



UMPRINTABLES

PREMIUM EDUCATIONAL RESOURCES

Rational Numbers in the Real World

Positive & Negative Quantities Discovery

A Discovery-Based Mega Unit for Grade 6

6.NS.C.5 Pos/Neg in Context	6.NS.C.6a Opposites on # Line	6.NS.C.7a-b Inequalities & Order	6.NS.C.7c-d Absolute Value
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Four Real-World Contexts: Temperature • Elevation • Money • Electric Charge

Includes: 4 Discovery Activities • 4 Guided Notes • 4 Practice Sets • 4 Card Sorts (96 cards) • Vocabulary Foldable • 4 Exit Tickets • 16-Question Quiz + Key • Printable Number Lines • Anchor Chart • CCSS Alignment Chart • Teacher Review Request

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CCSS Alignment Chart

This unit fully addresses the four sub-standards within **6.NS.C** (the cluster on applying and extending previous understandings of numbers to the system of rational numbers). The chart below maps each context and each major component to the specific sub-standards it addresses. Use this chart for lesson planning, progress monitoring, and documentation of standards coverage.

Sub-Standard Reference

Code	Standard Statement (Paraphrased)
6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
6.NS.C.6a	Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite.
6.NS.C.7a	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
6.NS.C.7b	Write, interpret, and explain statements of order for rational numbers in real-world contexts.
6.NS.C.7c	Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
6.NS.C.7d	Distinguish comparisons of absolute value from statements about order.

Coverage Matrix by Context

The matrix below shows which sub-standards each context primarily targets. A solid circle (●) indicates the context is the primary vehicle for that sub-standard; an open circle (○) indicates the sub-standard is also reinforced within that context.

Component	6.NS.C.5	6.NS.C.6a	6.NS.C.7a-b	6.NS.C.7c-d
Context 1: Temperature	●	○	●	○
Context 2: Elevation	●	●	○	●
Context 3: Money	●	○	●	○
Context 4: Electric Charge	○	●	○	●
Vocabulary Foldable	●	●	○	●
Printable Number Lines	○	●	●	●
Anchor Chart: Greater vs. Greater Absolute Value	○	○	●	●
16-Question Quiz	●	●	●	●

Vocabulary Foldable

Directions for the teacher: Print this page single-sided. Have students fold along the long horizontal line so the title strip shows on top, then cut along the six vertical lines *only on the top flap* (the bottom half remains intact). Students lift each tab to record their own definition, an example, and a non-example as the class works through each term. The bottom half is a quick reference with the formal definition.

Six Key Terms: positive • negative • opposite • absolute value • integer • rational number

POSITIVE	NEGATIVE	OPPOSITE	ABSOLUTE VALUE	INTEGER	RATIONAL NUMBER
<i>My definition:</i>	<i>My definition:</i>	<i>My definition:</i>	<i>My definition:</i>	<i>My definition:</i>	<i>My definition:</i>
<i>Example:</i>	<i>Example:</i>	<i>Example:</i>	<i>Example:</i>	<i>Example:</i>	<i>Example:</i>

— fold along this line —

Term	Formal Definition & Example
POSITIVE	A number greater than 0. Written without a sign or with a + sign. Examples: +3, 5, 1/2, 0.4.
NEGATIVE	A number less than 0. Always written with a – sign. Examples: –3, –5, –1/2, –0.4. Negative numbers represent quantities below zero (colder, lower, owed, opposite charge).
OPPOSITE	Two numbers that are the same distance from 0 but on opposite sides of 0 on the number line. The opposite of 5 is –5; the opposite of –5 is 5. Notation: $-(-5) = 5$. The opposite of 0 is 0.
ABSOLUTE VALUE	The distance of a number from 0 on the number line. Distance is always positive (or zero). Written $ x $. Example: $ -7 = 7$ because –7 is 7 units from 0; $ 7 = 7$.
INTEGER	A whole number or its opposite. The set of integers is {..., –3, –2, –1, 0, 1, 2, 3, ...}. Integers do not include fractions or decimals.
RATIONAL NUMBER	Any number that can be written as a fraction a/b where a and b are integers and $b \neq 0$. Includes integers, terminating decimals, repeating decimals, and fractions.

V

Vocabulary Routine

Introduce one term per context launch. After the Discovery Activity reveals the concept, have students fill in the corresponding tab *before* showing the formal definition. This honors the discovery process — students name what they just experienced. The bottom reference panel then confirms or refines their thinking.

Anchor Chart: Greater Than vs. Greater Absolute Value

This is the single most important conceptual distinction in the entire unit. Students frequently confuse **'greater than'** (which compares the position of two numbers on the number line) with **'greater absolute value'** (which compares each number's distance from 0). The two ideas often disagree: for example, -7 has a greater absolute value than 3, but 3 is greater than -7 . Display this anchor chart prominently and refer to it every time a comparison problem arises.

GREATER THAN	GREATER ABSOLUTE VALUE
Order comparison	Magnitude comparison
'Greater Than' asks: Which number is farther to the RIGHT on the number line?	'Greater Absolute Value' asks: Which number is FARTHER FROM 0?
Notation: $3 > -7$ (read '3 is greater than -7 ').	Notation: $ -7 > 3 $ because $7 > 3$.
Meaning: 3 is to the right of -7 , so 3 is the greater number.	Meaning: -7 is 7 units from 0; 3 is only 3 units from 0. So -7 has the greater absolute value.
3 is to the RIGHT of $-7 \rightarrow 3 > -7$	-7 is FARTHER FROM 0 $\rightarrow -7 > 3 $
	
Result: $3 > -7$	Result: $ -7 > 3 $

Side-by-Side Worked Examples

Pair	Order: Which is greater?	Absolute Value: Which is farther from 0?
-4 and -1	$-1 > -4$ (-1 is to the right of -4 on the number line; -1 is closer to 0 on the positive side)	$ -4 > -1 $ ($4 > 1$, so -4 has the greater absolute value)
-9 and 2	$2 > -9$ (any positive number is greater than any negative number)	$ -9 > 2 $ ($9 > 2$, so -9 has the greater absolute value)
-6 and 6	$6 > -6$ (6 is to the right of -6)	$ -6 = 6 $ (both are exactly 6 units from 0; equal absolute value)
-3.5 and -7.2	$-3.5 > -7.2$ (-3.5 is to the right of -7.2)	$ -7.2 > -3.5 $ ($7.2 > 3.5$)
0 and -5	$0 > -5$ (0 is to the right of -5 ; 0 is greater than any negative number)	$ -5 > 0 $ ($5 > 0$)

Context 1 — Temperature: Real-World Card Sort

Directions: Cut out the 24 cards on the next page. Sort them onto the four Sorting Mats: (1) **Above Freezing** (temperature $> 0^{\circ}\text{C}$), (2) **Below Freezing** (temperature $< 0^{\circ}\text{C}$), (3) **At or Below -10°C** (very cold), and (4) **Coldest of All** (the four coldest cards in this deck, regardless of category). Some cards will land in more than one mat — that's part of the reasoning.

Sorting Mats

MAT 1: Above Freezing	MAT 2: Below Freezing
Temperatures greater than 0°C	Temperatures less than 0°C
MAT 3: At or Below -10°C	MAT 4: Coldest of All
Very cold: -10°C or colder	The 4 coldest cards in this deck

Card Deck (24 cards)

Print on cardstock. Cut along the lines to make 24 individual cards. Each card describes a temperature scenario in words; students must determine the temperature as a signed number and then sort the card into the correct mat(s).

-15°C A cold winter morning in Minneapolis	0°C The freezing point of water (outside)	42°C A hot summer afternoon in Phoenix	4°C The inside of a refrigerator
-18°C The inside of a kitchen freezer	22°C Room temperature	-89°C The lowest temp recorded on Earth (Vostok Station)	100°C Boiling point of water (sea level)
-3°C A frosty autumn morning	37°C Body temperature	15°C A mild spring day	8°C A cool fall evening

Context 3 — Money: Discovery Activity

Directions: Work with a partner. Track the checking account through six transactions. After each transaction, compute the new balance and write it as a signed number. Then answer the questions below. The account starts at **+\$120** (a \$120 credit balance).

The Six Transactions

Starting balance: +\$120

Transaction 1: Deposit paycheck of \$85 (credit)

Transaction 2: Grocery purchase of \$135 (debit)

Transaction 3: Electric bill payment of \$95 (debit)

Transaction 4: Refund of \$40 (credit)

Transaction 5: Online purchase of \$70 (debit)

Transaction 6: Birthday gift deposit of \$50 (credit)

Step 1 — Track the Balance

Step	Transaction	Change	Math	New Balance
Start	—	—	—	+\$120
1	Deposit \$85	+\$85	$+120 + 85$	+\$205
2	Groceries \$135	–\$135	$+205 - 135$	+\$70
3	Electric bill \$95	–\$95	$+70 - 95$	–\$25
4	Refund \$40	+\$40	$-25 + 40$	+\$15
5	Online purchase \$70	–\$70	$+15 - 70$	–\$55
6	Birthday gift \$50	+\$50	$-55 + 50$	–\$5

Use this table to record each balance. Show your math in the 'Math' column.

Step 2 — Answer the Questions

- After which transaction did the balance first go **negative**? _____ What was the new balance?

- After which transaction did the balance reach its **lowest** (most negative) point? _____ What was that balance? _____
- Write an inequality comparing the balance after Transaction 3 (–\$25) to the balance after Transaction 5 (–\$55) using $>$. Then explain what the inequality means in plain English.

Inequality: _____ Meaning: _____

Context 4 — Electric Charge: Guided Notes

Fill in the blanks. By the end of this page you should be able to represent charge as a signed number, find the opposite of any charge, compute $|q|$, and explain why neutral (0) is its own opposite.

Key Idea 1: Charge Is Signed

An object's electric charge is written as a signed number: positive (+) if the object has more protons than electrons, negative (−) if it has more electrons than protons, and **0** if the counts are equal (this is called **neutral**).

Example: An object with 100 protons and 103 electrons has charge -3 (3 more electrons than protons). An object with 100 protons and 97 electrons has charge $+3$.

Key Idea 2: Neutral = 0 Is Its Own Opposite

A neutral object has charge 0. The opposite of 0 is 0 itself — there is no 'other side' to flip to. We write: $-(0) = 0$.

Physical intuition: If an object has equal numbers of protons and electrons, 'flipping' its charge (swapping protons for electrons) leaves it with the same equal counts. So neutral is its own opposite.

Key Idea 3: $-(-q) = q$ (The Opposite-of-Opposite Rule)

The opposite of a positive charge is the corresponding negative charge, and vice versa. Flipping the sign twice returns the original charge:

- $-(+4) = -4$ (the opposite of $+4$ is -4)
- $-(-4) = \underline{\hspace{1cm}}$ (the opposite of -4 is $+4$)
- $-(-(-4)) = \underline{\hspace{1cm}}$ (three flips returns -4)

Physical intuition: An object with charge -4 has 4 extra electrons. If we 'flip' the charge (remove the extra electrons and add 4 extra protons instead), the object now has charge $+4$. Flipping again brings it back to -4 . Each flip is one application of the 'opposite' operation.

Key Idea 4: $|q|$ Is the Magnitude (Strength) of the Charge

The **absolute value** of a charge, written $|q|$, is the strength of the charge — how many extra protons or electrons the object has. Magnitude is always positive (or zero) and does not tell us the sign.

- $|+5| = 5$ (5 extra protons)
- $|-5| = \underline{\hspace{1cm}}$ (5 extra electrons — same strength, opposite sign)
- $|0| = \underline{\hspace{1cm}}$ (neutral object, no extra particles)

Real-world note: Two charges with the same magnitude but opposite signs (e.g., $+3$ and -3) attract each other with the same force that two charges of $+3$ and $+3$ would use to repel each other. Magnitude determines the strength of the interaction; sign determines whether it is attractive or repulsive.

Try It — Quick Check

$$-(+8) = \underline{\hspace{1cm}}$$

$$-(-11) = \underline{\hspace{1cm}}$$

Quiz Answer Key & Solutions

Complete answers and solutions for the 16-Question Quiz. For multiple choice, the correct letter is given with a brief justification. For short answer and extended response, full solutions are provided so teachers can identify exactly where a student's reasoning went off-track. An item analysis follows at the end of this section, mapping each question to the sub-standard it assesses.

Part 1 — Multiple Choice Key

Q#	Answer	Justification
1	B	'Below zero' means negative, so '12 degrees below zero' is -12°C . (6.NS.C.5)
2	C	The opposite of -7 is $-(-7) = +7$. The opposite of a negative is the corresponding positive. (6.NS.C.6a)
3	B	$-(-(-5))$: three negatives (odd) $\rightarrow$ negative result: -5 . (6.NS.C.6a)
4	C	$ -9 = 9$. Absolute value is distance from 0; distance is always non-negative. (6.NS.C.7c)
5	C	$-4 > -10$ because -4 is to the right of -10 on the number line. A is wrong ($-8 < -3$). B is wrong ($-2 < 5$). D is wrong ($0 > -1$). (6.NS.C.7a)
6	B	A negative balance means the account holder owes the bank money. $-\$45$ means owing $\$45$. (6.NS.C.5)
7	B	$ -200 = 200 > 150 = 150$. The -200 m elevation is farther from sea level. (6.NS.C.7c)
8	C	0 is its own opposite: $-(0) = 0$. 0 is neither positive nor negative. (6.NS.C.6a)

Part 2 — Short Answer Key

9. Order these numbers from least to greatest: $-3, 5, -8, 0, -1, 2$.

Answer: $-8, -3, -1, 0, 2, 5$. **Reasoning:** Negative numbers come first (in the order of 'more negative' to 'less negative'); then 0; then positive numbers in usual order. So -8 (most negative) $< -3 < -1 < 0 < 2 < 5$.

10. Simplify: $-(-(-(-(-14))))$. How many negative signs are there? Is the result positive or negative? Justify your answer.

Answer: There are 6 negative signs, which is an even number, so the result is positive: $+14$. **Rule:** An even number of negative signs gives a positive result; an odd number gives a negative result. Six is even, so the negatives cancel in pairs and the answer is $+14$.

11. An object has charge $+6$. Compute (a) its opposite, (b) its absolute value, and (c) explain what each result tells you.

Answer: (a) The opposite is -6 (using $-(+6) = -6$). This means an object with 6 extra electrons instead of 6 extra protons. (b) $|+6| = 6$. This tells us the *magnitude* (strength) of the charge — 6 extra charged particles. (c) The opposite changes the *kind* of charge (from positive to negative); the absolute value tells us the *amount* of charge, which stays the same.

12. Explain the meaning of 0 in each of these four real-world contexts: temperature, elevation, money, and electric charge.

Answer: Temperature: 0°C is the freezing point of water — the reference temperature above which water is liquid and below which water freezes. **Elevation:** 0 m is sea level — the average height of the ocean's surface, used as the reference for measuring height above or depth below. **Money:** $\$0$ is a clean-slate account balance — no money stored and no money owed; the reference point separating 'having money' from 'owing money.' **Electric charge:** 0 is a neutral object — equal numbers of protons and electrons, no net charge. In all four contexts, 0 is the reference point that lets us define 'above' and 'below' (or 'positive' and 'negative').



WHAT'S INSIDE THE FULL RESOURCE

Rational Numbers in the Real World

Positive & Negative Quantities Discovery • 65-page complete unit • CCSS 6.NS.C.5-7d

4

Discovery Activities

Partner discovery tasks built around Temperature, Elevation, Money, and Electric Charge.

4

Teacher Lesson Scripts

One lesson script for each context, with opening, launch, connect, practice, and closure guidance.

4

Guided Notes

Fill-in-the-blank notes that formalize the concepts after the discovery work and support student notebooks.

4

Practice Sets

Four graduated practice sections; each context moves from real-world situations toward more symbolic work.

96

Card Sort Cards

Four 24-card real-world decks plus sorting mats. Students reason about signs, order, opposites, and absolute value.

4

Exit Tickets

One 3-question formative check for each context, with teacher answers included in the unit.

1

Vocabulary Foldable

Six key terms: positive, negative, opposite, absolute value, integer, and rational number.

16

Question Quiz + Key

Multiple-choice, short-answer, and extended-response assessment with complete solutions and item analysis.

2

Number Lines + Anchor Chart

Large-format horizontal and vertical number lines from -10 to +10, plus a side-by-side anchor chart for order vs. absolute value.

ALSO INCLUDED IN THE FULL UNIT

- How-to-use guide and suggested 11-day pacing plan
- CCSS alignment chart + coverage matrix + Mathematical Practice connections
- Quiz item analysis + re-teaching decision tree