was the *Sports Illustrated* Sportsman of the Year. He has been on the cover of the magazine a record 49 times. In 1999, he was named by ESPN as the greatest athlete of the 20th century. The Associated Press listed him in second place behind Babe Ruth for the same title. He had many nicknames. He was called M.J. He was called Air Jordan. He was called His Airness. What kind of man could deserve such titles? To most people, all you have to do is say his name, and they know the greatness that surrounds him. His name is Michael Jordan.

[2] Michael Jeffrey Jordan was born to parents James and Delores Jordan in Brooklyn, New York, on February 17, 1963. Two brothers and a sister were waiting for him when he was brought home. Another sister would be born later. When Michael was very young, his family moved to Wilmington, North Carolina. Michael was an active athlete. He played baseball, basketball, and football while in high school.

[3] Have you ever wanted to play a sport only to be told you were too slow or too short or too small? Michael was told just that. When he was in 10th grade, he was cut from the varsity basketball team. The coaches felt that at 5 feet 11 inches, he was not developed enough to play varsity basketball. That didn't stop Michael. He worked on his physical strength and his basketball skills. That summer he grew four inches. He tried out for the team again, and this time he made it. During his last two years in high school, he averaged 29.2 points per game, 11.6 rebounds per game, and 10.1 assists. That is called a triple double because his average was in double digits in three different areas of the game.

[4] Michael accepted a scholarship to the University of North Carolina. There he played for Dean Smith, at one time the coach with the most wins in his coaching career. Michael led his team to the national championship in 1982.

[5] Michael left North Carolina in 1984 to pursue a career in professional basketball. Don't think he forgot about his college education. He continued his academic work when he could. He was able to complete a bachelor's degree in geography in 1986.

[6] Michael Jordan was not the first pick in the NBA draft that year. He wasn't the second pick, either. He was chosen third in the draft by the Chicago Bulls. Hakeem Olajuwon and Sam Bowie were chosen ahead of him. It didn't take Michael long to make himself known to basketball fans. They loved to see him make a dunk that had started at the foul line. They loved to see his soft jump shot that seemed to defy gravity and soar into the air. He was selected for the All-Star team his rookie year. His team finished with a losing season, but Michael was voted Rookie of the Year.

7 A broken foot kept Michael out of 64 games the following season. He recovered just in time to join his team for the playoffs. He scored 63 points against a championship Boston Celtics team led by the incredible Larry Bird. His team still lost the series. The following season, he returned in top shape. In that season, he became the second player to score 3,000 points in a single season. Wilt Chamberlain had been the only other player to reach that goal.

8 During his first years with the Bulls, the team kept improving, but it couldn't get very far in the playoffs. It wasn't until the 1990-91 season that everything started to come together. With the help of teammates Scottie Pippen and Horace Grant and the coaching of Phil Jackson, the Bulls were finally able to take the championship. They beat the Los Angeles Lakers led by Magic Johnson for the title. They followed up this title with one the following season and then again the next. They had achieved a "three-peat." Not only did they repeat, they did it three times.

9 In October of 1993, Michael Jordan had had enough. He was tired. He told the media that he no longer had the desire needed to play the game well. You also have to factor in that Jordan's father had been murdered just a few months earlier in July. What surprised people most, however, was that Michael Jordan signed a contract to play professional baseball the following March. He played for the Birmingham Barons during the 1994 season. He also played for the Scottsdale Scorpions in the Arizona Fall League. His baseball career was average -- nothing spectacular.

10 The rest must have done him good, for in March of 1995, he announced to the media, "I'm back." The 1995-96 season was the beginning of another three-peat for the Chicago Bulls. Dennis Rodman, an exceptional rebounder, was added to the team. After the 1999 season, he announced his second retirement from the game. Did that keep Michael Jordan away from basketball? No way.

11 Michael Jordan became part owner and President of Basketball Operations for the Washington Wizards. Things did not go so well for the team. Jordan was criticized for some of his decisions. He had to do something to bring his new team up to NBA standards. He felt he had no other choice than to come out of retirement and play for the Wizards himself. Injuries and age seemed to slow his game down a bit. The 2002-2003 season would be the final season for Michael Jordan. He called it quits for the final time having scored 32,292 points in his career. He thought he would go back to the Wizards and work in the office. The Wizards had other ideas and fired him.

12 Michael Jordan has kept his hand in the game by purchasing a part-ownership in the Charlotte Bobcats. He doesn't devote his whole life to basketball, however. He enjoys golf, motorcycling, and watching his sons and daughter as they mature into adults. As Magic Johnson once said, "There's Michael Jordan, and then there is the rest of us." That's very true. There has only been, and will only be, one Michael Jordan. He was inducted

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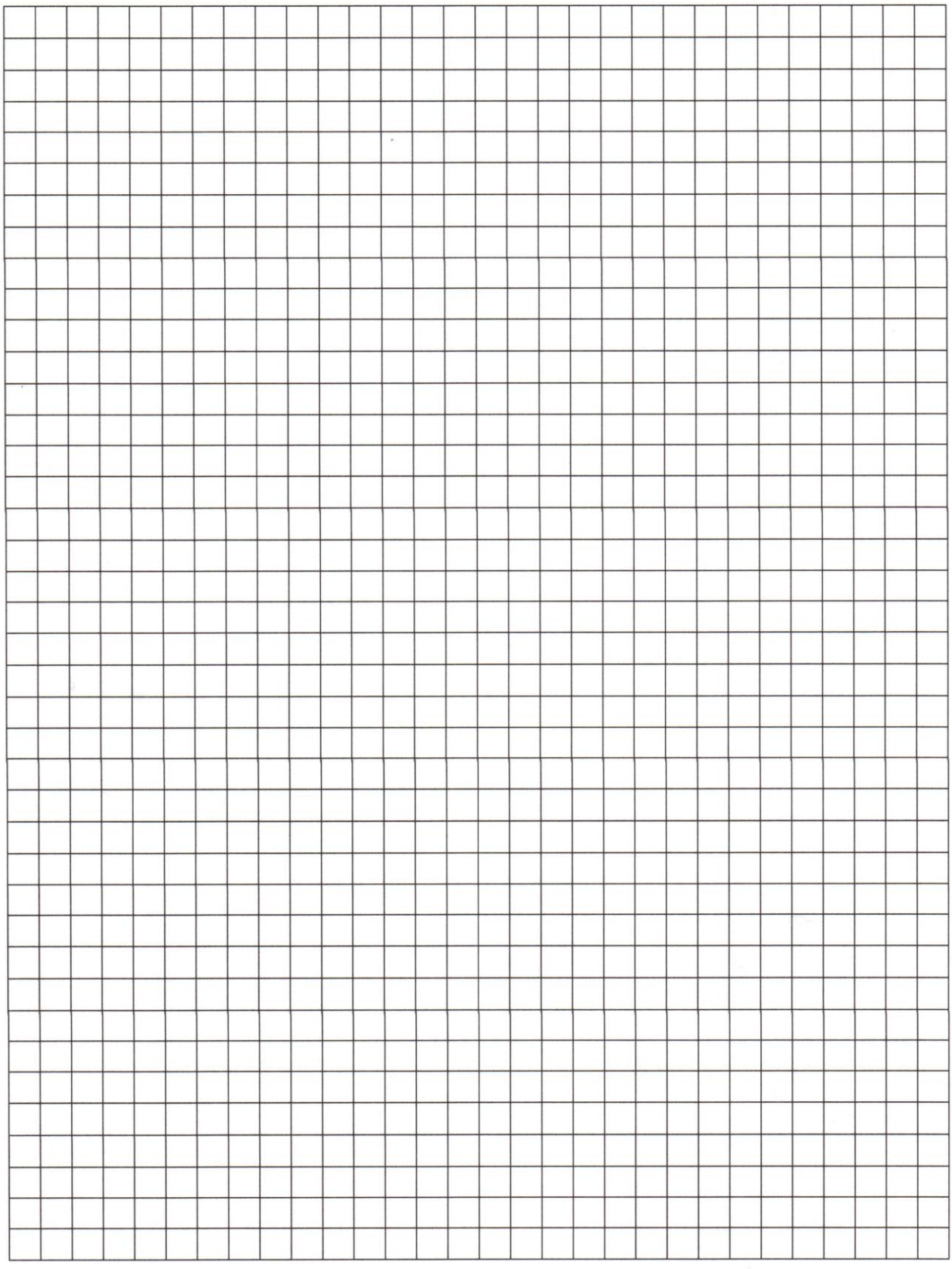


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MATHLETES
CHALLENGE

# My Mathletes United Points

**My Points for Today: _____**

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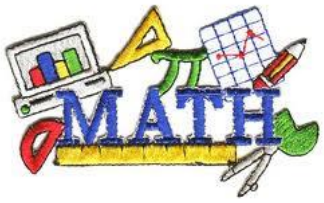
# My Playbook Planning Pages

# My Playbook Planning Pages




# Lesson 3: Persistence in problem solving in mathematics

## I can persist in problem solving.

### I can solve word problems involving addition and subtraction of fractions.

There are 4 steps that we can follow to always get fraction word problems correct.

Step 1: Find the unit. What is the question asking us to count by? Remember that in a question about a fraction, our units are all going to beparts of the whole.

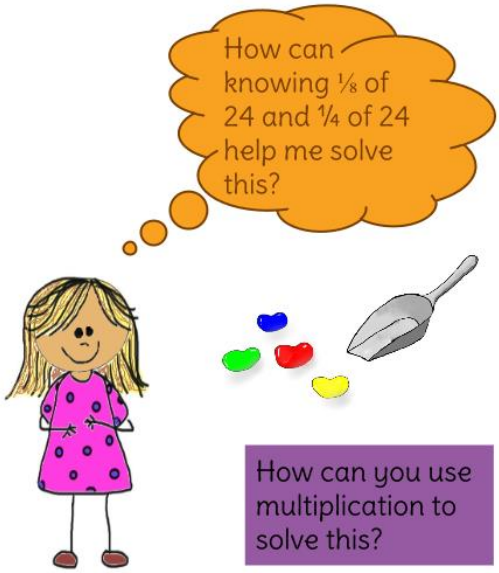
Step 2: Find the total number of this unit? The total number of unit should make up the whole and give us our denominator.

Step 3: Find the part of the total that the question asks us to think about? This will give is our numerator

Step 4: Draw a picture to match and find the fraction. (Learnzillion)

**Launch**

Julie scooped some jellybeans into a bag. One-eighth of Julie's jellybeans are red and one-fourth of them are green. She also scooped some yellow and blue jellybeans, for a total of 24 jellybeans. What number of each color jellybean could Julie possibly have?



# Aesop's Fables

## 21. THE CROW AND THE PITCHER

### By Tracey Hammett

This is the story of a pitcher and a crow, and a pitcher is a jug, in case you didn't know.

Old Mr Crow was a big black bird with a big black beak and he lived at the top of a tree.

He was a clever old creature. 'There's no problem you can't fix if you only take the time to think about it!' he would say.

And over the years, Old Mr Crow had managed to solve lots of problems...just through taking the time to settle his feathers and think.

When he wanted to feast on a juicy clam that was hiding inside its tightly shut shell, Mr Crow solved the problem by dropping the shell from a great height so it hit the ground and burst open. 'This clam sure tastes delicious!' he cawed.

'Go, go Mr Crow, you're the smartest bird we know!' chirped the Sparrow Sisters.

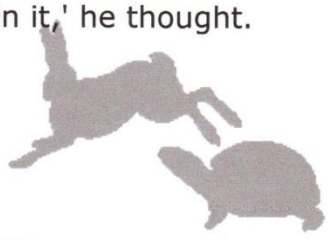
Walnuts were even trickier for a crow to crack open, but Mr Crow solved that problem too. 'I'll let the cars that drive by do the work for me,' he cawed. Then he plucked a walnut from the tree and dropped it in the road, just by the crossing. A car drove over it and cracked the walnut open. When the traffic lights turned red and the traffic stopped Mr Crow hopped into the road and pecked up the tasty nut.

'Go, go Mr Crow, you're so clever don't you know!' chirped the Sparrow Sisters.

Then one day Mr Crow came across a problem he thought he couldn't solve.

The weather had been hot and dry for weeks and all the water had dried up in the pond. Mr Crow was very thirsty. He flew for miles looking for water but wherever he went the streams and ponds were dry.

Then, as he was flying by a farm house, he noticed a pitcher in the garden. 'Maybe that pitcher will have water in it,' he thought.





So he flew down to look. There was a little bit of water at the bottom, not much, but enough for a crow. Mr Crow put his beak in eagerly...but the pitcher was tall and the water was shallow and his beak couldn't reach.

'I can see the water, but I can't drink it!' he said to himself. 'And without the water I will die of thirst. This is a problem!'

Mr Crow settled his feathers and thought for a while...and as he was thinking, his black beady eyes spotted a small stone...'Hmm,' he thought, 'I wonder if that stone can help me solve my problem?' Then he had an idea...he picked the stone up in his beak and he dropped it in the pitcher...this made the water in the pitcher rise, just a little.

'I need more stones,' thought Mr Crow. He flew around the yard searching for stones and, one by one, he dropped them into the pitcher. Each time the water rose a little but each time he dipped his beak in but it wouldn't reach the water.

Mr Crow worked all day...flying backwards and forwards picking up stones and dropping them in... then at last, as the sun was setting, he looked into the pitcher and saw that he had almost filled it with stones. Now the water had risen high enough for his beak to reach.

'Go, go Mr Crow, you're so clever don't you know!' chirped the Sparrow Sisters

'A problem's not a problem if you take the time to think,' said Old Mr Crow as he settled down to drink.



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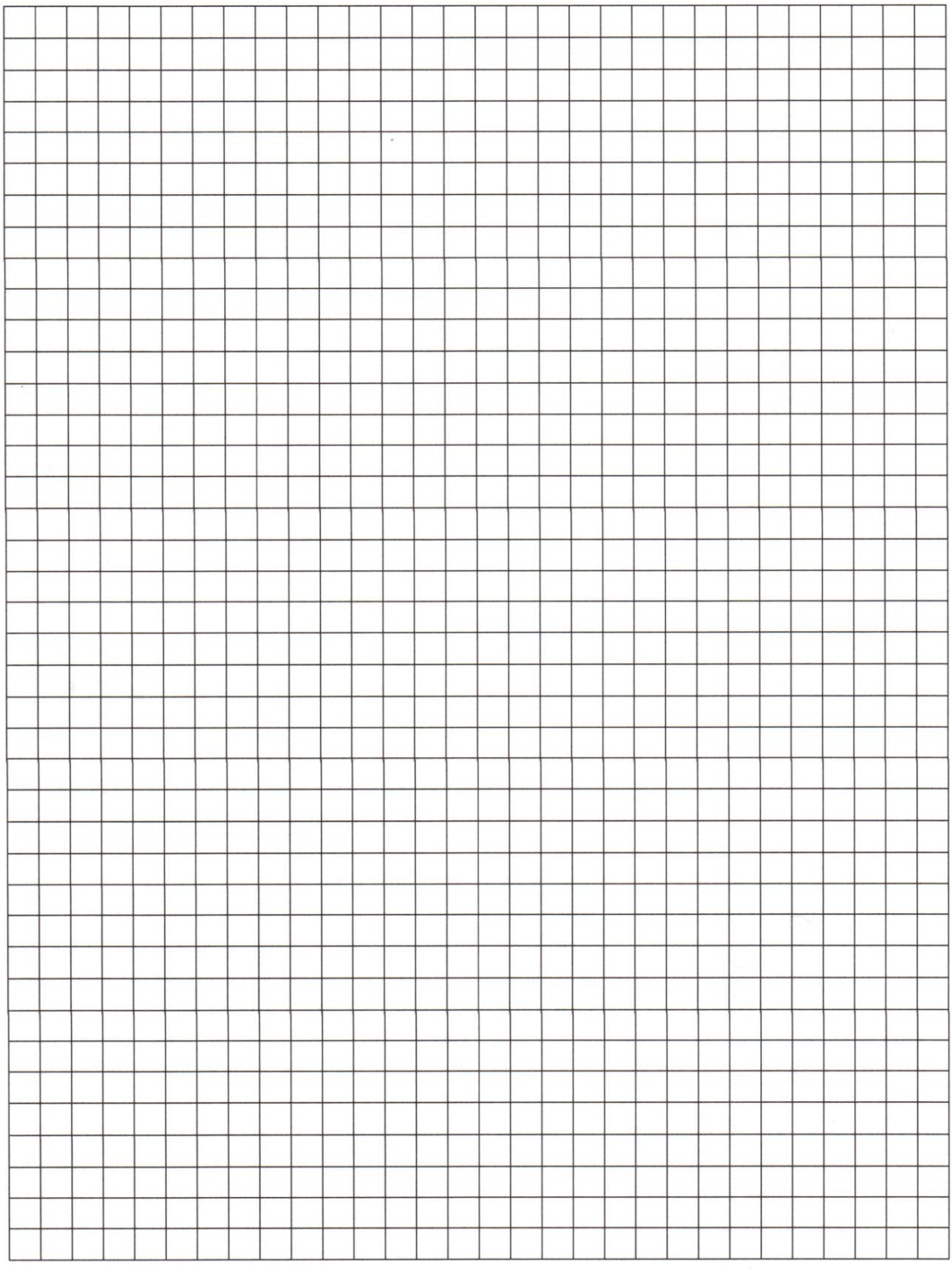


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MATHLETES
CHALLENGE

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# My Playbook Planning Pages

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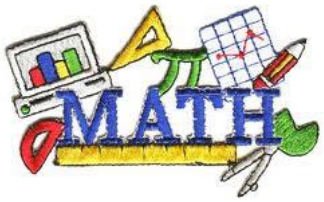
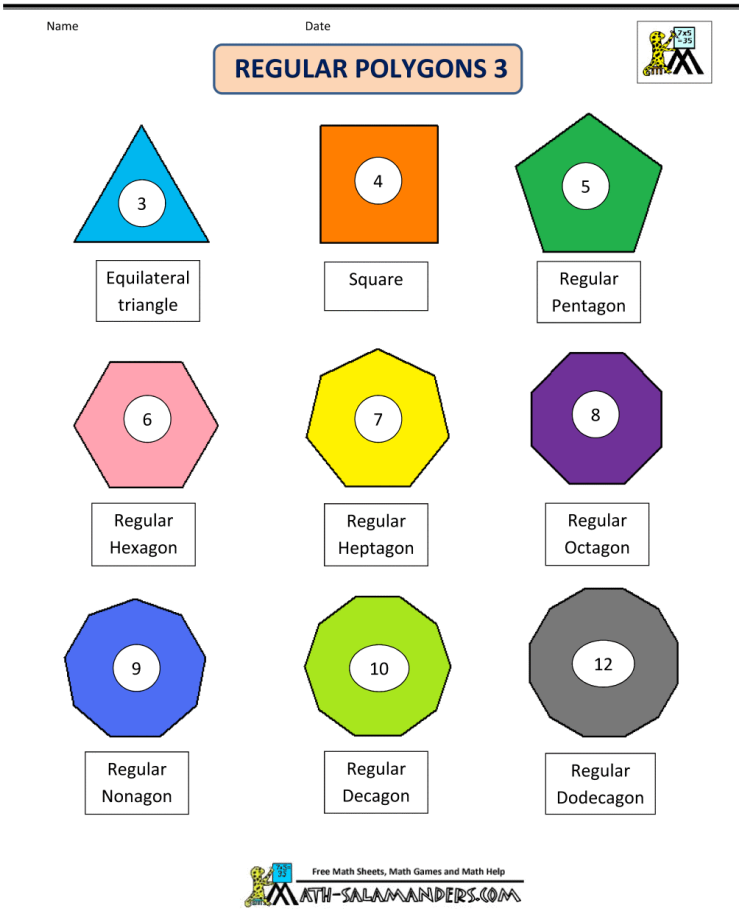
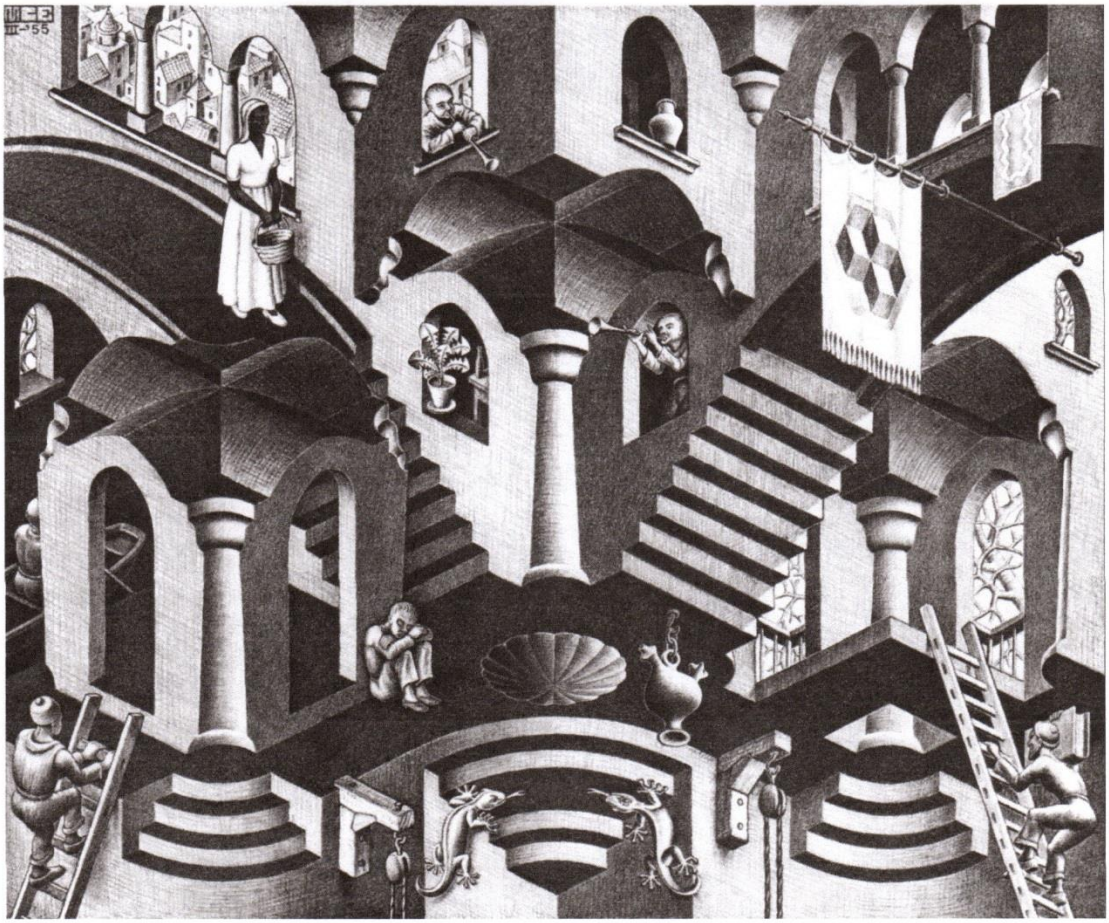



# Lesson 4: Mathematicians use specific tools and structure

I can apply my knowledge of polygons.

I can use mathematical tools and structure to create "Polygon Town."





Convex and Concave by M.C. Escher

# WHAT DO YOU SEE IN THE PICTURE?

## LIST AS MANY THINGS AS POSSIBLE. TRY TO FILL UP ALL THE LINES!

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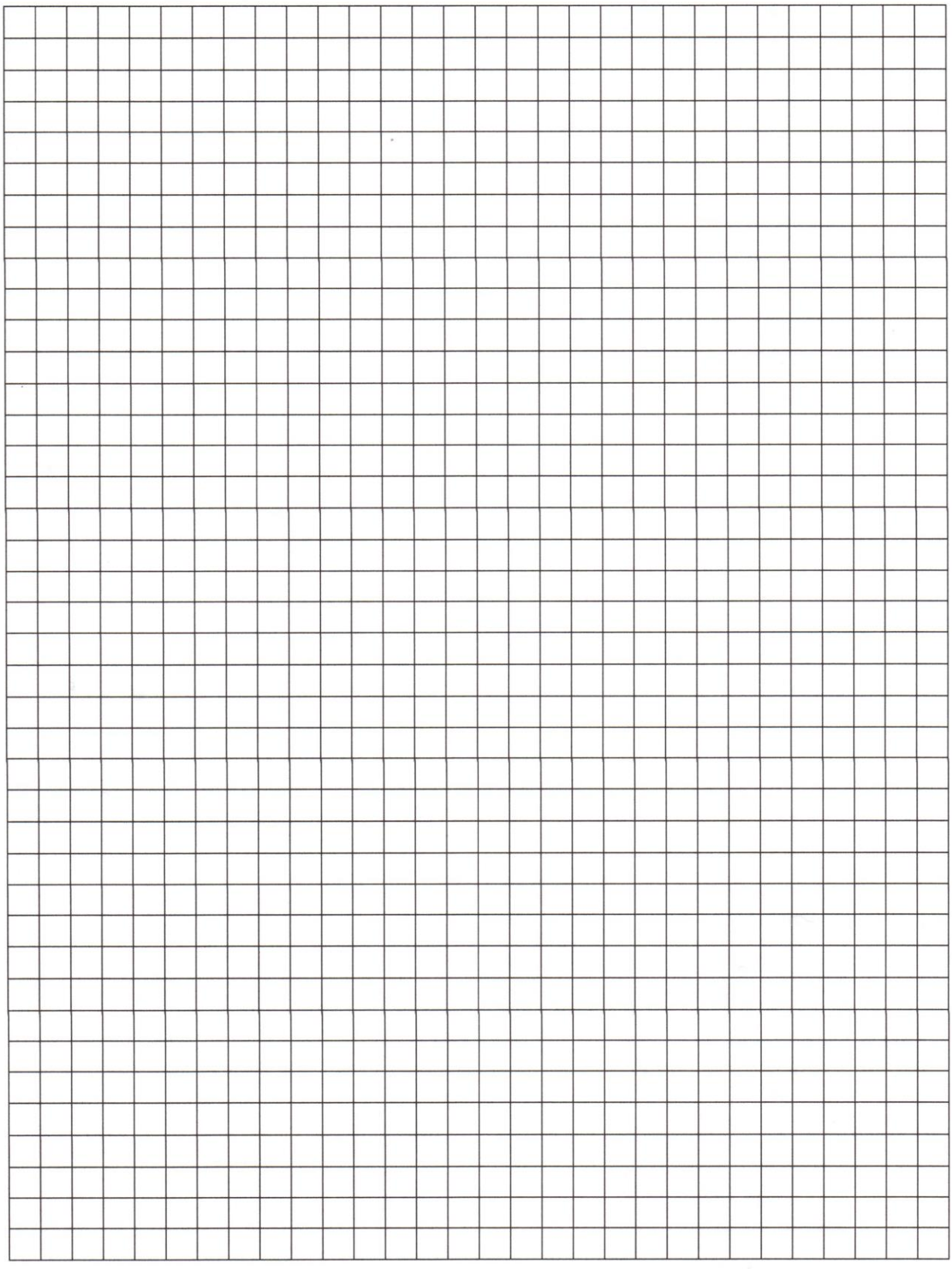


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MATHLETES
CHALLENGE

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# My Playbook Planning Pages

# My Playbook Planning Pages

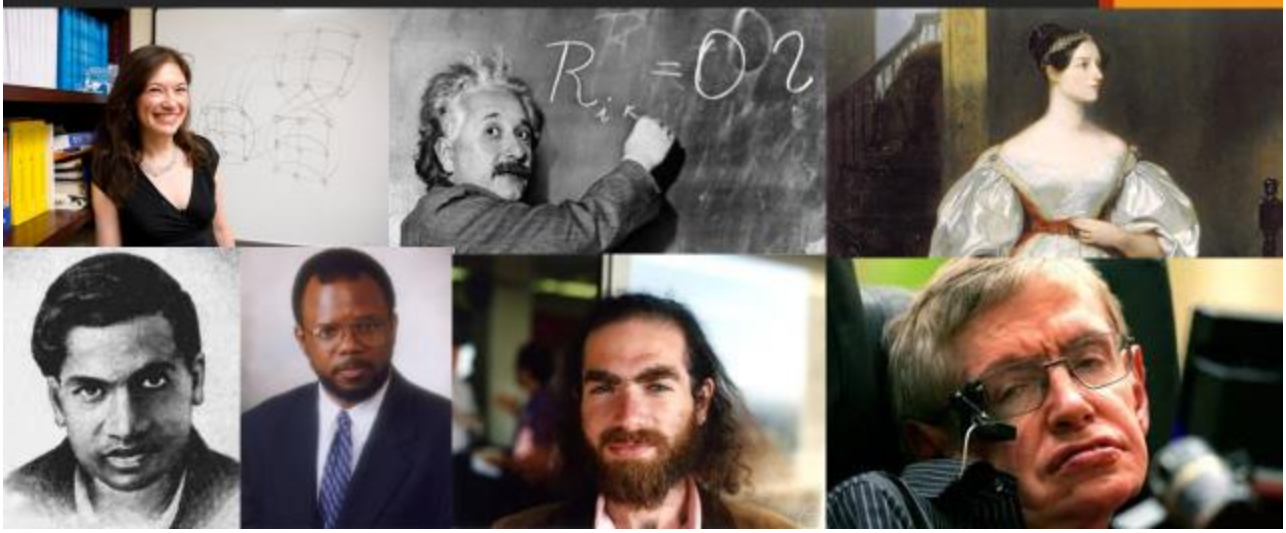
# What Do Mathematicians Do?

Mrs. Montes de Oca

## Ice Breaker

- Welcome!
- Today we will take a few minutes to get to know one another.
- Let's play "Toss-A-Name Game"
- Think of an adjective that describes you that begins with the same letter as your first name.
  - Example: Super Susan or Awesome Alex

## Mathematicians



## Answer these questions. . .

- What mathematicians do?
- What do mathematicians wear?
- What tools might mathematicians use?
- Where might mathematicians work?
- What characteristics should mathematicians possess?

## We will watch this video about a mathematician

- NASA Mathematian Katherine G. Johnson


- http://www.makers.com/katherine-g-johnson
- Observe
  - how the mathematician acts
  - what she does
  - what characteristics she possesses
- Do you notie any characteristics that show she uses precision?

## Reflect

- Now go back to your original list about mathematicians.
- What other things would you add to your list?

# Now You Will Observe a Mathematical Community!

- Now that you have an understanding of the role of mathematicians, you are going to observe mathematicians.
- You will observe six slides where you will observe a "mathematical community."
- You are to observe this community as a mathematician might observe it.
- Write down notes for each slide, observing details.

## Take Note

- How mathematicians use theories and techniques
- How they find mistakes/problems in math problems
- How mathematicians analyze and decipher encryption codes
- How mathematicians use data
- How mathematicians research
- How mathematicians act responsibly

## What Do Mathematicians Do?

# What Do Mathematicians Do?


# What Do Mathematicians Do?

## Can You Crack The Code?

**Secret Message #1** (Key: y = 5x – 3)

| 62 | 2 | 97 | 37 | 42 | 92 | 97 | 87 | 22 | 52 | 22 | 122 | 97 | 72 | 97 | 37 | 22 | 102 | 67 | 42 | 112 | 22 | 87 | 92 | 22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | |

**Secret Message #2** (Key: y = 2X + 15)

| 58 | 47 | 45 | 48 | 29 | 25 | 19 | 45 | 19 | 88 | 58 | 55 | 81 | 25 | 41 | 17 | 48 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | |

**Now, Can you make one?**

**ROW 1:** Write out your unencrypted message:

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ROW 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ROW 2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ROW 3 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ROW 4 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Friend decode | | | | | | | | | | | | | | | | | | | | | | | | | |

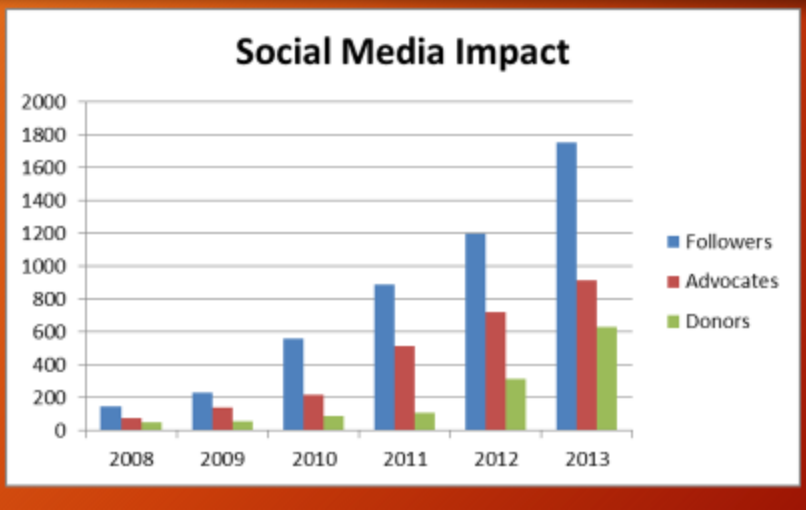
**ROW 2:** Assign each letter its real alphabet # (example: A is "1", Z is "26")

Now, choose **(and circle)** an encryption equation to use: y = 5x - 7 y = 3x + 12 y = 4x - 11 y = 6x - 3

**ROW 3:** Put each alphabet # into your encryption equation to find y (This is your encryption!)

Can your friend decode your Secret Message?

## What Do Mathematicians Do?




## What Do Mathematicians Do?

## What Do Mathematicians Do?

## Let's share!

- Now, you will discuss your answers in groups.
- Then we will meet back together to answer the previous questions.

## Now It's Your Turn!

- You will work with a partner to create a poster with a graphic organizer a mathematician
- Be sure to use the ideas we shared on the board in order to explain.
- You will have 10 minutes to complete your poster.
- We will put the posters up around the room.


## Gallery Walk

- Now you will have the opportunity to walk through and view each group's work.
- Use post-it notes to leave POSITIVE comments about the other groups' work

## What is a Mathlete?

- A Mathlete is someone who takes part in a mathematical competition, usually in middle school or high school.
- Just as there are coaches for athletics, there are also coaches for Mathlete Clubs.
- Now you will go around the room to make some observations about the Mathletes' most recent work with decimals.
- Take notes about your findings. We will go over answers at the end.


## Performance Task

- Your school has announced the establishment of a new Mathletes Team that will complete against other elementary schools in Winston-Salem. Because you are so gifted in Math, you have been selected to serve as the coach for your team, Mathletes United. Your task is to create a playbook for your team. The playbook will include strategies for our team to use to ensure they win and become the Winston-Salem Mathlete Champions! Be sure to include at least five important strategies and mathematical examples.

## What should each playbook include?

- Let's talk about this together and make a list on the board.
- What would be important items to include in your playbook?
- How many pages or slides (or parts) should be included?
- Other ideas?

## What questions do you have?

## Time to Work

- Use your "Mathletes" United book to plan your playbook's first one or two entries.
- You may work alone or with a partner, but each of you will need a product.


## Wrapping It Up

- On the index card, write your ticket out the door
- Thinking about the Mathletes' work that you viewed,

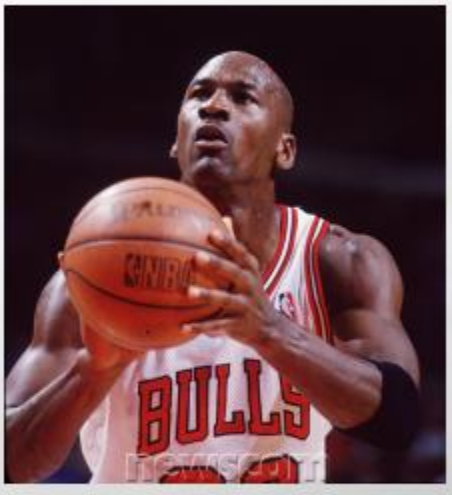
**In what ways does structure elicit precision?**

# PERSISTENCE THROUGH CHALLENGES

MRS. MONTES DE OCA

## WATCH AND NOTICE

- HTTPS://VIMEO.COM/42286578



# WHAT DID YOU NOTICE?


- NOW WE WILL WATCH A NIKE COMMERCIAL TITLED "FAILURE"
- HTTPS://WWW.YOUTUBE.COM/WATCH?V=45MMI0J5SZC
- WE WILL WATCH 2 TIMES
  - AS YOU WATCH, WRITE DOWN THE NUMBERS MICHAEL JORDAN MENTIONS
  - 2ND TIME: WRITE DOWN SPECIFICALLY WHAT THE NUMBERS REPRESENT

# WHAT IS PERSISTENCE?

- LET'S DEFINE WHAT WE MEAN BY PERSISTENCE
- TODAY WE WILL READ A PASSAGE TITLED "MICHAEL JORDAN"
- AS YOU READ, NOTE SPECIFIC THINGS YOU NOTICE ABOUT MICHAEL JORDAN PERSISTENCE
- WHEN YOU FINISH READING, TRY TO LIST 20 OR MORE THINGS YOU NOTICED ABOUT MICHAEL JORDAN'S PERSISTENCE (HOW, WHEN, WHY, ETC)
- WHEN EVERYONE HAS FINISHED, WE WILL LIST THESE TOGETHER


COLLABORATION!
• EACH GROUP WILL BE GIVEN 20 CARDS
• WRITE DOWN AN EXAMPLE OF MICHAEL JORDAN'S PERSISTENCE ON A SEPARATE CARD
• WORK TOGETHER WITH YOUR TEAM TO DECIDE WHICH ITEMS ARE ALIKE IN SOME ASPECT OF PERSISTENCE. YOU SHOULD HAVE AT LEAST 4 DIFFERENT GROUPINGS.
• DETERMINE THE MOST PRECISE LABEL FOR EACH GROUP. WRITE ON POST-IT NOTE AND PLACE AT TOP OF GROUPS.

# SHARE

- EACH GROUP WILL HAVE ONE REPRESENTATIVE TO SHARE THE LABELS THEY CREATED WITH THE CLASS.
- WHAT THOUGHT PROCESSES WERE INVOLVED IN MAKING THESE GROUPINGS?

# CHALLENGE!

- NOW YOU ARE FACED WITH A CHALLENGE! REGROUP THESE CARDS INTO DIFFERENT CATEGORIES.
- MAKE AT LEAST 4 NEW LISTS.
- MAKE NEW LABELS.
- CHOOSE A DIFFERENT REPRESENTATIVE TO SHARE YOU FINDINGS WITH THE CLASS.

# WRAP IT UP!

- HTTPS://WWW.YOUTUBE.COM/WATCH?V=9ZSVU76AX31
- ON AN INDEX CARD, RESPOND TO THIS PROMPT:
  - HOW DOES PERSISTENCE IMPACT SUCCESS?
  - WHAT CHALLENGES DID MICHAEL JORDAN GO THROUGH TO IMPACT HIS SUCCESS?
  - INCLUDE 4 AREAS OF CHALLENGES AND GROWTH

# GALLERY WALK

- TODAY WE WILL SOLVE FRACTION WORD PROBLEMS FOR POINTS.
- WE WILL BE WORKING ON ADDING AND SUBTRACTING FRACTIONS WITH UNLIKE DENOMINATORS.
- LET'S TRY A PRACTICE ONE TOGETHER FIRST.
- ENRIQUE HAS A COIN COLLECTION. IN HIS COLLECTION, 3/5 OF THE COINS WERE GIVEN TO HIM BY HIS AUNT ROSA, AND ¼ OF THE COINS WERE GIVEN TO HIM BY HIS PARENTS. ENRIQUE PURCHASED THE REST OF THE COINS BY HIMSELF. WHAT FRACTION OF HIS COIN COLLECTION DID ENRIQUE PURCHASE?

# Mathletes United
# Lesson 3

Mrs. Montes de Oca

## Our Essential Question

- How does persistence impact success?

## List as many examples of persistence that you can think of.


## Let's watch a video about persistence.

- https://www.youtube.com/watch?v=qFn-C7aXNN0

# Questions about the Video

# Let's Read the Crow and the Pitcher


- Circle words you do not
- know
- Underline or highlight sentences or phrases that seem important
- Summarize ideas in the margins, and
- Write open-ended questions in the margins that pique your curiosity.

# Let's Talk

- What was our story about? Setting? Main character?
- What is a fable? What is the purpose of a fable?
- What is the problem? Solution?
- How was the crow challenged? What were his strategies?
- What was the resolution?
- What is the theme of this story?

# Let's collaborate!

- Work with a partner to write 4 questions about The Crow and the Pitcher.
- Ask about **viewpoint** and/or **perspective**.
- Examine the title and/or text to **make connections with current issues**.
- Think about **how the character(s) in the text would relate or react** if they lived in the present.
- Ask questions in order to further **explore your interpretation** of the reading.
- Ask questions about the **importance of what you are reading**; So what….? What does it matter that…..? What does it mean that…? In today's world, I wonder if….?

# Expectations

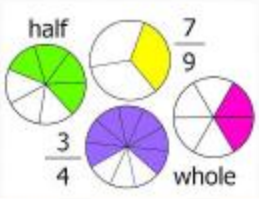

- Be courteous. Avoid using put-downs or sarcasm.
- Allow each speaker enough time to begin and finish his/her thoughts.
- Involve others in the discussion and ask others to elaborate on their responses.
- Build on what others say: ask questions, re-state and add, clarify, synthesize a variety of different views in your own summary.
- Use your best active listening skills.
- Participate openly, knowing you may pass whenever you need to pass.
- Support your opinions with evidence from the text.
- Keep an open mind and push deeply for interpretations.

# Suggested Responses During Collaboration

- I agree with….but would like to add
- I disagree with… and would like to add
- I am confused by…
- My feeling about ….ties back to (such and such a line)
- The author has clearly stated in line…
- It may not say this in the text, but we can conclude….
- I need clarification with…
- I wonder if …. means…

# Fraction Word Problems

- We will be working in small groups to complete Fraction Word Problems.
- Each group will start with #1
- As you finish a card, you will go to Mrs. Miller to check your answer and receive your next card.



# Mathletes United
# Lesson 4

Mrs. Montes de Oca

## Answer this question. . .

- How does persistence affect outcome?
- What is your evidence?

# Think about this question. . .

- In what ways does structure elicit precision?
- What is structure?
- What is precision?
- What does "elicit" mean?
- How is this true in mathematics?

# Challenge

- You are an architect and the city council wants you to design a new town that is named Polygon Town. They have asked you to create a blueprint of the town using various polygon shapes to represent buildings. You need to present the blueprint, including a scale, at the city council meeting next week.

# Wrap It Up

Is precision important in Math?

On an index card, answer: In what ways does structure elicit precision?

Reflect: What are three things you will take away from this week?

Please see me this afternoon to receive your bag with all of your prizes, playbook, and notebook.

Math Problems

Day 1

From Mentoring Math

*Each of these word problems had examples of student work where the problem was worked out incorrectly. Students were asked to find the problems and to answer them correctly.*

1. Arnold wants to make sure he saves enough money to purchase a new video game. His mom reminds him to save enough to include sales tax. Arnold uses his calculator and finds that he must save a total of $56.987. He rounded to the nearest cent and got $56.98. What did he do wrong?
2. Sonya is working on her homework. She needs to write a number that has the same value as $6.72 \times 10^4$. Sonya believes the number should have three zeroes to the left of the decimal. What did she do wrong?
3. While converting units of measure, Apollo multiplied 3.45 by 10,000. He put four zeroes to the left of the decimal point in the answer. What did he do wrong?
4. Missy bought 4.57 pounds of apples. She used 2.8 apples to make a pie. She used the remaining apples to make a fruit salad. Missy said the remaining apples were 4.29 pounds. What did she do wrong?
5. Hector plans to cut a 10.8 decimeter rope to repair the rope ladder. He needs to know how man 2.4 decimeter sections of rope he can cut. He says he can get 5 pieces of 2.4 decimeter rope. What did he do wrong?
6. Annabeth has 7.2 cups of cookie batter. If each cookie uses 0.45 cup of batter, how many cookies can she make? Annabeth says 15 cookies. What did she do wrong?
7. Mr. Pete pumped 18.6 gallons of gasoline into his car and then bought 2.3 gallons of gasoline for his lawn mower. He used the number line to solve his equation. He says he purchased 20.8 gallons altogether. What did Mr. Pete do wrong?
8. Ms. Stacy had 3.5 meters of fabric to make a banner. She only used 2.578 meters to make the banner. She says she has 7.797 meters left. What did she do wrong?

Day 2

From *50 Leveled Math Word Problems*

1. Cole constructed a wooden box that had a base area of 72 square centimeters. How many layers of cubes will he needs if he plans on putting 432 centimeter cubes in his wooden box? Justify your answers using numbers and a diagram.
2. Manny built a rectangular prism with a length of 10 in., a width of 3 in., and a volume of 210 $in.^3$

   How high was the prism Manny built?

3. Semi-trailer trucks are rectangular prisms. The average height for the tractors is 9 feet. Most trailers are about 8 feet wide and 20 feet long. What is the volume that the tractor trailer can haul? Justify your answer with numbers and words.
4. A shipping company wants to ship its boxes in a semi trailer truck. The boxes have dimensions of 2 feet by 5 feet by 3 feet. How many boxes will fit in a semi trailer truck that measures 9 feet by 8 feet by 20 feet? Justify your answer with numbers and words.
5. The shipping company needs to stack boxes in the trailer so that the bottom of each box measures 4 feet by 6 feet and ha a height of 3 feet. If a trailer is 10 feet high by 8 feet wide by 20 feet long, how much space is leftover?

Day 3

From *50 Leveled Math Word Problems*

1. Greyson is mixing red and blue paint to make purple paint. He puts $\frac{1}{4}$ cup of red paint in with 5/8 cup of blue paint. How much purple paint did he make?
2. David spends 2/3 hour playing video games, $\frac{1}{2}$ hour doing his chores, and 1 $\frac{1}{4}$ hours watching his brother. The rest of the time he can decide what to do. How much of David's time is already scheduled?
3. Samantha says that 2/3 cup of cocoa plus $\frac{1}{2}$ cup of cocoa equals 3/5 cup of cocoa. Andrew says that Samantha is incorrect, and that the sum is equal to 1 1/6 cups of cocoa. Who is correct? Justify your answer with pictures, numbers, or symbols.
4. Liliy is taking a quiz on fractions. She has to find the answers to the following four problems. Find the solutions. Justify your solutions using numbers and a picture or diagram.
5. Dante and some teammates celebrated a great game by eating large pizzas. Dante ate 2/3 of a pizza, Leonardo ate 7/8 of a pizza, and Dakota ate 5/6 of a pizza. If there were 6 pizzas purchased, how much pizza was left? Justify your solution using number and a picture or diagram.

Day 4

*You are an architect and the city council wants you to design a new town that is names Polygon Town. They have asked you to create a blueprint of the town using various polygon shapes to represent buildings. You need to present the blueprint, including a scale, at the city council meeting next week.*

## VI. Unit Resources

The following resources were helpful in creating this unit plan:

Math Problems were taken from and based upon problems in the following two books:

Lujan, Michael L. (Pub.). (2014). *Motivation Math.* Tyler, TX: Mentoring Minds.

Collins, Anne M. (2012). *50 Leveled Math Problems Level 5*. Huntington Beach, CA: Shell Education.

The following websites were used in the lessons:

Katherine Johnson, NASA video (www.makers.com/katherine-g-johnson)

**You Tube cartoon video about Persistence (https://www.youtube.com/watch?v=qFn-C7aXNN0)**

**BBC Aesop's Fable *The Crow and the Pitcher* (*http://www.bbc.co.uk/schoolradio/subjects/english/aesops_fables/17-24/crow_and_pitcher)***

*Video will be playing about Michael Jordan's basketball career.* **Here is the link to the video: https://vimeo.com/42286578.**

Students will then watch "Michael Jordan "Failure" Nike Commercial. (http://behindthehustle.com/2011/09/michael-jordan-succeeded-because-he-failed/)

**Article "Michael Jordan Succeeded Because He Failed." http://behindthehustle.com/2011/09/michael-jordan-succeeded-because-he-failed/ .**

Article about Michael Jordan taken from edhelper.com

**Maybe It's My Fault commercial** *about Michael Jordan (https://www.youtube.com/watch?v=9zSVu76AX3I ).*

Concave and Convex by M.C. Esher , (http://www.wikiart.org/en/m-c-escher/convex-and-concave) on the board.