

Saving Money

Brent works very hard on his family's farm. His mom and dad give him \$5.00 every week for being such a good helper. Each week he must put \$1.50 in the bank. Each week he must also put 50 cents in the family's vacation fund. Brent is saving up the rest of his money to buy a new soccer ball for \$14.00 (including tax) and a new baseball for \$3.00 (including tax). How long will it take Brent to save enough money to buy the soccer ball and the baseball?

Saving Money

Suggested Grade Span

Grades 3–5

Grade(s) in Which the Task Was Piloted

Grade 3

Task

Brent works very hard on his family's farm. His mom and dad give him \$5.00 every week for being such a good helper. Each week he must put \$1.50 in the bank. Each week he must also put 50 cents in the family's vacation fund. Brent is saving up the rest of his money to buy a new soccer ball for \$14.00 (including tax) and a new baseball for \$3.00 (including tax). How long will it take Brent to save enough money to buy the soccer ball and the baseball?

Alternative Versions of the Task

More Accessible Version:

Brent works very hard on his family's farm. His mom and dad give him \$3.00 every week for being such a good helper. Brent is saving his money to buy a new soccer ball and a new baseball that total \$17.00 (including tax). How long will it take Brent to save enough money to buy the soccer ball and the baseball?

More Challenging Version:

Brent works very hard on his family's farm. His mom and dad give him \$5.00 every week for being such a good helper. Each week he must put \$1.50 in the bank. Each week he must also put 50 cents in the family's vacation fund. Brent is saving up the rest of his money to buy a new baseball for \$3.00, and a soccer ball that is $4\frac{2}{3}$ times more expensive than the baseball. Neither of these prices includes a 5% sales tax. How long will it take Brent to save enough money to buy the soccer ball and the baseball?

NCTM Content Standards and Evidence

Number and Operation Standard for Grades 3–5

Instructional programs from Pre–Kindergarten through grade 12 should enable students to...

- Understand meanings of operations and how they relate to one another.
 - *NCTM Evidence:* Understand various meanings of multiplication and division, and understand the effects of multiplying and dividing whole numbers.
 - *Exemplars Task Specific Evidence:* This task requires students find a method for determining the number of threes it takes to equal \$17.00, and then to round up to the nearest whole number.

Time/Context/Qualifiers/Tip(s) From Piloting Teacher

This is a short to medium length task. If students are able to go right to a solution without having to utilize problem–solving strategies, then this task is not an appropriate problem solving assessment piece for this child.

Links

This task could link to a unit on earning and saving money, as well as link to soccer or baseball.

Common Strategies Used to Solve This Task

Most students will use a chart or diagrams to solve this task.

Possible Solutions

Original Version:

$\$5.00 - 1.50 = \$3.50 - \$0.50 = \3.00 to go toward the ball fund.

$\$14 + \$3 = \$17$ for the cost of the balls.

$\$17 \div 3 = 5.67$ weeks that should be rounded to 6 weeks.

More Accessible Version:

The solution is the same as that in the original version.

More Challenging Version:

$\$5.00 - 1.50 = \$3.50 - \$0.50 = \3.00 to go toward the ball fund.

$\$3 \times 4 \frac{2}{3} = \14 for the soccer ball

$\$14 + \$3 = \$17$ for the cost of the balls + 5% tax = \$17.85

$\$17.85 \div 3 = 5.95$ weeks that should be rounded to 6 weeks

Task Specific Assessment Notes

General Notes: This task does not lend itself well to students needing to create math representations as a problem-solving strategy, although many students attempt to do so. Students should not be penalized for not including a representation in their solution.

Novice: The Novice will have an incorrect solution with little or no math reasoning used. Many flaws will exist in the solution.

Apprentice: The Apprentice will have a partially correct solution, but the student may neglect to address part of the task or will achieve an incorrect solution due to computation or reasoning errors. Some math language will be used to communicate.

Practitioner: The Practitioner will achieve a correct solution with supporting work that is shown and labeled. Math language and representations will be used to communicate the solution. An awareness of audience will be evident.

Expert: The Expert will have an efficient strategy for solving the task. All work will be shown and labeled, and the approach and reasoning explained. The Expert will go beyond the task requirements to make a rule for solving the task, or will extend the task to a more complicated situation.

Author

Deb Armitage, Pre-K–8 Mathematics Assessment Consultant at the Vermont Department of Education, wrote this task. Teachers and students in Vermont piloted the task.

Exemplars

Novice

Little correct math reasoning is used. There is no evidence of the student determining that \$17.00 is needed.

I will find out how much money I need to find out He HAS Enough in 7 weeks

7 day \$5.00
 7 day \$5.00
 7 day \$5.00
 7 day \$5.00

2 day's \$15.00
 7 day 5.00
 7 days 5.00
 3 day 5.00

39 day 35.00

24

15.00
 1.50
 1.50
 3.00
 5.00

50
 50
 50

41.00

1.50
 1.50
 3.50
 50
 1.00

1.50
 1.50
 3.00
 50
 3.50

1.50
 1.50
 3.00
 50
 4.00

3.00
 1.00
 4.00
 3.00

4.00
 3.00
 1.20
 16.00

It is unclear why the student uses days vs. weeks.

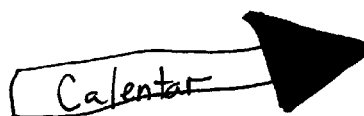
An incorrect answer is achieved. There is no evidence that the student knows \$3.00 a week is contributed to the sports equipment fund.

Apprentice

Some evidence of understanding is present.

I have to find out when he has a enough money.
I will make a calendar.

$$\begin{array}{r}
 \$14.00 \\
 +\$3.00 \\
 \hline
 17.00 \\
 +17.00 \\
 \hline
 \$34.00
 \end{array}$$



$$\begin{array}{r}
 \$14.00 \\
 +\$14.00 \\
 \hline
 31.00
 \end{array}$$

I kept going to \$28.00
He can only buy 1 more base

Some math language is used along with an attempt at a math representation.

The student determines a total cost of the soccer ball and baseball.

Apprentice cont.

Brents Money

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Sat Total
3.00						\$6.00
\$3.00					→	\$9.00
\$3.00					→	\$12.00
\$3.00					→	\$15.00
\$3.00					→	\$18.00
\$3.00					→	\$21.00
\$3.00					→	\$25.00
\$3.00					→	\$28.00

The student correctly contributed each week toward the ball fund.

Exemplars

Practitioner

A correct answer is given.
All work is shown
and labeled.

Math language and
representations are
used to communicate.

I will ^{8 weeks} make a chart.

I need to find out how much
weeks until he has enough money.

$$\begin{array}{r} \$4.00 \\ + 3.00 \\ \hline 7.00 \end{array}$$

Saving money

weeks	money	bank	vacation	save
1.	\$5.00	\$1.50	\$.50	\$3.00
2.	\$5.00	\$1.50	\$.50	\$6.00
3.	\$5.00	\$1.50	\$.50	\$9.00
4.	\$5.00	\$1.50	\$.50	\$12.00
5.	\$5.00	\$1.50	\$.50	\$15.00
6.	\$5.00	\$1.50	\$.50	\$18.00

after he buys the soccer ball and baseball
he will have a ones

A relevant observation
is made about the one
dollar extra.

An awareness of
audience is present.

Expert

The student uses an efficient approach to solving the task.

I need to find out how many weeks it takes him to buy his baseball and soccer ball. he needs 17 dollars to buy both of them $14 + 3 = 17$ he we have \$3.00 each week

$$\begin{array}{r} 5 \\ 3 \overline{) 17} \\ \underline{15} \\ 2 \end{array}$$

$$\begin{array}{r} \$5.00 \\ - \$2.00 \\ \hline 3.00 \end{array}$$

$$\begin{array}{r} \$15.00 \\ + 0.50 \\ \hline \$15.50 \end{array}$$

The approach and reasoning are explained. All work is shown.

$5\frac{2}{3}$ weeks so he needs to round up 6 weeks

Expert cont.

rule: cost of what to buy
divided by \$3.00 round up
is weeks it takes.

The student extends the solution to create a rule for solving the problem.