The Mobile Challenge
8th Grade Mathematics

Objectives:
- Write and solve a linear equation
- Graph and interpret the solution to a linear equation on a coordinate plane
- Make valid inferences based on data from graphs and tables
- Interpret slope and intercepts within the context of a real-life application

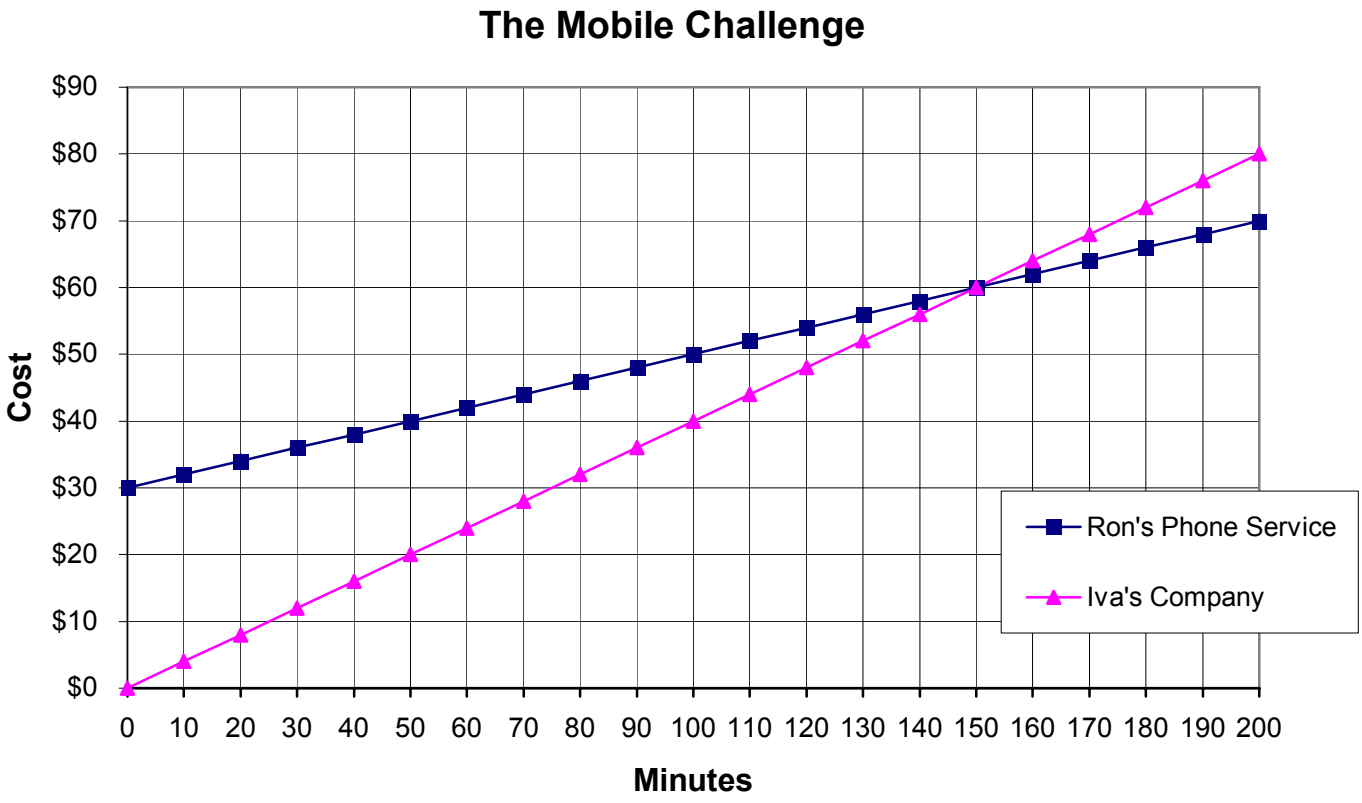
Materials:
- Graph paper
- Ruler
- Colored pencils (optional)
- Calculator (optional)
- Contact companies who offer local mobile phone services to obtain actual rates to use in this activity. (optional)

Procedure
- Inform students that the lesson involves mobile phones, examining data on competing mobile phone companies and drawing conclusions about the data.
- Initiate a conversation with students about their mobile phone that could involve some or all of the questions below.
    - How many students have a cell phone for their personal use?
    - If you were given an opportunity to choose a company to provide your cell phone service, what would be important things to consider?
    - How did you or your family decide which company?
- Launch the lesson
    - Tari wants a mobile phone and she has narrowed her choices to the following companies
        1. Ron's Phone Service-This service charges a $30 monthly fee and $0.20 per minute for calls.
        2. Iva's Company-This company charges $0.40 per minute for calls and does not have a monthly fee.
    - Prepare a written explanation to help Tari decide which phone company to choose for her mobile service.
    - Include equations, a table and linear graphs in your explanation.
- Give each group a copy of the item, a ruler and a sheet of graph paper.
- Read the item to the entire class and answer any questions.
- Allow groups to begin working and monitor each group as they complete the task.
- Allow each group of students to present their explanation to the class.
- Summarize the lesson with the entire class by facilitating a discussion using all or some of the questions below.
    - How are the of graphs the same?
    - How are the graphs different?
    - What did you observe about one pair of graphs that is true for all of the graphs?

- Which company would you choose if you used less100 minutes? Justify your answer.
- Which company would you choose if you used more than 180 minutes? Justify your answer.
- If Tari used 150 minutes, which company should she choose? Justify your answer.
- What is the slope and y-intercept of each graph? How is the slope and y-intercept indicated in the equation? Where is the slope and y-intercept on the graph? How does varying the slope and/or y-intercept change the graph?
- What if Iva's Company begins charging a $20 monthly fee and $0.30 per minute for calls, should Tara choose the same company?

Number of Minutes	**Ron's Phone Service**	**Iva's Company**
m	***30 + 0.20m***	***0.40m***
0	$30	$0
10	$32	$4
20	$34	$8
30	$36	$12
40	$38	$16
50	$40	$20
60	$42	$24
70	$44	$28
80	$46	$32
90	$48	$36
100	$50	$40
110	$52	$44
120	$54	$48
130	$56	$52
140	$58	$56
150	$60	$60
160	$62	$64
170	$64	$68
180	$66	$72
190	$68	$76
200	$70	$80

Number of Minutes = m
Ron's Phone Service = R
R = 30 + 0.20m
Iva's Company = I
I = 0.40m


The Mobile Challenge
Cost
$90
$80
$70
$60
$50
$40
$30
$20
$10
$0
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Minutes
Ron's Phone Service
Iva's Company

Rubric/ Scoring Guide

4 Complete understanding of concepts
Computations are correct
Include correct equations, a table and a linear representation
Clear explanation of conclusions

3 Generates some understanding of concepts
Minor computational errors
Minor errors in equations, table, and/or linear representation
Limited explanation of conclusion and/or recommendation missing

2 Limited understanding of concepts
Major computational errors
Major errors in equations, table, and/or linear representation
Explanation missing major steps or rationale

1 No understanding of concepts
Incorrect or missing computations
Missing elements
Unclear or no explanation