

Teacher Directions for 4th Grade Unit 2 RWE

This Rich Mathematical Task has these components:

- A situation in which an appropriate path to a solution is not readily apparent.
- Can be adapted to maintain high cognitive demand while meeting the needs of individual needs of students.
- Requires students to do more than remember a fact or reproduce a skill.
- Encourages investigations and the opportunity to think more deeply and discuss ideas and theories with classmates.
- Has multiple entry points, solution paths and at times, multiple solutions.

Adapted from Linda Gojak (2013) NCTM Conference

NOTE: During the pilot phase, please note whether students used calculators or computers and record any additional directions/instructions given by the teacher.

Task One

Part A

It is time for Outdoor Ed! You need to figure out how many people are attending this year. There are three teachers. Two of the teachers have an aide. Three parent chaperones are going from each class. Mr. Blair's class has 26 students, Mr. Dvorak's class has 28 students, and Mrs. Nickel's class has 26 students.

How many people are going altogether?

1 teacher x 3 classes = 3 teachers going

1 aide x 2 classes = 2 aides going

3 parents x 3 classes = 9 parents going

26 students + 28 students + 26 students = 80 students going

80 students + 3 teachers + 2 aides + 9 parents = 94 people total going on the trip

Part B

The cost is \$75 per person. What will be the total cost of the trip for all of the people going?

94 people x \$75 = \$7050 total cost for all to attend

Part C

The \$75 per person includes \$54 for lodging, \$7 for transportation and the remaining amount is for food. How much money does each person have to spend on food? What is the total amount spent on food for the entire group?

\$75 - \$54 - \$7 = amount left over for food

\$75 - \$54 - \$7 = \$14 is for food

\$14 x 94 people = \$1316 total spent on food for the entire group

Part D

PTO contributed \$650 for the 5th graders to attend an Endangered Species Presentation. The cost of the presentation is \$8 per student. Adults are free.

Is there enough money to cover the cost for the entire 5th grade? Show your work and explain your thinking using numbers, words and/or pictures.

80 students x \$8 = amount needed to pay for the show

\$640 is the total cost of the show

\$650 PTO money - \$640 cost of show = \$10 extra

There is enough money from the PTO for all students to attend the show. There will be \$10 left over from the PTO contribution.

Task Two

All the boys and girls will be invited to a lock-in, or sleepover, at the lodges one night. Girls will be in one lodge, and boys will be in another. A sleeping bag is a must! Teachers need to decide which size sleeping bag each student should bring to sleep comfortably in the lodge. Teachers have two choices of sleeping bags: 2 feet by 6 feet or 3 feet by 6 feet. They must decide which size people need to bring.

The area of each lodge is 600 square feet. Given the two sleeping bag choices, which size sleeping bag is needed for the boys to fit in one lodge and the girls to fit in the other lodge? You do not have to include sleeping bags for the adults.

Use the information calculated in Task 1, Part A. There are an equal number of boys and girls attending the trip.

Justify your sleeping bag choice by explaining your thinking in words, numbers and/or drawings. $\text{Area} = l \times w$
(answers and work shown may vary)
(If students find one answer quickly, encourage them to find another suitable solution.)

There can be 6 large sleeping bags & 34 small sleeping bags

OR

There can be 40 small sleeping bags

OR

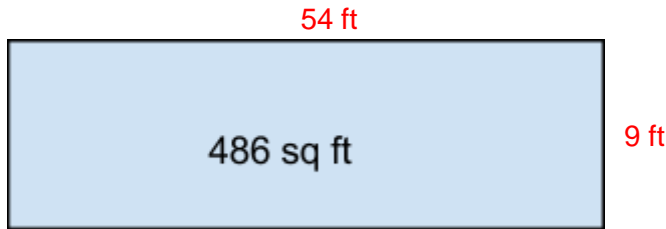
There can be 12 large sleeping bags & 28 small sleeping bags

Task Three

Part A

Part of Outdoor Ed is to complete a task as a group. This year, Covenant Harbor needs a new pier, and the 5th graders need to design it. The pier must measure 9 feet wide. The area of the pier needs to measure 486 square feet. What is the length of the pier? (Area= $l \times w$)

Draw a picture to show your thinking.



Part B

If you use wooden planks that measure 3 feet by 9 feet, how many planks would you need to cover the pier?

Draw a picture to show your thinking. (work shown may vary)

$$3 \times 9 = 27 \text{ sq ft} \quad 54 \text{ ft} \div 3 \text{ ft} = 18 \text{ planks}$$

The cost of each 3' x 9' wooden plank is \$28. How much will the total number of planks cost? Explain your thinking using words, numbers, and/or pictures.

$$18 \text{ planks} \times \$28 = \$504$$

Part C (work shown may vary)

If you use planks that measure 3 feet by 3 feet, how many planks would you need to cover the pier?

$$3 \text{ ft} \times 3 \text{ ft} = 9 \text{ sq ft} \quad 486 \text{ sq ft} \div 9 \text{ sq ft} = 54 \text{ planks}$$

OR

18 planks \times 3 = 54 planks because there are three 3 x 3 planks in 3 x 9 and therefore would yield three times as many planks

The cost of the 3' x 3' wooden plank is \$10. How much will the total number of planks cost? Explain your thinking using words, numbers, and/or pictures.

$$54 \text{ planks} \times \$10 = \$540$$

Part D

What is the difference in cost between the two choices?

$$\$540 - \$504 = \$36$$

Task Four

Use the information from Task 3 to design the pier. Use both sizes of planks in your design. Draw your design on graph paper.

Summarize Your Outdoor Education Calculations

It is time to summarize the great math thinking you did during this experience! Write a summary of some of the important calculations that you made. Be sure to include:

- How did you calculate the total number of people attending the trip?(Task 1 Part A)
 - Explain what you needed to know in order to solve Task 1-Part A
 - Explain all the steps you took to figure out your answer to Task 1-Part A
- How did you calculate the total amount of money spent on food for the entire group attending the trip?(Task 1 Part C)
 - Explain what you needed to know in order to solve Task 1-Part C
 - Explain all the steps you took to figure out your answer to Task 1-Part C
- Explain your pier design.
 - Which size plank would you choose to build the pier and why?
 - Explain how many of each size planks you used
 - Explain the total cost of the design
 - Use your calculations to construct your viable argument as to why you designed your pier a particular way

Real World Experience Scoring Rubric

Outdoor Education Project

Meeting	<ul style="list-style-type: none">• Student included a design of the pier with an area of 486 ft²• Student included an explanation of their pier design:<ul style="list-style-type: none">○ number of each size plank used○ why they choose a particular number of each plank○ total cost of planks for their pier design○ calculations in their argument to support their pier design• Student included an explanation of their calculations for:<ul style="list-style-type: none">○ the number of people attending the trip○ information needed to calculate total people attending the trip○ the total amount of money spent on food for the entire group○ information needed to calculate food cost
Developing	Meets 6 of 9 criteria
Beginning	Meets less than 6 of 9 criteria

Outdoor Education Project



Scenario

Fifth grade is planning their Outdoor Ed Trip to Covenant Harbor. The teachers need your help to figure out if they have enough money for their trip and enough space for everyone to sleep.

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Part B

The cost is \$75 per person. What will be the total cost of the trip for all of the people going?

Part C

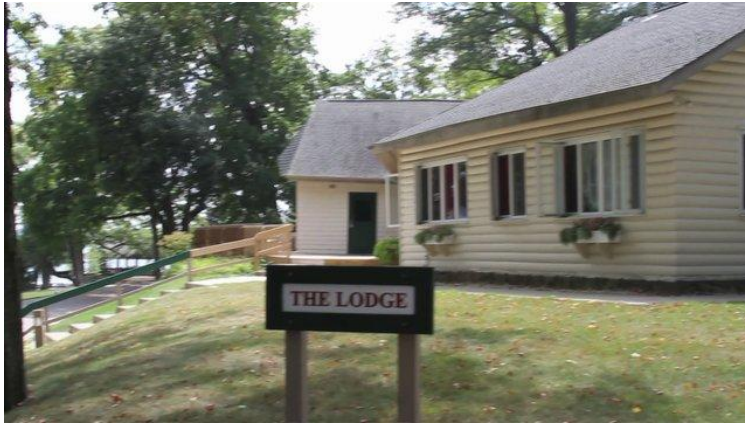
The \$75 per person includes \$54 for lodging, \$7 for transportation and the remaining amount is for food. How much money does each person have to spend on food? What is the total amount spent on food for the entire group?

Part D

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Is there enough money to cover the cost for the entire 5th grade? Show your work and explain your thinking using numbers, words and/or pictures.

Task Two



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The area of each lodge is 600 square feet. Given the two sleeping bag choices, which size sleeping bag is needed for the boys to fit in one lodge and the girls to fit in the other lodge? You do not have to include sleeping bags for the adults.

Use the information calculated in Task 1, Part A. There are an equal number of boys and girls attending the trip.

Justify your sleeping bag choice by explaining your thinking in words, numbers and/or drawings. $\text{Area} = l \times w$

Task Three



Part A

Part of Outdoor Ed is to complete a task as a group. This year, Covenant Harbor needs a new pier, and the 5th graders need to design it. The pier must measure 9 feet wide. The area of the pier needs to measure 486 square feet. What is the length of the pier? ($\text{Area} = l \times w$) Draw a picture to show your thinking.

Part B

If you use wooden planks that measure 3 feet by 9 feet, how many planks would you need to cover the pier? Draw a picture to show your thinking.

The cost of each 3' x 9' wooden plank is \$28. How much will the total number of planks cost? Explain your thinking using words, numbers, and/or pictures.

Part C

If you use planks that measure 3 feet by 3 feet, how many planks would you need to cover the pier?

The cost of the 3' x 3' wooden plank is \$10. How much will the total number of planks cost? Explain your thinking using words, numbers, and/or pictures.

Part D

What is the difference in cost between the two choices?

Task Four

Use the information from Task 3 to design the pier. Use both sizes of planks in your design. Draw your design on graph paper.

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- How did you calculate the total amount of money spent on food for the entire group attending the trip?(Task 1 Part C)
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 - Explain all the steps you took to figure out your answer to Task 1-Part C
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Name: _____

Unit 2
Real World Experience Scoring Rubric

Outdoor Education Project

Extending	<ul style="list-style-type: none">• Student meets criteria for proficient and demonstrates additional, higher level math conceptual understanding.
Meeting	<ul style="list-style-type: none">• Student included a design of the pier with an area of 486 ft²• Student included an explanation of their pier design:<ul style="list-style-type: none">○ number of each size plank used○ why they choose a particular number of each plank○ total cost of planks for their pier design○ calculations in their argument to support their pier design• Student included an explanation of their calculations for:<ul style="list-style-type: none">○ the number of people attending the trip○ information needed to calculate total people attending the trip○ the total amount of money spent on food for the entire group○ information needed to calculate food cost
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