WALK-A-THON

Student/Class Goal
Students are interested in the details of participating and organizing a local walk-a-thon. This lesson could be completed during or prior to the event.

Outcome (*lesson objective)*
Students will graph equations, calculate slopes using the slope formula and learn the slope-intercept formula.

Time Frame
3 classes

Standard *Use Math to Solve Problems and Communicate*

NRS EFL 3-5

Number Sense	Benchmarks	Geometry & Measurement	Benchmarks	Processes	Benchmarks
Words to numbers connection		Geometric figures		Word problems	3.21, 4.25, 5.25
Calculation	3.2, 4.2, 5.1	Coordinate system	3.7, 4.8, 5.7	Problem solving strategies	4.26, 5.26
Order of operations		Perimeter/area/volume formulas		Solutions analysis	4.27, 5.27
Compare/order numbers		Graphing two-dimensional figures		Calculator	3.22, 4.28, 5.28
Estimation		Measurement relationships		Mathematical terminology/symbols	3.23, 4.29, 5.29
Exponents/radical expressions		Pythagorean theorem		Logical progression	3.24, 4.30, 5.30
Algebra & Patterns	**Benchmarks**	Measurement applications		Contextual situations	4.31, 5.31
Patterns/sequences	3.14, 4.15, 5.15	Measurement conversions		Mathematical material	
Equations/expressions	3.15, 4.16, 5.16	Rounding		Logical terms	
Linear/nonlinear representations	4.17, 5.17	**Data Analysis & Probability**	**Benchmarks**	Accuracy/precision	
Graphing	4.18, 5.18	Data interpretation		Real-life applications	3.27, 4.34, 5.35
Linear equations		Data displays construction		Independence/range/fluency	3.28, 4.35, 5.36
Quadratic equations		Central tendency			
		Probabilities			
		Contextual probability			

Materials
Graph paper, colored pencils
Calculators
Walk-a-thon Scenario Handout
Walk-a-thon Donors Handout
Slope Handout
Looking at Equations and Graphs Handout
Walk-a-thon Summary of Results Handout
Walk-a-Thon Learning Objects

Learner Prior Knowledge
Previous practice using t-charts, graphing points and writing equations.

Instructional Activities
Step 1 - Discuss with students their experiences with walk-a-thons. Many of them might have walked in Race for the Cure (breast cancer), Walk for a Cure (diabetes), or another walk-a-thon to raise money for an agency or group. How do these events raise money for a group or cause? There are basically 3 ways: specific donation amount, specific donation plus so much per kilometer or donation per kilometer walked.

Step 2 - With the *Walk-a-thon Scenario* handout create your personal walk-a-thon scenario. Tell who will benefit, the length, when and where it will be held, and why your walk-a-thon supports an important cause. Each student will decide on a walk-a-thon scenario which is meaningful to them. They will decide how long the walk will be (5k, 10k, etc.).

Step 3 – Tell the students that they will be creating a walk-a-thon scenario with 4 donors. Give each donor an imaginary name.

Decide on the type of donation each donor will make (See Step 1). Make sure you have people donating in all three ways. Use the handout *Walk-a-thon Donors*, to record this information. Complete the T-chart showing the relationship between the kilometers walked(x) and the total donation(y) for each donor found on this handout. Write an equation representing the relationship between x and y in each T-chart.

Step 4 - Use the data found on the five T-charts in *Walk-a-thon Donors* Handout 2, to plot the relationship between x (kilometers walked) and y (total donation) for each donor. Label each line with the donor's name and the equation. Make sure that the intervals on the graph are appropriate for all 4 data sets, as the 4 equations will be plotted on the same graph. On a sheet of paper students will write 5 observations about their graphs.

Step 5 - Discuss as a class the observations the students made about their graphs. Be sure the steepness of the graphs is discussed. Talk about the meaning of slope (ratio of rise to run that results in a number that measures the steepness of a line) in mathematics. Show the students the slope formula found on the GED Formula Sheet. Using student data, demonstrate with the students how to find the slope of a line. After several examples with progressively less assistance by the teacher, distribute the *Slope* handout for students to complete. Review together by asking for examples.

Step 6 - Practice finding the y-intercept of each equation. The y-intercept is the point on the y-axis where the line touches or crosses it. Record these numbers on the *Looking at Equations and Graphs* handout. Study the slope-intercept form of a line. Look at several assorted equations and decide if they are in this form. Students will decide if their equations are in the slope-intercept form. Complete the rest of the handout. The students will compare the slope they calculated for each equation (Slope Handout) and the slope indicated by the slope-intercept form of the equation. Discuss their observations. Did their values agree?

Step 7 - Return to the walk-a-thon problem. Ask each student to compile the results of their fundraising if they walk the entire walk, half the route or if they did not walk at all. Each student will have a different answer, so they need to explain why they got the answer they did. *Walk-a-thon Summary of Results* handout can be used to summarize the outcomes.

Step 8 - Students can chose to write a brief paper explaining what they have learned during the walk-a-thon activity or create a poster presentation of their results.

Assessment/Evidence (*based on outcome)*
Student assessment is based on the examination of the student's work and the explanations that go with it. Students will write a short paper explaining what they learned about the slope-intercept formula. They could also choose to create a poster presentation of their results. In addition, exercises from GED materials can be used to demonstrate understanding.

Teacher Reflection/Lesson Evaluation
Not yet completed.

Next Steps
Provide additional practice with slope and slope-intercept formula. Walk-a-Thon Learning Objects will give students additional practice with graphing calculators and fundamental laws of algebra.

Technology Integration

Purposeful/Transparent
Activity is focused on walk-a-thons, the area that students want to know more about.

Contextual
Lesson context (walk-a-thons) is an area students are exposed to in life and will learn skills to use in similar situations.

Building Expertise
Lesson reinforces other algebra lessons and extends student learning to slope and the slope-intercept formula.

Walk-a-thon Scenario

My walk-a-thon will benefit _____.

The walk-a-thon will be _____kilometers long.

This is a description of my walk-a thon:

I selected _____ (the group or person) to receive the money raised from my walk-a-thon for several reasons:

Walk-a-thon Donors

Complete the following sheet for each donor. Remember, each donor's donation should be different. Be sure to use all the types of donations (flat amount, amount per kilometer, and flat amount plus amount per kilometer) when you complete the handout.

Donor 1 _____ Donation_____
Equation: y=

Kilometers walked (x)										
Total donation (y)										

Donor 2 _____ Donation_____
Equation: y=

Kilometers walked (x)										
Total donation (y)										

Donor 3 _____ Donation_____
Equation: y=

Kilometers walked (x)										
Total donation (y)										

Donor 4 _____ Donation_____
Equation: y=

Kilometers walked (x)										
Total donation (y)										

Slope

The **slope** of a line is represented by the ratio of the rise of the line to the run of the line.

The formal formula for this relationship (found on the GED Formula Sheet) is:

$m = (y_2-y_1) / (x_2-x_1)$ where (x_1,y_1) and (x_2,y_2) are two points on the equation.

Using 2 points and the slope formula, calculate the slope of each line on your graph.

Equation _____

Point 1 (x, y) _____

Point 2 (x, y) _____

Slope = _____

Equation _____

Point 1 (x, y) _____

Point 2 (x, y) _____

Slope = _____

Equation _____

Point 1 (x, y) _____

Point 2 (x, y) _____

Slope = _____

Equation _____

Point 1 (x, y) _____

Point 2 (x, y) _____

Slope = _____

Looking at Equations & Graphs

In algebra, the letter b is commonly used to represent the value of y when x equals zero. This is called the y-intercept. It is the point on the y-axis where the line crosses it.

The letter m is commonly used to represent the slope of the line that results when the equation is graphed.

Write each of your 4 equations on the chart below. Complete the chart for each equation. Use the slope calculated on Handout 3 and the graph to locate each value.

Equation	**y-intercept**	**Slope (m)**

Look at the equation: **y = m x + b**

This equation is written in the slope-intercept form. Evaluate the Equations. Are they in the slope-intercept form? Complete the chart below.

Equation	**Slope-intercept form Yes or No**	**m**	**b**

Walk-a-thon Summary of Results

Summarize the results of your walk-a-thon on the following chart and answer the questions at the bottom of the page.

Name of Walker	Walked Entire Walk	Walked Half the Walk	Sick – Didn't Walk at All

1. How much will you earn if you walk the entire race?

2. How much will you earn if you walk half the race?

3. Is this amount exactly half of what you would earn if you walked the entire race? Why or why not?

4. How much will you earn if you get sick and do not walk in the race at all?

5. How does this amount compare to the amounts earned in each of the other situations?

6. If you are asks to sponsor a walker in a walk-a-thon, what kind of donation will you make? Why?

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Slope and Intercept on Graphing Calculators
Author: Ron Keys
School: Chippewa Valley Technical College
Description: The learner reads directions for finding the slope, intercept, and correlation coefficient for a group of ordered pairs using one of eight different scientific calculators.
http://www.wisc-online.com/objects/index_tj.asp?objID=TP1602

Fundamental Laws of Algebra
Author: Douglas Jensen & Allen Reed
School: Northeast Wisconsin Technical College
Description: Learners review the fundamental laws of algebra including the commutative law of addition, the commutative law of multiplication, the associative law of addition, the associative law of multiplication, and the distributive law. Examples are given.
http://www.wisc-online.com/objects/index_tj.asp?objID=GEM704