

Lisa Williksen original creator

10-2 Lab

Text: Financial Algebra

Chapter: Electronic Utilities

Title of unit: Prepare a Comparison Chart (Cell Phone, Internet Providers)

Developed by: Len Kelly Clarkston Educational Opportunity Center

Date: June 25, 2013

Attach the Following Documents:

1. Lab Instructions
2. Student Handout(s)
3. Rubric and/or Assessment Tool

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

This lab will have student find several different cell phone and internet provider plan offers and then determine which plan is best for particular customers.

Electronic Utility Choices

LAB PLAN

TEACHER: *Len Kelly*

✓ **Lab Objective**

- *Understand piecewise functions*
- *Understand how to write piecewise functions to represent your electronic bill plan*
- *Understand how to determine your electronic device bill through your personal usage*
- *Understand how to compare different electronic utility plans to determine which one is best to meet personal needs*

✓ **Statement of prerequisite skills needed**

- *Completion of Chapter 10, Section 2 before beginning this lab*
- *Understanding of piecewise functions*
- *Understanding of solving algebraic equations*

✓ **Vocabulary**

- **Piecewise Function** – A set of function rules for each domain of a functions where $f(x)$ is computed differently for depending upon the value of x

✓ **State Standards addressed:**

- ✓ **Math:** (Common Core State Standards)
 - **A-SSE Interpret the structure of expressions**
 - 1a – Interpret parts of an expression, such as terms, factors and coefficients.
 - **F-IF Analyze functions using different representations**
 - 7a – Graph linear and quadratic functions and show intercepts, maxima, and minima
 - **F-IF Analyze functions using different representations**
 - 7b – Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions

- ✓ **Reading:** (Common Core State Standards)
 - Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.

- ✓ **Leadership:**
 - **1.1** - Student will analyze, refine & apply decision-making skills through classroom, family, community, and business and industry experiences.
 - **1.4** - Student will be involved in activities that require applying theory, problem-solving, and using critical & creative thinking skills while understanding outcomes of related decisions.
 - **2.1** – Student will communicate, participate, and advocate effectively in pairs, small groups, teams and large groups in order to reach common goals.

- ✓ **Writing:**
 - **2** – The student writes in a variety of forms for different audiences and purposes.
 - **3** – The student writes clearly and effectively
 - **SCAN Skills/Workplace Skills:**

- ✓ **Teacher Preparation:**
 - Materials: Computer access for each pair of students to find Internet providers & plans and cell phone providers & plans

- ✓ **Lab Organizational Strategies:**
 - Cooperative Learning: Students will be working in pairs
 - Expectations: Completion of the lab worksheet and 2 different plan comparison tables created by each pair
 - Time-line: 2 days

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

✓ **Post Lab Follow-Up/Conclusions** *(to be covered after student completes lab)*

- Discuss real world application of learning from lab: That students take away an understanding of how to create a comparison of different plans, the value of being a careful consumer and the validity of performing calculations to determine the appropriate cell phone and internet service plans
- Career Applications: Understanding on how to create comparison tables for marketing purposes or evaluations on product purposes for business.
- Optional or Extension Activities: Students could review this lab with their parents to determine if their family cell phone and internet service providers are appropriate for their family needs.

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

Electronic Utility Comparison Lab

Your assignment is to compare cell phone and internet service providers in your area to determine which provider's plan offer is the most cost efficient for your own budget.

I. *Cell Phone Comparison – Your first assignment is to create a comparison chart for cell phone plans in your area. Before you begin, it is important to ask yourself exactly what your cell phone usage needs are and then to plan and create your comparison chart from this perspective.*

A. *Instructions*

1. *Determine 3 cell phone carriers in Lewis-Clark Valley (Sprint, Inland Cellular, and Verizon) that you would consider using*

2. *Ask yourself what features are important to you and require comparison between providers:*

- a)
- b)
- c)
- d)
- e)
- f)
- g)
- h)

3. *Create your comparison chart to document each provider and their plans. You must include data from at least 3 different providers with a minimum of 5 different plan offers. Your chart should be well organized and easy to read.*

4. *Figure out the average monthly total for each of the plans on your comparison plan using your typical monthly usage of voice minutes, data, text messages, etc. Be sure to include your monthly usage averages that you used for your calculations. Create in excel worksheet.*

5. *What other considerations should you discuss before switching plans immediately today if you found a cell phone plan that is less expensive than the plan you're using? Fully explain in complete sentences.*

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

II. *Internet Service Providers* – Your second assignment is to create a comparison chart for Internet Service providers and plans in your area. Before you begin, it is important to ask yourself exactly what features you use or wish you had on your internet service. Next you need to create your comparison chart from this perspective.

A. *Instructions*

1. *Determine 3 internet service providers in your area that you would consider using.*

2. *Ask yourself what features are important to you and require comparison between providers. You need to list the questions that you considered about your usage.*

a)

b)

c)

d)

e)

f)

g)

3. *Create your comparison chart to document each provider and their plans. You must include data from at least 3 different providers with a minimum of 5 different plan offers. Your chart should be well organized and easy to read. Create in excel spreadsheet to show the data for each provider.*

4. *Figure out the average monthly total for each of the plans on your comparison plan using your typical monthly usage. Be sure to include your monthly usage averages that you used for your calculations. Create an excel worksheet to show your comparisons.*

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

WAMC Lesson Plan

Name(s): Len Kelly Clarkston Educational Opportunity Center

Lesson Title: Electronic Utilities 10-2

Date: 6/26/2013

Text: Financial Algebra

Lesson Length: 2 days

<p>Common Core State Standards:</p> <p><i>A-SSE1a – Interpret parts of an expression, such as terms, factors, and coefficients</i></p> <p><i>F-IF7a – Graph linear and quadratic functions and show intercepts, maxima, and minima</i></p> <p><i>F-IF7b – Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions</i></p>	
<p>Mathematical Practice(s):</p>	
<p>Content Objectives:</p> <p><i>Compute to cost of cell phone calls, text messaging, internet service, and cable television</i></p> <p><i>Compare different plans for these services</i></p> <p><i>Understand piecewise functions</i></p> <p><i>Understand how to write piecewise functions to represent your electronic bill plan</i></p>	<p>Language Objectives:</p> <p><i>Peer Teaching</i></p> <p><i>District provided aide</i></p>
<p>Vocabulary:</p> <p><i>Electronic utilities</i></p> <p><i>Piecewise function</i></p>	<p>Connections Prior to Learning</p> <p><i>Understanding solving algebraic equations</i></p> <p><i>Understand decimals</i></p> <p><i>Understand conversions to metric</i></p>
<p>Questions to Develop Mathematical Thinking:</p> <ul style="list-style-type: none"> • <i>Understand piecewise functions</i> 	<p>Common Misconceptions:</p> <ul style="list-style-type: none"> • <i>Know the difference between Cadillac plans and everyday need plans</i>

Assessment (Formative and Summative):

- Application problems pgs. 494-495 Probs 1-12, workbook problems 10-2, Quiz 10-2, Post test
- 10-2 Lab

WAMC Lesson Plan

Materials:

- Textbook, workbook, calculators

Instruction Plan:

Launch: How much do electronic utilities cost to use?

Explore: Compute costs of different cell phone plans, internet plans, and cable TV providers

Career Application(s):

- This lesson will help them become wise consumers of electronic plans and be independent upon graduation

21st Century Skills and Interdisciplinary Themes:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

- Global Awareness Financial/Economic/Business/Entrepreneurial Literacy Civic Literacy
 Health/Safety Literacy Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION

Creativity and Innovation

- Think Creatively
 Work Creatively with Others
 Implement Innovations

Critical Thinking and Problem Solving

- Reason Effectively
 Use Systems Thinking
 Make Judgments and Decisions

Solve Problems

Communication and Collaboration

- Communicate Clearly
 Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate Information

- Use and manage Information

Media Literacy

- Analyze Media
 Create Media Products

Information, Communications and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
 Be Flexible

Initiative and Self-Direction

- Manage Goals and Time
 Work Independently
 Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
 Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects

- Produce Results

Leadership and Responsibility

- Guide and Lead Others
 Be Responsible to Others

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

Name _____

“Show all work”

Len Kelly

Clarkston Educational Opportunity Center

Quiz Chapter 10-2

- _____ 1. Mrs. Watanabe is choosing a cell phone plan. One plan costs \$35 a month and includes 450 minutes. The charge for each minute over 450 is \$0.16. The company also offers an unlimited calling plan with a \$55 monthly charge. At how many minutes would the cost of the two plans be the same?
- | | |
|----------------|----------------|
| a. 575 minutes | c. 552 minutes |
| b. 566 minutes | d. 525 minutes |

Short Answer

2. Katelyn is shopping for a cellular phone service. Trenton Bell charges a monthly fee of \$40 for up to 500 minutes. For every minute over 500, there is an \$0.18 charge. Write a piecewise function to represent the cost of this plan.
3. A pay phone at a football stadium charges \$0.75 for the first five minutes (or part of) and \$0.33 for each extra minute (or part of). Express the cost $c(m)$ of a m -minute phone call as a piecewise function using the greatest known integer function.

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

**Quiz Chapter 10-2
Answer Section**

MULTIPLE CHOICE

1. ANS: A
 $35 + 0.16(x - 450) = 55; x = 575$

SHORT ANSWER

2. ANS:
$$c(x) \begin{cases} 40 & \text{when } x \leq 500 \\ 40 + 0.18(x - 500) & \text{when } x > 500 \end{cases}$$

3. ANS

$c(m) =$

0.75
0.75

When $m \leq 5$
when $m > 5$ and m is an integer

0.75

when $m > 5$ and m is not an integer