

## Open Ended Problem: **Close Encounters of the Cash Kind!**

**Done by:** Mary, Pat, Jen, and Joe (K-2 Grade Level Band)

**Grade Level:** Second Grade

**Content Area:** Estimation / Number Sense

### **PA Standards Addressed:**

- 2.1.3.A Count using whole numbers (to 10,000) and by 2's, 3's, 5's, 10's, 25's, and 100's.
- 2.1.3.C Represent equivalent forms of the same number through the use of concrete objects, drawings, word names and symbols.
- 2.1.3.I Apply place-value concepts and numeration to counting, ordering and grouping.
- 2.1.3.J Estimate, approximate, round or use exact numbers as appropriate.
- 2.2.3.B Solve single- and double-digit addition and subtraction problems with regrouping in vertical form.
- 2.2.3.E Use estimation skills to arrive at conclusions.**
- 2.5.3.A Use appropriate problem-solving strategies (e.g., guess and check, working backwards).
- 2.5.3.C Select and use an appropriate method, materials and strategy to solve problems, including mental mathematics, paper and pencil and concrete objects.
- 2.8.3.B Use concrete objects and trial and error to solve number sentences and check whether solutions are sensible and accurate.

### **NCTM Standards Addressed:**

Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

- Count with understanding and recognize “how many” in sets of objects.
- Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers.
- Connect number words and numerals to the quantities they represent, using various physical models and representations.

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Jon went to the candy store.  
He had some coins in his pocket,  
*BUT* he had no pennies!

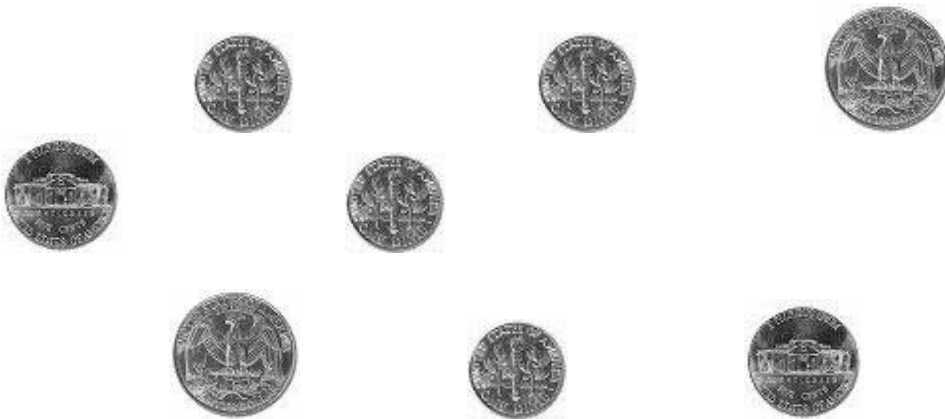
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He bought a pack of gum for 15 cents, a chocolate kiss for 5 cents, and two gummy worms for 4 cents *each*. How many cents did his candy cost?

Show how you found your answer.

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Circle the coins that are closest to how much money Jon needed to buy his candy.



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Tell why you circled those coins.

**Problem Name:** Close Encounters of the Cash Kind!

**Grade Level:** Second Grade

**Content Area:** Estimation / Number Sense

**Problem Solutions:**

Step One: Computation Piece

**Any number sentence showing a sum of 28 cents using 15, 5, 4, and 4 cents, OR other amounts of money resulting from using other addition strategies. (For example, doubling the four cents for two gummy worms.)**

$$15+5+4+4=28$$

$$15+5+8=28$$

$$20+8=28$$

**Illustrations (coins, tallies, tens/ones) showing groups being joined to obtain a sum of 28.**

**Finding a sum of 24 cents will be acceptable at a level below a 5 on the rubric.**

Step Two: Selecting an estimated amount of money

Most correct solutions:

1. Three dimes
2. One quarter, one nickel
3. Two dimes, two nickels

Acceptable solutions:

1. One quarter, one dime
2. Four dimes
3. Two quarters

**OR ANY OTHER SOLUTION MORE THAN 30 CENTS, but LESS THAN 50.**

Unacceptable solutions:

1. One quarter
2. Two dimes
3. Dime, nickel
4. Two nickels

**ANY OTHER SOLUTION LESS THAN 25 CENTS or CHOOSING MORE THAN 50 CENTS.**

Step Three: Explanation

**Phrases in the solution could include something approximate to the following:**

*“don’t have the coins to make 28 cents”*

*“I added the coins to get close to 28”*

*“these coins are closest to 28 cents”*

*“there were no pennies”*

*“is closer to 28 cents than ....”*

*“I didn’t want too much extra...”*

*“these coins were enough”*

*“I knew I needed more than 28”*

## Rubric

**Problem Name:** Close Encounters of the Cash Kind!

**Grade Level:** Two

### Specific Rubric:

#### A. Computation Criteria:

- Correctly computed the sum of the prices to be 28 cents, using any method of computation to arrive at that answer
- Selected coins totaling 30 cents in any combination

#### B. Strategy Criteria:

- Selected addition operation
- Demonstrated estimation by selecting a combination of coins totaling 30 cents

#### C. Explanation of Work

Responses may include those noted in the solution

- Mentions needing to select different coins because the exact amount cannot be made from the given selection coins
- Mentions selecting sufficient coins
- Mentions selecting no extra coins
- Mentions needing to select money close to needed amount

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*“I added the coins to get close to 28”*

*“these coins are closest to 28 cents”*

*“there were no pennies”*

*“is closer to 28 cents than...”*

*“I didn’t want too much extra...”*

*“these coins were enough”*

*“I knew I needed more than 28”*

**Specific Rubric Continued:**

<b>Score</b>	<b>Computation</b>	<b>Strategies</b>	<b>Explanation</b>
<b>5.</b>	All computation is correct	Selected coins totaling 30 cents	Mentions at least two criteria
<b>4.</b>	All computation is correct	Selected coins totaling 35 cents or more	Mentions at least one criteria
	----- One computation error (ex. failing to double or incorrectly computing the sum)	Selected coins totaling 25 or 30 cents, consistent with any computational error	Mentions at least one criteria
<b>3.</b>	One computation error (ex. failing to double or incorrectly computing the sum)	Selected coins totaling 30 cents	Little or no explanation
	----- Selected addition and correctly computed sum but failed to double the 4 cents	Selected coins totaling 35 to 40 cents	Little or no explanation
	----- One computation error (ex. failing to double or incorrectly computing the sum)	Selected coins totaling 35 to 40 cents	Mentions at least two criteria
<b>2.</b>	Two computation errors (ex. failing to double or incorrectly computing the sum) but attempted to add prices	Selected coins totaling 35 to 40 cents	Little or no explanation
	----- One computation error (ex. failing to double or incorrectly computing the sum) but attempted to add prices	Selected coins totaling 40 to 50 cents	Little or no explanation
<b>1.</b>	Two computation errors (ex. failing to double or incorrectly computing the sum) but attempted to add prices	Selected coins in excess of 40 cents	Little or no explanation
<b>0.</b>	Made no attempt to answer or showed no understanding of the task.		