Multiplying Integers

Unit Topic : **Multiplying and Dividing Rational Numbers**

Grade level : **7th**

Presenter : Dung Le

Lecture Objectives

STUDENTS ARE ABLE TO:

- **REPRESENT A MULTIPLICATION PROBLEM OF THE FORM P X Q, WHERE P OR Q IS A POSITIVE OR NEGATIVE INTEGER, BY WRITING A PHRASE AND DRAWING AN INTEGER TILES PICTURE TO REPRESENT THE PROBLEM.**
- **CALCULATE THE PRODUCT OF THE MULTIPLICATION PROBLEM USING INTEGER TILES.**
- **RECOGNIZE THE SIGN OF THE PRODUCT OF TWO INTEGERS WHEN THE TWO INTEGERS HAVE THE SAME OR DIFFERENT SIGNS.**

Math Content Standards

CCSS.MATH.CONTENT.7.NS.A.2

APPLY AND EXTEND PREVIOUS UNDERSTANDINGS OF MULTIPLICATION AND DIVISION AND OF FRACTIONS TO MULTIPLY AND DIVIDE RATIONAL NUMBERS.

CCSS.MATH.CONTENT.7.NS.A.2.A

UNDERSTAND THAT MULTIPLICATION IS EXTENDED FROM FRACTIONS TO RATIONAL NUMBERS BY REQUIRING THAT OPERATIONS CONTINUE TO SATISFY THE PROPERTIES OF OPERATIONS, PARTICULARLY THE DISTRIBUTIVE PROPERTY, LEADING TO PRODUCTS SUCH AS (-1)(-1) = 1 AND THE RULES FOR MULTIPLYING SIGNED NUMBERS. INTERPRET PRODUCTS OF RATIONAL NUMBERS BY DESCRIBING REAL-WORLD CONTEXTS.

CCSS.MATH.CONTENT.7.NS.A.2.C

APPLY PROPERTIES OF OPERATIONS AS STRATEGIES TO MULTIPLY AND DIVIDE RATIONAL NUMBERS.

How to Present The Multiplication Problem below?

3 x 5

Yes/No Question

Yes or No?

3 + 5

Yes or No?

Repeated Addition

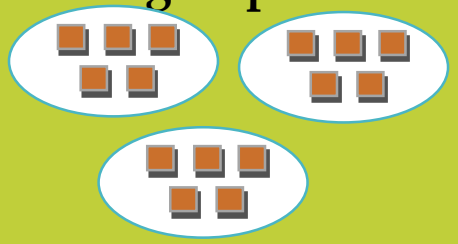
5 + 5 + 5

Yes or No?

An array with 3 rows and 5 columns

Yes or No?

3 groups of 5



Educational Hook – Smart Art Visual Aid

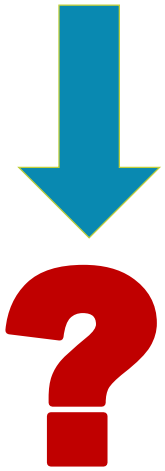
MORE: How to Present Other Multiplication Problems?

Multiplication Problems

3 x -5

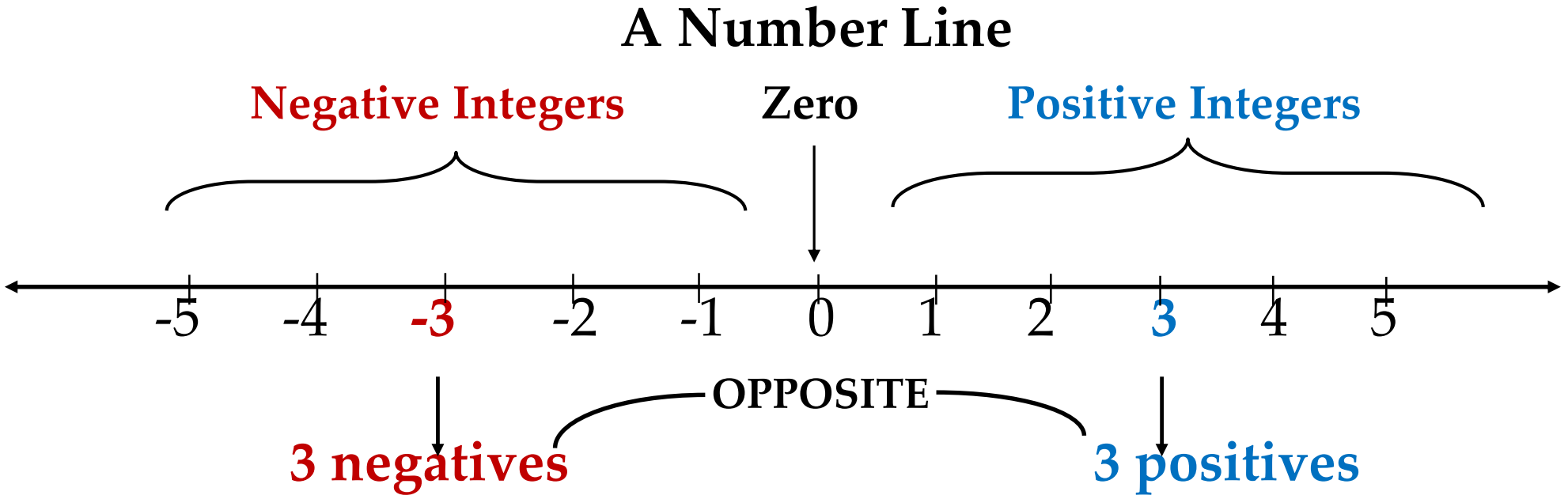
-3 x 5

-3 x -5



Educational Hook – Dual Coding Visual Aid

Review: Positive and Negative Integers

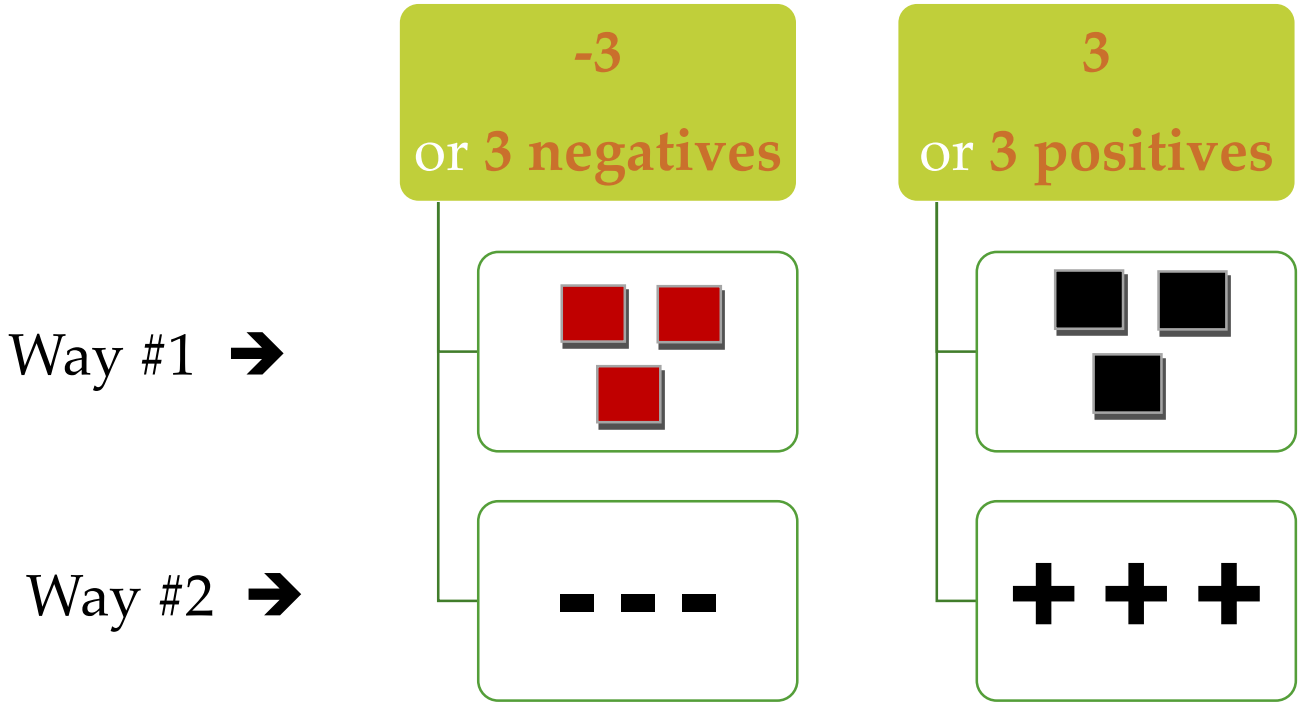


***The opposite of 3 negatives* is 3 positives**

The opposite of 3 positives is *3 negatives*

Dual Coding – Visual Aid

Using Virtual Integer Tiles to Represent Integers



Note: You can color the virtual integer tiles + and -, e.g., + and -

NOW YOU TRY: Use Integers Tiles to Represent Some Integers

REQUEST	IMPLEMENTATION
Use integer tiles to present 7 negatives	
Use integer tiles to present 11 positives	
Use integer tiles to present the opposite of 7 negatives	
Use integer tiles to present the opposite of 11positives	
Use integer tiles to present two groups of 3 negatives (two groups, each group has 3 negatives)	

Progress Monitoring Questions

EXAMPLES: Use Integers Tiles to Represent Some Integers

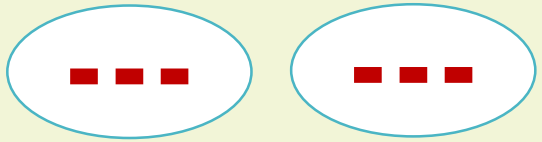
REQUEST	IMPLEMENTATION
Use integer tiles to present 7 negatives	
Use integer tiles to present 11 positives	
Use integer tiles to present the opposite of 7 negatives	
Use integer tiles to present the opposite of 11 positives	
Use integer tiles to present two groups of 3 negatives (two groups, each group has 3 negatives)	

Table Organizer

NOW YOU TRY: Use Integer Tiles to Represent 3 x 5

Fill out the blanks

Multiplication

How many groups?

How many in in each group?

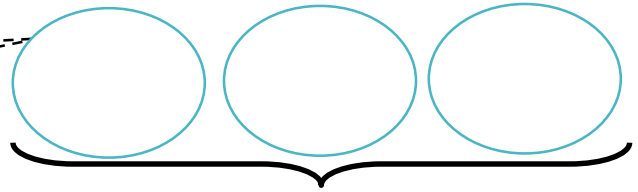
The product

3 x 5 = _____

Write: _____ groups of _____ positives

Draw: Use integer tiles to represent the problem

Fill up what are inside each group



_____ groups

The product (the total from the groups) = _____

Progress Monitoring Question

WHAT WE FOUND: Use Integer Tiles to Represent 3 x 5

Multiplication

3
groups

5 positives
in each group

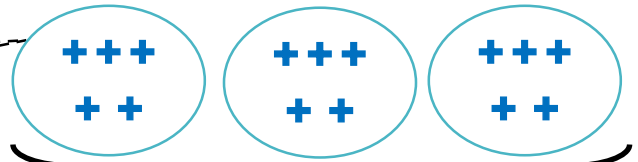
The product

3 x 5 = 15

Write: 3 groups of 5 positives

Draw: Use integer tiles to represent the problem

Fill up what are inside each group

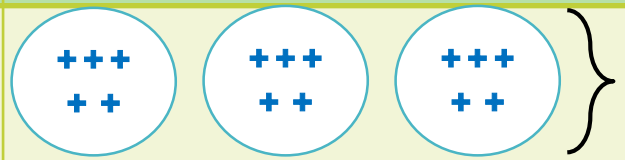


3 groups

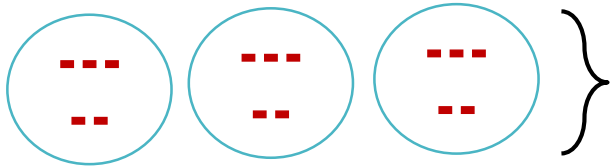
The product (the total from the groups): 15 positives

Dual Coding-Demonstration

The 4 TYPICAL PROBLEMS of Multiplying Integers

Problem	Write	Draw: Use integer tiles to represent the problem	The product
3 x 5	3 groups of 4 positives	 The total: ➔ 15	15
3 x -5			
-3 x 5			
-3 x -5			

Solve Problem 2: 3 x -5

Problem	Write	Draw: Use integer tiles to represent the problem	The product
3 x 5			
3 x -5	3 groups of 5 negatives	 The total: ➔ -15	-15
-3 x 5			
-3 x -5			

NOW YOU TRY: Solve 2 x -7

Problem ?	Write 	 Draw: Use integer tiles to represent the problem	The product
2 x -7			

Progress Monitoring Question

Solve Problem 3: -3 x 5

Problem	Write	Draw: Use integer tiles to represent the problem	The product
3 x 5			
3 x -5			
-3 x 5	The OPPOSITE of 3 groups of 5 positives	3 groups of 5 positives: (+++ ++) (+++ ++) (+++ ++) → The OPPOSITE of 3 groups of 5 positives: (--- --) (--- --) (--- --) The total: 15 The total: -15	-15
-3 x -5			

NOW YOU TRY: Solve -2 x 7

Problem	Write	Draw: Use integer tiles to represent the problem	The product
-2 x 7			

Progress Monitoring Question

Solve Problem 4: -3 x -5

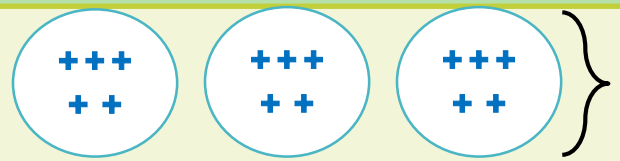
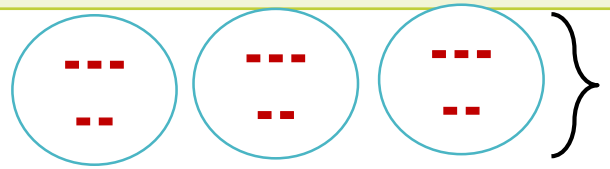
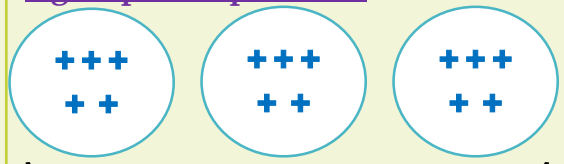
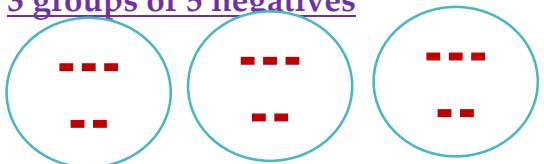
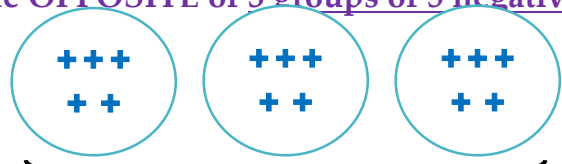
Problem	Write	Draw: Use integer tiles to represent the problem	The product
3 x 5			
3 x -5			
-3 x 5			
-3 x -5	The OPPOSITE of 3 groups of 5 negatives	3 groups of 5 negatives: (---, --) (---, --) (---, --) → The OPPOSITE of 3 groups of 5 negatives: (+++, ++) (+++, ++) (+++, ++). The total: -15. The total: 15	15

NOW YOU TRY: Solve -2 x -7

Problem	Write	Draw: Use integer tiles to represent the problem	The product
-2 x -7			

Progress Monitoring Question

The 4 TYPICAL PROBLEMS of Multiplying Integers (COMPLETED)

Problem	Write	Draw: Use integer tiles to represent the problem	The product
3 x 5	3 groups of 4 positives	 The total: → 15	15
3 x -5	3 groups of 5 negatives	 The total: → -15	-15
-3 x 5	The OPPOSITE of 3 groups of 5 positives	3 groups of 5 positives  The total: 15 → The OPPOSITE of 3 groups of 5 positives  The total: -15	-15
-3 x -5	The OPPOSITE of 3 groups of 5 negatives	3 groups of 5 negatives  The total: -15 → The OPPOSITE of 3 groups of 5 negatives  The total: 15	15

Dual Coding - Visual Aid

SIGN-OF-PRODUCT Table (*Incomplete*)

Signs of two integers a and b		Sign of the Product a x b
+	+	
+	-	
-	+	
-	-	

Thinking

SIGN-OF-PRODUCT Table (*Completed*)

Signs of two integers a and b		Sign of the Product a x b
+	+	+
+	-	-
-	+	-
-	-	+

Thinking

Table Organizer

? NOW YOU TRY: RULE of Signs in Multiplication

1. From the Sign-of-Product table, what do you notify about the signs of multiplication?

2. Is there any rule of multiplication signs we can build up?

- If two integers have the **same sign**, their product _____

_____

- If two integers have **different signs**, their product _____

_____

NOW YOU TRY

Practice solving multiplication problems (Fill up the blanks)

-7 x (-8) = _____	4 x (_____) = -4
-4 x 9 = _____	_____ x -3 = 18
3 x (-11) = _____	-9 x (_____) = 45
15 x 19 = _____	_____ x 7 = -21

-5 x 4 x (-8) = _____

6 x (-7) x 3 = _____

-2 x (-6) x (-3) = _____

Culminating Activity