

## **WAMC Lab Template**

Math Concept(s): Piecewise Functions

Source / Text: *Financial Algebra*, Chapter 6

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### **Attach the following documents:**

Lab Instructions

- Students break up into groups based on teacher discretion
- Overview of how cell phone plans make charges.
- Distribute lab sheet.
- Goal: evaluate the cell phone plans provided. Create a piecewise function for 3 plans from the data provided. After creating piecewise functions students will graph the function and identify the cusp.
- Teacher does one example and students need to complete 3 piecewise functions using the plan.
- Next level: distribute ATT plan and have students fill in the chart and then have them write the piecewise functions for that plan and include graphs.

### **Short Description (Be sure to include where in your instruction this lab takes place):**

Students will work in groups to evaluate cell phone data plans and create a piecewise function for each in order to make a decision about which plan meets their needs.

### **Lab Plan**

Lab Title: Choosing a Cell Phone Plan

Prerequisite skills: Piecewise functions and linear equations

Lab objective: Apply the piecewise function in a real-life decision making process situation.

### **Standards:**

CCSS-M:

- A-CED 2: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- F-IF 2: Use the function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
- A-CED 1: Create equations and inequalities in one variable and use them to solve problems.
- A-CED 4: Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
- A-REI 3: Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
- F-BF 1d: Write a function that describes a relationship between two quantities.

- F-LE 1: Distinguish between situations that can be modeled with linear functions and with exponential functions.

Standards for Mathematical Practice:

- MP 1 Makes sense of problems and persevere in solving them.
- MP 2 Reason abstractly and quantitatively.
- MP 3 Construct viable arguments and critique the reasoning of others.
- MP 4 Model with mathematics

State Standards addressed (2008 Washington State Mathematics Standards):

- A1.1.A Select and justify functions and equations to model and solve problems.
- A1.1.B Solve problems that can be represented by linear functions, equations, and inequalities.
- 1.1.C Solve problems that can be represented by a system of two linear equations or inequalities.
- A1.2.B Recognize the multiple uses of variables, determine all possible values of variables that satisfy prescribed conditions, and evaluate algebraic expressions that involve variables.
- A1.2.D Determine whether approximations or exact values of real numbers are appropriate, depending on th
- A1.4.A Write and solve linear equations and inequalities in one variable

Reading:

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Writing:

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Leadership/21st Century Skills:

<u>21st Century Interdisciplinary themes</u> (Check those that apply to the above activity.)			
<input type="checkbox"/> Global Awareness	<input checked="" type="checkbox"/> Financial/Economic/Business/Entrepreneurial Literacy	<input type="checkbox"/>	Civic Literacy
<input type="checkbox"/> Health/Safety Literacy	<input type="checkbox"/> Environmental Literacy		
<u>21st Century Skills</u> (Check those that students will demonstrate in the above activity.)			
<b>LEARNING AND INNOVATION</b>	<b>INFORMATION, MEDIA &amp; TECHNOLOGY SKILLS</b>	<b>LIFE &amp; CAREER SKILLS</b>	<b>Productivity and Accountability</b>
<u>Creativity and Innovation</u>	<u>Information Literacy</u>	<u>Flexibility and Adaptability</u>	
<input checked="" type="checkbox"/> Think Creatively	<input checked="" type="checkbox"/> Access and Evaluate Information	<input type="checkbox"/> Adapt to Change	<input type="checkbox"/> Manage Projects
<input checked="" type="checkbox"/> Work Creatively with Others	<input checked="" type="checkbox"/> Use and manage Information	<input type="checkbox"/> Be Flexible	<input type="checkbox"/> Produce Results
<input type="checkbox"/> Implement Innovations	<u>Media Literacy</u>	<u>Initiative and Self-Direction</u>	<u>Leadership and Responsibility</u>
<u>Critical Thinking and Problem Solving</u>	<input checked="" type="checkbox"/> Analyze Media	<input checked="" type="checkbox"/> Manage Goals and Time	<input type="checkbox"/> Guide and Lead Others
<input checked="" type="checkbox"/> Reason Effectively	<input type="checkbox"/> Create Media Products	<input type="checkbox"/> Work Independently	<input type="checkbox"/> Be Responsible to Others
<input checked="" type="checkbox"/> Use Systems Thinking	<u>Information, Communications and Technology (ICT Literacy)</u>	<input type="checkbox"/> Be Self-Directed Learners	
<input checked="" type="checkbox"/> Make Judgments and Decisions	<input checked="" type="checkbox"/> Apply Technology Effectively	<u>Social and Cross-Cultural</u>	
<input checked="" type="checkbox"/> Solve Problems		<input checked="" type="checkbox"/> Interact Effectively with Others	
<u>Communication and Collaboration</u>		<input checked="" type="checkbox"/> Work Effectively in Diverse Teams	
<input checked="" type="checkbox"/> Communicate Clearly			
<input checked="" type="checkbox"/> Collaborate with Others			

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## **Teacher Preparation: (What materials and set-up are required for this lab?)**

### Materials

- Sample cell phone plans, graph paper, lab sheet.

### Set-Up Required:

- None

## **Lab Organization Strategies:**

### Grouping/Leadership/Presentation Opportunities:

- Students grouped at teacher discretion. Groups of 2 to 4, depending on class size.

### Cooperative Learning:

- Students work in groups to evaluate cell phone plans and write equations.

### Expectations:

- Completed lab sheet by the end of the period.

### Timeline:

- One class period?
- After sections 6.1 – 6.3.

## **Post Lab Follow-Up/conclusions:**

### Discuss real world application of learning from lab

- Selecting a cell phone plan is a real-world problem.
- Address other companies who have unlimited data plans, but when you go over your data usage they don't charge more but slow down the data significantly (no watching YouTube videos!). Discuss the pros/cons of this.

### Career Applications

- Differentiating a group of data is used in almost every career.

<https://wa-appliedmath.org/>

# AT&T Mobile Share

First – Choose your monthly data amount

Per Month

Mobile Share with Unlimited Talk & Text	1GB \$40	4GB \$70	6GB \$90	10GB \$120	15GB \$160	20GB \$200
Each Smartphone *	+ \$45	+ \$40	+ \$35	+ \$30	+ \$30	+ \$30

Next – Add more devices to your Mobile Share plan

Up to 10 devices per plan



Basic & Messaging Phones

Laptops, LaptopConnect cards and Netbooks

Tablets and Gaming Devices

Shared Data  
Unlimited Talk & Text

Shared Data

Shared Data

\$30 each/month

\$20 each/month

\$10 each/month

Additional data, \$15 per GB

Include Mobile Hotspot at no additional cost for capable smartphones and tablets.

How does it work?

## Share 6GB of Data

Mobile Share 6GB \$90/mo.

+ 1 Smartphone Unlimited Talk & Text Share 6GB of Data	\$35/mo.
+ 1 Smartphone Unlimited Talk & Text Share 6GB of Data	\$35/mo.
+ 1 Tablet Share 6GB of Data	\$10/mo.

Total \$170/mo

See which plan is right for you at [att.com/mobileshare](http://att.com/mobileshare)



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Smartphone required. Available for 3G, HSPA+, LTE devices only. Up to ten devices per plan. Additional monthly charge per device. Unlimited talk and text for phones only. If you are using a shared data plan without a Smartphone(s) on the account or you do not have all required elements of the plan, AT&T reserves the right to place the non-complying device(s) on an appropriate plan(s). If you exceed the amount of data in your plan during your billing period, an additional 1GB is automatically provided as specified in your rate plan. Overage charges are billed to the primary line. All data allowances, including overages, must be used in the billing period in which the allowance is provided or they will be forfeited. Authorized users on the account may temporarily suspend data access for each device using the Shared Data Plan. Data access will be restored at the beginning of the next billing cycle. Monthly charges, however, will continue to apply. Tethering and mobile hot spot use is permitted with up to five (5) simultaneous devices. Access to corporate email, intranet and apps available for \$15/mo. per device. Additional monthly charge per device not eligible for discounts. Domestic use only. Activation fee may apply. Additional deposits and other restrictions may apply.