

Making Sense of SCIENCE

Equations & Expressions: Student Work Samples and Task A for Grades 6-8

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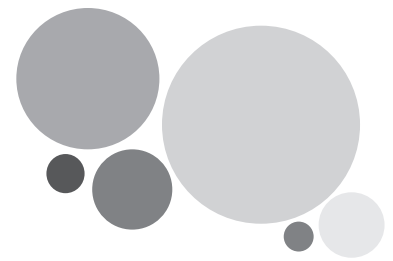
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Equations & Expressions

STUDENT WORK SAMPLES & TASK – SET **A**

This student work was collected for educators to use for their own professional learning. It is ideal to use with our Making Sense of Student Work protocol when teachers are unable to bring in student work from their classrooms. It can also be used with many other protocols designed to support teachers looking collaboratively at student work.

The samples in this download include ones from students with high, medium, and low levels of understanding. They show an authentic variety

of responses from a typical classroom. To protect students' identities, their names have been removed and each has been assigned an alias.

Also included in this PDF is a black line master of the task. This task is part of a larger Formative Assessment Task Bank. The full task bank and other task banks on different topics are available for download. Visit our website for more information and to purchase these items.

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Name: _____

TASK

A

EQUATIONS & EXPRESSIONS

1. Write an algebraic expression for each student's sequence of operations.

First I added 5 to x . Then I subtracted 2 from the result. Finally I doubled that result.

Jessie says...




First I added 5 to x . Then I doubled that result. Finally I subtracted 2.

José says...



2. Will both sequences result in the same number? Yes No

Justify your choice using mathematical reasoning.



EQUATIONS & EXPRESSIONS

1. Write an algebraic expression for each student's sequence of operations.

First I added 5 to x . Then I subtracted 2 from the result. Finally I doubled that result.

Jessie says...

$$(5+x) - 2$$

You don't need parenthesis, but it tells me what to do first.

First I added 5 to x . Then I doubled that result. Finally I subtracted 2.

José says...

$$2(5+x) - 2$$

You need the parenthesis in this expression

2. Will both sequences result in the same number? Yes No

Justify your choice using mathematical reasoning.

José is adding another step (doubling the result)
That is one more step than Jessie.
Doubling will increase the result before subtracting.

EQUATIONS & EXPRESSIONS

1. Write an algebraic expression for each student's sequence of operations.

First I added 5 to x . Then I subtracted 2 from the result. Finally I doubled that result.

Jessie says...

$$\begin{array}{l} 5+x=0 \\ x=-5 \\ -2 \end{array} \rightarrow \begin{array}{l} x=-7 \\ \times 2 \end{array} \rightarrow x=-14$$

First I added 5 to x . Then I doubled that result. Finally I subtracted 2.

José says...

$$\begin{array}{l} 5+x=0 \\ x=-5 \\ \times 2 \end{array} \rightarrow \begin{array}{l} x=-10 \\ -2 \end{array} \rightarrow x=-12$$

2. Will both sequences result in the same number? Yes No

Justify your choice using mathematical reasoning.

Jessie and José both had the same objective but in a different order. José should be the one that is right because he is following PEMDAS.

P () e \times M \times D \div — A + S -

EQUATIONS & EXPRESSIONS

1. Write an algebraic expression for each student's sequence of operations.

$$\begin{array}{l} \text{Arrows point from } (5+x) \text{ to } -2 \text{ and from } (5+x) \text{ to } 2 \\ [(5+x)-2] \\ 10+2x-4 \\ 6+2x \end{array}$$

First I added 5 to x . Then I subtracted 2 from the result. Finally I doubled that result.

Jessie says...

$$\begin{array}{l} 2[(5+x)-2] \\ \text{Simplified: } 2x+6 \end{array}$$

First I added 5 to x . Then I doubled that result. Finally I subtracted 2.

José says...

$$\begin{array}{l} 2(5+x)-2 \\ \text{Simplified: } 2x+8 \end{array}$$

$$\begin{array}{l} 2(5+x)-2 \\ 10+2x-2 \\ 2x+8 \end{array}$$

2. Will both sequences result in the same number? Yes No

Justify your choice using mathematical reasoning.

In Jessie's statement, she says subtract first then double it, unlike José, who says double it then subtract. If you simplify both equations you get Jessie's is $2x+6$ and José's is $2x+8$. $2x+6 \neq 2x+8$, therefore both sequences don't result in the same number.

EQUATIONS & EXPRESSIONS

1. Write an algebraic expression for each student's sequence of operations.

First I added 5 to x . Then I subtracted 2 from the result. Finally I doubled that result.

Jessie says...

$$2[(x+5)-2]$$

First I added 5 to x . Then I doubled that result. Finally I subtracted 2.

José says...

$$[2(x+5)]-2$$

2. Will both sequences result in the same number? Yes No

Justify your choice using mathematical reasoning.

Jessie	0	José	Jessie	10	José
$2[(0+5)-2]$		$[2(0+5)]-2$	$2[(10+5)-2]$		$[2(10+5)]-2$
$2[5-2]$		$[2(5)]-2$	$2[15-2]$		$[2(15)]-2$
$2(3)$		$10-2$	$2(13)$		$30-2$
6		8	26		28

Both answers always has José's answer 2 more than Jessie's

EQUATIONS & EXPRESSIONS

1. Write an algebraic expression for each student's sequence of operations.

First I added 5 to x . Then I subtracted 2 from the result. Finally I doubled that result.

Jessie says...

$$(5+x)-2$$

First I added 5 to x . Then I doubled that result. Finally I subtracted 2.

José says...

$$2(5+x)-2$$

2. Will both sequences result in the same number? Yes No

Justify your choice using mathematical reasoning.

$$(5+x)-2$$

$$5+x-2 \quad \frac{5}{-2} \quad \frac{3}{3}$$

$$\textcircled{3+x}$$

say $x=3$

$$3+3=\textcircled{6}$$

$$2(5+x)-2$$

$$10-2x-2 \quad \frac{10}{-2} \quad \frac{8}{8}$$

$$\textcircled{8-2x}$$

$$8-(2)3=\textcircled{2}$$

EQUATIONS & EXPRESSIONS

1. Write an algebraic expression for each student's sequence of operations.

First I added 5 to x . Then I subtracted 2 from the result. Finally I doubled that result.

Jessie says...

$$((x+5)-2) \times 2$$

First I added 5 to x . Then I doubled that result. Finally I subtracted 2.

José says...

$$((x+5) \times 2) - 2$$

2. Will both sequences result in the same number? Yes No

Justify your choice using mathematical reasoning.

$$\begin{array}{l}
 \cancel{((x+5)-2) \times 2} = \cancel{((x+5) \times 2) - 2} \\
 \begin{array}{l}
 \times \\
 (x+5-2) \times 2 \\
 (x+3) \times 2 \\
 2x+6 = 2x+3
 \end{array}
 \end{array}$$

↑
Will always be 3 more than this

EQUATIONS & EXPRESSIONS

1. Write an algebraic expression for each student's sequence of operations.

First I added 5 to x . Then I subtracted 2 from the result. Finally I doubled that result.

Jessie says...

$$2(5+x-2)$$

First I added 5 to x . Then I doubled that result. Finally I subtracted 2.

José says...

$$2(5+x) - 2$$

2. Will both sequences result in the same number? Yes No

Justify your choice using mathematical reasoning.

$x=5$	$x=5$	$x=3$	$x=3$
$2(5+x-2)$	$2(5+x)-2$	$2(5+x-2)$	$2(5+x)-2$
$2(5+5-2)$	$2(5+5)-2$	$2(5+3-2)$	$2(3+3)-2$
$2(10-2)$	$2(10)-2$	$2(8-2)$	$2(6)-2$
$2(8)$	$20-2$	$2(4)$	$12-2$
$=16$	$=18$	$=8$	$=10$

BODMAS

EQUATIONS & EXPRESSIONS

1. Write an algebraic expression for each student's sequence of operations.

First I added 5 to x . Then I subtracted 2 from the result. Finally I doubled that result.

Jessie says...

$$2(5+x-2) = y$$

First I added 5 to x . Then I doubled that result. Finally I subtracted 2.

José says...

$$2(5+x) - 2 = y$$

2. Will both sequences result in the same number? Yes No

Justify your choice using mathematical reasoning.

Jessie

$$2(5+2-2) = y$$

$$(10+4-4) = y$$

$$10 = y$$

$$y = 10$$

José

$$2(5+2) - 2 = y$$

$$(10+4) - 2 = y$$

$$14 - 2 = 12$$

$$y = 12$$

EQUATIONS & EXPRESSIONS

1. Write an algebraic expression for each student's sequence of operations.

First I added 5 to x . Then I subtracted 2 from the result. Finally I doubled that result.

Jessie says...

$$2x + 6$$

First I added 5 to x . Then I doubled that result. Finally I subtracted 2.

José says...

$$2x + 8$$

2. Will both sequences result in the same number? Yes No

Justify your choice using mathematical reasoning.

x	y	$2x + 6$
-2	2	
-1	4	
0	6	
1	8	
2	10	

x	y	$2x + 8$
-2	4	
-1	6	
0	8	
1	10	
2	12	

EQUATIONS & EXPRESSIONS

1. Write an algebraic expression for each student's sequence of operations.

First I added 5 to x . Then I subtracted 2 from the result. Finally I doubled that result.

Jessie says...

$$(5+x-2)2$$

First I added 5 to x . Then I doubled that result. Finally I subtracted 2.

José says...

$$2(5+x)-2$$

2. Will both sequences result in the same number? Yes No

Justify your choice using mathematical reasoning.

make a table

x	$2(5+x-2)$	$2(5+x)-2$
0	6	8
1	8	10
2	10	12
3	12	14