

RUN A LAWN MOWING BUSINESS: A MULTIPLICATION AND DIVISION PROJECT

Use multiplication and division to work with all aspects of running a small lawn mowing business! This project includes:

- basic multiplication and division facts to 12
- some higher level multiplication and division
- other math skills such as area, perimeter, time, money, problem solving

CREATED BY SHELLEY GRAY

ABOUT THIS RESOURCE

Are you looking for a way to reinforce basic multiplication and division concepts in an engaging way that helps your students make connections? "Run a Lawn Mowing Business" is a **real-life math project** where students will complete THIRTEEN different multiplication and division tasks. This project will help your students see how multiplication and division are used in real life.

You might choose to print specific tasks to use during Math centers, or you might make a booklet out of all of the tasks and let your students choose which one to do when. The choice is yours.

Take a look at what you'll find inside this math project:

TASK #1: Your Business Plan

Any new business needs a plan! Let's think of a name, and then work with three different revenue and expense scenarios.

Skills: basic multiplication, multiplying a single-digit number by a multiple of 10, subtraction

TASK #1 YOUR BUSINESS PLAN	
Before we start a business, we need to make a plan.	
First, think of a name for your lawn mowing business.	
<input type="text"/>	
Next, it's time to write down the <u>estimated</u> expenses and revenue that you'll have.	
<ul style="list-style-type: none">You'll be using your dad's lawn mower to mow the lawns.You'll be hauling the lawn mower with your bike and a trailer that your dad has.You will need to buy your own gas. You estimate that you will need \$500 for gas.You are planning to charge \$20 per lawn.	
To figure out what you'll make for the summer, you'll try out a few different scenarios. Figure out what you could make if you mow 3 lawns per week, 6 lawns per week, and 10 lawns per week.	
Scenario #1 - 3 lawns per week	
REVENUE PER WEEK:	
Lawn mowing fee (\$20/lawn)	
EXPENSES PER WEEK:	
Fuel expense (\$5/lawn)	
TOTAL PROFIT PER WEEK (revenue - expenses)	
If you mow three lawns per week, you will make about _____ in profit per week.	
Scenario #2 - 6 lawns per week	
REVENUE PER WEEK:	
Lawn mowing fee (\$20/lawn)	
EXPENSES PER WEEK:	
Fuel expense (\$5/lawn)	
TOTAL PROFIT PER WEEK (revenue - expenses)	
If you mow six lawns per week, you will make about _____ in profit per week.	
Scenario #3 - 10 lawns per week	
REVENUE PER WEEK:	
Lawn mowing fee (\$20/lawn)	
EXPENSES PER WEEK:	
Fuel expense (\$5/lawn)	
TOTAL PROFIT PER WEEK (revenue - expenses)	
If you mow ten lawns per week, you will make about _____ in profit per week.	
Now let's suppose that you mow lawns for 8 weeks this summer. Figure out how much money you would make throughout the 8 weeks for each scenario:	
Scenario #1 (3 lawns per week):	
Scenario #2 (6 lawns per week):	
Scenario #3 (10 lawns per week):	

TASK#2: ADVERTISING

Now that we've made a business plan, it's time to get advertising! First we'll make a poster to put up around town. Then we'll take a look at two different print shops to see where the best deal is.

Skills: basic division facts

TASK #2 ADVERTISING	
Now that you've made your business plan, it's time to get advertising!	
First, design a poster that you can put up around town to advertise your business. Remember to include your name, the cost of your services, and your contact information.	
<input type="text"/>	
You're going to use some of the allowance that you've saved up to get posters printed. You have \$200 saved that you can use for posters.	
Let's check out the printing costs of two different print shops:	
PIERRE'S PRINT SHOP	PRINT WITH THE PROS
PRICE: 50¢ per poster	PRICE: 5 posters for \$100
How many posters could you get with your \$20?	How many posters could you get with your \$20?
You want to get the most posters that you can for your \$200. Which print shop will you choose?	
<input type="text"/>	
Now it's time to put up the posters. Suppose that you want to put up 10 posters in each block around your house. How many blocks can you possibly post for?	
<input type="text"/>	
THINK FAST!	
Suppose that Pierre's Print Shop makes \$100 in poster printing sales today. How many posters did they print?	
If Print With the Pros also wants to make \$100, how many posters will they need to print?	

TASK #3: TAKING BOOKINGS

You've been advertising and now the bookings are coming in! You're off to a great start! Now that we've got bookings, we'll use a tally chart to figure out the estimated fuel expense and revenue for the eight weeks of summer.

Skills: basic multiplication facts, tally charts, addition

TASK #3 TAKING BOOKINGS
You've been advertising and now the bookings are coming in! Your business is off to a great start!

During the first week, you get 5 phone calls about your lawn mowing services. One-third of those people make an appointment with you. Write a division equation to show how many people made appointments.

Some people want their lawn mowed once a week, while others only need it mowed once or twice over the summer. Now that you've got your bookings, you make a graph by the bookings you will be mowing each week. Figure out your estimated fuel expense and revenue for each week.

Week #	Number of Lawns to Mow	Estimated Fuel Expense (\$20/lawn)	Estimated Revenue (\$20/lawn)
Week 1			
Week 2			
Week 3			
Week 4			
Week 5			
Week 6			
Week 7			
Week 8			

What is the total estimated fuel expense for the eight weeks of summer?

What is the total estimated revenue for the eight weeks of summer?

What is the total estimated profit (revenue minus expenses) for the eight weeks of summer?

TASK #4: YOUR TRANSPORTATION PLAN

You and your dad will be building a trailer so that you can haul your lawn mower behind your bike. In this task we'll work with the building of the trailer and the ride times to each yard.

Skills: basic multiplication and division, elapsed time

TASK #4 YOUR TRANSPORTATION PLAN
You'll need to figure out a way to get your lawn mower from yard to yard!

With the help of your dad, you will build a lawn mower trailer that you can pull behind your bicycle! You need to be able to fit your lawn mower, a gas can, and any other lawn supplies that you might need. You sketch out a picture of what it might look like.

You and your dad will need at least 18 hours to build this trailer. But you only have 6 days to get it finished. How many hours will you need to spend per day? Write a division equation.

How many **minutes** will you spend per day? Write a multiplication equation.

Once you have the trailer built, it's time to get it behind your bicycle! You find that you can ride **one block in three minutes** while hauling the lawn mower. How far (in blocks) is each customer's yard?

Name of Customer	Time to Ride to the Yard	How many blocks is the yard from your house? (Write a division equation to figure it out.)
Cassie Brennan	15 minutes	
Arman Derrick	9 minutes	
Jonathan Prosser	36 minutes	
Bartley Lowry	12 minutes	
Marnie Rees	18 minutes	

Let's suppose that you plan to arrive at a customer's yard at 1:00 pm. At what time would you need to leave your house to get to:

- Cassie's yard? _____
- Jonathan's yard? _____
- Marnie's yard? _____
- Arman's yard? _____

TASK #5: TIME TO MOW!

Your lawn mower is full of gas, your trailer is ready, and you are excited! In this task we'll look at two of the yards you'll be mowing. We'll calculate the area to mow and work with other details such as flower gardens, fences, and length of time to mow.

Skills: multiplication by a multiple of 10, area of regular and irregular shapes, basic multiplication facts, basic division facts, elapsed time

TASK #5 TIME TO MOW!
It's the start of Week One and you are ready! Your lawn mower is full of gas, your trailer is ready, and you are excited! Let's do this!

The first yard that you go to this week is Cassie's.

Cassie's lawn is a large rectangular shape.

What is the total area of Cassie's lawn?

THINK FAST! Can you think of another lawn shape that would have the same area as Cassie's lawn?

You estimate that it will take about 5 minutes to mow every 100 square meters. About how long will it take to mow this lawn?

You plan to get to Cassie's yard at about 1:00 pm. It'll take you 5 minutes to unload your lawn mower, and 5 minutes to pack up. At what time will you be finished mowing and packing up? Show your thinking on the number line.

You'll be finished packing up at _____

Arman's lawn is irregular. It's a 3x4 den in his house.

How long will it take to mow on Arman's lawn? Remember to subtract the area of the den.

Arman's lawn has a 10-meter long fence dividing his yard from the next yard. How many flower beds are there in all? Write a division equation.

Arman has a beautiful flower bed. There are 7 flowers for every square meter of area in the garden. How many flowers will he need?

THINK FAST! Arman wants to create another flower garden that is 5 square meters. If he puts 9 flowers per square meter in this new garden, how many flowers will he need?

TASK #6: UH OH...A BREAKDOWN

Just as business was moving along smoothly, you make a big mistake. Solve the equations to find out what the mistake was.

Skills: basic multiplication and division facts

TASK #6 UH OH...A BREAKDOWN
Just as business was moving along smoothly, you make a big mistake. Solve the equations to figure out what it was.

A: 24	F: 5	K: 18	P: 9	U: 4	Z: 50
B: 12	G: 21	L: 27	Q: 45	V: 15	
C: 32	H: 36	M: 6	R: 30	W: 8	
D: 2	I: 25	N: 42	S: 3	X: 48	
E: 28	J: 40	O: 20	T: 16	Y: 7	

When you take your lawn mower in to get fixed, you're told that it will take 40 minutes to repair. The repair shop charges \$8 for every 10 minutes. How much will it cost to get repaired?

©Shelley Gray www.ShelleyGrayTeaching.com

TASK #7: BACK IN BUSINESS

Your lawn mower is fixed, and you're back in business! Let's mow another lawn!

Skills: basic multiplication and division, area

TASK #7 BACK IN BUSINESS!
Your lawn mower is fixed, and you're back in business! Next up is Jonathan's lawn!

Jonathan has a big yard with apple trees and a pool.

There is a row of apple trees along one side of the house that you'll have to mow around. The row of trees is 30 meters long, and there is one tree planted every 2 meters. Write a division equation to show how many trees are in the row.

The total area of Jonathan's pool is 14 square meters. Write a division equation to figure out the unknown side.

What is the total area of Jonathan's house? Write a multiplication equation.

It's your first time mowing Jonathan's lawn, but you need to move fast because you only have 60 minutes until it's going to start raining! You'll mow the lawn in 4 different sections. Each section will take you 12 minutes to mow. Will you finish before it starts raining?

©Shelley Gray www.ShelleyGrayTeaching.com

TASK#8: SOLVING PROBLEMS

Being able to solve problems is a big part of running a business - and you seem to be solving a lot of them as you mow each lawn! Solve each problem.

Skills: basic multiplication and division, multi-step word problems

TASK #8 SOLVING PROBLEMS
Being able to solve problems is a big part of running a business - and you seem to be solving a lot of them as you mow each lawn.

Your bike got a flat tire on the way to a mowing job! You'll need to walk back home and get help. You know that you are 7 blocks away from home, and it takes you about 2 min to walk each block. How long will it take you to walk home?

You figure out that one tank of gas will last you about 3 hours. How many tanks of gas will you need to last 27 hours?

On one of your busiest days in the summer, your brother offers to help you. With his help, you can finish in HALF the time! If you normally would have spent 60 minutes mowing, how long will it take with your brother helping?

The dog of one of the yards you're mowing likes to jump on you as you mow the lawn! It's pretty funny! One day you counted that he ran 7 laps in one minute. How many laps would he run in 6 minutes?

It usually takes you 4 minutes to mow around the edge of one yard. But today the grass is longer than usual and it takes you three times as long. How long did it take you?

©Shelley Gray www.ShelleyGrayTeaching.com

TASK #9: YOUR SAVINGS JARS

Summer is over, and you've managed to save up quite a bit of money! You know that it's important to manage your earnings in a smart way, so you set up three different jars - saving, spending, and giving. Let's see what's in each jar.

Skills: basic multiplication facts, money

TASK #10: ENCOUNTERING OBSTACLES

Whether it's trees, shrubs, gardens, or lawn decorations, there are always obstacles to work around while you're mowing the lawn!

Skills: basic multiplication and division facts, fact families, perimeter

TASK #11: EXTRA JOBS

You're finding that when you are working on mowing lawns, you are sometimes asked to do other things as well! Since you're trying to save money, you'll take all the work you can get!

Skills: basic multiplication and division facts, multi-step word problems

TASK #12: FINAL REVENUE AND EXPENSES

Summer is over and this summer job was a success! You had a lot of fun running your business, and you were able to save up quite a bit! Let's take a look at final revenue and expenses for the summer.

Skills: basic multiplication, multiplying by 20, addition

TASK #9 YOUR SAVINGS JARS
Summer is half over, and you've managed to save up quite a bit of money already!

You know that it's important to manage your earnings in a smart way, so you set up three different jars - saving, spending, and giving. After the first month, here is what you have in each jar:

JAR	WHAT'S IN THE JAR?	HOW MANY?	TOTAL AMOUNT
SAVING	\$10 bills		\$60
	\$5 bills	9	
	TOTAL		
SPENDING	\$20 bills	4	
	\$10 bills		\$30
	\$5 bills		\$40
	TOTAL		
GIVING	\$20 bills	1	
	\$5 bills		\$25
	TOTAL		

How much money have you made so far?
How many \$10 bills do you have in all?
Write a multiplication equation to represent the **total dollars** that you have in \$10 bills.
Now represent this equation as an array.

THINK FAST!
Suppose that by the end of the summer, you are able to would your total earnings be at the end of the summer?

TASK #10 ENCOUNTERING OBSTACLES
Whether it's trees, shrubs, gardens, or lawn decorations, there are always obstacles to work around while you're mowing the lawn!

Trees can be tricky to mow around, especially when they are close together! One of the yards that you mow has 8 rows of trees. It took FOREVER to mow around them all! Here's a diagram of how the trees were spaced.

Write two different multiplication equations to show the total number of trees:

Another one of the yards has a 36 meter fence that goes around the entire yard. There's a post every 3 meters that needs to be trimmed around. How many posts are there in all?

At another yard, there is a dog that likes you and barks as you mow. Don't worry - she's friendly and just wants to play! On one of the dogs that you mow there, the dog barked at you every 4 seconds for 30 seconds straight. How many barks did she bark?

Sometimes you need to trim around a garden or driveway, which takes you a bit of extra time. You figure out that it takes about 1 minute to trim 6 meters.

How long would it take you to trim around this vegetable garden?
How long would it take you to trim the two edges of this driveway?

TASK #11 EXTRA JOBS
You're finding that when you are working on mowing lawns, you are sometimes asked to do other things as well! Since you're trying to save money, you'll take all the work you can get!

Armani asks you if you'd like to also weed and water his flower garden when he's away on vacation. He'll pay you \$2 per square meter of the garden. Of course you say you'll do it!

How much will you be paid to weed and water the garden? Write a multiplication equation.

When you water the garden, Armani says that you need to water it in three different places for 4 minutes each. How long will it take to water the garden?

After you finish your last job of the summer he asks, "Do you do snow shoveling in the winter?" Jonathan offers to pay you \$2 for 10 minutes, and would like you to shovel his driveway 8 times in all. How much would you be paid each time you shovel his driveway?

Cassie has seven shrubs throughout her yard and she hasn't trimmed them in a while. Jonathan offers to trim them for \$15/minute, and you say, "Of course I'll do it!" How much money will she pay you?

Marnie still has a section of her lawn that hasn't been raked, so you decide to do it for one of your favorite customers! The section of lawn is about 20 square meters of leaves for every 4 square meters. How many bags of leaves did you get?

TASK #12 FINAL REVENUE AND EXPENSES
Summer is over and this summer job was a success! You had a lot of fun running your business, and you were able to save up quite a bit of money!

Fill out the chart to find the total received from each customer:

REVENUE				
Customer	# of mows	Amount per mow	Total amount received from mowing	Total amount received from this customer
Cassie Brennan	9	\$20		\$180
Armani Derrick	2	\$20		\$40
Jonathan Prosser	6	\$20		\$120
Bartley Lowry	7	\$20		\$140
Marnie Rees	1	\$20		\$20
TOTAL AMOUNT RECEIVED				

Now it's time to figure out your expenses:

EXPENSES	
Item	Total Cost
Fuel (\$5 per mow - a total of 25 mows)	
Lawnmower maintenance	\$50
TOTAL EXPENSES	

Lastly subtract your expenses from your revenue to figure out your profit:

REVENUE - EXPENSES = PROFIT

TASK #13: SAVING, SPENDING, AND GIVING

Now for the fun part – figuring out how you will save, spend, and give. In this task we'll work with each of those categories!

Skills: basic multiplication and division facts, money

TASK #14 SAVING, SPENDING, AND GIVING
Now for the fun part – figuring out how much you have to save, spend, and give!

Out of the money that you've earned this summer, you'll be saving \$175.00, spending \$100.00, and giving \$125.00. You can't wait to get started!

First up is giving! Your grandma always told you how important it is to give to people or do something nice for them. You're going to buy some cards of food, soap, kibbles. If each can of food costs \$2.00, how many cans can you buy?

Next, you head to the local coffee shop. You see the regulars all get their morning coffee. You need to cash register. If you get their coffee without than If each of their coffees cost \$1.50 each, what is the total?

You have \$5 left to spend. You don't know what to do with it! You walk to the store and see the remaining items. The owner will tell her that you'd like her to use it to buy you a big bag of dog treats. She will buy 2 big bags of dog treats. She will buy 2 big bags of dog treats. She will buy 2 big bags of dog treats.

Next is saving! You're still young, but it's never too early to start saving for a car. Your mom and dad are going to take it to the bank for you. Here are the bills that you give her.

Type of Bill	How many?	Total Amount
\$5	11	
\$10	6	
\$20	3	

THINK FAST! In your bank account, you have \$2000 in all. How much more do you need to save?

Lastly, it's spending! You love to make crafts, so you've decided to spend most of your "spending" budget on craft supplies! The chart below shows what you buy. Figure out the total amount for each.

Item	Quantity	Cost Per Item	Total Cost
sparkly neon paint	7	\$6	
foam stickers	3	\$5	
colored paper	2	\$4	
crayons	1	\$4	
canvases	2	\$10	
paint brushes	5	\$1	
paint tray	1	\$1	
large glue bottles	2	\$5	

You have \$53 left to spend. You want to buy another football that he really wants, which was \$10.00. Now how much is left?

With the rest of your money, you've decided to buy some new clothes. You find a rack of shirts for \$8 each. How many shirts can you buy with the \$10 that you have left?

CONGRATULATIONS! YOU HAVE COMPLETED THIS PROJECT!

Let's reflect. Is running a team moving business something that you would like to do? Why or why not?

Shelley Gray www.ShelleyGrayTeaching.com

ANSWER KEYS ARE INCLUDED TO MAKE SELF-CHECKING SIMPLE.

WAYS TO USE MATH PROJECTS IN YOUR CLASSROOM:

Math projects are an ideal way to consolidate learning. I recommend using them as an engaging activity AFTER skills have been learned rather than during learning. You will likely find that engagement is very high and that your students ask to do more of these!

There are many ways to use math projects in your classroom. Some of the most popular are:

- a small-group or pairs activity
- a guided math activity to allow you to see where your students are struggling
- a fun, rewarding way to engage your early finishers
- a low-prep, easy-to-implement activity for a substitute teacher

Enjoy!

Shelley Gray

www.ShelleyGrayTeaching.com