William Rowen Elementary School

Topic 4- Use Strategies and Properties to Multiply by 2-Digit Numbers

Unit #:	WRES1-00068108	Duration:	3.0 Week(s)	Date(s):	

Team:
Erin Geary (Author), Ellen Foster, Tracey Johnson
Grades:
4
Subjects:
Mathematics

Unit Focus

In Topic 4 students use models to multiply 2-digit numbers by multiples of 10. Students also use area models, the Distributive Property and partial products to multiply. Students use the standard algorithm to solve 2 by 2 multiplication.

Prior Learnings / Connections

The algorithm for multiplying 2-digit numbers is developed similarly. First, students learn patterns in multiplying multiples of 10. Then they use models to multiply a 2-digit number by a multiple of 10 and to multiply using partial products and the Distributive Property.

Stage 1: Desired Results - Key Understandings

Established Goals

Common Core
Mathematics: 4

- 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.
CCSS.MATH.CONTENT.4.OA.A.3

Transfer

Meaning

Understandings

U1

Basic facts and place value patterns can be used to mentally multiply a 2-digit number by a multiple of 10.

U2

Place- value blocks, area models and arrays provide ways to visualize and find products.

Essential Questions

Q1

How does understanding place value help you with number relationships and computing efficiently?

- Fluently add and subtract multi-digit whole numbers using the standard algorithm. *CCSS.MATH.CONTENT.4.NBT.B.4*
- Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. *CCSS.MATH.CONTENT.4.NBT.B.5*
- Attend to precision. *CCSS.MATH.MP.6*
- Construct viable arguments and critique the reasoning of others. *CCSS.MATH.MP.3*
- Look for and express regularity in repeated reasoning. *CCSS.MATH.MP.8*
- Look for and make use of structure. *CCSS.MATH.MP.7*
- Make sense of problems and persevere in solving them. *CCSS.MATH.MP.1*
- Model with mathematics. *CCSS.MATH.MP.4*
- Reason abstractly and quantitatively. *CCSS.MATH.MP.2*
- Use appropriate tools strategically. *CCSS.MATH.MP.5*

Pennsylvania Academic Standards
4

- Apply place value concepts to show an understanding of multi-digit whole numbers. *CC.2.1.4.B.1*
- Represent and solve problems involving the four operations. *CC.2.2.4.A.1*
- Use place value understanding and properties of operations to perform multi-digit arithmetic. *CC.2.1.4.B.2*

U3

Products of 2-digit by 2-digit multiplication problems can be estimated by replacing each factor with the closest multiple of ten.

U4

Products can be estimated by replacing factors with other numbers that are close and easy to multiply mentally.

U5

The expanded algorithm for multiplying with 2-digit numbers is an extension of the expanded algorithm for multiplying with 1-digit numbers.

U6

The Distributive Property can be used to multiply two 2-digit numbers by breaking the computation down into 4 simpler products and adding the partial products together.

U7

The expanded algorithm for multiplication can be represented with arrays. In the algorithm, numbers are broke apart using place value, and the parts are used to find partial products.

U8

The standard algorithm for multiplying a 2-digt number by a multiple of 10 is an extension of the algorithm for multiplying multi-digit numbers by a 1-digit number.

U9

The standard multiplication algorithm involves breaking the calculations into

	simpler ones using place value and properties of operations. Regrouping is used rather than showing all partial products. **U10** The standard multiplication algorithm involves breaking the calculations into simpler ones using place value and properties of operations. Regrouping is used rather than showing all partial products. **U11** Good math thinkers make sense of problems and think of ways to solve them. If they get stuck, they don't give up.	
	Acquisition of Knowledge and Skill	
	Knowledge	**Skills**
	K1 compatible numbers **K2** array **K3** algorithm **K4** variable **K5** product	**S1** SWBAT multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. **S2** SWBAT fluently add and subtract multi-digit whole numbers using the standard algorithm. **S3** SWBAT 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. **S4** SWBAT identify the missing symbol (+, -, ×, ÷, =, <, >) that makes a number sentence true (single-digit divisor only).

Stage 2: Assessment Evidence

Performance Task(s)

Coding	Code	Description
Standards • CCSS.MATH.CONTENT.4.OA.A.3 • CCSS.MATH.MP.6 • CCSS.MATH.MP.3 • CCSS.MATH.MP.8 • CCSS.MATH.MP.7 • CCSS.MATH.MP.1 • CCSS.MATH.MP.4 • CCSS.MATH.MP.2 • CCSS.MATH.MP.5 **T/U/Q/K/S** • Q1 • S1	PT1	**Exemplar** **Due:** Dec. 1, 2017 **Evaluative Criteria** Rubric **Assesssment Evidence** Bag of Stickers **Resources** • RES1 - Bag of Stickers - https://exemplarslibra... - (link)
Standards • CCSS.MATH.CONTENT.4.NBT.B.5 • CCSS.MATH.MP.6 • CCSS.MATH.MP.3 • CCSS.MATH.MP.8 • CCSS.MATH.MP.7	PT2	**Exemplar** **Due:** Dec. 8, 2017 **Evaluative Criteria** Rubirc

• CCSS.MATH.MP.1 • CCSS.MATH.MP.4 • CCSS.MATH.MP.2 • CCSS.MATH.MP.5 **T/U/Q/K/S** • Q1 • S1		**Assesssment Evidence** Pencils **Resources** • RES1 - Pencils - https://exemplarslibra... - (link)

Other Evidence

Coding	Code	Description
	OE1	**Assessment** **Assesssment Evidence** classwork, participation, homework, quizzes, test
Standards • CCSS.MATH.CONTENT.4.OA.A.3 • CC.2.2.4.A.1 **T/U/Q/K/S** • S3	OE2	**Map Skills - 4.OA.A.3** **Due:** Dec. 8, 2017 **Evaluative Criteria** Web-Based Mastery Measure **Assesssment Evidence** **Solving Problems, Equations, and Inequalities** • Determine if the answers to word problems that involve whole numbers are reasonable. • Solve word problems in which remainders must be interpreted. • Solve multistep word problems involving whole numbers, using the four operations, within 1000.
Standards • CCSS.MATH.CONTENT.4.NBT.B.4 • CC.2.1.4.B.1	OE3	**Map Skills - 4.NBT.B.4** **Due:** Dec. 15, 2017

T/U/Q/K/S • S2		**Evaluative Criteria** Web-Based Mastery Measure **Assesssment Evidence** **Computation Base Ten** • Add multi-digit whole numbers > 1000. • Subtract multi-digit whole numbers > 1000.
Standards • CCSS.MATH.CONTENT.4.NBT.B.5 • CC.2.1.4.B.2 **T/U/Q/K/S** • U1 • U2 • U3 • U4 • U5 • U6 • U7 • U8 • U9 • U10 • S1	OE4	**Map Skills - 4.NBT.B.5** **Due:** Dec. 15, 2017 **Evaluative Criteria** Web-Based Mastery Measure **Assesssment Evidence** **Computational Base Ten** • Multiply whole number up to 4 digits by a 1-digit whole number. • Multiply a 2-digit whole number by a 2-digit whole number.
Standards • CCSS.MATH.CONTENT.4.OA.A.3 • CCSS.MATH.CONTENT.4.NBT.B.4 • CCSS.MATH.CONTENT.4.NBT.B.5 • CC.2.1.4.B.1 • CC.2.2.4.A.1 • CC.2.1.4.B.2 **T/U/Q/K/S**	OE5	**PSSA Released Items - 4.NBT.B.4, 4.NBT.B.5, 4.OA.A.3** **Due:** Dec. 15, 2017 **Evaluative Criteria** Selective Response (Multiple Choice) **Assesssment Evidence** PSSA Released Items based on the following Eligible Content:

• U5 • U6 • U7 • U8 • U9 • U11 • Q1 • S1 • S2 • S3 • S4		• **M04.B-O.1.1.1** • **M04.B-O.1.1.3** • **M04.B-O.1.1.2** • **M04.A-T.2.1.2** • **M04.A-T.2.1.3** • **M04.A-T.2.1.1** • **M04.B-O.1.1.4** **Resources** • RES1 - Grade4_PSSA_Release_4OAA3_4NBTB4_4NBTB5_editable - PSSA Released Items • RES2 - Grade4_PSSA_Release_4OAA3_4NBTB4_4NBTB5_noneditable - PSSA Released Items
Standards • CCSS.MATH.CONTENT.4.NBT.B.5 • CC.2.1.4.B.2 **T/U/Q/K/S** • S1	OE6	**IXL - 4.NBT.B.5** **Due:** Dec. 15, 2017 **Evaluative Criteria** Web-Based Mastery Measure **Assesssment Evidence** Below are the IXL skills students may complete: • D.5 • D.6 • D.8 • D.9 • D.10 • D.11 • D.17 • D.18 • D.24
Standards • CCSS.MATH.CONTENT.4.NBT.B.4	OE7	**IXL - 4.NBT.B.4** **Due:** Dec. 15, 2017

• CC.2.1.4.B.1 **T/U/Q/K/S** • S2		**Evaluative Criteria** Web-Based Mastery Measure **Assesssment Evidence** Below are the IXL Skills students may complete: • B.1 • B.2 • B.5 • B.7 • C.1 • C.2 • C.3 • C.5
Standards • CCSS.MATH.CONTENT.4.OA.A.3 • CC.2.2.4.A.1 **T/U/Q/K/S** • S3	OE8	**IXL - 4.OA.A.3** **Due:** Dec. 15, 2017 **Evaluative Criteria** Web-Based Mastery Measure **Assesssment Evidence** Below are IXL Skills students may complete: • A.12 • D.27 • E.7 • E.11 • F.3 • F.4 • F.5 • F.6 • F.7 • F.10 • K.2 • K.3