

## Playground Committee

The Playground Committee is considering creating a walkway along the building in back of the primary classrooms, which would enable the students to go from the back doors of their classrooms to the paved walkway in back of the gym without getting muddy. They are, however, concerned about the cost and are wondering if it can be done for less than \$500.

An anonymous resident has agreed to cover the cost of labor and other needed materials (including sand to level out the pavers). Attached are possible materials that the committee would need to buy to complete the walkway, along with sizes and prices.

Help the committee by designing an attractive walkway and determining whether it can be done within their budget.

Write them a letter...

- describing your design,
- the cost of the design,
- the materials needed, and
- why your plan is worthy of their consideration.

## Playground Committee

### Suggested Grade Span

3-5

### Task

The Playground Committee is considering creating a walkway along the building in back of the primary classrooms, which would enable the students to go from the back doors of their classrooms to the paved walkway in back of the gym without getting muddy. They are, however, concerned about the cost and are wondering if it can be done for less than \$500.

An anonymous resident has agreed to cover the cost of labor and other needed materials (including sand to level out the pavers). Attached are possible materials that the committee would need to buy to complete the walkway, along with sizes and prices.

Help the committee by designing an attractive walkway and determining whether it can be done within their budget.

Write them a letter...

- describing your design,
- the cost of the design,
- the materials needed, and
- why your plan is worthy of their consideration.

### Alternate Versions of Task

#### More Accessible Version:

The Playground Committee is considering creating a walkway along the building in back of the primary classrooms that would enable the students to go from the back doors of their classrooms to the paved walkway in back of the gym without getting muddy. They are, however, concerned about the cost, and are wondering if it can be done for less than \$400 dollars.

An anonymous resident has agreed to cover the cost of labor, and other needed materials to support the project. The walkway will be 10 feet long and 3 feet wide. The bricks to make the walkway are 6 inches long and 3 inches wide. They cost \$1.50 each.

Determine whether the walkway can be made within their budget. Write them a letter describing the cost of materials needed.

---

# Exemplars

---

## **More Challenging Version:**

The Playground Committee is considering creating a walkway along the building in back of the primary classrooms that would enable the students to go from the back doors of their classrooms to the paved walkway in back of the gym without getting muddy. They are, however, concerned about the cost, and are wondering if it can be done for less than \$500 dollars.

An anonymous resident has agreed to cover the cost of labor, and other needed materials (including sand to level out the pavers). Below are possible materials that the committee would need to buy to complete the walkway, along with sizes and prices. Help the committee by designing an attractive walkway and determining whether it can be done within their budget.

Determine the least expensive version of your design. Determine the most expensive version of your design. Write them a letter describing your design, the cost of the design (both least and most expensive), the materials needed and which you would recommend.

## **Context**

This task was given to students after a geometry unit, but as it turned out, students focused more on the measurement aspect of it. Students had just evaluated a plan that our school playground committee had received from a landscape architect, making this fictional task was relevant and meaningful to them. Students were very invested in finding solutions and took the task very seriously.

## **What This Task Accomplishes**

Since this problem can be solved using manipulatives or sketches, as well as by using computation all students can be successful at their individual levels. When solving the problems using manipulatives and sketches, many patterns and relationships evolve, lending themselves well to children extending their solutions and making connections. This task also provides students with a real-world application of the skills they have been developing in class.

## **What the Student Will Do**

Students were given a choice to work independently or in groups. Most chose groups. Students began by sketching out a plan and then proceeded outside to take measurements. Since the distance was long, many students used meter sticks to measure, but then needed to convert their measurement to inches which was complicated for some. Some students used string, while others used measuring tapes. The majority of the students chose to make the path one paver wide and therefore did not need to deal with the tessellation of paver shapes. If this is an objective you want students to address, you may want to add a width requirement. Students then took their measurements and went back to experiment with which pavers they could use and then figured the cost.

---

# Exemplars

---

## Time Required for Task

4-5 hours

At least three, one-and-a-half hour periods. Many students needed longer, depending on how elaborate their plans were.

## Interdisciplinary Links

This activity could incorporate art and landscaping. Students could also visit stores which sell pavers or perhaps visit companies which manufacture them. They could also interview and/or visit landscapers and other professional designers.

## Teaching Tips

This task was difficult for some of my lower level students. I recommend adjusting the length of the walkway for students of limited abilities so the numbers will be more manageable. I would also spend some time before giving this task reviewing division and converting measurements. When students were outside measuring I had three adults supervising. I stayed in the classroom to supervise students who were done measuring early. This helped with behavior management issues.

## Suggested Materials

- Calculators
- Graph paper
- Yard sticks
- Measuring tapes and rulers
- String
- Pattern blocks
- Product List (see page 6)

## Possible Solutions

Solutions will vary depending on the area chosen to cover and the type of pavers used.

### More Accessible Version Solution:

#### Walkway

$$10 \times 12 = 120 \text{ inches}$$

$$3 \times 12 = 36 \text{ inches}$$

$$120 \times 36 = 4,320 \text{ square inches}$$

## Playground Committee

---

# Exemplars

---

## Bricks

6 inches x 3 inches = 18 square inches

4,320 ÷ 18 = 240 bricks

240 bricks x \$1.50 = \$360, so yes, there is enough money in the budget to complete the project.

### **More Challenging Version Solution:**

Solutions will vary. When assessing students' solutions look for correctness in computation and mathematical reasoning.

### **Task Specific Assessment Notes**

#### **Novice**

This solution shows an incomplete understanding or ability to solve the problem. The solution does not address the cost or number of pavers. Reasoning is lacking or inaccurate. It is not clear what the student did to solve the task.

#### **Apprentice**

A solution that attempts to address the walkway measurement, number of pavers and the total cost, but is incomplete or incorrect in the final result. A solution which shows some understanding of the problem, but has a random or weak explanation or strategy. The student lacks communication about what was done to solve the task.

#### **Practitioner**

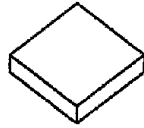
A solution that shows understanding of measurement and the cost aspect of the problem. A solution in which the student is able to apply fundamentals of division to calculate either the number or cost of the pavers. The student demonstrates an understanding of conversion between units of measure as well as the number of units and the price per unit. The student is able to communicate with some clarity what was done and why.

#### **Expert**

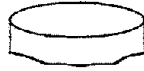
A solution that addresses accuracy of measurement, cost and function of the pathway. The student offers multiple solutions and elaborates on the process and strategy used. The student communicates clearly using a variety of terms, symbols and notation.

# Exemplars

## Product List for Moore's



18 inch square natural paver: \$2.99



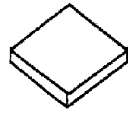
18 inch round red paver: \$3.29



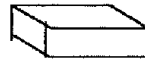
18 inch hexagon paver: \$3.00



V-Block paver  
4 inches x 8 inches: 50¢



12 inch square paver: \$1.29



common brick  
4 inches x 8 inches: 39¢