Theme Park Tycoon

A Connected Business Simulation in Ratios and Proportions

Teacher Overview

The Storyline

Students step into the role of lead designer for Aurora Park, a brand-new theme park funded by investor Marisol Chen. Across eight meetings with Marisol, students take an empty 12-acre plot and turn it into a complete investor pitch. They size the park to its expected crowd, choose and budget its rides, set ticket prices against a rival park opening the same season, plan a marketing campaign, build a concession menu, find the daily break-even point, and finally assemble every figure into a return-on-investment pitch.

The defining feature of the lab is continuity. Each worksheet's committed numbers carry forward into the next, so a student's own decisions about rides, pricing, and budget flow all the way through to their unique final ROI. The design philosophy is math with stakes, where a wrong answer is not just a wrong calculation but a wrong business decision the student has to live with downstream.

What the Lab Covers

Theme Park Tycoon is built entirely around Grade 7 Ratios and Proportional Relationships. Every worksheet is anchored to a specific 7.RP standard, and the scenario is designed so that proportional reasoning is the tool students reach for, not an abstract exercise layered on top. Over the eight meetings, students work with unit rates, constants of proportionality, equations of the form y = kx, ratio tables and their graphs, scale drawings, percent markup, and break-even analysis framed as fixed cost against proportional revenue.

Grade level	Grade 7
Standards	Ratios and Proportional Relationships (7.RP.A.1, A.2, A.3)
Format	Eight connected interactive worksheets, plus intro decks and a closing pitch
Structure	Sequential. Each worksheet's committed numbers carry forward into the next.
Time	Roughly one class period per meeting; flexible across two to three weeks
Grading	Auto-graded per question, with live teacher dashboard visibility

The Eight Meetings

Each meeting is a single interactive worksheet with an accompanying intro slide deck. The full step-by-step student instructions, learning objective, and teacher tip for every worksheet are provided in the companion activity guide. The map below is a quick orientation.

Meeting	Worksheet	What students do
1	**Industry Briefing**	Compute unit rates across five comparable parks and decide which rates stay constant (proportional) and which vary.

Meeting	Worksheet	What students do
2	**Sizing Aurora**	Write y = kx, build a ratio table, and read Aurora's projected attendance off the line at 12 acres.
3	**Choosing Attractions**	Compute riders per hour for twelve rides, then select a buildable park that meets capacity, budget, and anchor rules.
4	**Setting Ticket Prices**	Test candidate prices against a rival park, apply discounts and a demographic mix, and find the revenue-maximizing price.
5	**Getting the Word Out**	Split a marketing budget by ratio across channels, then scale the park emblem onto a billboard in proportion.
6	**Concessions and Revenue**	Apply percent markup to set menu prices, then scale a sales mix to find food revenue per visitor.
7	**A Day at the Park**	Model fixed daily cost against proportional revenue and find the daily break-even guest count.
8	**The Investor Pitch**	Scale every carried figure to a full season and compute return on investment as a percent.

Running It in the Classroom

The lab is sequential and is meant to be run in order, since the carry-forward spine depends on it. A natural pace is one meeting per class period, spread across two to three weeks, though the worksheets are self-contained enough to flex around your schedule. Each meeting follows the same rhythm:

- **Open with the intro deck.** A short cream-slide deck sets up the meeting's scenario in plain language before students touch the worksheet. It frames the decision without spoiling any value students are meant to discover.
- **Let students work the interactive worksheet.** Inputs recalculate live, so students can experiment, watch graphs and totals respond, and adjust. Several worksheets have no single correct answer, which is intended.
- **Watch the dashboard.** Auto-grading and the live teacher view let you see who has started, who has finished, and who is stuck, so you can intervene where it matters rather than collecting and grading by hand.
- **Close the loop on the decision.** Most worksheets end with a Make the Call prompt where students justify a choice. These are worth a brief discussion, since the reasoning is where the proportional thinking surfaces.

Because many decisions have no dominant strategy, expect different students to build different parks, set different prices, and arrive at different but defensible final numbers. This is a feature of the lab, not a grading problem. The companion activity guide flags, meeting by meeting, where answers are student-specific and what a strong justification looks like.

Prerequisites

Students should be comfortable with the following before starting. None of these are taught from scratch in the lab; the lab applies them in context.

- Multiplying and dividing decimals, and working with money to the nearest cent.
- Finding a percent of a number, and adding a percent increase to a base amount.

- Reading and plotting points on a coordinate grid.
- Basic familiarity with unit rates, such as miles per hour or price per item.

No prior business or economics knowledge is needed. Terms like revenue, cost, profit, investment, and return on investment are introduced in plain seventh-grade language as they come up.

What Students Walk Away With

By the end of the lab, students have used ratios and proportions to make a connected series of real decisions and have seen those decisions compound into a single result they can defend. They finish able to compute and compare unit rates, recognize and use proportional relationships, apply scale and percent reasoning, and interpret a break-even point and a return on investment. More than any single skill, they leave with the sense that proportional reasoning is something you use to decide things, not just something you compute.

Activities

Overview to Teacher (Teacher Only Activities)

Section 1: Introduction

1.1 Introduction

1.1 .1 Introduction (3 Min.)

This is a reading activity.

(Download as PPT)

1.1.2 Review Questions (2 Min.)

This is a quiz activity. The correct answers are:

Question 1

What is your role in the Aurora Park project?

- ◯ The lead designer
- ◯ An investor
- ◯ A construction manager
- ◯ A ticket seller

The correct answer is:

The lead designer

Question 2

How many acres of land has Marisol Chen bought for Aurora Park?

Enter your response

*Enter only numeric value

The correct answer is:

12

Question 3

What kind of park is Aurora Park meant to be?

- A national resort families visit for a week
- A small regional park families drive to for a long Saturday
- A traveling carnival that moves between towns
- An indoor amusement center inside a mall

The correct answer is:

A small regional park families drive to for a long Saturday

Question 4

What is the main competitive problem Marisol warns you about?

- Wonderworld, opening the same season nearby
- A rising cost of construction materials
- A shortage of available land
- Bad weather expected on opening day

The correct answer is:

Wonderworld, opening the same season nearby

Question 5

What is your very first job in Meeting One?

- Setting ticket prices
- Studying five existing regional parks to find the ratios that hold true
- Choosing which rides to build
- Pitching the final business case to Marisol

The correct answer is:

Studying five existing regional parks to find the ratios that hold true

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1.2 Study the Nearby Parks

1.2 .1  Study the Nearby Parks (2 Min.)

This is a reading activity.

(Download as PPT)

1.2.2  The Industry Analysis (5 Min.)

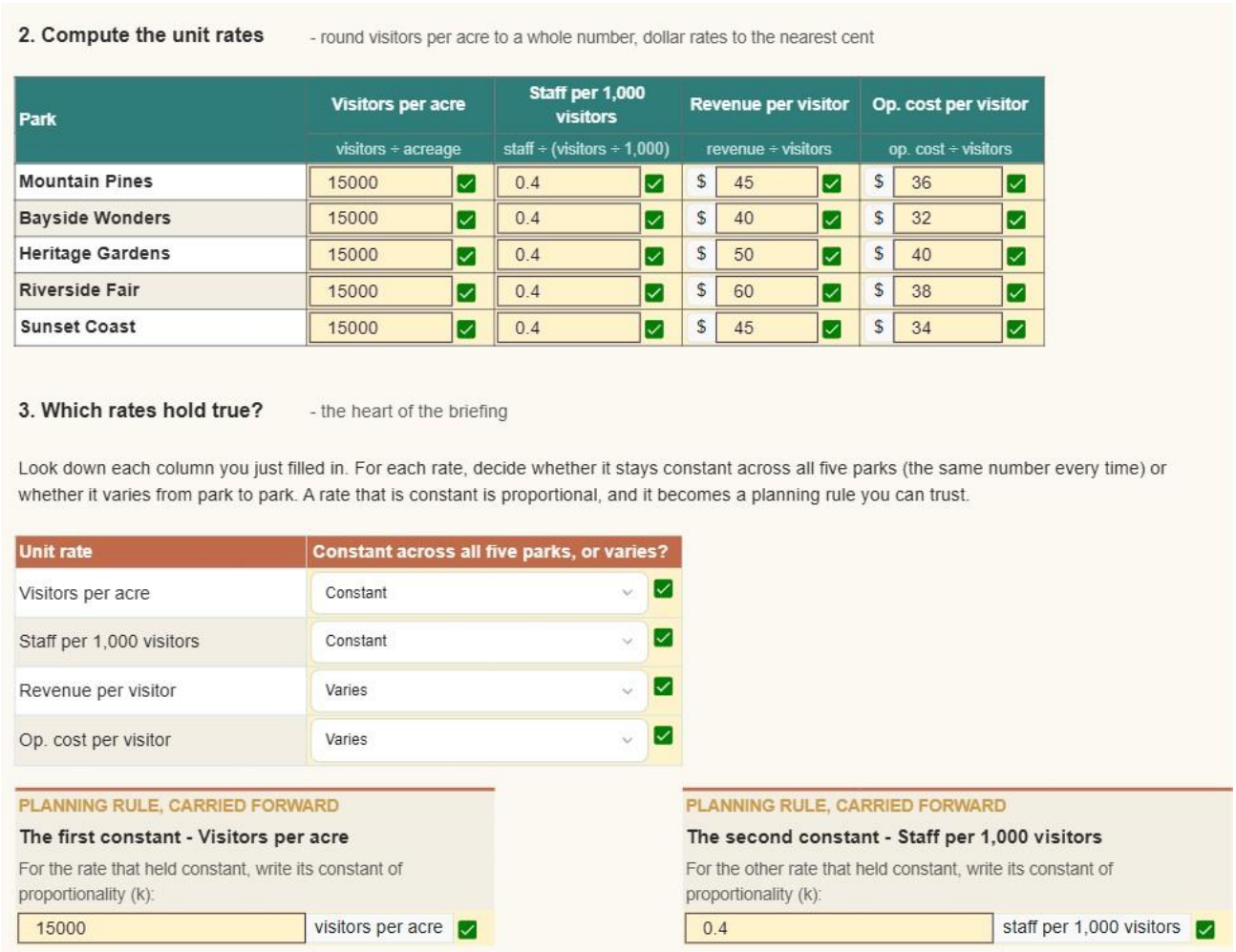
Students compute unit rates from real park data and test each rate for proportionality across multiple cases (7.RP.A.1, 7.RP.A.2a, 7.RP.A.2b). The goal is for students to recognize that a proportional relationship produces the same constant rate every time, while a non-proportional one drifts, and to use that distinction to decide which rates can become reliable planning assumptions for designing Aurora Park.

- The two constants are visitors per acre (15,000) and staff per 1,000 visitors (0.4). Revenue per visitor and operating cost per visitor both vary, and that variation is the point of the
- worksheet.
  Bayside Wonders is set at 14 acres on purpose so no park's figures mirror Aurora's eventual
- 12 acres. Students cannot shortcut by copying a row.
  Watch for students who decide a rate is constant after checking only two parks. Push them to
- verify all five before committing.

On Make the Call, a strong answer notes that because revenue per visitor varies, it cannot be assumed for Aurora the way the constant rates can. The constants become trustworthy planning rules; the varying ones must be decided later.

- **The two constants carry forward and anchor every later meeting, so accuracy here matters for the whole lab.**

The correct answers for the worksheet are below -



2. Compute the unit rates - round visitors per acre to a whole number, dollar rates to the nearest cent

Park	Visitors per acre visitors ÷ acreage	Staff per 1,000 visitors staff ÷ (visitors ÷ 1,000)	Revenue per visitor revenue ÷ visitors	Op. cost per visitor op. cost ÷ visitors
Mountain Pines	15000	0.4	$ 45	$ 36
Bayside Wonders	15000	0.4	$ 40	$ 32
Heritage Gardens	15000	0.4	$ 50	$ 40
Riverside Fair	15000	0.4	$ 60	$ 38
Sunset Coast	15000	0.4	$ 45	$ 34

3. Which rates hold true? - the heart of the briefing

Look down each column you just filled in. For each rate, decide whether it stays constant across all five parks (the same number every time) or whether it varies from park to park. A rate that is constant is proportional, and it becomes a planning rule you can trust.

Unit rate	Constant across all five parks, or varies?
Visitors per acre	Constant
Staff per 1,000 visitors	Constant
Revenue per visitor	Varies
Op. cost per visitor	Varies

PLANNING RULE, CARRIED FORWARD

The first constant - Visitors per acre

For the rate that held constant, write its constant of proportionality (k):

15000 visitors per acre

PLANNING RULE, CARRIED FORWARD

The second constant - Staff per 1,000 visitors

For the other rate that held constant, write its constant of proportionality (k):

0.4 staff per 1,000 visitors

Step-by-step instructions for students

- For each park, compute the four unit rates: visitors per acre, staff per 1,000 visitors, revenue per visitor, and operating cost per visitor.
- In Section 3, look down each completed column. Decide whether each rate stays constant across all five parks or varies from park to park.
- Find the two rates that hold constant. Write each one's constant of proportionality (k) in its Planning Rule box
- Answer Make the Call in one or two sentences: explain why the varying rates matter for Aurora, and whether a revenue-per-visitor number can be assumed the way visitors-per-acre can.

1.3 Sizing Aurora

1.3 .1 Sizing Aurora (2 Min.)

This is a reading activity.

(Download as PPT)

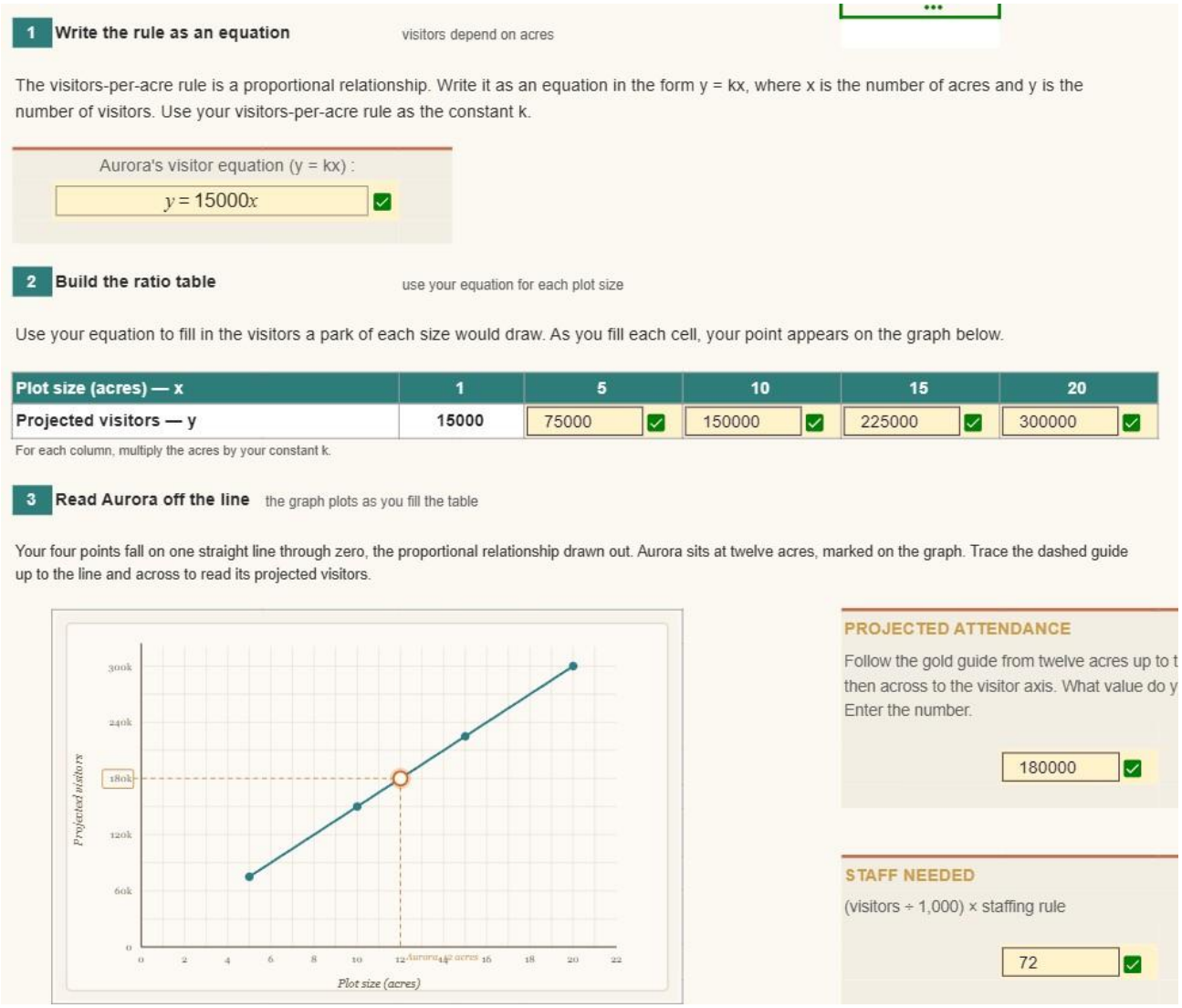
1.3.2  Finding Visitor and Staff Counts (3 Min.)

Students apply a constant of proportionality to model a real situation, writing the relationship as an equation in the form y = kx, building a ratio table from it, and graphing the resulting points to see that a proportional relationship forms a straight line through zero. They then use that line to predict a value not listed in the table, reading Aurora's projected attendance at twelve acres directly off the graph, and finish by applying a second rate to find the staffing the park needs.

This worksheet works best when students treat the table and the graph as one connected idea rather than two separate tasks. A few things to manage:

- Have students complete the ratio table fully before reading the graph, since the line only makes sense once all four points are plotted.
- The twelve-acre value is meant to be *read off the line*, not calculated, that is the whole point of the graph step, so discourage students from just multiplying 12 by 15,000 to shortcut it.
- Watch for the common slip on staffing: the rule is staff per 1,000 visitors, so students must divide attendance by 1,000 first, then apply the rate.

The correct answers are -



Step-by-step instructions for students

- You should see the two rules - visitors per acre, and staff per 1,000 visitors that you found out in the previous worksheet copied here.
- Write the visitors-per-acre rule as an equation in the form y = kx, using your constant as k.
- Use your equation to fill in the projected visitors for each plot size in the ratio table.
- Watch your points appear on the graph as you fill each cell.
- Trace the gold guide up from twelve acres to the line, then across to the visitor axis, and read Aurora's projected attendance.
- Apply the staffing rule to that attendance to find how many staff Aurora needs.

1.4 Attractions for the Park

1.4 .1 Attractions for the Park (2 Min.)

This is a reading activity.

(Download as PPT)

1.4.2  Choosing Attractions (5 Min.)

Students compute a rate (riders per hour) from a two-step relationship, then apply those rates to select a set of attractions that satisfies multiple simultaneous constraints (7.RP.A.1, 7.RP.A.3). The goal is for students to reason about capacity and cost together, weighing each ride's throughput against its price rather than choosing by appeal, and to justify a build as one valid solution among several.

- There is no single correct park. Twelve different valid builds satisfy all four rules, so expect different answers across the room and treat that as intended.
- The anchor rule (at least 2 anchors) is the constraint that forces a real tradeoff, since anchors tend to cost more. Students who ignore it often hit the rider target cheaply but produce an invalid park.
- The strongest reasoning in Defend your park compares riders per hour per dollar, not raw riders or raw cost alone. A ride that moves more people per dollar spent is the better budget choice.
- Watch for students who fill the riders-per-hour column correctly but then select rides by name recognition instead of by the rates they just computed. Point them back to their own numbers.
- A student's chosen build carries forward, so their rides drive their own construction cost and throughput in later meetings.

For students who stall on selecting a valid set, point them to the live meters. Encourage them to toggle rides on and off and watch how each of the four totals responds, rather than trying to plan the whole park before touching anything. A common path is to lock in two anchors first, then fill remaining slots with high riders-per-hour, low-cost rides until the demand meter clears.

The correct answers for the worksheet are below.

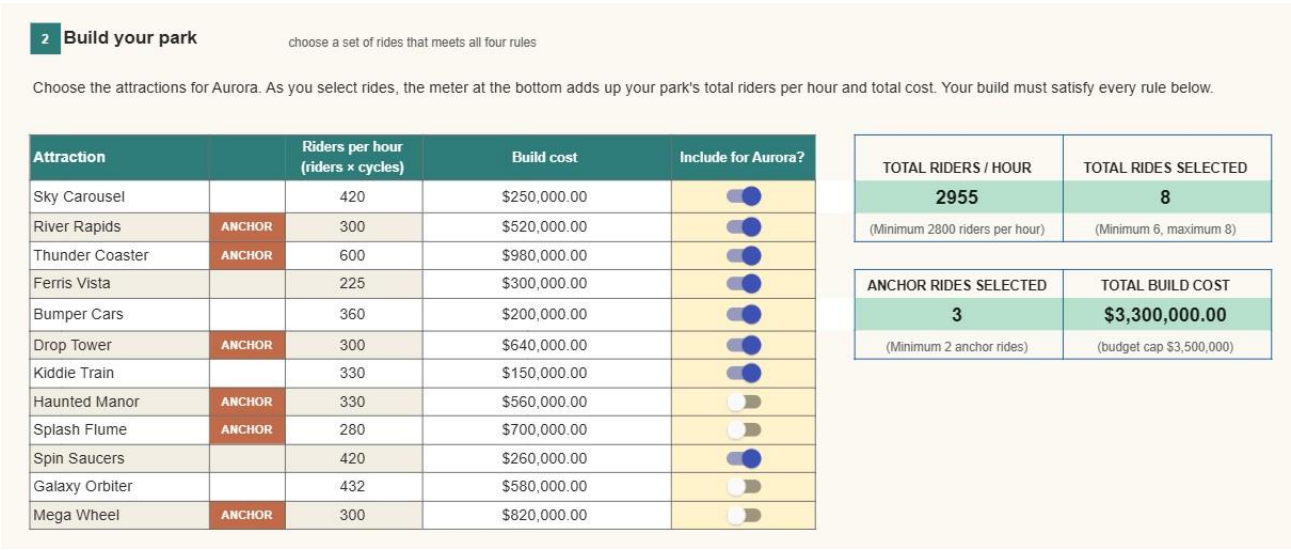
1 Find each ride's riders per hour the rate you build the park on

Each attraction runs a full cycle in a set number of minutes and carries a set number of riders per cycle. Work out how many riders each ride moves in one h minutes in an hour.

Attraction		Riders per cycle	Minutes per cycle	Cycles per hour (60 ÷ minutes)	Riders per hour (riders × cycles)	Build cost
Sky Carousel		35	5	12	420	250,000
River Rapids	ANCHOR	30	6	10	300	520,000
Thunder Coaster	ANCHOR	40	4	15	600	980,000
Ferris Vista		45	12	5	225	300,000
Bumper Cars		24	4	15	360	200,000
Drop Tower	ANCHOR	25	5	12	300	640,000
Kiddie Train		33	6	10	330	150,000
Haunted Manor	ANCHOR	44	8	7.5	330	560,000
Splash Flume	ANCHOR	28	6	10	280	700,000
Spin Saucers		28	4	15	420	260,000
Galaxy Orbiter		36	5	12	432	580,000
Mega Wheel	ANCHOR	50	10	6	300	820,000

An anchor ride is a major attraction that pulls crowds to the park. The data packet marks six of them.

Here is a combination of rides that meets all constraints -



2 Build your park choose a set of rides that meets all four rules

Choose the attractions for Aurora. As you select rides, the meter at the bottom adds up your park's total riders per hour and total cost. Your build must satisfy every rule below.

Attraction		Riders per hour (riders × cycles)	Build cost	Include for Aurora?
Sky Carousel		420	$250,000.00	
River Rapids	ANCHOR	300	$520,000.00	
Thunder Coaster	ANCHOR	600	$980,000.00	
Ferris Vista		225	$300,000.00	
Bumper Cars		360	$200,000.00	
Drop Tower	ANCHOR	300	$640,000.00	
Kiddie Train		330	$150,000.00	
Haunted Manor	ANCHOR	330	$560,000.00	
Splash Flume	ANCHOR	280	$700,000.00	
Spin Saucers		420	$260,000.00	
Galaxy Orbiter		432	$580,000.00	
Mega Wheel	ANCHOR	300	$820,000.00	

TOTAL RIDERS / HOUR	TOTAL RIDES SELECTED
2955	8
(Minimum 2800 riders per hour)	(Minimum 6, maximum 8)

ANCHOR RIDES SELECTED	TOTAL BUILD COST
3	$3,300,000.00
(Minimum 2 anchor rides)	(budget cap $3,500,000)

Step-by-step instructions for students

- In Section 1, work through the table one ride at a time. Find cycles per hour by dividing 60 by the minutes per cycle.
- Find riders per hour by multiplying riders per cycle by cycles per hour. Enter both values for all twelve attractions and check them off.
- In Section 2, use the rides you scored to build your park. Toggle attractions on for Aurora. Watch the
- four meters as you select. Your build must satisfy every rule: at least 2,800 total riders per hour, between 6 and 8 rides, at least 2 anchor rides, and total cost at or under $3,500,000.
- Adjust your selections until all four meters are satisfied at once.
- Answer Defend your park in Section 3: name one ride you chose and one you skipped, and explain your reasoning using each ride's riders-per-hour rate and its cost.

1.4.3  Lay Out Aurora (5 Min.)

This activity gives students ownership of the park they earned through the rate and budget work in the previous worksheet. There is no new math and nothing is scored. Its purpose is engagement and continuity: the rides a student chose in Choosing Attractions are the exact rides they place here, which reinforces that their numerical decisions produced a real, tangible park. The payoff is motivational, and it strengthens investment in the meetings that follow.

This is a breather between two demanding worksheets, and that is by design. After the constraintjuggling of Choosing Attractions, students get a low-stakes moment to enjoy the result of their work, so it is fine to let the room be a little louder and more relaxed here. You do not need to steer their layouts. If a student asks whether placement affects their score or later numbers, the answer is no.
Spatial arrangement does not feed the carry-forward spine.

A few things worth keeping an eye on:

- If a student's ride list looks short, that is correct. The list only shows the attractions they selected earlier, so a six-ride park has six rides to place.
- Watch the clock. This activity can absorb more time than its value warrants, so give a soft time limit and move the class on to the next meeting once most students have placed their full set.
- For students who finish quickly, a good extension question is to ask why they grouped rides the way they did, for example clustering high-throughput rides near the gate. It keeps them thinking without adding required work.

There are no answers to check for this activity, since it is not graded.

Step-by-step instructions for students

- Pick a ride from the "Choose a ride" list on the right. Only the rides you selected for your park appear here.
- Click anywhere on the map to drop the selected ride at that spot.
- Work around the fixed features already on the map: the main gate and the pond.
- Keep placing rides until all of your attractions are on the map. The counter tracks how many you have placed.
- Use Undo to remove your last placement, or Reset all to start over. Arrange the park however you like. Nothing here is graded.

1.5 Ready to Set Ticket Prices?

1.5 .1 Ready to Set Ticket Prices? (2 Min.)

This is a reading activity.

(Download as PPT)

1.5.2 Set Ticket Prices (3 Min.)

Students apply proportional reasoning across a multi-step pricing decision (7.RP.A.3). They convert a ticket price to a per-ride rate, use a given linear relationship to project attendance, and compute revenue, then refine that figure by applying percentage discounts and splitting attendance into demographic groups. The goal is for students to see that a realistic revenue figure depends on layered proportional adjustments, not a single multiplication, and to defend a pricing choice as a business decision with a traceable justification.

The thing to flag before students start is that this worksheet's answers depend on the number of rides each student built in the previous meeting. Price per ride is ticket price divided by their ride count, so a student with six rides and a student with eight rides will get different per-ride rates, different attendance, and different revenue at the same ticket price. There is no single answer key for the room, and the screenshot below shows the case for a student who built eight rides.

A few things to watch:

- The two-stage structure trips up some students. The first table treats everyone as a full-price adult to find the revenue-maximizing price. The second part then corrects that figure for discounts and demographics. Make sure students understand the first answer is deliberately an overestimate that gets refined, not a mistake.
- On the candidate prices, revenue peaks in the middle of the range rather than at the highest price. Students who assume the highest price always wins will pick wrong. Point them to their own revenue column.
- Watch for students who forget to divide by their ride count and instead compare ticket prices directly against Wonderworld's $6.40. The comparison only works on a per-ride
- basis. In Step 1, the discount is taken off the adult price, so the discounted price is lower than the adult price. A common slip is computing the discount amount and forgetting to
- subtract it. The selected price and the average ticket revenue both carry forward into later meetings, so accuracy here shapes each student's downstream revenue and ROI.

Because the correct values depend on ride count, the answers below are for a student who selected eight rides. A student with a different ride count will have different but analogous answers.

After several experiments, Marisol has already figured out that there is a close relationship between Price per r
received. The relationship is proportional and is represented by the below equation -

$$\text{attendance} = -25000 \times \text{price per ride} + 300000$$

Now let's try four candidate prices, and find out the attendance we can expect at each price.

Price	# Rides	Price per Ride	Expected Attendance (Use above formula)	Expected Revenue (Attendance x Price)
$36.00	8	$ 4.5 ✓	187500 ✓	$ 6750000 ✓
$40.00	8	$ 5 ✓	175000 ✓	$ 7000000 ✓
$48.00	8	$ 6 ✓	150000 ✓	$ 7200000 ✓
$52.00	8	$ 6.5 ✓	137500 ✓	$ 7150000 ✓

Which price gives you maximum revenue? Let's pick that price for Aurora 48

Selected Price	$48.00

Expected Attendance	150,000.00

Step 1: Calculate the ticket price of Children and Senior Citizens

Category	Discount	Adult Price You Selected	Discounted Price
Children	25%	$48.00	$ 12 ✓
Senior Citizen	20%		$ 9.6 ✓

Step 2: Calculate the count of Adults, Children and Senior Citizen

Category	Percentage	Count
Adults	50%	75000 ✓
Children	30%	45000 ✓
Senior Citizen	20%	30000 ✓

Step 3: Calculate total Revenue

Category	Count	Ticket Price	Total Revenue
Adults	75000	48	$ 3600000 ✓
Children	45000	12	$ 540000 ✓
Senior Citizen	30000	9.6	$ 288000 ✓

Total =	$4,428,000.00
Average Ticket Revenue =	$29.52

Step-by-step instructions for students

- In the first table, work through the four candidate prices. For each, fill price per ride by dividing the ticket price by your number of rides.
- Use the attendance formula (attendance = -25000 x price per ride + 300000) to find expected attendance at each price.
- Multiply attendance by price to find expected revenue for each candidate. Enter all values. From the
- dropdown, select the price that gives the maximum revenue. That becomes your Aurora ticket price.
- In the second part, your selected price and its expected attendance carry down. Step 1: apply the 25% child and 20% senior discounts to your adult price to get each discounted ticket price.
- Step 2: split the expected attendance into adults (50%), children (30%), and seniors (20%) to get each count.
- Step 3: multiply each group's count by its ticket price, sum the three for total revenue, then divide by total attendance to get average ticket revenue per visitor.
- In Prepare for the Ticket Price Meeting, write down the price you chose, why you chose it, and the total yearly revenue you expect.

1.6 Getting the Word Out

1.6 .1 Getting the Word Out (3 Min.)

This is a reading activity.

(Download as PPT)

1.6.2 Marketing Campaign (5 Min.)

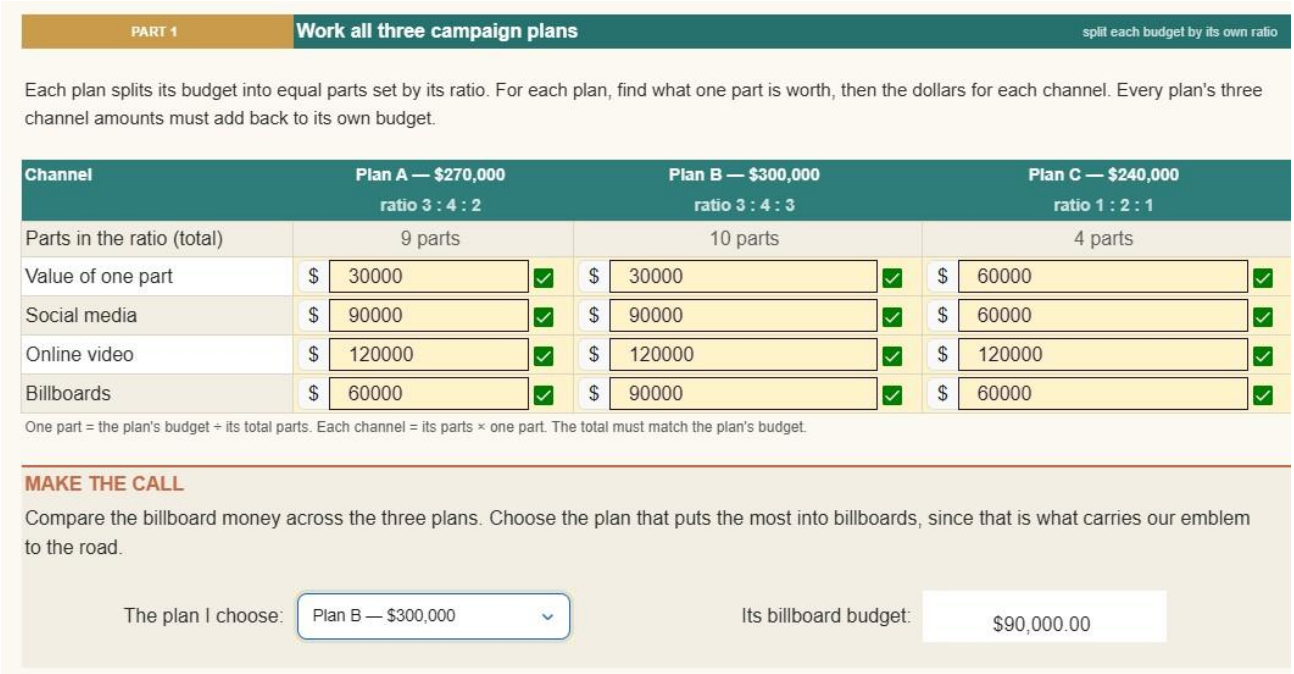
Students apply ratios and proportional reasoning in two connected contexts (7.RP.A.2, 7.RP.A.3). First they partition a total into parts set by a ratio, using the value of one part to distribute a budget across channels and verifying that the parts reconstitute the whole. Then they apply a scale factor to enlarge a multi-edge figure, reinforcing that every dimension must scale by the same factor for the shape to stay proportional. The goal is for students to see ratios both as a way to divide a quantity and as a way to resize a figure without distorting it.

Plan B is the choice that maximizes billboard money, so most students who work the table correctly will land there. The value of this worksheet is the partitioning method, not the final pick, so make sure students are dividing by the total parts and multiplying back out, rather than guessing which plan looks biggest.

A few things to watch:

- The most common error in Part 1 is using the wrong total parts. Students sometimes carry one plan's part total into another plan. Each plan has its own ratio and its own divisor, so the value of one part is different for each.
- In Part 2, the scale is a single multiplier applied to every edge. Watch for students who scale some edges and not others, or who add 2 instead of multiplying by 2. The reminder that the emblem must stay proportional is the conceptual anchor: scaling one edge differently would stretch the shape.
- The chosen billboard budget and the campaign cost carry forward, so the plan choice feeds each student's marketing spend in later meetings.

The correct answers for the worksheet are below.



PART 1 **Work all three campaign plans** split each budget by its own ratio

Each plan splits its budget into equal parts set by its ratio. For each plan, find what one part is worth, then the dollars for each channel. Every plan's three channel amounts must add back to its own budget.

Channel	Plan A — $270,000 ratio 3 : 4 : 2	Plan B — $300,000 ratio 3 : 4 : 3	Plan C — $240,000 ratio 1 : 2 : 1
Parts in the ratio (total)	9 parts	10 parts	4 parts
Value of one part	$ 30000 ✓	$ 30000 ✓	$ 60000 ✓
Social media	$ 90000 ✓	$ 90000 ✓	$ 60000 ✓
Online video	$ 120000 ✓	$ 120000 ✓	$ 120000 ✓
Billboards	$ 60000 ✓	$ 90000 ✓	$ 60000 ✓

One part = the plan's budget ÷ its total parts. Each channel = its parts × one part. The total must match the plan's budget.

MAKE THE CALL

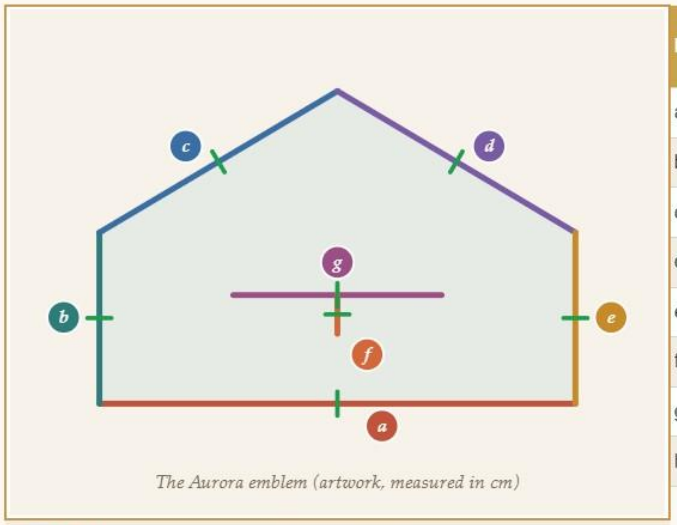
Compare the billboard money across the three plans. Choose the plan that puts the most into billboards, since that is what carries our emblem to the road.

The plan I choose: Plan B — $300,000

Its billboard budget: $90,000.00

PART 2 **Scale the Aurora emblem onto a billboard** eight edges, one scale, kept true+

The Aurora emblem is drawn as artwork measured in centimeters. On the billboard it is reproduced at the scale 1 cm = 2 feet. Scale every edge of the emblem from artwork centimeters to real billboard feet.



The Aurora emblem (artwork, measured in cm)

1 cm = 2 ft the billboard scale

Emblem edge	Artwork (cm)	Billboard (ft)
a — base bar	5 cm	10 ✓
b — left riser	3 cm	6 ✓
c — upper left slant	4 cm	8 ✓
d — peak edge	2 cm	4 ✓
e — upper right slant	4 cm	8 ✓
f — right riser	3 cm	6 ✓
g — inner notch	1.5 cm	3 ✓
h — crossbar	2.5 cm	5 ✓

Step-by-step instructions for students

- In Part 1, work one plan at a time. First add the ratio numbers to get the total parts, find the value of one part by dividing that plan's budget by its total parts.
- Find each channel's dollars by multiplying its ratio number by the value of one part.
- In Make the Call, compare the billboard dollars across all three plans. Select the plan with the most billboard money and enter its billboard budget.
- In Part 2, scale the Aurora emblem from artwork centimeters to billboard feet using the scale 1 cm = 2 ft.

1.7 Let's Price the Food

1.7 .1 Let's Price the Food (2 Min.)

This is a reading activity.

(Download as PPT)

1.7.2 Food Revenue (5 Min.)

Students apply percent markup and proportional reasoning to build a concession revenue model (7.RP.A.3). They convert a wholesale cost to a retail price using a percent increase, then scale a per-100-guests sales mix down to a per-visitor revenue figure. The goal is for students to combine percent reasoning with rate scaling, and to see that a realistic revenue-per-visitor number comes from a weighted mix of items rather than a single product.

The key conceptual point in Section 1 is that markup is a percent of the cost, added to the cost. Students who treat the markup percent as the final price, or who confuse markup with margin, will get menu prices that are too low. A quick sanity check: a 150% markup more than doubles the price, so the hot dog goes from $2.00 to $5.00, not to $3.00.

A few things to watch:

- The two-step structure of Section 1 helps here. Computing the markup amount first, then adding it, prevents the common error of multiplying cost by the percent and stopping. Make sure both columns are filled.
- In Section 3, the sales mix is the point. The stand does not sell one of everything, so revenue per visitor is a weighted blend, not an average of the six prices. Students who try to average the menu prices will miss this.
- The final divide-by-100 step converts per-100-guests revenue to per-visitor revenue. Watch for students who report the $820 total as the per-visitor figure instead of dividing down to $8.20.
- This food revenue per visitor carries forward and combines with ticket revenue in the next worksheet, so it feeds each student's daily break-even and season ROI. Accuracy here matters downstream.

The correct answers for the worksheet are below.

1 Set the menu with markup

Each item costs Aurora a wholesale price. Apply the markup percent to find the menu price guests pay. Markup means the price goes up by that percent of the cost.

Item	Cost to Aurora	Markup	Amount of markup (cost × markup%)	Menu price (cost + markup)
Hot dog	$2.00	150%	$ 3 ✓	$ 5 ✓
Popcorn	$1.00	200%	$ 2 ✓	$ 3 ✓
Soft drink	$0.80	250%	$ 2 ✓	$ 2.8 ✓
Pretzel	$1.50	100%	$ 1.5 ✓	$ 3 ✓
Ice cream	$1.20	150%	$ 1.8 ✓	$ 3 ✓
Nachos	$2.50	120%	$ 3 ✓	$ 5.5 ✓

Amount of markup = cost × (markup percent). Menu price = cost + amount of markup.

3 Find the food revenue per visitor

Marisol's consultant studied the crowd. The stand does not sell the same thing to everyone. For every 100 guests, the table shows how many of each item are sold. Multiply each item's menu price by the number sold to find that item's revenue per 100 guests. Add them for the total, then divide by 100 to find the food revenue per visitor.

Item	Menu price	Sold per 100 guests	Revenue per 100 guests
Hot dog	5	40	$ 200 ✓
Popcorn	3	50	$ 150 ✓
Soft drink	2.8	75	$ 210 ✓
Pretzel	3	20	$ 60 ✓
Ice cream	3	30	$ 90 ✓
Nachos	5.5	20	$ 110 ✓

Total revenue per 100 guests **$820.00**

What is the food revenue per visitor (total ÷ 100) $ 8.2 ✓

Step-by-step instructions for students

- In Section 1, work through the menu table one item at a time. Find the amount of markup by multiplying each item's cost to Aurora by its markup percent.
- Find the menu price by adding the amount of markup to the cost. Enter both values for all six items.
- Section 3 automatically carries each item's menu price down into the revenue table.
- For each item, find its revenue per 100 guests by multiplying its menu price by the number sold per 100 guests.
- Divide that total by 100 to find the food revenue per visitor.

1.8 A Day at the Park

1.8 .1 A Day at the Park (2 Min.)

This is a reading activity.

(Download as PPT)

1.8.2 Calculating Daily Profit (3 Min.)

Students model a daily profit scenario as fixed cost against proportional revenue and locate the break-even point (7.RP.A.2c, 7.RP.A.3). They compute a total daily cost that does not change with attendance, a revenue that grows in direct proportion to guests, and the guest count where the two are equal. The goal is for students to understand break-even as the crossing point of a flat line and a proportional line, and to interpret guest counts below it as daily losses and above it as profits.

The conceptual spine here is fixed cost versus proportional revenue. The cost line is flat because staffing and operations are paid no matter how many guests come, while revenue rises with each guest. Break-even is simply where those two meet, found by dividing total daily cost by revenue per visitor. Students who grasp that single division understand the whole worksheet.

A few things to watch:

- Break-even is one division: total daily cost divided by revenue per visitor. Steer students away from guess-and-check on this. The slider is a tool for seeing the crossing and checking the table, not for hunting the break-even number by trial.
- Because revenue per visitor is carried from each student's own ticket and food figures, breakeven differs from student to student. There is no single class answer, and the break-even guest count will rarely be a round number.
- In the profit-or-loss table, the rule is consistent: any guest count below that student's breakeven is a loss, any count above it is a profit. If a student marks a row above their break-even as a loss, their break-even or their profit math is off.
- The daily profit and break-even figures carry forward into the investor pitch, so this meeting feeds each student's season profit and ROI.

Because revenue per visitor carries from earlier choices, the answers below are for one representative student. A student with different ticket and food figures will have different but analogous break-even and profit values.

Step-by-step instructions for students

- In the Daily cost panel, compute staffing as 72 staff x $120 per day, add the given fixed operations cost, and find total daily cost.
- In the Daily revenue panel, find Aurora's average daily guests (annual visitor count divided by 300 days), then multiply your revenue per visitor by that guest count to get revenue at 600 guests.
- At the bottom, bring down revenue at 600 guests and total daily cost, then subtract to find total expected daily profit.

- In the slider section, drag the guest count and watch the revenue line cross the flat cost line. Read off the minimum number of guests needed to break even (where profit is just above zero).
- In the table, use the slider to find the profit at 200, 300, 400, 500, and 550 guests, and mark each row as a profit or a loss.

1.9 Ready for the Pitch to Marisol?

1.9 .1  Ready for the Pitch to Marisol? (2 Min.)

This is a reading activity.

(Download as PPT)

1.9.2  Build the Pitch (5 Min.)

Students synthesize every figure built across the lab into a single investment summary and compute return on investment as a percent (7.RP.A.3). They scale per-unit values up to a full season, separate ongoing operating profit from up-front investment, and express profit as a percent of money invested. The goal is for students to assemble a multi-step business case from carriedforward values and interpret ROI as a meaningful measure of how well an investment performs.

This is the payoff meeting, where all eight worksheets resolve into one number. The conceptual work is keeping two ideas distinct: the season's operating profit, which is ongoing, and the up-front investment, which is spent once to build and launch the park. ROI relates the two by asking what percent of the invested money comes back each season.

A few things to watch:

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- If the student messed up previous worksheets, they will have issues with the dossier bar. The build cost is treated as investment, not as a year-one expense. It belongs in total investment, not in season operating cost. Students who subtract construction cost from season profit will understate ROI badly. The dossier separates these on purpose.
- Because revenue per visitor and construction cost are each student's own carried figures, the final ROI differs across the room. There is no single class answer, and a well-built park lands in a healthy range rather than at one fixed percent.
- The hint box is doing real work. Students often assume a good ROI must approach 100 percent. Reinforce that 20 to 30 percent in a season is a strong, realistic return, so an ROI above that is excellent news for Marisol.

- Watch the percent step. ROI is profit divided by investment times 100. A student who reports the decimal (such as 0.40) instead of the percent (40) has the right ratio but the wrong form.
- If a student's numbers look off, the dossier is a tracing tool. Have them confirm each carried figure against the meeting it came from before recomputing, which is exactly the move Marisol asks for when she challenges the figures.

Step-by-step instructions for students

- Read the dossier bar. Every figure here carried forward from an earlier meeting: yearly attendance, revenue per visitor, daily operating cost, construction cost, marketing cost, and operating days.
- In Section 1, find season revenue, operating cost, and operating profit.
- In Section 2, add construction cost and marketing cost to get Marisol's total up-front investment.
- In Section 3, find return on investment by dividing season operating profit by total investment, then multiplying by 100 to express it as a percent.

1.10  Your Final Proposal to Marisol (5 Min.)

Students will write their response to the question

You have run all the numbers. Now write Marisol a short proposal, in your own words, recommending whether she should break ground on Aurora Park. In your proposal, make sure you:

- ***State your recommendation clearly: should Aurora be built, yes or no?***
- ***Tell her how many guests the park needs each day to start making a profit (your break-even), and how that compares to the 600 guests a day you expect.***
- ***Tell her the return she can expect on her investment (your ROI) and what that percent means for her money.***
- ***Back up your recommendation with at least two numbers you worked out during the project, and say which meeting each one came from.***

Write it the way you would actually send it to an investor: confident, clear, and built on your math. Three to five sentences is enough.

You are grading the reasoning, not the writing polish. A strong proposal does not need to be long, but it should show the student can connect their numbers to a real recommendation. Look for:

- **A clear recommendation.** They take a position (build or don't build), not a vague "maybe." Either answer can be correct if the numbers support it.

- **Break-even used correctly.** They state their break-even (around 500 guests a day) and compare it to the expected 600, showing they understand the park profits because expected attendance is above break-even.
- **ROI stated and explained.** They give their ROI percent and show they know it means the return on Marisol's investment, not just a number they copied.
- **At least two figures traced back.** They cite real numbers from their own work and name where each came from, proving the proposal rests on the whole project, not a guess.

A student whose park came out with a weak or negative ROI can still earn full marks if they honestly recommend against building and explain why, that shows the strongest understanding of all. Reward sound reasoning from their own numbers over a "right" answer.

1.11  Summary (2 Min.)

This is a reading activity.

(Download as PPT)

1.12  Post-Project Survey (3 Min.)

This is a post-survey activity.

1.13  Wrap Up (Min.)

In this wrap up activity, students will see their final score, the status of activities (completed or not) etc..

How to Assign to Classroom?

1. Login to your teacher account (create one if you don't have already by clicking here)
2. Go to https://app.teachrealmath.com/educator/lab-details-purchase/5e7574c0-1d52-4527-a546a9dd294d3f11/lab
3. Click on "Add to Classroom" button
4. If you have a coupon code, click on "I Have Coupon Code" button.
5. If you have a TPT receipt, click on "I Have TPT Receipt" button.

6. If you don't have either of these, "Add to Cart" and checkout the product (1 license for 1 classroom). 7. After purchasing, go to your My Purchases screen and click on "Add to Classroom"
8. After assigning monitor the student progress using the real-time teacher console.