Student Guide

The Coat of Many Bits (SG pp. 129–132) Question 1–17

1–12.* Answers will depend on student data. See the lesson for further discussion.

The Coat of Many Bits

Making Costumes for the Play

Help wanted! Your creative talents are needed to help make costumes for a play in Ms. Alfonso's class. The students want to cover the front of their costumes with a special, colorful material. They need your help to figure out how much of this material they will need.

1. Trace the outline of a coat onto a large piece of paper.

2. Use base-ten pieces to help measure the area in square centimeters. Trace flats, skinnies, and bits onto your picture to show how they can cover your coat. (How many square centimeters does one bit cover?)

3. Write the number of flats, skinnies, and bits that cover the front of your coat. Record your answer in a class table like this:

Names	100s	10s	1s
Suzanne and Romesh	22	19	54

4. Look at the class table from Question 3. Which group recorded the largest area? Be prepared to explain your reasoning.

5. Find the total number of square centimeters covered by your base-ten pieces. Explain how you found your answer.

6. How many flats, skinnies, and bits are needed to show your number using the Fewest Pieces Rule? Write your answer in a new class table like the one above. The new table will have a 1000s column and also a column for you to write the total number of square centimeters you measured.

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7. Look at the two tables your class made. How are the two class tables different? How are they alike? Discuss this with a partner and with the class.

8. List the areas each group found from smallest to largest.

9. Compare the coat areas using the list from Question 8.
   A. About how much larger is the area of the largest coat than the smallest coat?
   B. Is it more or less than 500 square centimeters larger?
   C. Is it more or less than 1000 square centimeters larger?

10. If the material costs 10¢ for every 100 square centimeters, about how much will it cost to cover your group's coat? Show how you found your answer.

11. Your group has a 6000 square centimeter piece of material. About how much will be left over after you cut out enough material to cover your group's coat?

12. Use base-ten shorthand and the Fewest Pieces Rule to show your number from Question 5. Then write the number. How are these two ways of showing the number different? How are they the same?

Place Value

Our number system is a place value system based on tens. It has a code built into it. When we write numbers in **standard form** in our base-ten system, the place that each digit sits in the number tells us its value. Here is a four-digit number in standard form:

5 3 2 4

Thousands Hundreds Tens Ones

The 5 is in the thousands place. It means 5 thousands: $5 \times 1000 = 5000$.
The 3 is in the hundreds place. It means 3 hundreds: $3 \times 100 = 300$.
The 2 is in the tens place. It means 2 tens: $2 \times 10 = 20$.
The 4 is in the ones place. It means 4 ones: $4 \times 1 = 4$.

Adding the value of each place gives the number:

$$5000 + 300 + 20 + 4 = 5324.$$

Writing a number as a number sentence in this way is called **expanded form**.

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***Answers and/or discussion are included in the lesson.**

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13. **A.** 362
    B. 503
    C. 450
    D. 1641
    E. 2065
    F. 2507
    G. 3084
    H. 4005

14. **A.** $300 + 60 + 2$
    B. $500 + 3$
    C. $400 + 50$
    D. $1000 + 600 + 40 + 1$

15. No. Think of base-ten pieces. If you have more than 9 pieces of one value, you can trade 10 pieces for a piece of the next larger place value. Do this until all places are less than 10. For example, you can trade 12 tens for 1 hundred and 2 tens.

16. Johnny is not correct. When he wrote 12 tens, he took up two places. He put the 1 in the hundreds place and bumped the other 4 hundreds out. He should trade his 12 tens for 1 hundred and 2 tens and then combine the hundreds. Combining the 1 hundred with his other 4 hundreds, he has 5 hundreds. The number is 525.

17.* Answers will vary. Some are discussed in the lesson.

Standard Form in the Base-Ten System	Base-Ten Shorthand	Roman Numerals
123	||||| ||||| || •••	CXXIII
321	☐ ☐ ☐ || •	CCCXXI
301	☐ ☐ ☐ •	CCCI
120	☐ ||	CII

*Answers and/or discussion are included in the lesson.

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**Standard and Expanded Form
(SAB pp. 175–176)
Questions 1–8**

1. **A.** 505
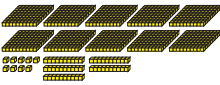   **B.** 237
   C. 1059
2. 237, 505, 1059
3. **A.** 682
   B. 5204
   C. 3906
4. 682, 3906, 5204
5. **B.** 2000 + 90 + 2
   C. 8000 + 50 + 6
   D. 900 + 50
6. 950, 2092, 4361, 8056
7. **A.** 304
   B. 296
   C. 340
   D. 140
8. 140, 296, 304, 340

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