

# Unit 2: Title of Unit : Operations and Algebraic Thinking

Content Area: **Mathematics**  
Course(s): **Mathematics - Grade 4**  
Time Period: **Generic Time Period**  
Length: **3 weeks**  
Status: **Published**

## Unit Overview

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Students will use the four operations with whole numbers to solve problems, generate and analyze patterns, and use place value understanding and properties of operations to perform multi-digit arithmetic.

**By the end of January, administer the LinkIT! G4 CC TEI AG Math Online Form B.**

## Transfer

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Students will be able to independently use their learning to...

Students will be able to fluently solve real world problems involving all four operations by using equations, area models, arrays, identifying patterns, and understanding of operational properties.

For more information, read the following article by Grant Wiggins.

[http://www.authenticeducation.org/ae\\_bigideas/article.lasso?artid=60](http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=60)

## Meaning

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## Understandings

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Students will understand...

- how to use addition and subtraction to describe and extend a number pattern
- how to write observations about sequences
- how to use equations to describe patterns
- how to use the order of operations to find the value of an expression
- how to use a table to show equations with more than one operation

## Essential Questions

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Students will keep considering...

- How are patterns used in mathematics?

## Application of Knowledge and Skill

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### Students will know...

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Students will know...

- how to find a rule that describes the relationship between the numbers in a pattern
- how to use the rule to extend the pattern
- a sequence is an arrangement of terms in a pattern
- that features of sequences that are not described by a rule can be identified
- how to write an equation to describe a pattern between the input and output numbers in a table
- how to use equations to extend patterns
- that rules that tell which operations to perform first are called the order of operations
- the order of operations ensures that a problem can have only one correct answer
- how to represent real-life situations using equations with two or more operations
- how to substitute input values into equations to find output values

### Students will be skilled at...

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Students will be skilled at...

- describing and extending number patterns like 55, 56, 52, 53, 49, 50,    ? (The pattern is add 1, then subtract 4. So, the next number in the pattern is  $50 - 4$ , or 46.)
- extending sequences and making observations. **Ex:** First Term: 14 Rule: Add 5 Sequence: 14, 19,

24, 29, 34 Observation: The ones digits alternate between 4 and 9.

- using the order of operations to simplify expressions like  $5 + (9 - 1) / 4$
- finding the unknown quantity in equations with more than one operation. **Ex:** If  $x = 6$ , what is the value of  $y$  in  $2x(9 + x) = y$ ?
- writing equations to describe and extend number patterns **Ex:** Rule: Multiply by 3 Equation:  $a \times 3 = b$  (See chart below)

Input(a)	Output (b)	Equation
4	12	$4 \times 3 = 12$
7	21	$7 \times 3 = 21$
10	30	$10 \times 3 = 30$
13	?	

## **Academic Vocabulary**

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### Chapter 7

- pattern
- nonnumeric patterns
- numeric patterns
- rule
- term
- sequence
- input
- output

### Review Vocabulary

- equation
- operations
- unknown

## **Daily Targets Chapter 7**

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### SWBAT...

- identify, describe, and extend numeric patterns (Lesson 2/ DOK 2)
- extend patterns and write observations about the patterns (Lesson 3/DOK 3)
- look for a pattern to solve problems (Lesson 4/DOK 3)
- find and use rules to write addition and subtraction equations (Lesson 5/DOK 3)
- find and use rules to write multiplication and division equations (Lesson 6 /DOK 3)
- use the order of operations to solve problems (Lesson 7/DOK 3)

- explore equations with two operations (Lesson 8/DOK 3)
- use tables to recognize and write equations with two or more operations (Lesson 9/DOK 3)

MA.4.OA

Operations and Algebraic Thinking

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

MA.K-12.2

Reason abstractly and quantitatively.

MA.K-12.3

Construct viable arguments and critique the reasoning of others.

MA.4.OA.A.3

Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

MA.K-12.4

Model with mathematics.

MA.4.OA.C.5

Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

MA.K-12.5

Use appropriate tools strategically.

MA.K-12.6

Attend to precision.

MA.K-12.7

Look for and make use of structure.

MA.K-12.8

Look for and express regularity in repeated reasoning.

## Formative Assessment and Performance Opportunities

Tests

Common unit Assessment

Quiz

Chapter 7 Project- Make a Game (pg.406)

Performance Task- Farmer's Market- Estimate division using different methods, divide larger numbers, and look for patterns in the results (DOK2, DOK3) TM474PT1

Power Up for State Assessment

Classwork

Centers

Student interviews

Academic Games

Exit Tickets

## **Summative Assessment**

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Tests

Common unit Assessment

Quiz

Project

Performance Task- Farmer's Market

Classwork

Centers

Student interviews

## **21st Century Life and Careers and technology**

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CRP.K-12.CRP2

Apply appropriate academic and technical skills.

CRP.K-12.CRP2.1

Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.

CRP.K-12.CRP4

Communicate clearly and effectively and with reason.

CRP.K-12.CRP4.1

Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting

	with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
CAEP.9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.
TECH.8.1.5.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.5.D.4	Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.
TECH.8.1.5.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.5.D.CS2	Demonstrate personal responsibility for lifelong learning
TECH.8.1.5.D.CS3	Exhibit leadership for digital citizenship.

## **Accommodations and Modifications**

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- 504 Accommodations
- TAG Manipulative Kits
- BSI Support
- English Learner Support Interactive Guide (TM58-67)
- ELL Support Strategy - Use the activity in the Vocabulary Check to assess students' ability to extend their understanding
- Beyond Level Enrichment Resource Guide
- IEP Modifications
- Interactive Guide: Scaffolded differentiated activities (emerging, expanding and bridging levels)
- Math Fact Chart
- Divisibility Rules Chart
- Performance Tasks
- Service Rich Environment
- Learning Centers
- Manipulative/Concrete Models
- RTI Guide in My Math - Chapter Specific
- Provide Visual and Auditory Aides (foldables, songs, chants)
- Reteaching Masters (Chapter Specific)
- Enrichment Masters (Chapter Specific)
- [STMath](#)
- [XtraMath](#)

## Unit Resources

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- AAAMath <http://www.aaamath.com/>
- Brainpop <http://www.brainpop.com/>
- Cool math 4 kids <http://www.coolmath4kids.com/>
- Funbrain <http://www.funbrain.com/>
- illustrative mathematics: <http://www.illustrativemathematics.org/>
- Link It!
- Math Fact Café <http://www.mathfactcafe.com/>
- Math playground <http://www.mathplayground.com/>
- McGraw-Hill My Math Text
- NCTM illuminations <http://illuminations.nctm.org/> factor game, product game

## Interdisciplinary Connections

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*The Olympic Games* leveled reader describes the history of the modern Games, shows maps with major cities in which the modern Games have occurred, and presents a variety of facts about the Games. Students will solve word problems comparing information presented in the maps and charts. (4.OA.3)

The *Strange But True* leveled reader focuses on unusual creatures in a variety of animal groups. Students will use mathematics operations as they make calculations and interpret charts. (4.OA.3)

SCI.4.4-LS1-1.LS1.A.1	Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.
SOC.6.1.4.B.1	Compare and contrast information that can be found on different types of maps and determine how the information may be useful.
SOC.6.1.4.B.CS2	Places are jointly characterized by their physical and human properties.