**Board of Education**
**Newtown, Connecticut**

Minutes of the Board of Education meeting on January 6, 2015 in the council chambers, 3 Primrose Street.

| | |
|---|---|
| K. Alexander, Chair | J. Erardi |
| L. Roche, Vice Chair | L. Gejda |
| K. Hamilton, Secretary | 16 Staff |
| D. Leidlein | 12 Public |
| J. Vouros | 2 Press |
| D. Freedman | |
| M. Ku | |

Mr. Alexander called the meeting to order at 7:32 p.m.
Item 1 – Pledge of Allegiance

Item 2 – Celebration of Excellence
Dr. Erardi spoke about the two-year contribution by John Jay College and Tony Gentile to the security of our schools. At no compensation he offered his assistance to our security committee and training for our guards. As his contribution will be coming to a close we wanted to acknowledge all he has done for our community.
Mark Pompano said that on behalf of the security and safety committee and himself he thanked Mr. Gentile for his wisdom and guidance in putting together an outstanding security and safety plan for the children of this town.
Tom Kuroski stated how wonderful it was having someone of this caliber with us since day one. He also introduced others who helped us become more aware of how to run our schools in the safest manner and thanked him on behalf of the staff and students.

Mr. Alexander thanked him on behalf of the Board of Education for his special help in the important area of security. He presented a plaque from the district.

Mr. Gentile expressed his thanks and his only regret was meeting under these circumstances.

Item 4 – Public Participation
Julia Conlon, Old Castle Drive, thanked the Board for their work. She was disappointed that last year's budget was additionally reduced. Many education supporters cannot attend meetings but rely on Board members to do right by our children.

Item 3 – Consent Agenda
MOTION: Mrs. Roche moved that the Board of Education approve the consent agenda which includes the minutes of December 16, 2014, the high school field trip to Boston, the donations to Sandy Hook School and the correspondence report. Mr. Vouros seconded. Motion passes unanimously.

Item 5 – Reports
Chair Report: Mr. Alexander asked that all Board members receive subcommittee agendas.

Superintendent's Report: Dr. Erardi referred to his mid-year goals for the Board to review. He shared pictures of the school based health center at the middle school and mentioned the value of the grant-funded Unified Theater program which will be offered at the high school.
A community forum will be held for seniors at the Senior Center on January 28 at 2:30 p.m.
Megan Milano said high school mid-term exams are next week. There is a fund raiser with the Harlem Wizards on January 15.
Rilind Abazi shared that the wrestling team is in first place standing with their next match this Wednesday at 7 p.m. There is also an art competition open to students.

Committee Reports:
Ms. Hamilton attended the Municipal Buildings Strategic Plan Advisory Committee meeting. This committee is looking at the conditions of the town buildings. Geralyn Hoerauf is leading the group. The Board of Education won't get involved until there are decisions on the town buildings.
Mrs. Leidlein asked if a consultant was being hired to look at the town and Board of Education buildings.
Ms. Hamilton said they are just looking at the town buildings with the first being the Hook and Ladder building, multi-purpose building and Town Hall South.

Mr. Alexander said the communication committee met and worked on the newsletter.
Ms. Hamilton stated the finance committee met with Dr. Erardi and Mr. Bienkowski regarding the bus routes and what four tiers would cost. They would like All-Star to attend for further discussion to optimize costs. The policy committee will meet next Thursday.

Item 6 – Old Business
MOTION: Mrs. Ku moved to approve the grade 7 math, grade 7 accelerated math and grade 8 math curricula. Mrs. Roche seconded.

Mrs. Leidlein had questions regarding the math program at the last meeting and asked when Dr. Gejda would provide a presentation for the Board.
Dr. Gejda said before a presentation would be made to the full Board there would be an ongoing conversation with the Curriculum and Instruction committee who she would work with to put the presentation together.
Mrs. Leidlein requested to table this conversation until we see that presentation.

Mrs. Ku said there are legitimate issues and we need to review the curriculum. The Curriculum and Instruction committee feels these curricula are appropriate for Newtown. The questions are if students are qualified to go into the program.

Ms. Hamilton said the other concern was more the vertical alignment, the paths students take and how they get there.
Mrs. Leidlein asked if these were the only math courses offered at the middle school and what the protocol was for students to go above these courses.

Dr. Gejda said we recently offered geometry and last year algebra II. These three curricula are for most of our students and we want them in place as they address alignment. We need to look at our whole K-12 program. The passing of these curricula would not have the other concerns go away.

Mrs. Leidlein wanted to have an explanation of the math courses and the percentage of students taking each course.
Mr. Vouros said the math program allows for students to move up if they can meet the academic rigor. The Curriculum and Instruction committee is monitoring this as to how it is administered and to who, which is another thing that will continue to be discussed. It's not just math we need to look at.
Ms. Hamilton asked what the specific curricula address.

Dr. Erardi said there is clear evidence we will have students taking all three courses. He suggested that February 10 we bring to the Board the math curriculum from 4th grade through the high school.

Ms. Leidlein respectfully asked to table this until we have the full picture.

MOTION: Mrs. Leidlein moved to table the vote on the grade 7 math, grade 7 accelerated math and grade 8 math curricula until the February 10 presentation. Mr. Freedman seconded.

Dr. Gejda said we have SBAC test this spring. Part of the curriculum process is identifying assessments. Teachers will continue to work following state guidelines. The middle school is piloting some materials. Until they have a curriculum to be approved by the Board that process might be held up.

Mr. Freedman asked what the timeline was for this curriculum implementation.
Dr. Gejda said this is a forward look to next year. Teachers would be able to move forward with curriculum they worked on.

Ms. Hamilton didn't think delaying a month would cause any significant problems.

Mrs. Leidlein appreciates what the middle school teachers have done. She wants to see the big picture for the math program in the district.

MOTION: Mrs. Leidlein moved to table the vote on the grade 7 math, grade 7 accelerated math and grade 8 math curricula until the February 10 presentation. Mr. Freedman seconded.
Vote: Mrs. Ku – no
Mr. Freedman – yes
Mr. Vouros – no
Mrs. Leidlein – yes
Ms. Hamiilton – yes
Mrs. Roche – no
Mr. Alexander – no
Motion failed.
Vote on main motion: 4 ayes, 3 nays (Ms. Hamilton, Mrs. Leidlein, Mr. Freedman)
Motion passes.

Mrs. Leidlein hoped that this will continue to be a discussion going forward on academic rigor in this district.

Item 7 – New Business

Item 8 – Superintendent's Overview of the Proposed 2015-2016 Budget
Dr. Erardi presented the proposed operating budget plan for 2015-2016. The budget amount is $72,399,186 which is a 1.48% increase.

Ms. Hamilton asked about the world language program for kindergarten students.
Dr. Erardi had conversations with principals who are all in favor of this program. This will provide 30-minute classroom sessions.
Ms. Hamilton referred to the Danbury magnet school where students learn Spanish and asked if we would consider it in 6th grade for students returning.
Dr. Erardi said there is a decreasing interest in that school and we have decreased the number for the next school year. We looked to start in kindergarten as an opportunity to continue through the grade levels.

Mrs. Roche asked if we have it in kindergarten would we offer it to those students in first grade the following year.
Dr. Erardi said after a mid-year report on the program would move it to first grade for those students.

Ms. Hamilton asked about the proposed academic officer position at the high school.

Dr. Rodrigue said the assistant principals and department chairs are involved in observations. The academic officer will have a teacher leadership role also working with students, helping coach teachers in the classrooms and assist struggling students. This has a lot to do with the NEASC requirements.
Dr. Erardi supports this position to assure no students are falling through any cracks at the high school. A critical piece to the leadership team is to perform best practices for the students.

Mr. Vouros said that last year the Board of Finance suggested technology be put on a five year plan and asked if that was in this budget.
Dr. Erardi said there was a discussion on the cycle. This budget shows us moving forward with hardware replacement which is being addressed by the technology committee.

Item 9 – Elementary Schools Budgets
Ms. Gasparine stated she was comfortable this year and their work with Dr. Erardi was a team effort.
Dr. Erardi said that Head O'Meadow would have an additional section for 4th grade.
Ms. Gasparine asked to consider moving the preschool class and its office so she could use those rooms next year.

Mr. Freedman asked for feedback on transportation.
Ms. Gasparine said it ran smoothly this year and she appreciated working with
Mr. Colangelo who is a great communicator. All principals agreed.

Ms. Hamilton asked if the schedules were the same in each elementary school, to which
Dr. Erardi said they were.
Ms. Hamilton asked for that information and a list of paraprofessionals and their hours in each elementary school.
Mr. Alexander liked the points of pride sections and the good things being done in the schools.

Item 10 – Reed Intermediate School
Mr. Freedman was concerned about the reduction in physical education.
Dr. Erardi said the reduction was the reflection of tightening the teacher schedules.

Mrs. Ku asked why there were more reading specialists than math specialists.
Mrs. Uberti said there was more language arts support than math so last year through reallocation she increased math support by .8 and writing to full time.

Ms. Hamilton asked Mr. Bienkowski to provide an accounting of the budget similar to the budget detail line items.

Item 11 – Public Participation
Michele Hankin, 16 Greenleaf Farm, said that regarding budget year comparisons it is important to make the public aware of why we need what we want. Having advanced math is critical in the middle school. She supports the arts and athletics but suggested looking at all the extra-curricular activities outside of athletics so there is equity in what the costs are for the students to participate.

Dr. Erardi said there is a budget increase for performing arts and regarding athletics he agrees there should be a balance.

MOTION: Mrs. Leidlein moved to adjourn. Mrs. Roche seconded. Motion passes unanimously.

Item 12 - Adjournment
The meeting adjourned at 10:28 p.m.

Respectfully submitted:

_____

Kathryn Hamilton
Secretary

# NEWTOWN MIDDLE SCHOOL
## FIELD TRIP APPLICATION FORM

Part II.

A. Please attach a copy of your completed "Proposed Field Trip Survey Form" to this form.

B. Complete this form and give it to an administrator for approval.

Date of Application: 11/20/14 Teacher Making Request: Paul Esposito

Name of Trip and Location: Boston, MA Date of Trip: 5/13/15

Depart from School: 6:00 (A.M.)/P.M. Return to School: 6:00 A.M.(P.M.)

Grade(s) or Class(es) going on trip: 7 Red Cluster Number of Students: 93

Purpose of Trip (connections to curriculum): Tour of historic Boston (Bunker Hill, Old State House, U.S.S. Constitution, Old North Church) - Revolutionary War - Tea Party Ships + museum, Old Quincy Market, Charles River Duckboat (attached itinerary)

connections to 7th Grade SS. Curriculum Colonies, Revolution; War, Independence

Teacher Chaperones & Cell Phone #'s / Parent Chaperones

| | | | |
|---|---|---|---|
| Paul Esposito | 203 470 3984 | | |
| Kathy Dye | 203 512 4485 | | |
| Cheryl LaFerriere | 203 228 0048 | | |
| Kerry McKeegan | 203 521 1766 | | |
| | | | |

Name & Phone # of Bus Company: _____ # of Buses _____

Tour company: Destinations Unlimited arranges buses

**Approval**

Principal _____ Date 12/2/14

Assistant Principal _____ Date 12/3/14

**Please note: Once your trip has been approved, Cheryl Arendt will enter your trip on the NMS Staff School Calendar and give you a copy of the approved form.**

**Please complete this form if you will be using All-Star buses for your field trip. Once the trip has been approved, Cheryl Arendt will fax it to All-Star.**

Destinations Unlimited Inc.

P.O. Box 548
Southington, CT 06489
(860) 621-9178
1-800-246-1546

Newtown Middle School
**Boston, MA**
Spring 2015 Proposal #4
**TENTATIVE ITINERARY**

| DATE: | TIME: | |
|---|---|---|
| | 5:45 AM | Motorcoach arrives for boarding |
| | 6:00 am | Depart Newtown Middle School |
| | 9:30 am | Boston Duck Tour |

*The fun begins as soon as you board your "DUCK", a W.W.II style amphibious landing vehicle. A ConDUCKtor®, will be narrating your tour. You'll cruise by all the places that make Boston the birthplace of freedom and a city of firsts, from the golden-domed State House to Bunker Hill and the TD Banknorth Garden, Boston Common and Copley Square to the Big Dig, Government Center to fashionable Newbury Street, Quincy Market to the Prudential Tower, and more. And just when you think you've seen it all, there's more. It's time for "Splashdown" as your DUCK splashes right into the Charles River for a breathtaking view of the Boston and Cambridge skylines.*

| | |
|---|---|
| 11:30 pm | Lunch on own at Quincy Market |
| 1:30 pm | The Tea Party Ship and Museum |

*The Boston Tea Party Ships & Museum Tour Experience features full-scale replicas, artifacts and interactive elements throughout. You and your group will have a personalized "colonial character" host that will guide you through this never-before-seen museum experience. You'll "meet" Sam Adams, you'll participate in the re-enactment of the destruction of the tea; you'll be invited to board a tall ship, you'll marvel at one of only two known surviving tea crates and you'll be inspired by the film Let It Begin Here in the Minuteman Theatre.*

| | |
|---|---|
| 3:00 pm | Depart for home |
| 6:00 PM | Approximate arrival back at Newtown Middle School |

# DONATIONS

1/6/2015

To BOE for Approval on January 6, 2015

**SHES**

| | | | |
|---|---|---|---|
| Pepsico Silicon Valley Community Foundation<br>Mountain View, CA | | $75.00 | Ck# 170011157 |
| Anonymous donor | | $ 100.00 | Ck# 1194786 from 1st Bank |
| | Total | $ 175.00 | $ 175.00 |

**SHES Library**

**Newtown Public Schools** $ -

**Middle Gate School**

| | | |
|---|---|---|
| Total | $ - | $ - |

**NPS Teachers** $ -

$ 175.00

$ 175.00

BOE Communications Report, 1/6/2015
Kathy Hamilton, Board of Education Secretary

| From | Date | Description |
|---|---|---|
| John Bestor | 12/21/2014 | Common Core |
| Kinga Walsh | 12/31/2014 | Link in BOE Newsletter |
| Lynn Edwards | 1/1/2015 | March 10 Budget Meeting Conflicting with RIS Music Expo |
| Russel Zimmer | 1/5/2015 | Media Request for 1/6/2015 Board Meeting |
| Jennifer Atherton | 1/6/2015 | 2015-16 Calendar Request |

Administrative Report

January 6, 2015

1. Midyear Update – Superintendent's Goals and Objectives (Attach #1)

2. School Based Health Center – NMS

3. Unified Theater – NHS (Attach #2)

4. Community Forum: "Senior Connections"
   Wednesday, January 28th 2:30 p.m. Senior Center

5. NHS Student Representative Report:
   a. Megan Milano Class of 2015
   b. Riland Abazi Class of 2016

1/6/15

{spotlight on ability}

# UNIFIED theater®

October 28, 2014

Dear Ms. Williams,

It is with pleasure that I write to confirm our support of the Newtown High School application for the Arts Education Mini-Grant opportunity. We are excited to be a part of this initiative to bring greater access to the arts and arts education to the young people of all abilities in the Newtown Public Schools.

Through this opportunity, not only will Newtown High School be able to join our Spotlight School program and bring young people with and without disabilities together this school year to create an original piece of theater but we will be able to collaborate on a curriculum which will sustain and grow our program throughout the Newtown district. In addition we are excited to work with Newtown High School to add additional arts learning experiences for both the students involved in the program and the staff of the district. Our hope is that together with Newtown High School we can facilitate increased opportunity and access to rich arts education experiences for students of all abilities.

If you should have any questions while reviewing this proposal, please do not hesitate to reach out to me at any time: 860-559-3810.

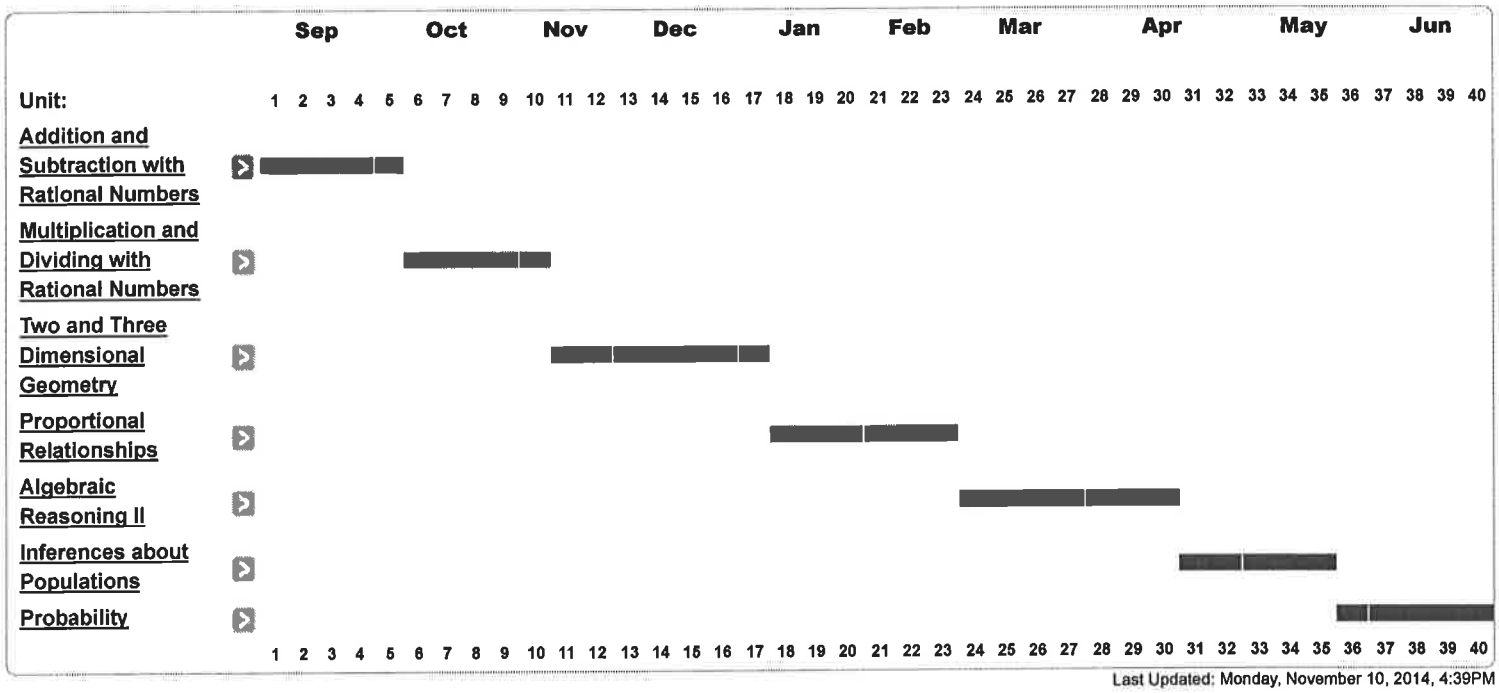
Sincerely,

Laura E McLelland
Chief Executive Officer
Unified Theater

Newtown Public Schools

## Course Assignments › Math Grade 7

Collaboration | Grade 7 | Mathematics | Newtown Middle School




Last Updated: Monday, November 10, 2014, 4:39PM

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# Addition and Subtraction with Rational Numbers

Collaboration Math Grade 7 Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 3:15PM*

**Unit: Addition and Subtraction with Rational Numbers** (Week 1, 5 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. There are many ways to represent a number.
2. Number sense develops through experience with real-world situations.
3. Subtraction is an additive inverse.

## Essential Question(s)

1. How can mathematical ideas be represented?
2. What happens when you add and subtract integers?
3. What happens when you add and subtract fractions?
4. What are different ways that numbers can be represented and how do they relate to each other?
5. How do I determine the best numerical representation for a given situation?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. How do you add integers
2. How do you subtract integers?
3. How do you add fractions?
4. How do you subtract fractions?
5. How are numbers used in daily life?
6. How can we use the number line to represent operations in real-world situations?
7. What are different ways you can rewrite the same number sentence?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, The Number System**

7.NS.A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

- 7.NS.A.1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
- 7.NS.A.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

Add and subtract rational numbers (3)
Describe opposites quantities (1)
Understand positive or negative direction (2)
Show additive inverses (1)
Interpret sums in context (2)
Understand subtraction as additive inverses (2)
Show absolute value (2)
Apply absolute value principle in context (3)
Apply properties of operations as strategies (3)
Solve with or without context (3, 4)
Apply properties of operations to calculate (3)
Convert between equivalent forms (2)
Assess reasonableness of answers (5)
Use mental computation and estimation strategies

## Content/Topics

*Critical content that students must **KNOW***

- Categorize and Define all Rational Numbers
- Compare and order Rational Numbers
- Number Line, Opposites, and Absolute Value
- Using Estimation Strategies
- Properties of Addition
- Additive Inverse

## Skills

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

- Mixed Numbers and Improper Fractions
- Write Fractions as Decimals
- Write Decimals as Fractions
- Adding and Subtracting Integers
- Add and Subtract Like Fractions
- Add and Subtract Unlike Fractions
- Add and Subtract Mixed Numbers
- Adding and Subtracting Positive and Negative Decimals

**Vocabulary:**
Integer
Negative Integer
Positive Integer
Graph
Absolute Value
Opposites
Additive Inverse
Common Denominator
Least Common Denominator
Like Fractions
Rational Numbers
Unlike Fraction

**Core Learning Activities**

Spreadsheet scramble
Flipping for Integers Game
VersaTiles
Inquiry Lab: Add Integers-Football Field
Inquiry Lab: Subtract Integers-Dolphin Swim
Inquiry Lab: Distance on a Number Line
Problem Solving Investigation: Look for a Pattern
Inquiry Lab: Rational Numbers on the Number Line-Graph
Inquiry Lab: Add and Subtract on the Number Line-Baseball
Problem Solving Investigation: Draw a Diagram

**Resources**

*Professional & Student*
Professional
Teacher-share
Textbook – Prentice Hall Mathematics Course 2 and 3
PLC
Students
Textbook – Prentice Hall Mathematics Course 2 and 3
Online textbook
Glencoe Math-Course 2: Volume 1
- Graphic Organizer-Integer
- Number Lines
- Graphic Organizer-Opposites
- Rate Yourself
- Reflect On Essential Question
- Quick check
- Foldable

**Assessments (Titles)**

**Unit 1 Student Self-Reflection Form re: essential and guiding question**
**Summative: Self Assessment**

**Exit Tickets**
**Formative: Other written assessments**

**Keeping Track of the Distance Pronlem**
**Formative: Other written assessments**

**Postcard Collection Problem**
**Formative: Other written**

**Graduation Standards**

**Information Literacy**
**Problem Solving**
**Spoken Communication**
**Written Performance**

**Interdisciplinary Connections**

1. Reason abstractly and quantitatively
2. Use appropriate tools strategically
3. Attend to precision
4. Look for and express regularity in repeated reasoning.
5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks
6. Analyze, evaluate and use information responsibly to create a solution and/or a product

| | | |
|---|---|---|
| **assessments**<br><br>**Summative Unit Test**<br>**Summative: Written Test**<br><br>**"Trail Mix" Problem**<br>**Summative: Group Project**<br>Performance Task<br><br>**The Fraction Maze"**<br>**Summative: Group Project** | | 7. Evaluate both the process and the product |

**<< Previous Year**

Last Updated: Monday, November 10, 2014, 3:56PM

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# Multiplication and Dividing with Rational Numbers

Collaboration Math Grade 7 Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 3:15PM*

**Unit: Multiplication and Dividing with Rational Numbers** (Week 6, 5 Weeks)

**Enduring Understanding(s)/ Generalization(s)**

1. The relationships among numbers and number systems form the foundations of number sense and mathematics communication.

**Essential Question(s)**

1. How can mathematical ideas be represented?
2. What happens when you multiply and divide integers?
3. What happens when you multiply and divide fractions?
4. Why are different representations of the same number needed to solve different types of problems?
5. Why is there a specific order to the procedures used in operations?
6. How do the mathematical operations relate to one another?
7. How do I know which computational method to use?

**Guiding Questions**

*Factual, Conceptual, Provocative*

1. How do you multiply integers?
2. How do you divide integers?
3. How do you multiply fractions?
4. How do you divide fractions?
5. How do I apply the properties of multiplication to fractions?
6. How can we assess the reasonableness of answers using mental computation and estimation strategies?
7. Why do we need to apply rules in mathematics?
8. What are different ways you can rewrite the same number sentence?

**Standard(s)**

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, The Number System**

7.NS.A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

- 7.NS.A.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
- 7.NS.A.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

**CCSS: Mathematics, CCSS: Grade 7, Expressions & Equations**

7.EE.A. Use properties of operations to generate equivalent expressions.

- 7.EE.A.2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

7.EE.B. Solve real-life and mathematical problems using

**Objective(s)**

**Bloom/ Anderson Taxonomy / DOK Language**

Multiply and divide rational numbers (3)
Understand/develop rules for multiplying signed numbers (2)
Understand every quotient of integers with non-zero divisor is a rational number (2)
Interpret products and quotients in context (6)
Apply properties of operations as strategies (3)
Solve multi-step problems in context (2)
Apply properties of operations to calculate (4)
Convert between equivalent forms of rational numbers (3)
Understand the relationship between equivalent forms of expression (2)
Assess reasonableness of answers (5)
Use mental computation and estimation strategies

numerical and algebraic expressions and equations.

- 7.EE.B.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.

**Content/Topics**

*Critical content that students must **KNOW***

- Use Estimation Strategies
- Properties of Multiplication
- Multiplicative Inverse
- Distributive Property
- Multiply and Divide Integers with Different Signs
- Multiply and Divide Integers with the Same Sign
- Convert Fractions and Decimals
- Multiply and Divide Positive and Negative Decimals
- Multiply and Divide Positive and Negative Fractions
- Multiply and Divide Positive and Negative Mixed Numbers
- Convert between systems
- Orders of Operation and Exponents

**Vocabulary:**
Multiplicative Property of Zero
Distributive Property
Multiplicative Identity
Repeating Decimal
Terminating Decimal
Bar Notation

**Skills**

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

**Core Learning Activities**

Integer Contig
Decimal Contig
Hot Number
VersaTiles
Inquiry Lab: Multiply Integers
Inquiry Lab: Use Properties to Multiply-Scientific Properties

**Resources**

*Professional & Student*
Professional
Teacher-share
Textbook – Prentice Hall Mathematics Course 2 and 3
PLC
Students
Textbook – Prentice Hall Mathematics Course 2 and 3
Online textbook
Glencoe Math-Course 2: Volume 1
- Graphic Organizer-Multiply/Divide Integers
- Number Lines
- Graphic Organizer-Fraction Rules
- Rate Yourself
- Reflect On Essential Question
- Quick check
- Foldable

| **Assessments (Titles)** | **Graduation Standards** | **Interdisciplinary Connections** |
|---|---|---|
| **Unit 2 Student Self-Reflection Form** | **Information Literacy** | |

| | | |
|---|---|---|
| re: essential and guiding questions<br>Summative: Self Assessment<br><br>Unit 2 Exit Tickets<br>Formative: Other written assessments<br><br>Common Unit Test<br>Summative: Written Test<br><br>"The Decimal Maze" Performance Task<br>Summative: Group Project<br><br>"Kneading Bread" Performance Task<br>Summative: Group Project | Problem Solving<br>Spoken Communication<br>Written Performance | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

<< Previous Year

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# Two and Three Dimensional Geometry

Collaboration Math Grade 7 Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 3:16PM*

**Unit: Two and Three Dimensional Geometry** (Week 11, 7 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Geometry and spatial sense offer ways to visualize, to interpret, and to reflect on our physical environment.
2. Objects can be described and compared using their geometric properties.

## Essential Question(s)

1. How can you use different measurements to solve real-life problems?
2. How does geometry help us describe real-world objects?
3. How do measurements help you describe real-world objects?
4. How are geometric properties used to solve problems in everyday life?
5. How can plane and solid shapes be described?
6. How do we describe, sort, and classify figures and solids?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. How do polygons help us describe real-world objects?
2. How do polyhedrons help us describe real-world objects?
3. How do you use circumference to measure real-world objects?
4. How do you use area to measure real-world objects?
5. How do you use volume to measure real-world objects?
6. How do you use surface area to measure real-world objects?
7. How can I solve real-life and mathematical problems involving angle measure, area, surface area, and volume?
8. How can I draw, construct, and describe geometrical figures and describe the relationships between them?
9. How are geometric figures constructed?
10. How do three-dimensional objects relate to its two-dimensional counterpart?
11. What is the relationship between area and circumference of a circle?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, Geometry**

7.G.A. Draw construct, and describe geometrical figures and describe the relationships between them.

- 7.G.A.2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
- 7.G.A.3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

- Know and Develop formulas - 2,3
- Solve problems using formulas - 3
- Give and Derive informally the relationship between circumference and area of a circle - 4
- Solve with and without context
- Draw and Construct geometric shapes with given conditions - 3
- Use rulers, protractors, technology - 3
- Describe two-dimensional figures that result from plane sections of three-dimensional figures - 2
- Write and Solve problems using equations to find an

rectangular pyramids.

7.G.B. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

- 7.G.B.4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
- 7.G.B.5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
- 7.G.B.6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

unknown angle in a figure - 4,5

**Content/Topics**

*Critical content that students must **KNOW***

- Classify Angles
- Name and Identify Angles
- Find a Missing Measure
- Pairs of Angles – Complementary and Supplementary
- Classify Triangles
- Angles of a Triangle ($180^{\circ}$)
- Use a Scale Drawing or a Scale Model
- Find a Scale Factor
- Draw Three-Dimensional Figures
- Identify Cross Sections
- Identify Three-Dimensional Figures
- Radius and Diameter of a Circle
- Find Circumference and Area of a Circle
- Approximate Circumference and Area of a Circle
- Area of Composite Figures
- Volume of Right Prisms
- Volume and Height of Pyramids
- Surface Area and Nets of Prisms
- Surface Area and Nets of Pyramids
- Volume and Surface Area of Composite Figures

**Vocabulary:**
Acute Angle
Acute Triangle
Adjacent Angles
Base
Center
Circle
Circumference
Complementary Angles
Composite Figure
Cone
Congruent
Congruent Segments

**Skills**

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Coplanar
Cross Section
Cylinder
Diagonal
Diameter
Edge
Equilateral Triangle
Face
Isosceles Triangle
Lateral Face
Lateral Surface Area
Obtuse Angle
Obtuse Triangle
Pi
Plane
Polyhedron
Prism
Pyramid
Radius
Regular Pyramid
Right Angle
Right Triangle
Scale
Scale Drawing
Scale Factor
Scale Model
Scalene Triangle
Semicircle
Slant Height
Straight Angle
Supplementary Angles
Surface Area
Triangle
Vertex
Vertical Angles
Volume

| Core Learning Activities | Resources |
|---|---|
| "Fence for Fido"<br>"Circle Activity"<br>"Rectangle Problem"<br>"Play Dough Cross Sections"<br>VersaTiles<br>Inquiry Lab: Create Triangles<br>Inquiry Lab: Draw Triangles<br>Problem Solving Investigation: Make a Model<br>Inquiry Lab: Investigate Online Maps and Scale Drawings<br>Inquiry Lab: Scale Drawings<br>Inquiry Lab: Circumference<br>Inquiry Lab: Area of Circles<br>Problem Solving Investigation: Solve a Simpler Problem<br>Inquiry Lab: Volume of Pyramids<br>Inquiry Lab: Nets of Three-Dimensional Figures<br>Inquiry Lab: Relate Surface Area and Volume Inquiry Lab: Composite Figures | *Professional & Student*<br>Professional<br>Teacher-share<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>PLC<br>Students<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>Online textbook<br>Glencoe Math-Course 2: Volume 2<br>- Model Sheets<br>- Formulas<br>- Graphic Organizers<br>- Rate Yourself<br>- Reflect On Essential Question<br>- Quick check<br>- Foldable |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Unit 3 Student Self-Reflection Form re: essential and guiding questions**<br>**Summative: Other written** | **Information Literacy**<br>**Problem Solving**<br>**Spoken Communication** | 1. Reason abstractly and quantitatively |

| | | |
|---|---|---|
| **assessments**<br><br>**Exit Tickets for Unit 3**<br>**Formative: Other written assessments**<br><br>**Design Your Own Park Performance Task**<br>**Summative: Group Project**<br><br>**Unit 3 test**<br>**Summative: Written Test** | **Written Performance** | 2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

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# Proportional Relationships

Collaboration Math Grade 7 Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 3:17PM*

**Unit: Proportional Relationships** (Week 18, 6 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Mathematics can be used to describe change and model real world situations.

## Essential Question(s)

1. How can you use mathematics to describe change, and model real world situations?
2. How can you show that two objects are proportional?
3. How can percent help you understand situations involving money?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. How can you solve a proportion?
2. How can you show that two objects are proportional with a table?
3. How can you show that two objects are proportional with a graph?
4. How can you show that two objects are proportional with an equation?
5. How is rate a measure of one quantity per unit of another quantity?
6. Give an example of a real-world situation in which you would find the percent of a number.
7. Explain how two amounts of change can be the same but the percents of change can be different.

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, Ratios & Proportional Relationships**

7.RP.A. Analyze proportional relationships and use them to solve real-world and mathematical problems.

- 7.RP.A.1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
- 7.RP.A.2. Recognize and represent proportional relationships between quantities.
- 7.RP.A.2a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
- 7.RP.A.2b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- 7.RP.A.2c. Represent proportional relationships by equations.
- 7.RP.A.2d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

- Recognize proportional relationships – 1,2
- Represent proportional relationships in a variety of ways - 3
- Decide proportional relationship - 5
- Test equivalent ratios - 5
- Observe graph - 1
- Identify constant of proportionality - 4
- Explain point (x,y) - 2
- Solve multi-step problems – 4,5
- Compute unit rates - 3
- Compute actual lengths/areas from scale drawings - 3
- Reproduce a scale drawing at a different scale – 2 (covered in unit 3)

- 7.RP.A.3. Use proportional relationships to solve multistep ratio and percent problems.

**CCSS: Mathematics, CCSS: Grade 7, Geometry**
7.G.A. Draw construct, and describe geometrical figures and describe the relationships between them.

- 7.G.A.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

| **Content/Topics** | **Skills** |
|---|---|
| *Critical content that students must **KNOW*** | *Transferable skills that students must be able to **DO*** |
| • Use bar diagram to understand ratios<br>• Find unit rate<br>• Simplify a complex fraction and find the unit rate<br>• Convert unit rates using dimensional analysis<br>• Identify proportional and non-proportional relationships using a table<br>• Graph proportional and non-proportional relationships<br>• Identify proportional and non-proportional relationships using a graph<br>• Write proportion problems<br>• Solve proportion problems<br>• Use unit rate<br>• Find constant rate of change (unit rate) using a table<br>• Find constant rate of change (unit rate) using a graph<br>• Find constant rate of change (unit rate) using an equation<br>• Find constant rate of change (unit rate) using diagrams<br>• Find constant rate of change (unit rate) using verbal descriptions<br>• Understand and find slope as vertical change/horizontal change and rise/run<br>• Determine direct variation<br>• Use bar diagrams to represent fractions and percents<br>• Find the percent of a number<br>• Use percents greater than 100 and percents less than 1<br>• Estimate the percent of a number<br>• Use the percent proportion (part/whole) to find: part, whole, percent<br>• Use the percent equation to find: part, whole, percent<br>• Determine Reasonable Answers<br>• Find percent change and percent error using an equation<br>• Find Sales Tax and Total Cost<br>• Find tips and Markups<br>• Find Sale Price and Original Cost<br>• Find simple interest using an equation for savings, | • 2. Work independently and collaboratively to solve problems and accomplish goals.<br>• 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving. |

loans and credit cards
- Technology: Compound interest-spreadsheet
- Scale Drawings (covered in Unit 3)

**Vocabulary**
Complex fraction
Constant of proportionality
Constant rate of change
Constant of variation
Coordinate plane
Cross products
Dimensional analysis
Direct variation
Discount
Equivalent ratios
Gratuity
Markup
Markdown
Non-proportional
Percent Equation
Percent Error
Percent of change
Percent of decrease
Percent of increase
Percent proportion
Principle
Proportion
Proportional
Ordered Pair
Origin
Quadrant
Rate
Rate of Change
Sales Tax
Selling Price
Simple Interest
Slope
Tip
Unit Rate
x-axis
x-coordinate
y-axis
y-coordinate

**Core Learning Activities**

- VersaTiles
- Inquiry Lab: Unit Rates
- Problem Solving Investigation: The Four Step Plan
- Inquiry Lab: Proportional and Non Proportional Relationships
- Inquiry Lab: Rate of Change
- Inquiry Lab: Percent Diagrams
- Inquiry Lab: Find Percents
- Problem-Solving Investigation: Determine Reasonable Answers
- Inquiry Lab: Rate of Change
- Inquiry Lab: Compound Interest

**Resources**

*Professional & Student*
Professional
Teacher-share
Textbook – Prentice Hall Mathematics Course 2 and 3
PLC
Students
Textbook – Prentice Hall Mathematics Course 2 and 3
Online textbook
Glencoe Math-Course 2: Volume 1
- Review: Function using input->rule->output
- Foldable- key concept: table, graph, equation
- Foldable- key concept: percent equation and proportion
- Study skill: Draw a picture
- graph paper
- Graphic Organizer-slope
- Graphic Organizer-compare and contrast tax and discount

| | |
|---|---|
| | - Rate Yourself<br>- Reflect On Essential Question<br>- Quick check<br>- Foldable |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Become a travel expert performance task**<br>**Summative: Group Project**<br><br>**Unit 4 Student Self-Reflection Form re: essential and guiding questions**<br>**Summative: Other written assessments**<br><br>**Exit Tickets available on teacher-share**<br>**Formative: Other written assessments**<br><br>**Unit 4 Assessment**<br>**Summative: Written Test** | Information Literacy<br>Problem Solving<br>Spoken Communication<br>Written Performance | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

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# Algebraic Reasoning II

Collaboration Math Grade 7 Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 3:16PM*

**Unit: Algebraic Reasoning II** (Week 24, 7 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Rewriting an expression in different forms can show how the quantities in a problem are related.
2. Mathematical expressions represent relationships.

## Essential Question(s)

1. How can you communicate mathematical ideas effectively?
2. How can you use numbers and symbols to represent mathematical ideas?
3. What does it mean to say that two quantities are equal?
4. How can relationships be expressed symbolically?
5. What strategies can be used to solve for unknowns?
6. How can we express real-world situations mathematically?
7. Where in the real world would I find patterns?
8. When are algebraic and numeric expressions used?
9. Why do we use variables?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. When do you use a variable?
2. How do you know which operation symbol to use?
3. When do you use an equal sign?
4. When do you use an inequality symbol?
5. How can we use variables to represent unknowns in real-world situations?
6. How can we use properties of operations to solve two-step equations and inequalities?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, Expressions & Equations**

7.EE.A. Use properties of operations to generate equivalent expressions.

- 7.EE.A.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- 7.EE.A.2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

7.EE.B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

- 7.EE.B.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

- Use variables (3)
- Construct simple equations and inequalities (3)
- Solve problems in context (4, 5)
- Simple equations
- Simple inequalities
- Reason about quantities (4)
- Compare solutions (2)
- Graph inequality (3)
- Interpret inequality (2)
- Apply properties of operations (3)
- Factor linear expressions with rational coefficients (4)
- Expand Linear expressions with rational coefficients (3)
- Write an expression in different forms (3)
- Understand how rewriting an expression in different forms can show how the quantities in a problem are related (2)

## Content/Topics

## Skills

| *Critical content that students must **KNOW*** | *Transferable skills that students must be able to **DO*** |
|---|---|
| • Write Algebraic Expressions<br>• Evaluate Algebraic Expressions<br>• Describe and Extend Sequences<br>• Properties of Operations<br>• Use the Distributive Property<br>• Identify Parts of an Expression<br>• Simplify Algebraic Expressions<br>• Add Linear Expressions<br>• Subtract Linear Expressions<br>• Use Additive Inverse to Subtract<br>• Factor Linear Expressions<br>• Find the GCF of Monomials<br>• Solve One-Step Equations<br>• Properties of Equality<br>• Solve Equations with Rational Coefficients<br>• Solve Two-Step Equations<br>• Solving One and Two-Step Inequalities<br>• Properties of Inequality<br>• Graph Solution to Inequality<br><br>**Vocabulary:**<br>Addition Property of Equality<br>Addition Property of Inequality<br>Additive Identity Property<br>Algebra<br>Algebraic Expression<br>Arithmetic Sequence<br>Associative Property<br>Coefficient<br>Commutative Property<br>Constant<br>Counterexample<br>Define a Variable<br>Distributive Property<br>Division Property of Equality<br>Division Property of Inequality<br>Equation<br>Equivalent Expressions<br>Equivalent Equations<br>Factor<br>Factored Form<br>Like Terms<br>Linear Expression<br>Monomial<br>Multiplicative Identity Property<br>Multiplicative Property of Equality<br>Multiplicative Property of Inequality<br>Multiplicative Property of Zero<br>Property<br>Sequence<br>Simplest Form<br>Solution<br>Subtraction Property of Equality<br>Subtraction Property of Inequality<br>Term<br>Two-Step Equation<br>Two-Step Inequality<br>Variable | • 2. Work independently and collaboratively to solve problems and accomplish goals.<br>• 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving. |

| Core Learning Activities | Resources |
|---|---|
| Inquiry Lab: Sequences<br>Problem-Solving Investigation: Make a Table<br>Inquiry Lab: Factor Linear Expressions<br>Inquiry Lab: Solve One-Step Addition and Subtraction Problems<br>Inquiry Lab: Multiplication Equations with Bar Diagrams<br>Inquiry Lab: Solve Equations with Rational Coefficients<br>Inquiry Lab: Solve Two-Step Equations<br>Inquiry Lab: More Two-Step Equations<br>Problem-Solving Investigation: Work Backward<br>Inquiry Lab: Solve Inequalities<br>"Expressions Activity"<br>"Food Expressions Activity"<br>VersaTiles<br>Algebra Tiles | *Professional & Student*<br>Professional<br>Teacher-share<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>PLC<br>Students<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>Online textbook<br>Glencoe Math-Course 2: Volume 2<br>- Study Skill: Reading Math (key words)<br>- Foldable- Linear Expressions<br>- Foldable- Solve Two-Step Equations<br>- Box sheets<br>- Graphic Organizer-Properties<br>- Rate Yourself<br>- Reflect On Essential Question<br>- Quick check<br>- Foldable |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Unit 5 Student Self-Reflection Form re: essential and guiding questions**<br>**Summative: Other written assessments**<br><br>**Exit Tickets available on teacher-share**<br>**Formative: Other written assessments**<br><br>**"School Dance DJ" performance task**<br>**Summative: Group Project**<br><br>**Unit 5 Assessment**<br>**Summative: Written Test** | Information Literacy<br>Problem Solving<br>Spoken Communication<br>Written Performance | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

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# Inferences about Populations

Collaboration Math Grade 7 Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 3:19PM*

**Unit: Inferences about Populations** (Week 31, 5 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population.
2. Understand that random sampling tends to produce representative samples and support valid inferences.
3. The way data is collected, organized and displayed influences interpretation

## Essential Question(s)

1. How do I interpret data for a specific population and draw conclusions?
2. What inferences can I make from sample data?
3. How do you know which type of graph to use when displaying data?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. When is a bar graph used to display data?
2. When is a line graph used to display data?
3. When is a double dot plot used to display data?
4. When is a double box plot used to display data?
5. What is the benefit of looking at only a sample of the population?
6. When is a sample valid?
7. Why is random sampling effective?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, Statistics & Probability**

7.SP.A. Use random sampling to draw inferences about a population.

- 7.SP.A.1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
- 7.SP.A.2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

7.SP.B. Draw informal comparative inferences about two populations.

- 7.SP.B.3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

- Understand and Use Statistics - 2
- Examine a Sample of the Population - 2,3
- Generalize information about a population - 4,5
- Determine if a sample is representative/valid - 3,4
- Use measures of center and measures of variability for numerical data from random samples - 4,5
- Draw informal comparative inferences
- Use data from a random sample
- Draw inferences about a population - 4,5
- Generate multiple samples of the same size - 3
- Gauge the variation in estimates or predictions
- Express and Calculate the difference between the centers of two numerical data distributions as a multiple of a measure of variability – mean absolute deviation - 3

between the centers by expressing it as a multiple of a measure of variability.
- 7.SP.B.4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

**Content/Topics**

*Critical content that students must **KNOW***

- Make Predictions Using Ratios
- Make Predictions Using Equations
- Biased and Unbiased Samples
- Use Multiple Data Samples
- Use Sampling to Predict
- Use a Graph
- Collect Data
- Identify a Misleading Graph
- Identify Misleading Statistics
- Compare Two Populations
- Recognize Visual Overlap
- Calculate Difference in Means
- Calculate Mean Absolute Deviation
- Select an Appropriate Display

**Vocabulary:**
Biased Sample
Convenience Sample
Difference in Means
Double Box Plot
Double Dot Plot
Mean Absolute Deviation
Population
Sample
Simple Random Sample
Statistics
Survey
Systematic Random Sample
Unbiased Sample
Visual Overlap
Voluntary Response Sample

**Skills**

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

**Core Learning Activities**

Inquiry Lab: Multiple Samples of Data
Problem-Solving Investigation: Use a Graph
Inquiry Lab: Collect Data
Inquiry Lab: Visual Overlap of Data Distributions
Market Research Performance Assessment

**Resources**

*Professional & Student*
Professional
Teacher-share
Textbook – Prentice Hall Mathematics Course 2 and 3
PLC
Students
Textbook – Prentice Hall Mathematics Course 2 and 3
Online textbook
Glencoe Math-Course 2: Volume 2
- Study Skill: Writing Math
- Graph paper
- Graphic Organizer-Biased and Unbiased Samples
- Rate Yourself
- Reflect On Essential Question
- Quick check

- Foldable

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Unit 6 Student Self-Reflection Form re: essential and guiding questions**<br>**Summative: Other written assessments**<br><br>**Exit Tickets available on teacher-share**<br>**Formative: Other written assessments**<br><br>**Unit 6 Assessment**<br>**Summative: Written Test**<br><br>**Market Research performance task**<br>**Summative: Group Project** | Information Literacy<br>Problem Solving<br>Spoken Communication<br>Written Performance | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

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# Probability

Collaboration Math Grade 7 Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 3:19PM*

**Unit: Probability** (Week 36, 5 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Understand probability measures the likelihood of an event to occur.
2. Understand probability helps to analyze the risk in a situation and make informed decisions.
3. Understand probability is used to make inferences and predictions about a situation.

## Essential Question(s)

1. How can you find the number of outcomes of more than one event?
2. How can you predict the outcome of future events?
3. How can you determine the likelihood of an event?
4. How do independent and dependent events differ?
5. What is the difference between theoretical and experimental probability?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. How can you use theoretical probability to predict the outcome of future events?
2. How can you use experimental probability to predict the outcome of future events?
3. How can you use sample space to predict the outcome of future events?
4. How can you use simulation to predict the outcome of future events?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, Statistics & Probability**

7.SP.C. Investigate chance processes and develop, use, and evaluate probability models.

- 7.SP.C.5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
- 7.SP.C.6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
- 7.SP.C.7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
- 7.SP.C.7a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.
- 7.SP.C.7b. Develop a probability model (which may not be uniform) by observing frequencies in data

## Objective(s)

Bloom/ Anderson Taxonomy / DOK Language

- Develop and use
  - a uniform probability model – 3,6
  - a probability model which may not be uniform – 3,6
- Find
  - probabilities of simple events - 3
  - probability of compound events using organized lists, tables, tree diagrams and simulation - 3
  - frequencies for compound events - 3
- Compare probabilities from a model to observed frequencies - 2
- Explain possible sources of the discrepancy - 5
- Observe frequencies in data - 1

- Understand - 2
  - probability of a chance event is a number between 0 and 1
  - probability of a compound event is the fraction of outcomes in the sample space
- Predict approximate relative frequency - 5

generated from a chance process.

- 7.SP.C.8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
- 7.SP.C.8a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
- 7.SP.C.8b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.
- 7.SP.C.8c. Design and use a simulation to generate frequencies for compound events.

**Content/Topics**

*Critical content that students must **KNOW***

- Determine Probability of Simple Events
- Find and use Relative Frequency
- Experimental and Theoretical Probability
- Predict Future Events
- Determine Probability of Compound Events
- Find a Sample Space
- Find Probability
- Simulations
- Model Equally Likely Outcomes
- Model Unequally Likely Outcomes
- Fundamental Counting Principle
- Permutations
- Probability of Independent Events
- Probability of Dependent Events

**Vocabulary:**
Complementary Events
Compound Events
Dependent Events
Chance Events (old-Experimental Probability)
Fair
Fundamental Counting Principle
Independent Events
Outcome
Permutation
Probability
Random
Relative Frequency
Sample Space
Simple Event
Simulation
Theoretical Probability
Tree Diagram
Uniform Probability Model
Unfair

**Skills**

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

**Core Learning Activities**

Inquiry Lab: Relative Frequency

**Resources**

*Professional & Student*

| | |
|---|---|
| Problem-Solving Investigation: Act it Out<br>Inquiry Lab: Fair and Unfair Games<br>Inquiry Lab: Simulate Compound Events<br>Inquiry Lab: Independent and Dependent Events<br>Career in Medicine | Professional<br>Teacher-share<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>PLC<br>Students<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>Online textbook<br>Glencoe Math-Course 2: Volume 2<br>- Graphic Organizer-Outcomes<br>- Foldable – Probability Example/Picture<br>- Rate Yourself<br>- Reflect On Essential Question<br>- Quick check<br>- Foldable |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Unit 7 Student Self-Reflection Form re: essential and guiding questions**<br>**Summative: Other written assessments**<br><br>**Exit Tickets available on teacher-share**<br>**Formative: Other written assessments**<br><br>**Unit 7 Assessment**<br>**Summative: Written Test** | Information Literacy<br>Problem Solving<br>Spoken Communication<br>Written Performance | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

<< Previous Year

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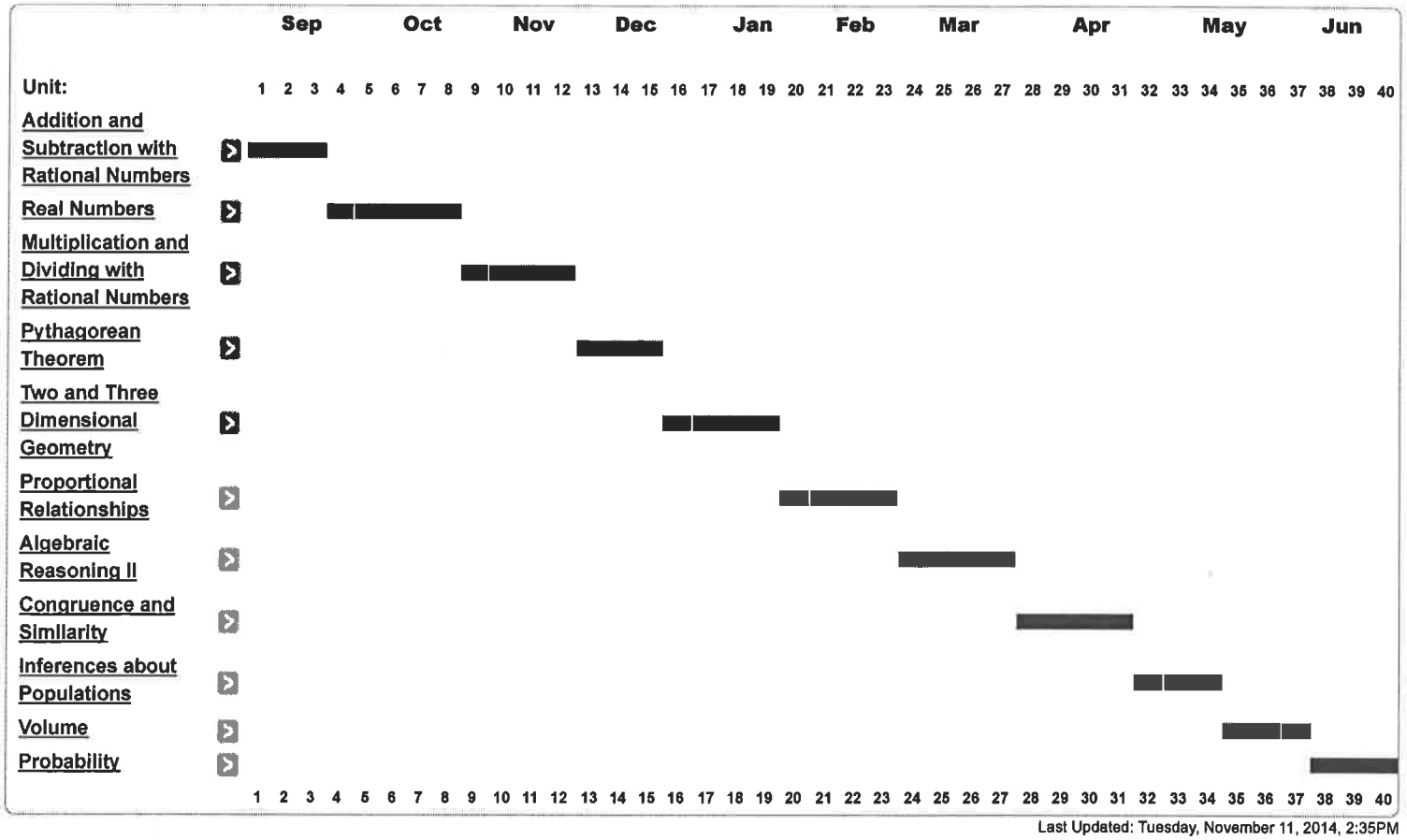
Newtown Public Schools

## Course Assignments › Math Grade 7 Accelerated

Collaboration | Grade 7 | Mathematics | Newtown Middle School




Last Updated: Tuesday, November 11, 2014, 2:35PM

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# Addition and Subtraction with Rational Numbers

Collaboration | Math Grade 7 Accelerated | Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 2:48PM*

**Unit: Addition and Subtraction with Rational Numbers** (Week 1, 3 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. There are many ways to represent a number.
2. Number sense develops through experience with real-world situations.
3. Subtraction is an additive inverse.

## Essential Question(s)

1. How can mathematical ideas be represented?
2. What happens when you add and subtract integers?
3. What happens when you add and subtract fractions?
4. What are different ways that numbers can be represented and how do they relate to each other?
5. How do I determine the best numerical representation for a given situation?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. How do you add integers
2. How do you subtract integers?
3. How do you add fractions?
4. How do you subtract fractions?
5. How are numbers used in daily life?
6. How can we use the number line to represent operations in real-world situations?
7. What are different ways you can rewrite the same number sentence?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, The Number System**

7.NS.A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

- 7.NS.A.1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
- 7.NS.A.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

Add and subtract rational numbers (3)
Describe opposites quantities (1)
Understand positive or negative direction (2)
Show additive inverses (1)
Interpret sums in context (2)
Understand subtraction as additive inverses (2)
Show absolute value (2)
Apply absolute value principle in context (3)
Apply properties of operations as strategies (3)
Solve with or without context (3, 4)
Apply properties of operations to calculate (3)
Convert between equivalent forms (2)
Assess reasonableness of answers (5)
Use mental computation and estimation strategies

## Content/Topics

*Critical content that students must **KNOW***

- Categorize and Define all Rational Numbers
- Compare and order Rational Numbers
- Number Line, Opposites, and Absolute Value
- Using Estimation Strategies
- Properties of Addition
- Additive Inverse

## Skills

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

- Mixed Numbers and Improper Fractions
- Write Fractions as Decimals
- Write Decimals as Fractions
- Adding and Subtracting Integers
- Add and Subtract Like Fractions
- Add and Subtract Unlike Fractions
- Add and Subtract Mixed Numbers
- Adding and Subtracting Positive and Negative Decimals

**Vocabulary:**
Integer
Negative Integer
Positive Integer
Graph
Absolute Value
Opposites
Additive Inverse
Common Denominator
Least Common Denominator
Like Fractions
Rational Numbers
Unlike Fraction

| Core Learning Activities | Resources |
|---|---|
| Spreadsheet scramble<br>Flipping for Integers Game<br>VersaTiles<br>Inquiry Lab: Add Integers-Football Field<br>Inquiry Lab: Subtract Integers-Dolphin Swim<br>Inquiry Lab: Distance on a Number Line<br>Problem Solving Investigation: Look for a Pattern<br>Inquiry Lab: Rational Numbers on the Number Line-Graph<br>Inquiry Lab: Add and Subtract on the Number Line-Baseball<br>Problem Solving Investigation: Draw a Diagram | *Professional & Student*<br>Professional<br>Teacher-share<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>PLC<br>Students<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>Online textbook<br>Glencoe Math-Course 2: Volume 1<br>- Graphic Organizer-Integer<br>- Number Lines<br>- Graphic Organizer-Opposites<br>- Rate Yourself<br>- Reflect On Essential Question<br>- Quick check<br>- Foldable |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Unit 1 Student Self-Reflection Form re: essential and guiding question**<br>**Summative: Self Assessment**<br><br>**Exit Tickets**<br>**Formative: Other written assessments**<br><br>**Keeping Track of the Distance Pronlem**<br>**Formative: Other written assessments**<br><br>**Postcard Collection Problem**<br>**Formative: Other written** | **Information Literacy**<br>**Problem Solving**<br>**Spoken Communication**<br>**Written Performance** | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product |

| | | |
|---|---|---|
| **assessments**<br><br>**Summative Unit Test**<br>**Summative: Written Test**<br><br>**"Trail Mix" Problem**<br>**Summative: Group Project**<br>Performance Task<br><br>**The Fraction Maze"**<br>**Summative: Group Project** | | 7. Evaluate both the process and the product |

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# Real Numbers

Collaboration **Math Grade 7 Accelerated** Grade 7|Mathematics|Newtown Middle School|2014-2015

*Wednesday, November 12, 2014, 2:49PM*

**Unit: Real Numbers** (Week 4, 5 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Operations create relationships among numbers.
2. Acknowledge the reasonableness of a quantitative outcome from using good number sense and estimation strategies.

## Essential Question(s)

1. What is the difference between rational and irrational numbers?
2. What makes estimation reasonable?
3. Where would you find the very big and very small numbers?
4. How would you most efficiently use very big and very small numbers?
5. When is it acceptable to approximate versus being exact?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. This number is an example of which type of number?
2. Which type of number converts to a fraction or a decimal?
3. What is a perfect square/perfect cube?
4. What is a good process to find a reasonable approximation of an irrational number?
5. How do we apply the properties of integers to exponents?
6. How do we apply Scientific Notation in the Real World?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 8, The Number System**

8.NS.A. Know that there are numbers that are not rational, and approximate them by rational numbers.

- 8.NS.A.1. Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.
- 8.NS.A.2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions

**CCSS: Mathematics, CCSS: Grade 8, Expressions & Equations**

8.EE.A. Work with radicals and integer exponents.

- 8.EE.A.1. Know and apply the properties of integer exponents to generate equivalent numerical expressions.
- 8.EE.A.2. Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

KNOW (rational and irrational numbers) - 2
UNDERSTAND (decimal expansion) -2
SHOW (decimal expansion repeats) -2
CONVERT (repeating decimal expansion to a rational number) -3
USE: **integer power of 10**
ESTIMATE (large or small quantities) - 3
EXPRESS (magnitude of numbers using powers of 10) - 2
**rational approximations or irrational numbers**
COMPARE (sizes or rational numbers) - 1
LOCATE (rational numbers approximately on the number line) - 2
ESTIMATE (value of expressions) - 2
**Square root and cube root symbols**
REPRESENT (solutions to equations) - 2
EVALUATE (square roots of perfect squares and cubed roots of
perfect cubes) - 1,3
**Scientific Notation**
REPRESENT (very large and very small numbers) - 2
CHOOSE (units of appropriate size) - 3

KNOW/APPLY (properties of integer exponents) - 3
GENERATE (equivalent numerical expressions) - 3

| | |
|---|---|
| and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.<br>• 8.EE.A.3. Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.<br>• 8.EE.A.4. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. | CALCULATE/CONVERT (numbers expressed in scientific notation/decimal form) - 4<br>INTERPRET (scientific notation generated by technology) - 3 |

| **Content/Topics** | **Skills** |
|---|---|
| *Critical content that students must **KNOW*** | *Transferable skills that students must be able to **DO*** |
| 1. Conversion of terminating and repeating decimals to fractions<br>2. Identify irrational numbers<br>3. Identify perfect squares/cubes<br>4. State the square/cubed root for perfect squares/cubes<br>5. Approximate square/cubed roots<br>6. Powers (x/÷ rules, power to a power, fractional, zero and negative exponents)<br>7. Scientific Notation (convert and compare, products and quotients) | • 2. Work independently and collaboratively to solve problems and accomplish goals.<br>• 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving. |

| **Core Learning Activities** | **Resources** |
|---|---|
| 1. Web Quest<br>2. TI-73 calculators<br>3. Versatiles: Real Numbers , Expressions & Equations | *Professional & Student*<br>Professional<br>Students: access to computers/internet<br>access to TI-73 calculator<br>Versatiles |

| **Assessments (Titles)** | **Graduation Standards** | **Interdisciplinary Connections** |
|---|---|---|
| **Quarter 1 Test**<br>**Summative: Written Test**<br>A test of all of the material for quarter 1, given by every grade 8 math teacher.<br><br>**Common Formative Assessment**<br>**Formative: Written Test**<br>One of 6 Common Formative Assessments given during the unit to track student growth for each standard.<br><br>**Student Reflection**<br>**Summative: Written Report**<br>Students will complete a pre and post written reflection on the topics covered | **Information Literacy**<br>**Problem Solving**<br>**Spoken Communication**<br>**Written Performance** | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create |

| | | |
|---|---|---|
| in the unit. Students will evaluate their individual performance and compare it to the evaluation by the instructor.<br><br>**Exponent Web Quest**<br>**Summative: Technology Project**<br>Students will complete a webquest on the use of exponents in the real world. | | a solution and/or a product<br>7. Evaluate both the process and the product |

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# Multiplication and Dividing with Rational Numbers

Collaboration Math Grade 7 Accelerated Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 2:50PM*

**Unit: Multiplication and Dividing with Rational Numbers** (Week 9, 4 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. The relationships among numbers and number systems form the foundations of number sense and mathematics communication.

## Essential Question(s)

1. How can mathematical ideas be represented?
2. What happens when you multiply and divide integers?
3. What happens when you multiply and divide fractions?
4. Why are different representations of the same number needed to solve different types of problems?
5. Why is there a specific order to the procedures used in operations?
6. How do the mathematical operations relate to one another?
7. How do I know which computational method to use?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. How do you multiply integers?
2. How do you divide integers?
3. How do you multiply fractions?
4. How do you divide fractions?
5. How do I apply the properties of multiplication to fractions?
6. How can we assess the reasonableness of answers using mental computation and estimation strategies?
7. Why do we need to apply rules in mathematics?
8. What are different ways you can rewrite the same number sentence?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, The Number System**

7.NS.A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

- 7.NS.A.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
- 7.NS.A.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

**CCSS: Mathematics, CCSS: Grade 7, Expressions & Equations**

7.EE.A. Use properties of operations to generate equivalent expressions.

- 7.EE.A.2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

7.EE.B. Solve real-life and mathematical problems using

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

Multiply and divide rational numbers (3)
Understand/develop rules for multiplying signed numbers (2)
Understand every quotient of integers with non-zero divisor is a rational number (2)
Interpret products and quotients in context (6)
Apply properties of operations as strategies (3)
Solve multi-step problems in context (2)
Apply properties of operations to calculate (4)
Convert between equivalent forms of rational numbers (3)
Understand the relationship between equivalent forms of expression (2)
Assess reasonableness of answers (5)
Use mental computation and estimation strategies

numerical and algebraic expressions and equations.

- 7.EE.B.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.

**Content/Topics**

*Critical content that students must **KNOW***

- Use Estimation Strategies
- Properties of Multiplication
- Multiplicative Inverse
- Distributive Property
- Multiply and Divide Integers with Different Signs
- Multiply and Divide Integers with the Same Sign
- Convert Fractions and Decimals
- Multiply and Divide Positive and Negative Decimals
- Multiply and Divide Positive and Negative Fractions
- Multiply and Divide Positive and Negative Mixed Numbers
- Convert between systems
- Orders of Operation and Exponents

**Vocabulary:**
Multiplicative Property of Zero
Distributive Property
Multiplicative Identity
Repeating Decimal
Terminating Decimal
Bar Notation

**Skills**

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

**Core Learning Activities**

Integer Contig
Decimal Contig
Hot Number
VersaTiles
Inquiry Lab: Multiply Integers
Inquiry Lab: Use Properties to Multiply-Scientific Properties

**Resources**

*Professional & Student*
Professional
Teacher-share
Textbook – Prentice Hall Mathematics Course 2 and 3
PLC
Students
Textbook – Prentice Hall Mathematics Course 2 and 3
Online textbook
Glencoe Math-Course 2: Volume 1
- Graphic Organizer-Multiply/Divide Integers
- Number Lines
- Graphic Organizer-Fraction Rules
- Rate Yourself
- Reflect On Essential Question
- Quick check
- Foldable

| **Assessments (Titles)** | **Graduation Standards** | **Interdisciplinary Connections** |
|---|---|---|
| **Unit 2 Student Self-Reflection Form** | **Information Literacy** | |

| | | |
|---|---|---|
| **re: essential and guiding questions**<br>**Summative: Self Assessment**<br><br>**Unit 2 Exit Tickets**<br>**Formative: Other written assessments**<br><br>**Common Unit Test**<br>**Summative: Written Test**<br><br>**"The Decimal Maze" Performance Task**<br>**Summative: Group Project**<br><br>**"Kneading Bread" Performance Task**<br>**Summative: Group Project** | Problem Solving<br>Spoken Communication<br>Written Performance | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

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# Pythagorean Theorem

Collaboration **Math Grade 7 Accelerated** Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 2:50PM*

**Unit: Pythagorean Theorem** (Week 13, 3 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Pythagorean Theorem is one of the most important relationships in all mathematics.
2. Applying Pythagorean Theorem helps you solve interesting problems with distance and length.

## Essential Question(s)

1. Where in the real-world can you apply Pythagorean Theorem
2. What is the meaning of Pythagorean Theorem?
3. How are real numbers and the Pythagorean Theorem used in every day life?
4. What is the relationship of Pythagorean Theorem and slope
5. Where does Pythagorean Theorem apply in a 3-D figure?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. Will the Pythagorean Theorem work for triangles that are not right triangles?
2. How can you use any two sides of a right triangle to find the third side?
3. How can you use the Pythagorean Theorem to find the length of any line segment on a coordinate plane that is not vertical or horizontal?
4. How can you use Pythagorean Theorem to determine the diagonal of a 3-D figure?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 8, Geometry**

8.G.B. Understand and apply the Pythagorean Theorem.

- 8.G.B.6. Explain a proof of the Pythagorean Theorem and its converse.
- 8.G.B.7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
- 8.G.B.8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

1. Explain a proof of the Pythagorean Theorem and its converse. -4
2. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. - 3
3. Apply the Pythagorean Theorem to find the distance between two points in a coordinate plane - 3

## Content/Topics

*Critical content that students must **KNOW***

1. Explain a proof of Pythagorean Theorem andits converse.
2. Find missing side in a right triangle (leg and Hypotenuse).
3. Find the distance between 2 points using Pythagorean Theorem.
4. Find the length of the diagonal of a 3-D Figure
5. Find the slant height of a cone and pyramid using

## Skills

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

the Pythagorean theorem.

| Core Learning Activities | Resources |
|---|---|
| TI-73 calculators<br>Pythagorean Project<br>VersaTiles: Algebra 1 & Expressions & Equations | *Professional & Student*<br>Professional:<br>Text: Prentice Hall Math Course 3<br>Ancillaries provided by publisher<br>Math Department staff generated materials<br>Math Department reference books<br>Internet resources<br><br>Students: access to computers/internet<br>www.phschool.com<br>www.drmath.com<br>www.purplemath.com<br>www.kahnacademy.org<br>Text: Prentice Hall Math Course 3<br>Access to TI-73 calculator<br>VersaTiles |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Quarterly Assessment**<br>**Summative: Written Test**<br>Students will take a grade level assessment at the end of each marking period covering all of the topics learned in class.<br><br>**Common Formative Assessments (4)**<br>**Formative: Written Test**<br>Students will take 4 common formative assessments to measure mastery of the different topics within the unit.<br><br>1. Find missing side of a right triangle<br>2. Distance between 2 points<br>3. Proving right triangles<br>4. Application of Pythagorean Theorem<br><br>**KWL Chart**<br>**Formative: Written Report**<br>Students will complete a KWL chart at the beginning of the unit to demonstrate pre-knowledge of the concepts being taught.<br><br>**Student Reflection**<br>**Summative: Written Report**<br>Students will provide a self evaluation report analyzing their growth from pre-assessment to end of unit assessment. Students will compare their analysis to that of the teacher. | **Information Literacy**<br>**Problem Solving**<br>**Spoken Communication**<br>**Written Performance** | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

# Two and Three Dimensional Geometry

Collaboration **Math Grade 7 Accelerated** Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 2:51PM*

**Unit: Two and Three Dimensional Geometry** (Week 16, 4 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Geometry and spatial sense offer ways to visualize, to interpret, and to reflect on our physical environment.
2. Objects can be described and compared using their geometric properties.

## Essential Question(s)

1. How can you use different measurements to solve real-life problems?
2. How does geometry help us describe real-world objects?
3. How do measurements help you describe real-world objects?
4. How are geometric properties used to solve problems in everyday life?
5. How can plane and solid shapes be described?
6. How do we describe, sort, and classify figures and solids?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. How do polygons help us describe real-world objects?
2. How do polyhedrons help us describe real-world objects?
3. How do you use circumference to measure real-world objects?
4. How do you use area to measure real-world objects?
5. How do you use volume to measure real-world objects?
6. How do you use surface area to measure real-world objects?
7. How can I solve real-life and mathematical problems involving angle measure, area, surface area, and volume?
8. How can I draw, construct, and describe geometrical figures and describe the relationships between them?
9. How are geometric figures constructed?
10. How do three-dimensional objects relate to its two-dimensional counterpart?
11. What is the relationship between area and circumference of a circle?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, Geometry**

7.G.A. Draw construct, and describe geometrical figures and describe the relationships between them.

- 7.G.A.2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
- 7.G.A.3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

- Know and Develop formulas - 2,3
- Solve problems using formulas - 3
- Give and Derive informally the relationship between circumference and area of a circle - 4
- Solve with and without context
- Draw and Construct geometric shapes with given conditions - 3
- Use rulers, protractors, technology - 3
- Describe two-dimensional figures that result from plane sections of three-dimensional figures - 2
- Write and Solve problems using equations to find an

rectangular pyramids.

7.G.B. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

- 7.G.B.4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
- 7.G.B.5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
- 7.G.B.6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

unknown angle in a figure - 4,5

**Content/Topics**

*Critical content that students must **KNOW***

- Classify Angles
- Name and Identify Angles
- Find a Missing Measure
- Pairs of Angles – Complementary and Supplementary
- Classify Triangles
- Angles of a Triangle ($180^{\circ}$)
- Use a Scale Drawing or a Scale Model
- Find a Scale Factor
- Draw Three-Dimensional Figures
- Identify Cross Sections
- Identify Three-Dimensional Figures
- Radius and Diameter of a Circle
- Find Circumference and Area of a Circle
- Approximate Circumference and Area of a Circle
- Area of Composite Figures
- Volume of Right Prisms
- Volume and Height of Pyramids
- Surface Area and Nets of Prisms
- Surface Area and Nets of Pyramids
- Volume and Surface Area of Composite Figures

**Vocabulary:**
Acute Angle
Acute Triangle
Adjacent Angles
Base
Center
Circle
Circumference
Complementary Angles
Composite Figure
Cone
Congruent
Congruent Segments

**Skills**

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Coplanar
Cross Section
Cylinder
Diagonal
Diameter
Edge
Equilateral Triangle
Face
Isosceles Triangle
Lateral Face
Lateral Surface Area
Obtuse Angle
Obtuse Triangle
Pi
Plane
Polyhedron
Prism
Pyramid
Radius
Regular Pyramid
Right Angle
Right Triangle
Scale
Scale Drawing
Scale Factor
Scale Model
Scalene Triangle
Semicircle
Slant Height
Straight Angle
Supplementary Angles
Surface Area
Triangle
Vertex
Vertical Angles
Volume

| Core Learning Activities | Resources |
|---|---|
| "Fence for Fido"<br>"Circle Activity"<br>"Rectangle Problem"<br>"Play Dough Cross Sections"<br>VersaTiles<br>Inquiry Lab: Create Triangles<br>Inquiry Lab: Draw Triangles<br>Problem Solving Investigation: Make a Model<br>Inquiry Lab: Investigate Online Maps and Scale Drawings<br>Inquiry Lab: Scale Drawings<br>Inquiry Lab: Circumference<br>Inquiry Lab: Area of Circles<br>Problem Solving Investigation: Solve a Simpler Problem<br>Inquiry Lab: Volume of Pyramids<br>Inquiry Lab: Nets of Three-Dimensional Figures<br>Inquiry Lab: Relate Surface Area and Volume Inquiry Lab: Composite Figures | *Professional & Student*<br>Professional<br>Teacher-share<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>PLC<br>Students<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>Online textbook<br>Glencoe Math-Course 2: Volume 2<br>- Model Sheets<br>- Formulas<br>- Graphic Organizers<br>- Rate Yourself<br>- Reflect On Essential Question<br>- Quick check<br>- Foldable |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Unit 3 Student Self-Reflection Form re: essential and guiding questions**<br>**Summative: Other written** | **Information Literacy**<br>**Problem Solving**<br>**Spoken Communication** | 1. Reason abstractly and quantitatively |

| | | |
|---|---|---|
| **assessments**<br><br>**Exit Tickets for Unit 3**<br>**Formative: Other written assessments**<br><br>**Design Your Own Park Performance Task**<br>**Summative: Group Project**<br><br>**Unit 3 test**<br>**Summative: Written Test** | **Written Performance** | 2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

Last Updated: Tuesday, November 11, 2014, 1:59PM

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# Proportional Relationships

Collaboration **Math Grade 7 Accelerated** Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 2:52PM*

**Unit: Proportional Relationships** (Week 20, 4 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Mathematics can be used to describe change and model real world situations.

## Essential Question(s)

1. How can you use mathematics to describe change, and model real world situations?
2. How can you show that two objects are proportional?
3. How can percent help you understand situations involving money?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. How can you solve a proportion?
2. How can you show that two objects are proportional with a table?
3. How can you show that two objects are proportional with a graph?
4. How can you show that two objects are proportional with an equation?
5. How is rate a measure of one quantity per unit of another quantity?
6. Give an example of a real-world situation in which you would find the percent of a number.
7. Explain how two amounts of change can be the same but the percents of change can be different.

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, Ratios & Proportional Relationships**

7.RP.A. Analyze proportional relationships and use them to solve real-world and mathematical problems.

- 7.RP.A.1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
- 7.RP.A.2. Recognize and represent proportional relationships between quantities.
- 7.RP.A.2a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
- 7.RP.A.2b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- 7.RP.A.2c. Represent proportional relationships by equations.
- 7.RP.A.2d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

- Recognize proportional relationships – 1,2
- Represent proportional relationships in a variety of ways - 3
- Decide proportional relationship - 5
- Test equivalent ratios - 5
- Observe graph - 1
- Identify constant of proportionality - 4
- Explain point (x,y) - 2
- Solve multi-step problems – 4,5
- Compute unit rates - 3
- Compute actual lengths/areas from scale drawings - 3
- Reproduce a scale drawing at a different scale – 2 (covered in unit 3)

- 7.RP.A.3. Use proportional relationships to solve multistep ratio and percent problems.

**CCSS: Mathematics, CCSS: Grade 7, Geometry**
7.G.A. Draw construct, and describe geometrical figures and describe the relationships between them.

- 7.G.A.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

| **Content/Topics** | **Skills** |
|---|---|
| *Critical content that students must **KNOW*** | *Transferable skills that students must be able to **DO*** |
| • Use bar diagram to understand ratios<br>• Find unit rate<br>• Simplify a complex fraction and find the unit rate<br>• Convert unit rates using dimensional analysis<br>• Identify proportional and non-proportional relationships using a table<br>• Graph proportional and non-proportional relationships<br>• Identify proportional and non-proportional relationships using a graph<br>• Write proportion problems<br>• Solve proportion problems<br>• Use unit rate<br>• Find constant rate of change (unit rate) using a table<br>• Find constant rate of change (unit rate) using a graph<br>• Find constant rate of change (unit rate) using an equation<br>• Find constant rate of change (unit rate) using diagrams<br>• Find constant rate of change (unit rate) using verbal descriptions<br>• Understand and find slope as vertical change/horizontal change and rise/run<br>• Determine direct variation<br>• Use bar diagrams to represent fractions and percents<br>• Find the percent of a number<br>• Use percents greater than 100 and percents less than 1<br>• Estimate the percent of a number<br>• Use the percent proportion (part/whole) to find: part, whole, percent<br>• Use the percent equation to find: part, whole, percent<br>• Determine Reasonable Answers<br>• Find percent change and percent error using an equation<br>• Find Sales Tax and Total Cost<br>• Find tips and Markups<br>• Find Sale Price and Original Cost<br>• Find simple interest using an equation for savings, | • 2. Work independently and collaboratively to solve problems and accomplish goals.<br>• 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving. |

loans and credit cards
- Technology: Compound interest-spreadsheet
- Scale Drawings (covered in Unit 3)

**Vocabulary**
Complex fraction
Constant of proportionality
Constant rate of change
Constant of variation
Coordinate plane
Cross products
Dimensional analysis
Direct variation
Discount
Equivalent ratios
Gratuity
Markup
Markdown
Non-proportional
Percent Equation
Percent Error
Percent of change
Percent of decrease
Percent of increase
Percent proportion
Principle
Proportion
Proportional
Ordered Pair
Origin
Quadrant
Rate
Rate of Change
Sales Tax
Selling Price
Simple Interest
Slope
Tip
Unit Rate
x-axis
x-coordinate
y-axis
y-coordinate

| Core Learning Activities | Resources |
|---|---|
| • VersaTiles<br>• Inquiry Lab: Unit Rates<br>• Problem Solving Investigation: The Four Step Plan<br>• Inquiry Lab: Proportional and Non Proportional Relationships<br>• Inquiry Lab: Rate of Change<br>• Inquiry Lab: Percent Diagrams<br>• Inquiry Lab: Find Percents<br>• Problem-Solving Investigation: Determine Reasonable Answers<br>• Inquiry Lab: Rate of Change<br>• Inquiry Lab: Compound Interest | *Professional & Student*<br>Professional<br>Teacher-share<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>PLC<br>Students<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>Online textbook<br>Glencoe Math-Course 2: Volume 1<br>- Review: Function using input->rule->output<br>- Foldable- key concept: table, graph, equation<br>- Foldable- key concept: percent equation and proportion<br>- Study skill: Draw a picture<br>- graph paper<br>- Graphic Organizer-slope<br>- Graphic Organizer-compare and contrast tax and discount |

| | |
|---|---|
| | - Rate Yourself<br>- Reflect On Essential Question<br>- Quick check<br>- Foldable |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Become a travel expert performance task**<br>**Summative: Group Project**<br><br>**Unit 4 Student Self-Reflection Form re: essential and guiding questions**<br>**Summative: Other written assessments**<br><br>**Exit Tickets available on teacher-share**<br>**Formative: Other written assessments**<br><br>**Unit 4 Assessment**<br>**Summative: Written Test** | **Information Literacy**<br>**Problem Solving**<br>**Spoken Communication**<br>**Written Performance** | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

Last Updated: Tuesday, November 11, 2014, 1:59PM

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# Algebraic Reasoning II

Collaboration **Math Grade 7 Accelerated** Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 2:52PM*

**Unit: Algebraic Reasoning II** (Week 24, 4 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Rewriting an expression in different forms can show how the quantities in a problem are related.
2. Mathematical expressions represent relationships.

## Essential Question(s)

1. How can you communicate mathematical ideas effectively?
2. How can you use numbers and symbols to represent mathematical ideas?
3. What does it mean to say that two quantities are equal?
4. How can relationships be expressed symbolically?
5. What strategies can be used to solve for unknowns?
6. How can we express real-world situations mathematically?
7. Where in the real world would I find patterns?
8. When are algebraic and numeric expressions used?
9. Why do we use variables?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. When do you use a variable?
2. How do you know which operation symbol to use?
3. When do you use an equal sign?
4. When do you use an inequality symbol?
5. How can we use variables to represent unknowns in real-world situations?
6. How can we use properties of operations to solve two-step equations and inequalities?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, Expressions & Equations**

7.EE.A. Use properties of operations to generate equivalent expressions.

- 7.EE.A.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- 7.EE.A.2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

7.EE.B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

- 7.EE.B.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

- Use variables (3)
- Construct simple equations and inequalities (3)
- Solve problems in context (4, 5)
- Simple equations
- Simple inequalities
- Reason about quantities (4)
- Compare solutions (2)
- Graph inequality (3)
- Interpret inequality (2)
- Apply properties of operations (3)
- Factor linear expressions with rational coefficients (4)
- Expand Linear expressions with rational coefficients (3)
- Write an expression in different forms (3)
- Understand how rewriting an expression in different forms can show how the quantities in a problem are related (2)

## Content/Topics

## Skills

| *Critical content that students must **KNOW*** | *Transferable skills that students must be able to **DO*** |
|---|---|
| • Write Algebraic Expressions<br>• Evaluate Algebraic Expressions<br>• Describe and Extend Sequences<br>• Properties of Operations<br>• Use the Distributive Property<br>• Identify Parts of an Expression<br>• Simplify Algebraic Expressions<br>• Add Linear Expressions<br>• Subtract Linear Expressions<br>• Use Additive Inverse to Subtract<br>• Factor Linear Expressions<br>• Find the GCF of Monomials<br>• Solve One-Step Equations<br>• Properties of Equality<br>• Solve Equations with Rational Coefficients<br>• Solve Two-Step Equations<br>• Solving One and Two-Step Inequalities<br>• Properties of Inequality<br>• Graph Solution to Inequality<br><br>**Vocabulary:**<br>Addition Property of Equality<br>Addition Property of Inequality<br>Additive Identity Property<br>Algebra<br>Algebraic Expression<br>Arithmetic Sequence<br>Associative Property<br>Coefficient<br>Commutative Property<br>Constant<br>Counterexample<br>Define a Variable<br>Distributive Property<br>Division Property of Equality<br>Division Property of Inequality<br>Equation<br>Equivalent Expressions<br>Equivalent Equations<br>Factor<br>Factored Form<br>Like Terms<br>Linear Expression<br>Monomial<br>Multiplicative Identity Property<br>Multiplicative Property of Equality<br>Multiplicative Property of Inequality<br>Multiplicative Property of Zero<br>Property<br>Sequence<br>Simplest Form<br>Solution<br>Subtraction Property of Equality<br>Subtraction Property of Inequality<br>Term<br>Two-Step Equation<br>Two-Step Inequality<br>Variable | • 2. Work independently and collaboratively to solve problems and accomplish goals.<br>• 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving. |

| Core Learning Activities | Resources |
|---|---|
| Inquiry Lab: Sequences<br>Problem-Solving Investigation: Make a Table<br>Inquiry Lab: Factor Linear Expressions<br>Inquiry Lab: Solve One-Step Addition and Subtraction Problems<br>Inquiry Lab: Multiplication Equations with Bar Diagrams<br>Inquiry Lab: Solve Equations with Rational Coefficients<br>Inquiry Lab: Solve Two-Step Equations<br>Inquiry Lab: More Two-Step Equations<br>Problem-Solving Investigation: Work Backward<br>Inquiry Lab: Solve Inequalities<br>"Expressions Activity"<br>"Food Expressions Activity"<br>VersaTiles<br>Algebra Tiles | *Professional & Student*<br>Professional<br>Teacher-share<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>PLC<br>Students<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>Online textbook<br>Glencoe Math-Course 2: Volume 2<br>- Study Skill: Reading Math (key words)<br>- Foldable- Linear Expressions<br>- Foldable- Solve Two-Step Equations<br>- Box sheets<br>- Graphic Organizer-Properties<br>- Rate Yourself<br>- Reflect On Essential Question<br>- Quick check<br>- Foldable |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Unit 5 Student Self-Reflection Form re: essential and guiding questions**<br>**Summative: Other written assessments**<br><br>**Exit Tickets available on teacher-share**<br>**Formative: Other written assessments**<br><br>**"School Dance DJ" performance task**<br>**Summative: Group Project**<br><br>**Unit 5 Assessment**<br>**Summative: Written Test** | **Information Literacy**<br>**Problem Solving**<br>**Spoken Communication**<br>**Written Performance** | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

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# Congruence and Similarity

Collaboration Math Grade 7 Accelerated Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 2:53PM*

**Unit: Congruence and Similarity** (Week 28, 4 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Reflections, translations, and rotations are actions produce congruent geometric figures in the world around us
2. Real-world objects can be measured indirectly using properties of similarity.
3. Patterns can help us draw conclusions
4. Rigid and non-rigid transformations play an important role in congruency and similarity.

## Essential Question(s)

1. How can you determine congruency and similarity?
2. What are the similarities and differences between congruency and similarity of polygons?
3. How is a dilation always similar to an pre-image?
4. How do you use indirect measurement to find unknown lengths?
5. How are scale drawings and models used in everyday life?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. How do we apply the properties of triangles to prove congruency?
2. What are corresponding parts?
3. Are there any properties that will not prove congruency but will prove similarity?
4. How are proportions and similarity used in the real world

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 8, Geometry**

8.G.A. Understand congruence and similarity using physical models, transparencies, or geometry software.

- 8.G.A.1. Verify experimentally the properties of rotations, reflections, and translations:
- 8.G.A.1a. Lines are taken to lines, and line segments to line segments of the same length.
- 8.G.A.1b. Angles are taken to angles of the same measure.
- 8.G.A.1c. Parallel lines are taken to parallel lines.
- 8.G.A.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
- 8.G.A.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
- 8.G.A.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

## Objective(s)

Bloom/ Anderson Taxonomy / DOK Language

- VERIFY (Experimentally properties of) - 2
  - Rotations
  - Reflections
  - Translations
  - Dilations
- UNDERSTAND (Congruency) - 2,3
- DESCRIBE (Sequence of rotations, reflections, translations) - 2,3
- UNDERSTAND (Similarity) - 2,3
- DESCRIBE (Sequence of rotations, reflections, translations, dilations) - 2
- DESCRIBE (effect of dilations, translations, rotations and reflections using coordinates) - 2
- PROVE (informally) - 5
  - Angle relationships in parallel lines cut by a transversal
  - Sum of angles in a triangle = 180°

- 8.G.A.5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

**Content/Topics**

*Critical content that students must **KNOW***

1. Rigid Transformations
2. Corresponding parts of polygons
3. Relationships for congruency
4. Proportional reasoning
5. Non-rigid transformation
6. Indirect measurement

**Skills**

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

**Core Learning Activities**

1. Geometer's Sketchpad
2. Illuminations website
3. NLVM website
4. TI-73 calculators
5. Versatiles: Proportions, Geometry

**Resources**

*Professional & Student*

Professional

Students: access to computers/internet
access to TI-73 calculator
Versatiles

**Assessments (Titles)**

**Student Reflection**
**Summative: Written Report**
Students will complete a Pre and Post Unit reflection with evaluation of performance. Students will compare their self-evaluation with teacher comments,

**Common Formative Assessment**
**Formative: Standardized Test**
Students will take a series of mastery quizzes during the course of the unit to track student understanding and growth.

**Quarter Test**
**Summative: Written Test**
Students will complete a common quarter test covering all of the standards taught during that marking period.

**Indirect Measurement WebQuest**
**Summative: Technology Project**
Students will complete an indirect measurement webquest during which they demonstrate their ability to indirectly measure varying objects and distances using similarity.

**Graduation Standards**

**Information Literacy**
**Problem Solving**
**Spoken Communication**
**Written Performance**

**Interdisciplinary Connections**

1. Reason abstractly and quantitatively
2. Use appropriate tools strategically
3. Attend to precision
4. Look for and express regularity in repeated reasoning.
5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks
6. Analyze, evaluate and use information

# Inferences about Populations

Collaboration **Math Grade 7 Accelerated** Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 2:54PM*

**Unit: Inferences about Populations** (Week 32, 3 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population.
2. Understand that random sampling tends to produce representative samples and support valid inferences.
3. The way data is collected, organized and displayed influences interpretation

## Essential Question(s)

1. How do I interpret data for a specific population and draw conclusions?
2. What inferences can I make from sample data?
3. How do you know which type of graph to use when displaying data?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. When is a bar graph used to display data?
2. When is a line graph used to display data?
3. When is a double dot plot used to display data?
4. When is a double box plot used to display data?
5. What is the benefit of looking at only a sample of the population?
6. When is a sample valid?
7. Why is random sampling effective?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, Statistics & Probability**

7.SP.A. Use random sampling to draw inferences about a population.

- 7.SP.A.1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
- 7.SP.A.2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

7.SP.B. Draw informal comparative inferences about two populations.

- 7.SP.B.3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

- Understand and Use Statistics - 2
- Examine a Sample of the Population - 2,3
- Generalize information about a population - 4,5
- Determine if a sample is representative/valid - 3,4
- Use measures of center and measures of variability for numerical data from random samples - 4,5
- Draw informal comparative inferences
- Use data from a random sample
- Draw inferences about a population - 4,5
- Generate multiple samples of the same size - 3
- Gauge the variation in estimates or predictions
- Express and Calculate the difference between the centers of two numerical data distributions as a multiple of a measure of variability – mean absolute deviation - 3

between the centers by expressing it as a multiple of a measure of variability.
- 7.SP.B.4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

**Content/Topics**

*Critical content that students must **KNOW***

- Make Predictions Using Ratios
- Make Predictions Using Equations
- Biased and Unbiased Samples
- Use Multiple Data Samples
- Use Sampling to Predict
- Use a Graph
- Collect Data
- Identify a Misleading Graph
- Identify Misleading Statistics
- Compare Two Populations
- Recognize Visual Overlap
- Calculate Difference in Means
- Calculate Mean Absolute Deviation
- Select an Appropriate Display

**Vocabulary:**
Biased Sample
Convenience Sample
Difference in Means
Double Box Plot
Double Dot Plot
Mean Absolute Deviation
Population
Sample
Simple Random Sample
Statistics
Survey
Systematic Random Sample
Unbiased Sample
Visual Overlap
Voluntary Response Sample

**Skills**

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

**Core Learning Activities**

Inquiry Lab: Multiple Samples of Data
Problem-Solving Investigation: Use a Graph
Inquiry Lab: Collect Data
Inquiry Lab: Visual Overlap of Data Distributions
Market Research Performance Assessment

**Resources**

*Professional & Student*
Professional
Teacher-share
Textbook – Prentice Hall Mathematics Course 2 and 3
PLC
Students
Textbook – Prentice Hall Mathematics Course 2 and 3
Online textbook
Glencoe Math-Course 2: Volume 2
- Study Skill: Writing Math
- Graph paper
- Graphic Organizer-Biased and Unbiased Samples
- Rate Yourself
- Reflect On Essential Question
- Quick check

| - Foldable | | |
|---|---|---|
| **Assessments (Titles)** | **Graduation Standards** | **Interdisciplinary Connections** |
| **Unit 6 Student Self-Reflection Form re: essential and guiding questions**<br>**Summative: Other written assessments**<br><br>**Exit Tickets available on teacher-share**<br>**Formative: Other written assessments**<br><br>**Unit 6 Assessment**<br>**Summative: Written Test**<br><br>**Market Research performance task**<br>**Summative: Group Project** | Information Literacy<br>Problem Solving<br>Spoken Communication<br>Written Performance | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

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# Volume

Collaboration Math Grade 7 Accelerated Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 2:54PM*

**Unit: Volume** (Week 35, 3 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. The knowledge of the formulas for the volumes of cones, cylinders and spheres can be used to solve real-world and mathematical problems.

## Essential Question(s)

1. How can the volume of 3-D objects be used to solve real world problems?
2. Is the exact answer or the estimated answer more beneficial in the real world?
3. Why are formulas important in math and science?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. How are some 3-D figures related to circles?
2. How does multiplying the dimensions of a 3-D figure by a scale factor affect its volume?
3. How does the knowledge of a solid assist in finding the volume of a composite or portion of a solid?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 8, Geometry**

8.G.C. Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

- 8.G.C.9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

## Objective(s)

Bloom/ Anderson Taxonomy / DOK Language

- Know the formulas for the volumes of cones, cylinders, and spheres - 2 **8.G.9**
- Apply the formulas for volumes of cones, cylinders, and spheres to solve real-world and mathematical problems. - 3
- Solve volume problems in context. - 3

## Content/Topics

*Critical content that students must **KNOW***

1. Identify 3-D figures from their attributes
2. Use the formula for the volume of the 3-D figure ( cones, cylinders, and spheres)

## Skills

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

## Core Learning Activities

- Web Quest
- TI-73 calculators
- Versatiles:

## Resources

*Professional & Student*

Professional:

Text: Prentice Hall Math Course 3

Ancillaries provided by publisher

Math Department staff generated materials

Math Department reference books

Internet resources

| | |
|---|---|
| | Students: access to computers/internet<br>www.phschool.com<br>www.drmath.com<br>www.purplemath.com<br>www.kahnacademy.org<br>Illuminations<br>National Council of Virtual Manipulative<br><br>Text: Prentice Hall Math Course 3<br>access to TI-73 calculator<br>Versatiles |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Packing Predicament**<br>**Summative: Group Project**<br>Students will complete a performance to pack the trunk of a car for a vacation using various volume formulas.<br><br>**Unit Test**<br>**Summative: Written Test**<br><br>**Quarter Test**<br>**Summative: Standardized Test** | **Information Literacy**<br>**Problem Solving**<br>**Spoken Communication**<br>**Written Performance** | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

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# Probability

Collaboration Math Grade 7 Accelerated Grade 7 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 2:55PM*

**Unit: Probability** (Week 38, 3 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Understand probability measures the likelihood of an event to occur.
2. Understand probability helps to analyze the risk in a situation and make informed decisions.
3. Understand probability is used to make inferences and predictions about a situation.

## Essential Question(s)

1. How can you find the number of outcomes of more than one event?
2. How can you predict the outcome of future events?
3. How can you determine the likelihood of an event?
4. How do independent and dependent events differ?
5. What is the difference between theoretical and experimental probability?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. How can you use theoretical probability to predict the outcome of future events?
2. How can you use experimental probability to predict the outcome of future events?
3. How can you use sample space to predict the outcome of future events?
4. How can you use simulation to predict the outcome of future events?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 7, Statistics & Probability**

7.SP.C. Investigate chance processes and develop, use, and evaluate probability models.

- 7.SP.C.5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
- 7.SP.C.6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
- 7.SP.C.7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
- 7.SP.C.7a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.
- 7.SP.C.7b. Develop a probability model (which may

## Objective(s)

Bloom/ Anderson Taxonomy / DOK Language

- Develop and use
  - a uniform probability model – 3,6
  - a probability model which may not be uniform – 3,6
- Find
  - probabilities of simple events - 3
  - probability of compound events using organized lists, tables, tree diagrams and simulation - 3
  - frequencies for compound events - 3
- Compare probabilities from a model to observed frequencies - 2
- Explain possible sources of the discrepancy - 5
- Observe frequencies in data - 1

- Understand - 2
  - probability of a chance event is a number between 0 and 1
  - probability of a compound event is the fraction of outcomes in the sample space
- Predict approximate relative frequency - 5

not be uniform) by observing frequencies in data generated from a chance process.
- 7.SP.C.8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
- 7.SP.C.8a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
- 7.SP.C.8b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.
- 7.SP.C.8c. Design and use a simulation to generate frequencies for compound events.

| **Content/Topics** | **Skills** |
|---|---|
| *Critical content that students must **KNOW*** | *Transferable skills that students must be able to **DO*** |
| • Determine Probability of Simple Events<br>• Find and use Relative Frequency<br>• Experimental and Theoretical Probability<br>• Predict Future Events<br>• Determine Probability of Compound Events<br>• Find a Sample Space<br>• Find Probability<br>• Simulations<br>• Model Equally Likely Outcomes<br>• Model Unequally Likely Outcomes<br>• Fundamental Counting Principle<br>• Permutations<br>• Probability of Independent Events<br>• Probability of Dependent Events<br><br>**Vocabulary:**<br>Complementary Events<br>Compound Events<br>Dependent Events<br>Chance Events (old-Experimental Probability)<br>Fair<br>Fundamental Counting Principle<br>Independent Events<br>Outcome<br>Permutation<br>Probability<br>Random<br>Relative Frequency<br>Sample Space<br>Simple Event<br>Simulation<br>Theoretical Probability<br>Tree Diagram<br>Uniform Probability Model<br>Unfair | • 2. Work independently and collaboratively to solve problems and accomplish goals.<br>• 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving. |
| **Core Learning Activities** | **Resources** |

| | |
|---|---|
| Inquiry Lab: Relative Frequency<br>Problem-Solving Investigation: Act it Out<br>Inquiry Lab: Fair and Unfair Games<br>Inquiry Lab: Simulate Compound Events<br>Inquiry Lab: Independent and Dependent Events<br>Career in Medicine | *Professional & Student*<br>Professional<br>Teacher-share<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>PLC<br>Students<br>Textbook – Prentice Hall Mathematics Course 2 and 3<br>Online textbook<br>Glencoe Math-Course 2: Volume 2<br>- Graphic Organizer-Outcomes<br>- Foldable – Probability Example/Picture<br>- Rate Yourself<br>- Reflect On Essential Question<br>- Quick check<br>- Foldable |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Unit 7 Student Self-Reflection Form re: essential and guiding questions**<br>**Summative: Other written assessments**<br><br>**Exit Tickets available on teacher-share**<br>**Formative: Other written assessments**<br><br>**Unit 7 Assessment**<br>**Summative: Written Test** | **Information Literacy**<br>**Problem Solving**<br>**Spoken Communication**<br>**Written Performance** | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

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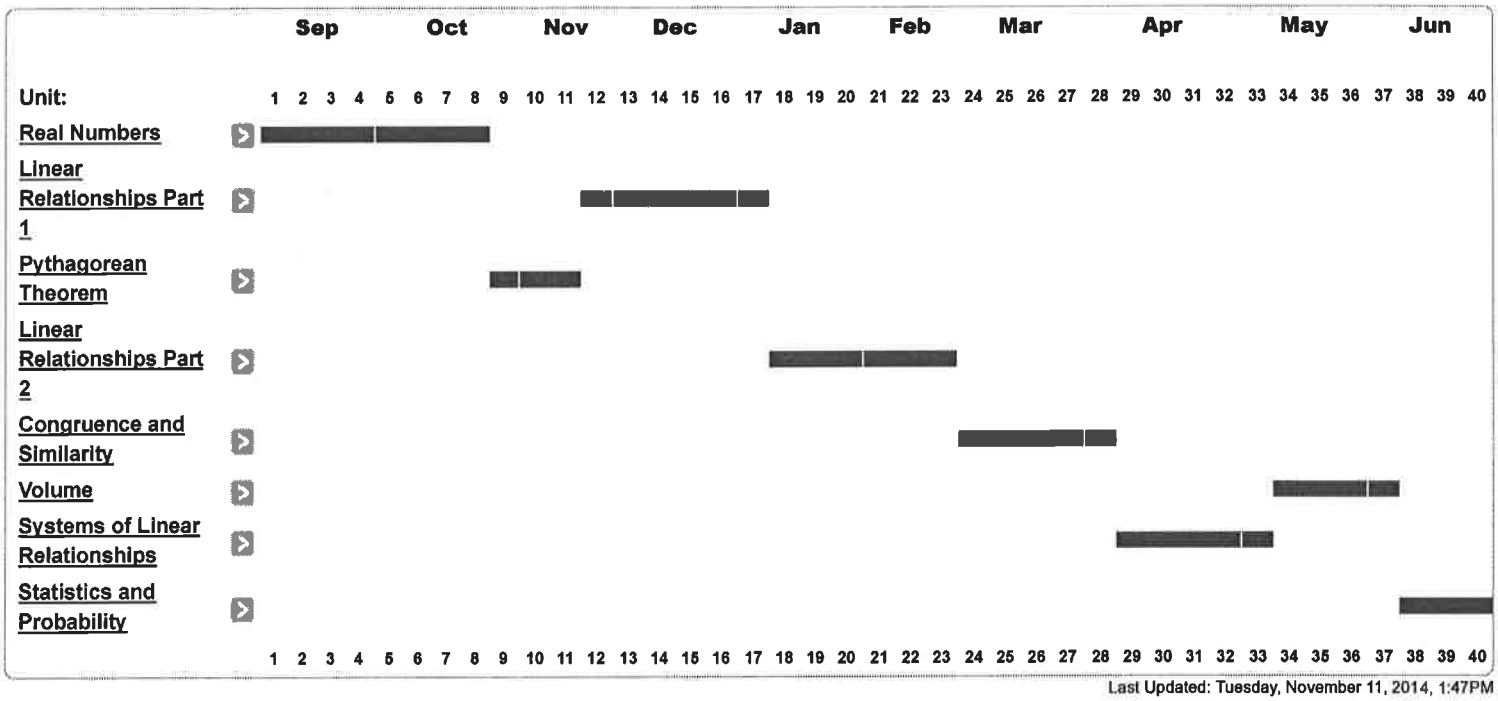
Newtown Public Schools

## Course Assignments › Math Grade 8

Collaboration | Grade 8 | Mathematics | Newtown Middle School

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# Real Numbers

Collaboration Math Grade 8 Grade 8|Mathematics|Newtown Middle School|2014-2015

*Wednesday, November 12, 2014, 3:05PM*

**Unit: Real Numbers** (Week 1, 8 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Operations create relationships among numbers.
2. Acknowledge the reasonableness of a quantitative outcome from using good number sense and estimation strategies.

## Essential Question(s)

1. What is the difference between rational and irrational numbers?
2. What makes estimation reasonable?
3. Where would you find the very big and very small numbers?
4. How would you most efficiently use very big and very small numbers?
5. When is it acceptable to approximate versus being exact?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. This number is an example of which type of number?
2. Which type of number converts to a fraction or a decimal?
3. What is a perfect square/perfect cube?
4. What is a good process to find a reasonable approximation of an irrational number?
5. How do we apply the properties of integers to exponents?
6. How do we apply Scientific Notation in the Real World?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 8, The Number System**

8.NS.A. Know that there are numbers that are not rational, and approximate them by rational numbers.

- 8.NS.A.1. Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.
- 8.NS.A.2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions

**CCSS: Mathematics, CCSS: Grade 8, Expressions & Equations**

8.EE.A. Work with radicals and integer exponents.

- 8.EE.A.1. Know and apply the properties of integer exponents to generate equivalent numerical expressions.
- 8.EE.A.2. Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

KNOW (rational and irrational numbers) - 2
UNDERSTAND (decimal expansion) -2
SHOW (decimal expansion repeats) -2
CONVERT (repeating decimal expansion to a rational number) -3
USE: **integer power of 10**
ESTIMATE (large or small quantities) - 3
EXPRESS (magnitude of numbers using powers of 10) - 2
**rational approximations or irrational numbers**
COMPARE (sizes or rational numbers) - 1
LOCATE (rational numbers approximately on the number line) - 2
ESTIMATE (value of expressions) - 2
**Square root and cube root symbols**
REPRESENT (solutions to equations) - 2
EVALUATE (square roots of perfect squares and cubed roots of perfect cubes) - 1,3
**Scientific Notation**
REPRESENT (very large and very small numbers) - 2
CHOOSE (units of appropriate size) - 3

KNOW/APPLY (properties of integer exponents) - 3
GENERATE (equivalent numerical expressions) - 3

| | |
|---|---|
| and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.<br>• 8.EE.A.3. Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.<br>• 8.EE.A.4. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. | CALCULATE/CONVERT (numbers expressed in scientific notation/decimal form) - 4<br>INTERPRET (scientific notation generated by technology) - 3 |

| **Content/Topics** | **Skills** |
|---|---|
| *Critical content that students must **KNOW*** | *Transferable skills that students must be able to **DO*** |
| 1. Conversion of terminating and repeating decimals to fractions<br>2. Identify irrational numbers<br>3. Identify perfect squares/cubes<br>4. State the square/cubed root for perfect squares/cubes<br>5. Approximate square/cubed roots<br>6. Powers (x/÷ rules, power to a power, fractional, zero and negative exponents)<br>7. Scientific Notation (convert and compare, products and quotients) | • 2. Work independently and collaboratively to solve problems and accomplish goals.<br>• 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving. |

| **Core Learning Activities** | **Resources** |
|---|---|
| 1. Web Quest<br>2. TI-73 calculators<br>3. Versatiles: Real Numbers , Expressions & Equations | *Professional & Student*<br>Professional<br>Students: access to computers/internet<br>access to TI-73 calculator<br>Versatiles |

| **Assessments (Titles)** | **Graduation Standards** | **Interdisciplinary Connections** |
|---|---|---|
| **Quarter 1 Test**<br>**Summative: Written Test**<br>A test of all of the material for quarter 1, given by every grade 8 math teacher.<br><br>**Common Formative Assessment**<br>**Formative: Written Test**<br>One of 6 Common Formative Assessments given during the unit to track student growth for each standard.<br><br>**Student Reflection**<br>**Summative: Written Report**<br>Students will complete a pre and post written reflection on the topics covered | **Information Literacy**<br>**Problem Solving**<br>**Spoken Communication**<br>**Written Performance** | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create |

| | | |
|---|---|---|
| in the unit. Students will evaluate their individual performance and compare it to the evaluation by the instructor.<br><br>**Exponent Web Quest**<br>**Summative: Technology Project**<br>Students will complete a webquest on the use of exponents in the real world. | | a solution and/or a product<br>7. Evaluate both the process and the product |

**<< Previous Year**

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# Linear Relationships Part 1

Collaboration Math Grade 8 Grade 8 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 3:07PM*

**Unit: Linear Relationships Part 1** (Week 12, 6 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Mathematical models can be used to clarify real-world relationships.
2. Real world situations can be represented symbolically and graphically.
3. Algebraic expressions and equations generalize relationships from specific cases.

## Essential Question(s)

1. How can algebraic expressions help solve real world problems?
2. How can mathematical models be used to describe real-world situations?
3. How can algebraic expressions and equations be used to show relationships?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. What does a variable represent in an equation?
2. How do we use inverse operations to solve algebraic equations?
3. How can we use the number properties to simplify an equation?
4. What types of solutions can equations have?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 8, Expressions & Equations**

8.EE.C. Analyze and solve linear equations and pairs of simultaneous linear equations.

- 8.EE.C.7. Solve linear equations in one variable.
- 8.EE.C.7a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).
- 8.EE.C.7b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

- SOLVE (linear equations) - 3
- Transform (equations) - 3
- EXPAND (expressions) - 3
  - Use the distributive property
  - Collect (like terms)

## Content/Topics

*Critical content that students must **KNOW***

1. algebraic method to solve two-step equations with rational coefficient
2. combining similar terms
3. simplify the distributive property
4. method to solve equations with variable on

## Skills

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem

| | |
|---|---|
| both sides of the equal sign<br>5. 3 possible cases for the solution to an equation (x=a, a=a, or a=b results) | solving. |

| Core Learning Activities | Resources |
|---|---|
| Manipulatives: (Algebra Tiles, Equation Balance)<br>VersaTiles: Algebraic Expressions & Equations, Algebra 1 & Linear Functions | *Professional & Student*<br>Professional:<br>Text: Prentice Hall Math Course 3<br>Ancillaries provided by publisher<br>Math Department staff generated materials<br>Math Department reference books<br>Internet resources<br>Students: access to computers/internet<br>www.phschool.com<br>www.drmath.com<br>www.purplemath.com<br>www.kahnacademy.org<br>Text: Prentice Hall Math Course 3<br>Access to TI-73 calculator<br>VersaTiles<br>Algebra Tiles |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Quarter Test**<br>**Summative: Standardized Test**<br>Students are given a grade level standardized quarter test at the end of each quarter. Questions from our beginning of the year diagnostic are repeated to show student growth.<br><br>**Student Written Reflection**<br>**Summative: Written Report**<br>Students prepared a written reflection based on their new understanding after instruction in the unit.<br><br>**Unit Test**<br>**Summative: Written Test**<br><br>**Common Formative Assessment**<br>**Formative: Written Test**<br>Students take a CF to assess where they are in the equation unit. | **Information Literacy**<br>**Problem Solving**<br>**Spoken Communication**<br>**Written Performance** | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

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# Pythagorean Theorem

Collaboration Math Grade 8 Grade 8 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 3:07PM*

**Unit: Pythagorean Theorem** (Week 9, 3 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Pythagorean Theorem is one of the most important relationships in all mathematics.
2. Applying Pythagorean Theorem helps you solve interesting problems with distance and length.

## Essential Question(s)

1. Where in the real-world can you apply Pythagorean Theorem
2. What is the meaning of Pythagorean Theorem?
3. How are real numbers and the Pythagorean Theorem used in every day life?
4. What is the relationship of Pythagorean Theorem and slope
5. Where does Pythagorean Theorem apply in a 3-D figure?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. Will the Pythagorean Theorem work for triangles that are not right triangles?
2. How can you use any two sides of a right triangle to find the third side?
3. How can you use the Pythagorean Theorem to find the length of any line segment on a coordinate plane that is not vertical or horizontal?
4. How can you use Pythagorean Theorem to determine the diagonal of a 3-D figure?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 8, Geometry**

8.G.B. Understand and apply the Pythagorean Theorem.

- 8.G.B.6. Explain a proof of the Pythagorean Theorem and its converse.
- 8.G.B.7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
- 8.G.B.8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

1. Explain a proof of the Pythagorean Theorem and its converse. -4
2. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. - 3
3. Apply the Pythagorean Theorem to find the distance between two points in a coordinate plane - 3

## Content/Topics

*Critical content that students must **KNOW***

1. Explain a proof of Pythagorean Theorem andits converse.
2. Find missing side in a right triangle (leg and Hypotenuse).
3. Find the distance between 2 points using Pythagorean Theorem.
4. Find the length of the diagonal of a 3-D Figure
5. Find the slant height of a cone and pyramid using

## Skills

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

the Pythagorean theorem.

| Core Learning Activities | Resources |
|---|---|
| TI-73 calculators<br>Pythagorean Project<br>VersaTiles: Algebra 1 & Expressions & Equations | *Professional & Student*<br>Professional:<br>Text: Prentice Hall Math Course 3<br>Ancillaries provided by publisher<br>Math Department staff generated materials<br>Math Department reference books<br>Internet resources<br><br>Students: access to computers/internet<br>www.phschool.com<br>www.drmath.com<br>www.purplemath.com<br>www.kahnacademy.org<br>Text: Prentice Hall Math Course 3<br>Access to TI-73 calculator<br>VersaTiles |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Quarterly Assessment**<br>**Summative: Written Test**<br>Students will take a grade level assessment at the end of each marking period covering all of the topics learned in class.<br><br>**Common Formative Assessments (4)**<br>**Formative: Written Test**<br>Students will take 4 common formative assessments to measure mastery of the different topics within the unit.<br><br>1. Find missing side of a right triangle<br>2. Distance between 2 points<br>3. Proving right triangles<br>4. Application of Pythagorean Theorem<br><br>**KWL Chart**<br>**Formative: Written Report**<br>Students will complete a KWL chart at the beginning of the unit to demonstrate pre-knowledge of the concepts being taught.<br><br>**Student Reflection**<br>**Summative: Written Report**<br>Students will provide a self evaluation report analyzing their growth from pre-assessment to end of unit assessment. Students will compare their analysis to that of the teacher. | **Information Literacy**<br>**Problem Solving**<br>**Spoken Communication**<br>**Written Performance** | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

**<< Previous Year**

# Linear Relationships Part 2

Collaboration Math Grade 8 Grade 8 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 3:08PM*

**Unit: Linear Relationships Part 2** (Week 18, 6 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Data can be expressed in varying formats.
2. Functions are used to map data in a very particular way.

## Essential Question(s)

1. In what forms can functions be represented?
2. How do you manipulate data? (graphically, algebraically, numerically, and verbally)
3. Is the y-intercept always a relevant value?
4. What connections can we make between proportional relationships, line, and linear equations?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. What is a function?
2. Are all functions linear?
3. What are the different ways to display data?
4. What is the difference between an independent and a dependent variable?
5. What is meant by the y-intercept? (graphically and verbally)
6. How do you correctly label a graph?
7. How does slope relate to unit rate?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 8, Expressions & Equations**

8.EE.B. Understand the connections between proportional relationships, lines, and linear equations.

- 8.EE.B.5. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.
- 8.EE.B.6. Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.

**CCSS: Mathematics, CCSS: Grade 8, Functions**

8.F.A. Define, evaluate, and compare functions.

- 8.F.A.1. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
- 8.F.A.3. Interpret the equation y = mx + b as

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

- GRAPH (proportional relationships) - 4
- INTERPRET (unit rate as slope) - 2
- COMPARE (proportional relationships) - 2
- EXPLAIN (why slope is the same between any two points on a non-vertical line using similar triangles) - 3
- DERIVE (linear equations y=mx and y=mx+b) - 3
- UNDERSTAND (function is a rule) - 2
- GRAPH (sets of ordered pairs)
- COMPARE (functions) - 3
  - Algebraically
  - Graphically
  - Numerically in tables
  - Verbal descriptions
- CONSTRUCT (function) - 3
- DETERMINE (rate of change and initial value of a function)
- READ (table or graph)
- GIVE (examples of non-linear functions) - 2
- DESCRIBE (functional relationship between two quantities) - 2
- DRAW (graph from a verbal description) - 3

defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

8.F.B. Use functions to model relationships between quantities.

- 8.F.B.4. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
- 8.F.B.5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

**Content/Topics**

*Critical content that students must **KNOW***

1. Understand connections between proportional relationships, line and llinear equations
2. Distinguish between a function vs. relation
3. Graph functions (from table, equation, or verbally)
4. Find rate of change (table, graph, equation, 2 plotted points)
5. Find the y-intercept (table, graph, equation, verbally)
6. Identify non-linear functions
7. State functional relationships

**Skills**

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

**Core Learning Activities**

1. Project: "Stressed Out"
2. TI-73 calculators
3. VersaTiles: Algebra 1 & Linear Functions, Algebra 1 & Functions, Algebra 1 & Polynomials and Non-Linear Functions

**Resources**

*Professional & Student*

Professional:
Text: Prentice Hall Math Course 3
Ancillaries provided by publisher
Math Department staff generated materials
Math Department reference books
Internet resources

Students: access to computers/internet
www.phschool.com
www.drmath.com
www.purplemath.com
www.kahnacademy.org
Text: Prentice Hall Math Course 3
Access to TI-73 calculator
VersaTiles

| **Assessments (Titles)** | **Graduation Standards** | **Interdisciplinary Connections** |
|---|---|---|
| **Unit Test** | **Information Literacy**<br>**Problem Solving** | 1. Reason abstractly and |

| | | |
|---|---|---|
| **Summative: Written Test**<br><br>**Quarter test**<br>**Summative: Standardized Test**<br><br>**Linear Graph performance task**<br>**Summative: Personal Project**<br>Students develop a graph for a linear relationship of their choice. | **Spoken Communication**<br>**Written Performance** | quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

**<< Previous Year**

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# Congruence and Similarity

Collaboration Math Grade 8 Grade 8|Mathematics|Newtown Middle School|2014-2015

*Wednesday, November 12, 2014, 3:08PM*

**Unit: Congruence and Similarity** (Week 24, 5 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Reflections, translations, and rotations are actions produce congruent geometric figures in the world around us
2. Real-world objects can be measured indirectly using properties of similarity.
3. Patterns can help us draw conclusions
4. Rigid and non-rigid transformations play an important role in congruency and similarity.

## Essential Question(s)

1. How can you determine congruency and similarity?
2. What are the similarities and differences between congruency and similarity of polygons?
3. How is a dilation always similar to an pre-image?
4. How do you use indirect measurement to find unknown lengths?
5. How are scale drawings and models used in everyday life?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. How do we apply the properties of triangles to prove congruency?
2. What are corresponding parts?
3. Are there any properties that will not prove congruency but will prove similarity?
4. How are proportions and similarity used in the real world )

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 8, Geometry**

8.G.A. Understand congruence and similarity using physical models, transparencies, or geometry software.

- 8.G.A.1. Verify experimentally the properties of rotations, reflections, and translations:
- 8.G.A.1a. Lines are taken to lines, and line segments to line segments of the same length.
- 8.G.A.1b. Angles are taken to angles of the same measure.
- 8.G.A.1c. Parallel lines are taken to parallel lines.
- 8.G.A.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
- 8.G.A.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
- 8.G.A.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
- 8.G.A.5. Use informal arguments to establish facts

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

- VERIFY (Experimentally properties of) - 2
  - Rotations
  - Reflections
  - Translations
  - Dilations
- UNDERSTAND (Congruency) - 2,3
- DESCRIBE (Sequence of rotations, reflections, translations) - 2,3
- UNDERSTAND (Similarity) - 2,3
- DESCRIBE (Sequence of rotations, reflections, translations, dilations) - 2
- DESCRIBE (effect of dilations, translations, rotations and reflections using coordinates) - 2
- PROVE (informally) - 5
  - Angle relationships in parallel lines cut by a transversal
  - Sum of angles in a triangle = 180°

about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

**Content/Topics**

*Critical content that students must **KNOW***

1. Rigid Transformations
2. Corresponding parts of polygons
3. Relationships for congruency
4. Proportional reasoning
5. Non-rigid transformation
6. Indirect measurement

**Skills**

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

**Core Learning Activities**

1. Geometer's Sketchpad
2. Illuminations website
3. NLVM website
4. TI-73 calculators
5. Versatiles: Proportions, Geometry

**Resources**

*Professional & Student*

Professional

Students: access to computers/internet
access to TI-73 calculator
Versatiles

**Assessments (Titles)**

**Student Reflection**
**Summative: Written Report**
Students will complete a Pre and Post Unit reflection with evaluation of performance. Students will compare their self-evaluation with teacher comments,

**Common Formative Assessment**
**Formative: Standardized Test**
Students will take a series of mastery quizzes during the course of the unit to track student understanding and growth.

**Quarter Test**
**Summative: Written Test**
Students will complete a common quarter test covering all of the standards taught during that marking period.

**Indirect Measurement WebQuest**
**Summative: Technology Project**
Students will complete an indirect measurement webquest during which they demonstrate their ability to indirectly measure varying objects and distances using similarity.

**Graduation Standards**

**Information Literacy**
**Problem Solving**
**Spoken Communication**
**Written Performance**

**Interdisciplinary Connections**

1. Reason abstractly and quantitatively
2. Use appropriate tools strategically
3. Attend to precision
4. Look for and express regularity in repeated reasoning.
5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks
6. Analyze, evaluate and use information

**<< Previous Year**

**Unit: Volume** (Week 34, 4 Weeks)

**Enduring Understanding(s)/ Generalization(s)**

1. The knowledge of the formulas for the volumes of cones, cylinders and spheres can be used to solve real-world and mathematical problems.

**Essential Question(s)**

1. How can the volume of 3-D objects be used to solve real world problems?
2. Is the exact answer or the estimated answer more beneficial in the real world?
3. Why are formulas important in math and science?

**Guiding Questions**

*Factual, Conceptual, Provocative*

1. How are some 3-D figures related to circles?
2. How does multiplying the dimensions of a 3-D figure by a scale factor affect its volume?
3. How does the knowledge of a solid assist in finding the volume of a composite or portion of a solid?

**Standard(s)**

*Content and CCSS*
**CCSS: Mathematics, CCSS: Grade 8, Geometry**
8.G.C. Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

- 8.G.C.9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

**Objective(s)**

Bloom/ Anderson Taxonomy / DOK Language

- Know the formulas for the volumes of cones, cylinders, and spheres - 2 **8.G.9**
- Apply the formulas for volumes of cones, cylinders, and spheres to solve real-world and mathematical problems. - 3
- Solve volume problems in context. - 3

**Content/Topics**

*Critical content that students must **KNOW***

1. Identify 3-D figures from their attributes
2. Use the formula for the volume of the 3-D figure ( cones, cylinders, and spheres)

**Skills**

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

**Core Learning Activities**

- Web Quest
- TI-73 calculators
- Versatiles:

**Resources**

*Professional & Student*
Professional:
Text: Prentice Hall Math Course 3
Ancillaries provided by publisher
Math Department staff generated materials
Math Department reference books
Internet resources

| | |
|---|---|
| | Students: access to computers/internet<br>www.phschool.com<br>www.drmath.com<br>www.purplemath.com<br>www.kahnacademy.org<br>Illuminations<br>National Council of Virtual Manipulative<br><br>Text: Prentice Hall Math Course 3<br>access to TI-73 calculator<br>Versatiles |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Packing Predicament**<br>**Summative: Group Project**<br>Students will complete a performance to pack the trunk of a car for a vacation using various volume formulas.<br><br>**Unit Test**<br>**Summative: Written Test**<br><br>**Quarter Test**<br>**Summative: Standardized Test** | Information Literacy<br>Problem Solving<br>Spoken Communication<br>Written Performance | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

<< Previous Year

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# Systems of Linear Relationships

Collaboration Math Grade 8 Grade 8 | Mathematics | Newtown Middle School | 2014-2015

*Wednesday, November 12, 2014, 3:09PM*

**Unit: Systems of Linear Relationships** (Week 29, 5 Weeks)

## Enduring Understanding(s)/ Generalization(s)

1. Systems of equations are a valuable tool used in mathematical modeling of the world around us

## Essential Question(s)

1. What is the meaning of the solution to systems of linear relationship?
2. Where can you apply systems?
3. Why is comparing functions useful?

## Guiding Questions

*Factual, Conceptual, Provocative*

1. What does the solution to a pair of simultaneous equations represent?
2. How can you find the solution to a pair of simultaneous equations?
3. Which method is most efficient in solving a system?
4. How can you compare functions of dissimilar forms?
5. What does the solution to a simultaneous application problem represent?
6. What Real world situations can be solved using simultaneous equations?

## Standard(s)

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 8, Expressions & Equations**

8.EE.C. Analyze and solve linear equations and pairs of simultaneous linear equations.

- 8.EE.C.8. Analyze and solve pairs of simultaneous linear equations.
- 8.EE.C.8a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
- 8.EE.C.8b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.

**CCSS: Mathematics, CCSS: Grade 8, Functions**

8.F.A. Define, evaluate, and compare functions.

- 8.F.A.2. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear

## Objective(s)

**Bloom/ Anderson Taxonomy / DOK Language**

- UNDERSTAND (Solutions) - 3
- SOLVE (systems of equations) - 3
- ESTIMATE (solutions) - 3
- GRAPH (equations) - 3
- SOLVE (Real-world problems leading to two linear equations in two variables) - 3
- COMPARE (functions represented differently) - 3

function represented by an algebraic expression, determine which function has the greater rate of change.

| Content/Topics | Skills |
|---|---|
| *Critical content that students must **KNOW*** | *Transferable skills that students must be able to **DO*** |
| 1. Solve pairs of simultaneous equations<br>2. Graphically (estimate solution if necessary)<br>3. Using substitution<br>4. Using elimination<br>5. Using technology<br>6. Real World applications<br>7. Compare properties of 2 functions represented by dissimilar forms | • 2. Work independently and collaboratively to solve problems and accomplish goals.<br>• 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving. |

| Core Learning Activities | Resources |
|---|---|
| TI-73 calculators<br>VersaTiles: Algebra 1 & Functions, Algebra 1 & Linear Functions<br>Initiation for Performance Assessment will be a collaboration piece for "Cell phone data Plans" | *Professional & Student*<br>Professional:<br>Text: Prentice Hall Math Course 3<br>Ancillaries provided by publisher<br>Math Department staff generated materials<br>Math Department reference books<br>Internet resources<br>Students:<br>access to computers/internet<br>www.phschool.com<br>www.drmath.com<br>www.purplemath.com<br>www.kahnacademy.org<br>Text: Prentice Hall Math Course 3<br>Access to TI-73 calculator<br>VersaTiles |

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Unit Test**<br>**Summative: Written Test**<br><br>**Quarter Test**<br>**Summative: Standardized Test**<br><br>**Battle Ship Performance Task**<br>**Summative: Personal Project**<br>Students calculate the location of pirate raids as they sail from London to New York across the Atlantic<br><br>**Carnival Planning Project**<br>**Summative: Group Project**<br>Students use their knowledge of systems of equations to design and decide on pricing for a carnival | Information Literacy<br>Problem Solving<br>Spoken Communication<br>Written Performance | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

<< Previous Year

**Unit: Statistics and Probability** (Week 38, 3 Weeks)

**Enduring Understanding(s)/ Generalization(s)**

1. The way that data is collected, organized and displayed influences interpretation.
2. Patterns and relationships can be represented numerically, graphically, symbolically, and verbally.
3. Patterns provide insights into potential relationships.
4. The probability of an event's occurrence can be predicted with varying degrees of confidence.

**Essential Question(s)**

1. Why is data collected and analyzed?
2. How do people use data to influence others?
3. How can predictions be made based on data?
4. What is a pattern?
5. How do I describe a pattern?
6. How do I express a pattern to show a relationship?
7. How can patterns be used to make predictions?

**Guiding Questions**

*Factual, Conceptual, Provocative*

1. How are patterns used when comparing two quantities?

**Standard(s)**

*Content and CCSS*

**CCSS: Mathematics, CCSS: Grade 8, Statistics & Probability**

8.SP.A. Investigate patterns of association in bivariate data.

- 8.SP.A.1. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
- 8.SP.A.2. Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
- 8.SP.A.3. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
- 8.SP.A.4. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two

**Objective(s)**

**Bloom/ Anderson Taxonomy / DOK Language**

- CONSTUCT scatter plots for bivariate measurement data - 3
- INTERPRET scatter plots for bivariate measurement data - 2
- INVESTIGATE patterns - 4
- DESCRIBE patterns - 1,2
- USE equation of a linear model - 4
- SOLVE in context - 4
- INTERPRET slope and intercept - 2
- UNDERSTAND patterns of association in data - 3
- DISPLAY frequencies and relative frequencies - 2
- DESCRIBE association between variables - 3
- DRAW line of best fit - 3

variables.

**Content/Topics**

*Critical content that students must **KNOW***

1. Construct Scatter Plots for bivariate measurement
2. Interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities
3. Describe Patterns
    1. Clustering
    2. Outliers
    3. Positive or negative correlation
    4. Linear
    5. Non-linear
4. Understand that patterns can be seen by displaying frequencies and relative frequencies in a two-way table
5. Construct and interpret two-way table summarizing data on two categorical variables collected from the same subjects.
6. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.
7. Use the equations of a linear model to solve problems in context of bivariate measurement data, interpreting the slope and intercept.
8. Know that a straight line is widely used to model relationships between two quantitative variables.
9. Use Line of Best Fit to assess the model fit by judging the closeness of the data points to the line.

**Skills**

*Transferable skills that students must be able to **DO***

- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

**Core Learning Activities**

- Web Quest
- TI-73 calculators
- Versatiles:

**Resources**

*Professional & Student*

Professional:

Text: Prentice Hall Math Course 3
Ancillaries provided by publisher
Math Department staff generated materials
Math Department reference books
Internet resources

Students: access to computers/internet
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www.purplemath.com
www.kahnacademy.org
Illuminations
National Council of Virtual Manipulative

Text: Prentice Hall Math Course 3
access to TI-73 calculator
Versatiles

| Assessments (Titles) | Graduation Standards | Interdisciplinary Connections |
|---|---|---|
| **Quarter Test**<br>**Summative: Standardized Test**<br><br>**Unit test**<br>**Summative: Written Test**<br><br>**Wheel of Fortune Letter Frequenbce**<br>**Summative: Personal Project**<br><br>**Could I be a Forensic Scientist?**<br>**Summative: Lab Assignment**<br>Performance task to look at lines of best fit | Information Literacy<br>Problem Solving<br>Spoken Communication<br>Written Performance | 1. Reason abstractly and quantitatively<br>2. Use appropriate tools strategically<br>3. Attend to precision<br>4. Look for and express regularity in repeated reasoning.<br>5. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks<br>6. Analyze, evaluate and use information responsibly to create a solution and/or a product<br>7. Evaluate both the process and the product |

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# Superintendent's Proposed Operating Budget Plan

## 2015 - 2016

Newtown
Public Schools

# Proposed Budget
## 2015-2016

## BOARD OF EDUCATION

Keith Alexander ~ Chair

Laura Roche ~ Vice-Chair

Kathy Hamilton ~ Secretary

David Freedman | Michelle Ku | Debbie Leidlein | John Vouros

## CENTRAL OFFICE

Dr. Joseph V. Erardi, Jr.~ Superintendent of Schools

Dr. Linda Gejda ~ Assistant Superintendent of Schools

Ron Bienkowski
Director of Business

Julie G. Haggard, M.S. Ed.
Director of Pupil Services

Gino Faiella
Director of Facilities

Carmella Amodeo
Director of Technology

Michelle Hiscavich
Director of Music

Dr. David Abbey (.6 FTE)
Director of Human Resources

Mark Pompano
Director of Security

Judy Blanchard
Director/Department of Education Grant
K-12 Health Education Coordinator

# Proposed Budget
## 2015-2016

### Newtown High School

**Dr. Lorrie Rodrigue**
*Principal*

*Assistant Principals*
**Kathy Boettner**
**Jaime Rivera**
**David Roach**

*Athletic Director*
**Greg Simon**

### Newtown Middle School

**Thomas Einhorn**
*Principal*

**Jim Ross**
*Assistant Principal*

### Reed Intermediate School

**Anne Uberti**
*Principal*

**Jill Bontatibus Beaudry**
*Assistant Principal*

### Hawley Elem School

**Christopher Moretti**
*Principal*

**Keri Snowden**
*Lead Teacher*

### Middle Gate Elem School

**Christopher Geissler**
*Principal*

**Peggy Kennedy**
*Lead Teacher*

### Sandy Hook Elem School

**Dr. Kathy Gombos**
*Principal*

**Tim Napalitano**
*Assistant Principal*

**Brian Kirmil (.4 FTE)**
*Assistant Principal*

### Head O'Meadow Elem School

**Barbara Gasparine**
*Principal*

**Carol Danenberg**
*Lead Teacher*

As of January 6, 2015

# Budget Reductions

**From Budget Builder ⟶ Superintendent ⟶ Board of Education**

| | | |
|---|---|---|
| Administrators' Initial Budget Request | $74,971,589 | 5.08% |
| Superintendent's Total Budget Reduction | ($2,572,403) | (3.61%) |
| Superintendent's Budget Request to the BOE | $72,399,186 | 1.48% |

# Superintendent's Budget 2015-2016

| Description | 15-16 Proposed |
|---|---|
| SALARIES | $ 45,107,597 |
| EMPLOYEE BENEFITS | $ 11,292,169 |
| PURCHASED PROFESSIONAL SERVICES | $ 788,173 |
| PURCHASED PROPERTY SERVICES | $ 2,137,580 |
| OTHER PURCHASED SERVICES | $ 7,685,662 |
| SUPPLIES | $ 4,498,556 |
| PROPERTY - EQUIPMENT | $ 819,493 |
| OTHER OBJECTS | $ 69,956 |
| TOTAL OPERATING BUDGET | $ 72,399,186 |
| OPERATING BUDGET INCREASE | 1.48 % |

# Budget Increase Breakdown

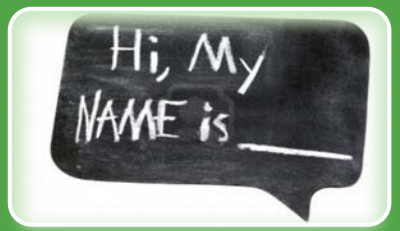
**Budget increase requested is 1.48%**

## THE BREAKDOWN

| | | |
|---|---|---|
| Regular Education | 0.52% | $369,745 |
| Special Education & Pupil Personnel | 0.61% | $436,457 |
| Others | 0.35% | $247,680 |

# Framework for the 2015-2016 Superintendent's Proposal

## Appropriately supporting CCSS and State directives

1. 

**Requested New Staff**

2.

**Property & Equipment**

3.
**Other Purchased Services**

# Budget Reductions

**From Budget Builder ⟶ Superintendent ⟶ Board of Education**

| | |
|---|---|
| Administrators' Proposed New Staffing Request | $716,435 |
| Reductions | $414,240 |
| Superintendent Supporting New Staffing Requests | $302,195 |

# Requested New Staff

1

| REQUESTED NEW STAFF | FTE | AMOUNT |
|---|---|---|
| **ADMINISTRATION:** | | |
| Supervisor to Replace Chair Sp.Ed. Supervisor to replace (1.0 FTE) NHS Dept. Chair | | $21,770 |
| **CERTIFIED STAFFING:** | | |
| Teacher – Gifted (Elementary School) | 1.0 | $56,594 |
| Teachers – Unified Theater (0.20 NHS),World Language (0.50 Elem School) | .70 | $39,616 |
| Special Education Supervisor (ESY) | | $18,501 |
| Academic Officer (NHS) | .40 | $22,638 |
| Stipends for NICE Program Expansion (K-12) | | $10,000 |
| NHS Guidance – Previously funded by SERV Grant | 1.0 | $55,322 |
| Athletic Coaches – Track, Gymnastics, Girls' Golf | | $14,370 |
| **NON-CERTIFIED STAFF:** | | |
| Differential (K-12) Custodial Supervisor (replacing 1.0 FTE custodian) | | $37,840 |
| Security Guard-Previously funded by SERV Grant* | 1.0 | $21,123 |
| Clerk | .16 | $ 4,421 |

* Present SERV funded (4 FTE), 2015-16 funded 3 FTE (reallocation of Guidance funds)

# Proposed 2015-2016 Staffing

| 2015-2016 Proposed Net Additions to Staff | | |
|---|---|---|
| Certified Additions | 3.10 | $238,811 |
| Non-Certified Additions | 1.16 | $ 63,384 |
| Total Additions to Cert. & Non-Cert Position | 4.26 | $302,195 |

# Proposed 2015-2016 Staffing

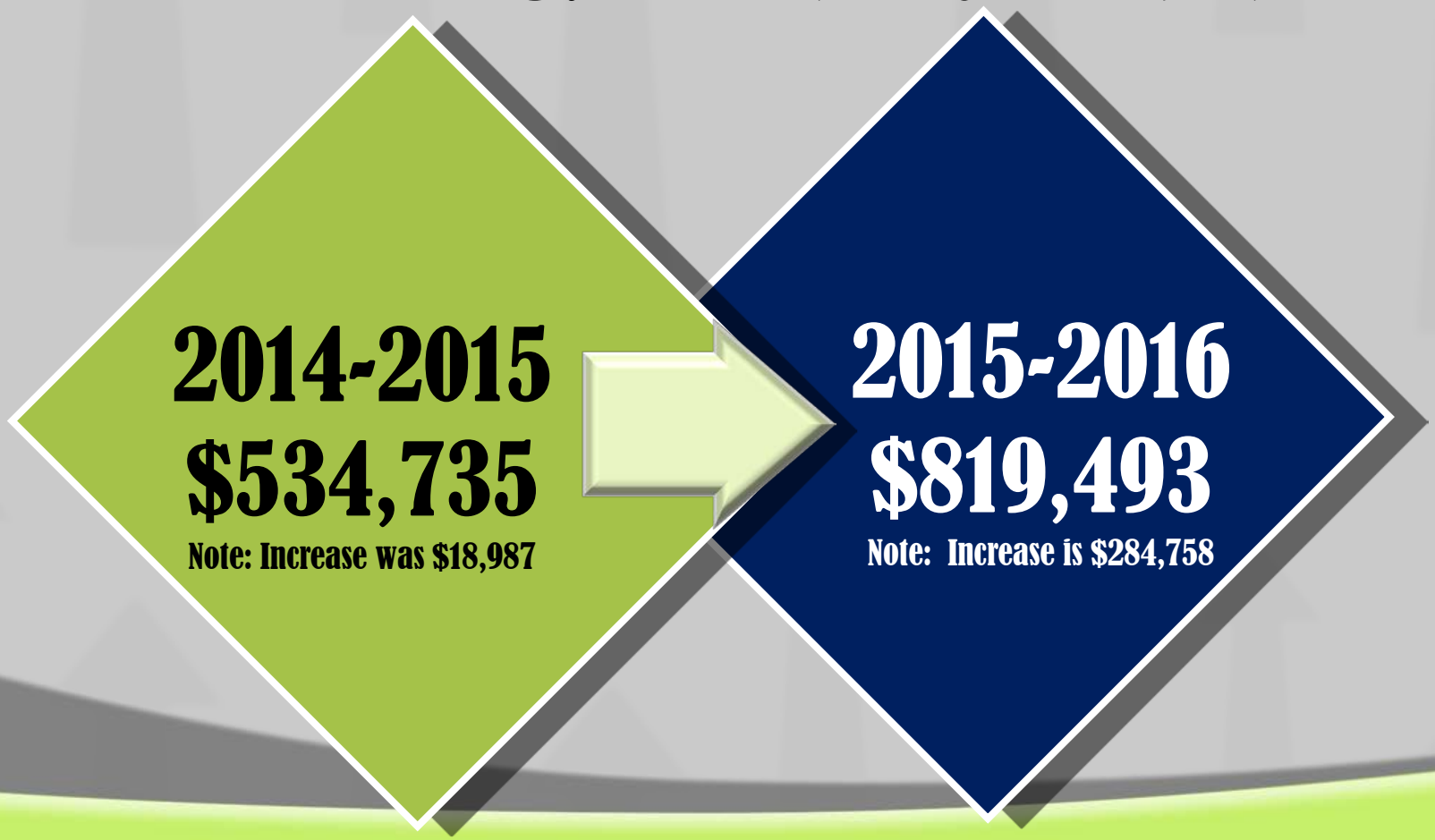
| 2015-2016 Proposed Net Reductions to Staff | | |
|---|---|---|
| **Certified Reductions**<br>**- 2 elementary teaching positions (1 classroom, 1 Art)**<br>**- 4 positions at the Intermediate School-Art, Music, PE, Classroom (2)**<br>**- 1.3 teachers at Middle School –Art, Music, PE**<br>**- 1 Speech & Language Pathologist** | **-8.30** | **($473,092)** |
| **Non-Certified Reductions**<br>**Paraeducators** | **-9.13** | **($160,492)** |
| **Total Reductions in Cert. & Non-Cert. Positions** | **-17.43** | **($633,584)** |

| | | |
|---|---|---|
| **Net Total – Additions/Reduction –Certified** | **-5.20** | **($234,281)** |
| **Net Total – Additions/Reduction-Non-Cert.** | **-7.97** | **($ 97,108)** |
| **Total BOE Changes in Staff** | **-13.17** | **($331,389)** |

# Property & Equipment

2

*Increase Funding for Property & Equipment*



# Requested Property & Equipment

2

**This increase is $284,758 which represents 0.40% of the total budget increase.**

- Technology equipment increase of $169,033
- Additional radios, cameras and computers for security $34,692
- Custodial replacement equipment increased by $30,650
- District replacement furniture $25,000
- Musical instruments, an additional $11,410
- All other equipment went up by $13,973

**$284,758**

# Other Purchased Services

3

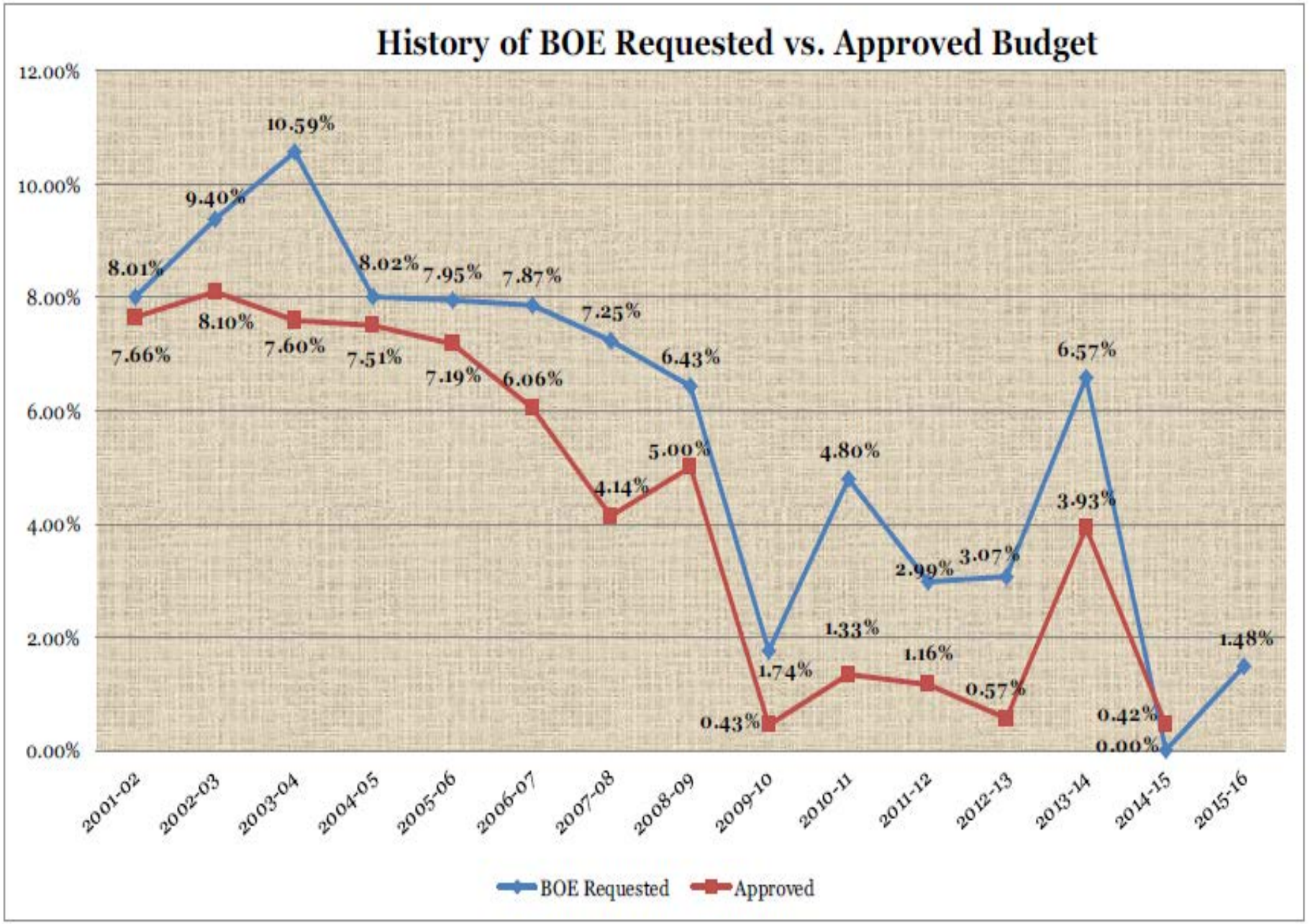
**This increase is $482,415 or a 0.68% increase to the total budget. The four larger areas of increase are:**

- **Out of District Tuition – increased by $211,687**
- **Transportation Services - $205,589 is required for transportation. Of this, $76,128 is for the basic contract.**
- **Contracted Services – increased by $34,903**
- **All other services, insurance, communication, student and staff travel increased by $30,236 collectively.**

**$482,415**

# Costs Driving the 2015-2016 Budget

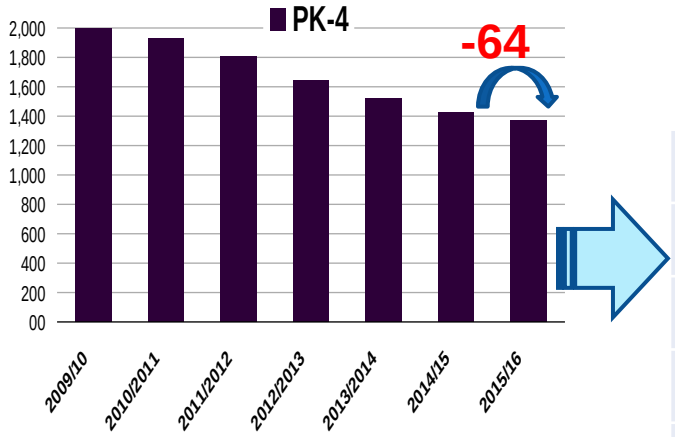
| | Cost Increase | % of Budget Increase |
|---|---|---|
| Total Personnel Costs | $107,970 | 0.15% |
| Other Purchased Services | $482,415 | 0.68% |
| Property & Equipment | $284,758 | 0.40% |
| Employee Benefits | $140,825 | 0.20% |


History of BOE Requested vs. Approved Budget
12.00%
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
8.01%
9.40%
10.59%
8.02%
7.95%
7.87%
7.25%
6.43%
1.74%
4.80%
2.99%
3.07%
6.57%
0.42%
1.48%
7.66%
8.10%
7.60%
7.51%
7.19%
6.06%
4.14%
5.00%
0.43%
1.33%
1.16%
0.57%
3.93%
0.00%
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
BOE Requested
Approved

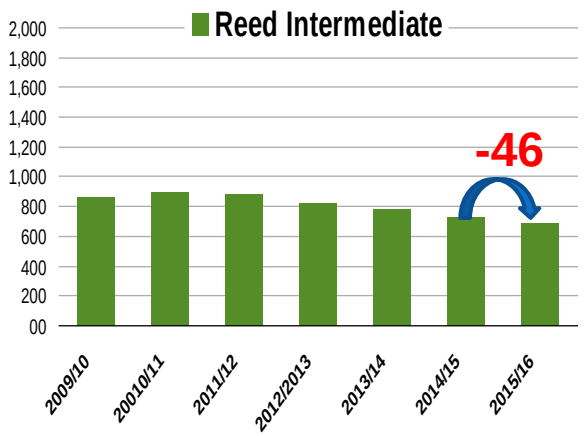
# Enrollment Overview

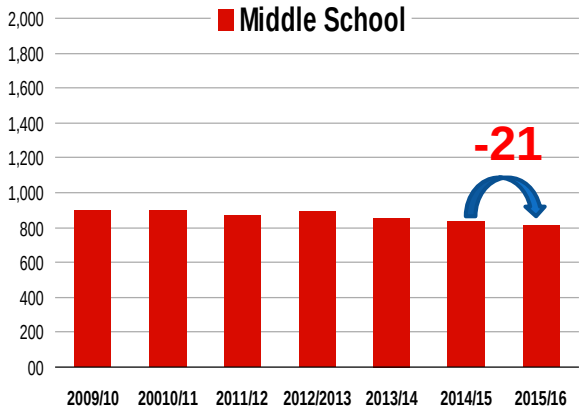
District Enrollment
2014/15 total: **4,738**
2015/16 projected: **4,543**

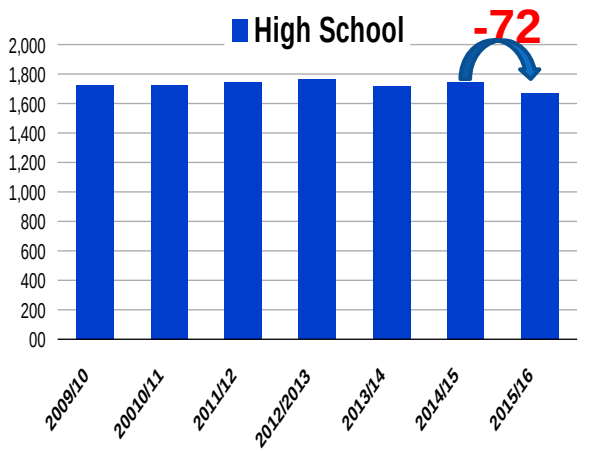
**-195**




| | |
|---|---|
| **Hawley** | **300** |
| **Head O Meadow** | **311** |
| **Middle Gate** | **367** |
| **Sandy Hook** | **343** |
| **PreK** | **50** |



*Care*

**MORE THAN OTHERS THINK IS WISE.**

*Expect*

**MORE THAN OTHERS THINK IS POSSIBLE.**