

SCHOOL CLOTHES: A 5th Grade Unit

TEACHER'S GUIDE

Correlation to NCTM Curriculum Focal Points and Connections to the Focal Points for Grade 5

(CFP) Number and Operations: Developing an understanding of and fluency with addition and subtraction of fractions and decimals

Students apply their understandings of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They apply their understandings of decimal models, place value, and properties to add and subtract decimals. **They develop fluency with standard procedures for adding and subtracting fractions and decimals. They make reasonable estimates of fraction and decimal sums and differences. Students add and subtract fractions and decimals to solve problems, including problems involving measurement.**



It is essential that these focal points be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations.

Bold print in the description of the focal point identifies the topics addressed in the unit.

This unit provides a real-world problem that is familiar to students.

Prerequisite Knowledge or Skills

To be successful in this unit, students will need to have had prior experience in making change as well as estimating the cost of combinations of items on sale.

WARM UP 1

Luke has two 1-dollar bills. At the store he sees this sign:

Jelly Beans	\$0.35	M & M's [®]	\$1.59
Gum	\$0.75	Gum Drops	\$1.19
Licorice	\$0.89		

Part A

Luke wanted to buy 2 different kinds of candy. Select 2 kinds of candy Luke can buy with his \$2 and get change back.

Part B

How much change will he get back?

Show your work.

Teacher's Guide: Grade 5

Each unit is correlated to the NCTM Curriculum Focal Points and/or Connections to the Focal Points.

Each unit includes one or more Warm Up Problems, a Problem Solving Task and one or more Extension Problems.

Warm Up 1 Suggestions

Encourage students to use play money. This problem is designed to be done with students grouped as partners. As you discuss the answers to Part B, be sure to ask students *how* they got their answer. Are they counting up to \$2? Are they writing a subtraction problem and using an algorithm to calculate change? Are they able to calculate change in their head? A group discussion would be a perfect way to draw out the strategies that students are using.

WARM UP 2

Adrianna has \$3.04 in her pocket. At the store she sees this sign:

Jelly Beans	\$0.35	M & M's [®]	\$1.59
Gum	\$0.75	Gum Drops	\$1.19
Licorice	\$0.89		

She will buy at least three types of candy. She may buy more than one package of each type. What could Adrianna buy with her money? How much change will she get back?

Show your work. Include labels.

Record in your journal any outcomes that did not work.

Answer: _____

Bonus: Find other combinations of 3 types of candies that Adrianna could buy with \$3.04.

Materials: play money, calculators and graph paper

Warm Up 2 Suggestions

Encourage students to use play money. This problem is designed to be solved with students grouped as partners. Be sure to ask students *how* they got their answer. Are they counting up to \$3.04? Are they writing a subtraction problem and using an algorithm to calculate change? Are they able to calculate change in their head? A group discussion would be a good way to draw out the strategies that students are using.

A Solution

There are many possible solutions for this Warm Up. Having the students record the attempts that did not work is one way to focus on learning from what doesn't work, not just what does work.

Teacher's Guide: Grade 5 (continued)

This program encourages multiple ways to find solutions. We encourage sharing the most concrete solutions first, so that all students can understand. We ask that the most abstract or the most sophisticated solutions be shared last. With that kind of scaffolding, all students can be successful.

PROBLEM SOLVING TASK

Ty's mother gave him a budget of \$120.00 for school clothes. He went shopping at Lang's Clothes for Kids. He liked these clothes:

Pants		Shirts		Shoes	
Jeans	\$14.95	Tee shirt	\$12.99	Tennis shoes	\$59.95
Sweats	\$19.95	Shirt on sale	\$5.99	Brand name tennis shoes	\$149.85
Designer jeans	\$69.95	Designer shirt	\$36.95	Boots on sale	\$37.50

Ty needs at least one pair of pants, one shirt and one pair of shoes. He could buy more than one of the items from each category. He wants to spend as much of the \$120.00 as possible.

- Use estimation to help you make some initial decisions.
- List which items and how many of each item Ty could buy so that he would spend between \$118.00 and \$120.00. Try to have the **least amount** of money left over. **Show your work.**
- How much money would he have left over? **Show your work.**

Answer: _____

Problem Solving Task Suggestions

Ask students to:

- State what they need to do to solve this problem.
- Describe what they notice about the chart.
- Estimate what they think Ty could buy with his money, but make sure that they attempt to have the least amount of money left over.

Possible Pitfalls:

- A student's solution may not meet all of the criteria of the problem (to stay within the range of \$118 - \$120, choose at least one item from each category and have the least amount of money left over).
- Vocabulary: budget, category, designer, brand name.

Questions for students who have trouble getting started:

- Read the first sentence to me. Say it in your own words. Read the next sentence to me. What is it telling you? This strategy can help students dissect the problem if they are having trouble understanding all of the information.

(Suggestions continue...)

Teacher's Guide: Grade 5 (continued)

Pages have been reduced in size and/or combined for this sample folder.

Each unit includes black line masters of all problems with permission for one classroom teacher to make paper copies for his/her students.

EXTENSION

Kathy has \$175.00. She also went shopping at Lang's Clothes For Kids. She needs at least one item from each category.

Pants		Shirts		Shoes	
Jeans	\$14.95	Tee shirt	\$12.99	Tennis shoes	\$59.95
Sweats	\$19.95	Shirt on sale	\$5.99	Brand name tennis shoes	\$149.85
Designer jeans	\$69.95	Designer shirt	\$36.95	Boots on sale	\$37.50

Use estimation to help you list how many of each chosen item she could buy so she had the **least amount** of money left over.

Show all your work.

Explain why you think your plan has the least amount of money left over.

Extension Suggestions

Besides the amount of money, the issue that will be an additional challenge for students in this problem is determining the "least amount of money left over" and explaining their reasoning.

A Solution

1 pair of designer jeans	$1 \cdot \$69.95 =$	\$69.95
5 shirts on sale	$5 \cdot \$ 5.99 =$	\$29.95
2 boots on sale	$2 \cdot \$37.50 =$	\$75.00
	Total:	\$174.90

Since estimation is strongly encouraged in this unit, accept all solutions between \$173.00 and \$175.00, but encourage students to get as close as possible.

Teacher's Guide: Grade 5 (continued)

Extension problems are included in each unit for students who are ready for additional challenge.

The range of difficulty, from the first Warm Up to the hardest Extension, provides appropriate challenge for students of diverse skill levels.

F.5 SCHOOL CLOTHES

Student Sample and Scored Commentary

Sample (S) #1: Score 3

The work identifies the items that would be purchased (and their cost) and shows a guess and check method of refining the answer. The response shows one minor error in addition. The total should have been \$119.82, which would have brought the cost even closer to \$120.00. The flow of ideas is clearly labeled and the explanation of why the answer would have the least amount of money left over is clear.

Sample (S) # 1

PSA

Ty's mother gave him a budget of \$120.00 for school clothes. He went shopping at Lang's Clothes for Kids. He liked these clothes:

Pants		Shirts		Shoes	
Jeans	\$14.95	Tee shirt	\$12.99	Tennis shoes	\$59.95
Sweats	\$19.95	shirt on sale	\$5.99	Brand name tennis shoes	\$149.85
Designer jeans	\$69.95	Designer shirt	\$36.95	boots on sale	\$37.50

Ty needs at least one pair of pants, one shirt and one pair of shoes. He could buy more than one of the items from each category. He wants to spend as much of the \$120.00 as possible.

- Use estimation to help you make some initial decisions.
- List which items and how many of each item Ty could buy so that he would spend between \$118.00 and \$120.00. Try to have the **least amount** of money left over. **Show your work.**

$$\begin{array}{r}
 \text{Jeans} - 15.00 \\
 \text{Tee Shirt} - 13.00 \\
 \text{Tennis Shoes} - 60.00 \\
 \hline
 88.00
 \end{array}$$

$$\begin{array}{r}
 120.00 \\
 - 88.00 \\
 \hline
 32.00
 \end{array}$$

$$\begin{array}{r}
 \text{Jeans} - 15.00 \\
 \text{Tee Shirt} - 13.00 \\
 \text{Tennis Shoes} - 60.00 \\
 \text{Sweats} - 28.00 \\
 \hline
 108.00
 \end{array}$$

$$\begin{array}{r}
 120.00 \\
 - 108.00 \\
 \hline
 12.00
 \end{array}$$

$$\begin{array}{r}
 108.00 \\
 + \text{clearance shirt} 6.00 \\
 \hline
 114.00
 \end{array}$$

$$\begin{array}{r}
 114.00 \\
 + \text{clearance s.} 6.00 \\
 + \text{clearance s.} 6.00 \\
 \hline
 126.00
 \end{array}$$

$$\begin{array}{r}
 \text{Jeans} - 14.95 \\
 \text{Tee s.} 12.99 \\
 \text{Tennis shoes} 59.95 \\
 \text{Sweats} 19.95 \\
 + 2 \text{ clearances} 11.98 \\
 \hline
 119.82
 \end{array}$$

$$\begin{array}{r}
 \text{Jeans} - 15.00 \\
 \text{Tee shirt} - 13.00 \\
 \text{Tennis Shoes} - 60.00 \\
 \text{Designer shirt} 31.00 \\
 \hline
 125.00
 \end{array}$$

I would buy Jeans, Tee Shirt, Tennis Shoes, Sweats, and two clearance Shirts, with the cost added up to \$119.82, I would have sixty-eight cents left over. If I bought anything else, it would be too much.

- How much money would he have left over? **Show your work.**

Answer: 68 ¢ left over.

Teacher's Guide: Grade 5 (continued)

Each Problem Solving Task has several samples of student work with scored commentaries based on an individual rubric.

The samples, commentaries and individual rubrics assist teachers in evaluating the work of their own students.

“FIX IT!”
F.5 SCHOOL CLOTHES

DIRECTIONS: CHANGE OR ADD TO THE WORK BELOW TO IMPROVE THE FINAL SCORE.

Ty’s mother gave him a budget of \$120.00 for school clothes. He went shopping at Lang’s Clothes for Kids. He liked these clothes:

Pants		Shirts		Shoes	
Jeans	\$14.95	Tee shirt	\$12.99	Tennis shoes	\$59.95
Sweats	\$19.95	shirt on sale	\$5.99	Brand name tennis shoes	\$149.85
Designer jeans	\$69.95	Designer shirt	\$36.95	boots on sale	\$37.50

Ty needs at least one pair of pants, one shirt and one pair of shoes. He could buy more than one of the items from each category. He wants to spend as much of the \$120.00 as possible.

- Use estimation to help you make some initial decisions.
- List which items and how many of each item Ty could buy so that he would spend between \$118.00 and \$120.00. Try to have the **least amount** of money left over. **Show your work.**

$$\begin{array}{r} 14.95 \leftarrow \text{Jeans} \\ + 14.95 \leftarrow \text{Jeans} \\ \hline 29.90 \\ + 12.99 \leftarrow \text{Teeshirt} \\ \hline 42.89 \\ + 12.99 \leftarrow \text{Teeshirt} \\ \hline 55.88 \\ + 37.50 \leftarrow \text{Clearance boots} \\ \hline 93.38 \\ + 5.99 \leftarrow \text{clearance shirt} \\ \hline 99.37 \\ + 14.95 \leftarrow \text{sweats} \\ \hline 114.32 \leftarrow \text{total} \end{array}$$

I chose those items because Ty had 120.00 for things I spent 108.02. That is the least amount I can give him.

- How much money would he have left over? **Show your work.**

Answer: _____

TEACHER SELF-EVALUATION FORM

Check the strategies you used in this unit and note what you said or did.

WAYS TO HELP STUDENTS MAKE SENSE OF PROBLEM SOLVING	✓	WHAT I SAID OR DID
• Be aware of the mathematics embedded in each unit—Warm Up(s), Task and Extension(s)—so you can engage students in discussions that will deepen mathematical understanding.		
• Encourage visualization of solutions, especially with the use of manipulatives.		
• Encourage students to rely on their own and each other’s thinking.		

(Form continues...)

**Teacher’s Guide:
Grade 5
(continued)**

After a class has completed a unit, the “FIX IT” activity can give students practice in revising and improving a work sample.

The job of the student in these exercises is to analyze what makes sense in the sample and what needs changing, and then to fix and complete the solution.

The Teacher Self-Evaluation Form is included at the end of each unit. It can assist teachers as they learn to incorporate these instructional strategies into their daily problem-solving lessons.