See the Parts Inside an Expression

Group a useful part, name it as one quantity, and rewrite without changing the value

Name: _____ Date: _____

Part 1 - Name a useful quantity

Directions: Each situation below is a fictional classroom scenario. Draw a box around a useful subexpression. Give the boxed part a name, such as T or B. Then explain what that one quantity means before you rewrite the expression.

1. Club supply bags

Five clubs each receive a supply bag with 18 pencils and 2p markers. The total number of items is represented by **5(18 + 2p)**.

a. Box a useful subexpression: 5(18 + 2p)

b. Let _____ = _____.

c. In this situation, my new variable means:

d. Rewrite the expression without parentheses. Show why it is equivalent.

2. Snack orders

A team orders n granola bars and 4 extra bars. Each bar costs $2.50. The cost is represented by **2.50(n + 4)**.

a. Box a useful subexpression: 2.50(n + 4)

b. Let _____ = _____.

c. Explain what your variable means in the situation.

d. Rewrite the expression without parentheses.

See the Parts Inside an Expression

Group a useful part, name it as one quantity, and rewrite without changing the value

Name: _____ Date: _____

Part 2 - A quantity can be a length

3. Square garden

A square garden has side length **s + 3** meters. Its area is represented by $\mathbf{(s + 3)^2}$ square meters.

a. Draw a box around the quantity that represents one side length.

b. Let _____ = _____.

c. Explain what your variable represents.

d. Rewrite the area expression without parentheses.

Check your structure

A student says, “Because the garden expression has s + 3 inside it, $(s + 3)^2 = s^2 + 9$.” Is the student correct? Explain what is missing. You may use a small sketch or an example value of s.

Exit sentence: A sum such as a + b can be treated as one quantity when _____.

See the Parts Inside an Expression

Group a useful part, name it as one quantity, and rewrite without changing the value

Answer key and teaching notes

Materials and setup: Provide each student with this two-page worksheet and a pencil. Optional: highlighters for boxing subexpressions. Students work independently for 10-12 minutes, then compare one boxed quantity with a partner for 2 minutes. Do not provide algebra tiles or calculators; neither is needed.

Teacher script: “An expression can have parts inside it. Today, circle or box a part that has one useful meaning in the situation. Give that whole part a name. Naming a sum does not turn it into a product. When you rewrite, use the distributive property or area reasoning so the value stays the same.” Read this only if students need oral directions: “For each situation, box a useful part, name it, explain its meaning, and make an equivalent rewrite.”

Observe: As students work, record whether each student (1) boxes a meaningful entire subexpression, (2) connects it to the context, and (3) preserves equivalence in the rewrite. Ask a student who boxes only one term, “What entire amount repeats or represents one side?” Accept different variable letters and equivalent explanations.

1. Box $18 + 2p$. Sample: Let $B = 18 + 2p$; B is the number of items in one club's supply bag. Then $5B = 5(18 + 2p) = 90 + 10p$. The 5 applies to both kinds of items.

2. Box $n + 4$. Sample: Let $T = n + 4$; T is the total number of bars ordered. Then $2.50T = 2.50(n + 4) = 2.50n + 10.00$. Units may be stated as dollars.

3. Box $s + 3$. Sample: Let $L = s + 3$; L is one side length in meters. Area is $L^2 = (s + 3)^2 = s^2 + 6s + 9$ square meters.

Structure check: The claim is incorrect; 6s is missing. For example, if $s = 2$, then $(2 + 3)^2 = 25$, while $2^2 + 9 = 13$. A square sketch may show an s-by-s square, two 3-by-s rectangles, and a 3-by-3 square. Exit sample: “when the whole sum represents one total, one length, or another single quantity.”

Source credit: New York Next Generation Mathematics Standard AI-A.SSE.1.b, “Interpret expressions by viewing one or more of their parts as a single entity.” https://lessonmakerpro.com/standards/ny-nextgen-math/ai-a-sse-1-b