

Math: Grade 7, Lesson 1, Creating and Evaluating Expressions

Objective: Students will create and evaluate expressions to analyze real-world situations.

Practice Focus: Creating and evaluating expressions to analyze real-world situations

TN Standard: 7.EE.B.4

Teacher Materials:

- white board or projector to show tables

Student Materials:

- paper
- pencil
- surface to write on
- Student packet for math, Grade 7, Lesson 1, which can be found at www.tn.gov/education

Teacher Do	Student Do
<p>Opening (1 min)</p> <p>Hello! Welcome to Tennessee’s At Home Learning Series for math! Today’s lesson is for all our 7th graders out there, though all children are welcome to tune in. This lesson is the first in our series.</p> <p>My name is ____ and I’m a ____ grade teacher in Tennessee schools! I’m so excited to be your teacher for this lesson! Welcome to my virtual classroom!</p> <p>Today we will be learning about creating and evaluating expressions to analyze real-world situations in mathematics! Before we get started, to participate fully in our lesson today, you will need:</p> <ul style="list-style-type: none">• Something to write with• A piece of paper• The student packet for math, Grade 7, Lesson 1 which can be found at www.tn.gov/education <p>Ok, let’s begin!</p>	<p>Students get materials ready for the lesson.</p>
<p>Intro (6 minutes)</p> <p>Today we will be reviewing expressions and how they can help us in the real world to reach a solution. Recall the difference between expressions and equations. Expressions do not have an equal sign whereas equations do. A variable is a placeholder for an unknown value. We traditionally use a letter for the variable. Have you ever wondered how you could save money and make sure you have enough minutes and texts to talk to your friends?!? Pause.</p>	

Teacher Model (7 minutes)

Writing expressions to model real world problems can be very powerful and helpful in making decisions! Let's take a look at an example!

John's father asked him to compare several different cell phone plans and identify which plan will be the least expensive for the family. Each phone company charges a monthly fee, but this fee does not cover any service: phone lines, texting, or internet access. Use the information in the table below to answer the following questions.

[Teacher displays exercise 1 chart.]

Cell Phone Plans

Name of Plan	Monthly Fee (Includes 1,500 shared minutes)	Price per Phone Line x	Price per line for Unlimited Texting y	Price per line for Internet Access z
Company A	\$70	\$20	\$15	\$15
Company B	\$90	\$15	\$10	\$20
Company C	\$200	\$10	included in monthly fee	included in monthly fee

We are going to use expressions to save money while still getting the best phone plan.

All members of the family may not want identical plans; therefore, we will let x represent the number of phone lines, y represent the number of phone lines with unlimited texting, and let z represent the number of phone lines with internet access.

Company A charges \$70 for 1500 minutes, \$20 per phone line, \$15 for every line that has the unlimited texting option, and \$15 for every line that has internet access.

Can you write an expression using variables x , y , and z for Company A? Give it a shot!

[Pause. Allow students time to attempt to write down or say an expression.]

[Teacher will write and explain terms of correct expression.]

Teacher will also be sure to explain that terms can be in different places.]

The expression is $70 + 20x + 15y + 15z$. Does this match your expression? Remember that your terms may be in a different order, and that is still correct. Addition is commutative.

[Pause.]

Remember that x is the price per phone line, and that is a \$20 charge per line; y is the price per line for unlimited texting, and that is \$15 charge per line; z is the price per line for internet access, and that is a \$15 charge per line.

Student: Responds to teachers prompt to write or say expression for company A.

Student: Responds to correct or incorrect expression and makes corrections as needed.

Let's do it again! According to the chart Company B charges \$90 for 1500 minutes, \$15 per phone line, \$10 for every line that has the unlimited texting option, and \$20 for every line that has internet access.

Can you write an expression using variables x , y , and z for Company B? Use your expression for Company A for a reference if you need it!

[Pause. Allow students time to write or say correct expression.]

[Teacher writes $90 + 15x + 10y + 20z$.]

Does your expressions match this: $90 + 15x + 10y + 20z$?

Pause.

Ok! Last one!

Here we go! According to the chart Company C charges \$200 for 1500 minutes and \$10 per phone line. Unlimited texting and internet is included in the monthly fee for this plan! Can you write an expression using variables x , y , and z for Company C? Use your expression for Company A or Company B for a reference if you need it! Be careful! This one is a little tricky since unlimited texting and internet is included.

[Pause. Allow students time to write or say correct expression.]

Let's compare our expressions. $200 + 10x$ models Company C.

[Pause.]

Now that we have all our expressions, let's use them to analyze different scenarios.

Let's see which plan is best for this scenario!

We are going to have 4 people who want phones, 4 people who want unlimited texting, and 2 who want internet!

4 people want phone lines, 4 People want unlimited texting, and 2 internet lines.

I will help you with Company A.

[Demonstrate how to evaluate $x=4$, $y=4$ and $z=2$.]

Company A	Company B	Company C
$70 + 20x + 15y + 15z$	$90 + 15x + 10y + 20z$	$200 + 10x$
$70 + 20(4) + 15(4) + 15(2)$	$90 + 15(4) + 10(4) + 20(2)$	$200 + 10(4)$
$70 + 80 + 60 + 30$	$90 + 60 + 40 + 40$	\$240
\$240	\$230	

Student: Responds to teachers prompt to write or say expression for company B.

Student: Responds to correct or incorrect expression and makes corrections as needed.

Student: Responds to teachers prompt to write or say expression for company C.

Student: Responds to correct or incorrect expression and makes corrections as needed.

Student will write an expression for each company's price and compare their work to the teacher.

[Pause for the student to work through company B and company C.]

Let's check your work.

[Pause. Work through company B and company C.]

Which company should we choose for this situation? Why?

Pause.

If you picked company B you are right! Company A and C cost \$240 while company B cost \$230 so we can save \$10!

Guided Practice (12 minutes)

Now we have another scenario. We have 4 people who want phone lines, 4 people who want unlimited texting and everyone wants internet! How many phones with internet are we going to need? [Pause]

4, that is correct.

I am going to work out Company A and you work along with me, and then you are going to work out Company B and C!

[Pause. Work out all of company A's plan.]

Now you try company B!

[Pause. Teacher will make sure they start with correct expression but then allow students to work.]

You can use our work from company A to help you!

[Pause. Allow appropriate wait time.]

Did you calculate \$270 for company B? Pause. Ok!

Let's take a look at the calculations.

[Pause. Teacher will work out company B's plan.]

Now you try company C. You can do this!

[Pause]

Did you calculate \$240 for company C? Let's double check!

[Pause. Teacher works out Company C.]

Company A	Company B	Company C
$70 + 20x + 15y + 15z$	$90 + 15x + 10y + 20z$	$200 + 10x$
$70 + 20(4) + 15(4) + 15(4)$	$90 + 15(4) + 10(4) + 20(4)$	$200 + 40$
$70 + 80 + 60 + 60$	$90 + 60 + 40 + 80$	$\$240$
$\$270$	$\$270$	

Student works the company A piece along with the teacher.

Student evaluates company B and company C.

Student checks their work.

Student does all that is in blue.

<p>Which company would you choose for this situation? Pause. Good job! You can save \$30 by choosing Company C in this case!</p> <p>Great work everyone. I hope that you were able to see how expressions assist us to make good choices in the real world! These are skills that you will continue to use throughout your life.</p>	<p>Student responds to teacher prompt of which company is best for this situation.</p>
<p><u>Independent Practice</u> (3 minutes) Great work, boys and girls! Today, we reviewed creating and evaluating expressions to analyze real-world situations. I hope you're seeing some connections to equal groups and repeated addition in multiplication! You sure did a great job! After the video, you will have some problems to practice on your own. Good luck and do your best!" [Show this problem to the student, and give them time to copy it. Pause.]</p>	
<p><u>Closing</u> (1 minute)</p> <ul style="list-style-type: none"> • Boys and Girls, I enjoyed doing some mathematics with you today! Thank you for inviting me into your home. I look forward to seeing you in our next lesson in Tennessee's At Home Learning Series! • Bye! 	

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