Analyzing Graphs and Tables

By: Paul Bodkin

7th Grade

5 Day Unit

Tools Used:
- Graphing Calculator (TI-83 or TI-84)
- CBR 2™ Sonic Motion Detector
- Graphing Calculator Overhead Unit
- Rulers and Meter Sticks
• Understand that variables in a situation are those quantities that change, such as time, temperature, feelings, distance traveled, and speed.
• Create tables and graphs that describe the patterns of change.
• Understand the relationships among forms of representation- words, tables, and graphs.
• Make decisions using tables and graphs.
• Use a graphing calculator for making tables and graphs to find information about a situation.
• Use a graphing calculator to analyze and compare tables and graphs.
• Collect data from an experiment and then make a table and a graph to organize and represent the data.
• Search for explanations for patterns and variations in data.
• Interpret information given in a graph.
• Make sense of data given in the form of a table or a graph.
• Read a narrative of a situation that changes over time and make a table and graph to represent these changes.
• Read data given in a table and make a graph from the table.
• Read data given in a graph and make a table from the graph.
• Compare tables, graphs, and narratives and understand the advantages and disadvantages of each form of representation.
• Understand the relationship between time and distance.
• Represent information regarding rates in tables and graphs and to use tables and graphs to compare rates.

NEW YORK STATE STANDARDS ADDRESSED IN THE UNIT
Problem Solving Strand

7.PS.1 Use a variety of strategies to understand new mathematical content and to develop more efficient methods

7.PS.4 Observe patterns and formulate generalizations

7.PS.5 Make conjectures from generalizations

7.PS.6 Represent problem situations verbally, numerically, algebraically, and graphically

7.PS.14 Determine information required to solve the problem

7.PS.15 Choose methods for obtaining required information

Reasoning and Proof Strand

7.RP.2 Use mathematical strategies to reach a conclusion

7.RP.3 Evaluate conjectures by distinguishing relevant from irrelevant information to reach a conclusion or make appropriate estimates

Communication Strand

7.CM.1 Provide a correct, complete, coherent, and clear rationale for thought process used in problem solving

7.CM.3 Organize and accurately label work

7.CM.4 Share organized mathematical ideas through the manipulation of objects, numerical tables, drawings, pictures, charts, graphs, tables, diagrams, models and symbols in written and verbal form

7.CM.6 Analyze mathematical solutions shared by others

7.CM.7 Compare strategies used and solutions found by others in relation to their own work

Connections Strand

7.CN.1 Understand and make connections among multiple representations of the same mathematical idea

7.CN.3 Connect and apply a variety of strategies to solve problems
7.CN.6 Recognize and provide examples of the presence of mathematics in their daily lives

7.CN.7 Apply mathematical ideas to problem situations that develop outside of mathematics

7.CN.9 Recognize and apply mathematics to other disciplines, areas of interest, and societal issues

7.CM.9 Increase their use of mathematical vocabulary and language when communicating with others

7.CM.10 Use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and rationale

**Representation Strand**

7.R.1 Use physical objects, drawings, charts, tables, graphs, symbols, equations, or objects created using technology as representations

7.R.2 Explain, describe, and defend mathematical ideas using representations

7.R.3 Recognize, compare, and use an array of representational forms

7.R.4 Explain how different representations express the same relationship

7.R.6 Use representations to explore problem situations

7.R.11 Use mathematics to show and understand mathematical phenomena (e.g., use tables, graphs, and equations to show a pattern underlying a function)

**Algebra Strand**

7.A.8 Create algebraic patterns using charts/tables, graphs, equations, and expressions

**Statistics and Probability Strand**
7.S.6  Read and interpret data represented graphically (pictograph, bar graph, histogram, line graph, double line/bar graphs or circle graph)

7.S.10  Predict the outcome of an experiment

**Algebra Strand**

8.A.3  Describe a situation involving relationships that matches a given graph

8.A.4  Create a graph given a description or an expression for a situation involving a linear or nonlinear relationship

**NCTM STANDARDS ADDRESSED IN THE UNIT**

**Content Standards**

Algebra
**Process Standards**

Problem Solving

Reasoning and Proof

Communication

Connections

Representation

**DESCRIPTION OF RESOURCES USED FOR THE UNIT**

Connected Mathematics Unit
Textbook: Variables and Patterns
Publisher: Pearson Prentice Hall
NUMB3RS Activity: How tall is the criminal?
Episode: “Judgment Day”
2005 Texas Instruments Incorporated
http://education.ti.com/go/NUMB3RS

Getting Started with the CBR 2™ Sonic Motion Detector
2004 Texas Instruments Incorporated
Activity 1 – Graphing your motion
Pages used: 11-13

Mathematics in Context
Textbook: Ups and Downs
Activity: Differences in Growth
Publisher: Encyclopedia Britannica Educational Cooperation
Authors: National Center for Research in Mathematical Sciences Educational Staff at the University of Wisconsin-Madison
Copyright Date: 1998
Page used: 13

MATERIALS AND EQUIPMENT NEEDED

- Graphing Calculators (TI-83 or TI-84) with appropriate motion detector connection cords
- CBR 2™ Sonic Motion Detector
- Graphing Calculator Overhead Unit
OVERVIEW OF THE UNIT

Situations that change are apart of everyone’s life. Some situations change in a predictable pattern. Others change in ways that seem beyond out ability to anticipate. It is human nature to want
to analyze, anticipate, and predict why things change. Learning to observe, describe, and record changes is the first step in analyzing and searching for patterns in real-world situations.

This unit develops students’ ability to explore a variety of situations in which changes occur and analyze tables and graphs using a variety of tools.

The relationship between two variables—in particular, the way in which one variable changes in relation to another—is an important idea in mathematics. This unit develops methods for representing these relationships and patterns of change. Verbal descriptions, tables, and graphs are the central representations in this unit. Each representation has its advantages and disadvantages in promoting understanding of relationships and patterns of change.

### Day 1

Students conduct a jumping jack experiment to explore what happens to a person’s ability to perform (endurance) after exerting energy over a period of time. Students will record their data and then analyze it.

### Day 2

Students graph their jumping jack data into their graphing calculator. As they graph their jumping jack data, students learn about variables, coordinate axes, and plotting data points. They then begin to make interpretations from their graphs. Students will input the data into the graphing calculator and create a graph.
DAY 1

Topic: Jumping Jack Experiment (collecting data and analyzing table and line graphs)- a Connected Mathematics Lesson

Objective:
- Collect data from an experiment and then make a table and a graph to organize and represent the data.
- Search for explanations for patterns and variations in data.
- Understand that a variable is a quantity that changes and to recognize variables in real world.

Day 3

Students will complete an activity in which they measure their femur length and create a scatterplot using the class femur length data. Students will use a graphing calculator to create the scatterplot. They will analyze the data to make predictions and conjectures.

Day 4

Students will do an activity in which they use a motion detector to investigate distance and time in line graphs. Students will analyze their graphs that they created on a graphing calculator.

Day 5

Students learn to examine data and create summary reports, tables, and graphs that show relationships. The advantages and disadvantages of using verbal descriptions, tables, or graphs to represent a situation are explored. Students understand the relationships among
• Understand that in order to make a graph that shows the relationship between two variables, you need to identify the two variables, choose an axis for each and select an appropriate scale for each axis.
• Interpret information given in a graph

Materials:
• Graphing Calculators
• Timers
• Grid paper
• Rulers

Procedures

1. Discuss with students how many jumping jacks they think they could do in 2 minutes. Have students begin thinking about how the rate they are doing the jumping jacks would change over the course of the experiment as well as what would affect their jumping jack rate.
2. Have students conduct a jumping jack experiment. Students should work in groups of 4. Each member will do one of the following jobs: a jumper (does the jumping jacks), a timer (keeps track of the time), a counter (counts the jumping jacks), and a recorder (writes down the number of jumping jacks). Students can decide as a group who does what or the teacher can assign roles.
3. Have the students record their jumping jacks on the table provided (Worksheet 1) every 10 seconds up to a total time of 2 minutes (120 seconds).
4. Here’s how to do the experiment: When the timer says “go”, the jumper begins doing jumping jacks. The counter counts the jumping jacks out loud. Every 10 seconds, the timer says “time” and the recorder records the total number of jumping jacks the jumper has done so far. The experiment can be repeated if other group member what to take a turn jumping and if time allow. Repeat the experiment four times so that everyone has a turn at each of the four tasks.
5. At the conclusion of the lesson, as a summary have groups share their results.

Homework

Connected Mathematics- Variables and Patterns: ACE question #5 on page 14

Name__________________________________  Worksheet 1

Jumping Jack Experiment

This experiment requires four people:
• a jumper (does the jumping jacks)
• a timer (keeps track of the time)
• a counter (counts the jumping jacks)
• a recorder (writes down the number of jumping jacks)
As a group, decide who will do each task.

Here’s how to do the experiment: When the timer says “go”, the jumper begins doing jumping jacks. The counter counts the jumping jacks out loud. Every 10 seconds, the timer says “time” and the recorder records the total number of jumping jacks the jumper has done so far.

1. Record your total number of jumping jacks after each 10 seconds, up to a total time of 2 minutes (120 seconds) in the table below:

<table>
<thead>
<tr>
<th>Day 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will complete an activity in which they measure their femur length and create a scatterplot using the class femur length data. Students will use a graphing calculator to create the scatterplot. They will analyze the data to make predictions and conjectures.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will do an activity in which they use a motion detector to investigate distance and time in line graphs. Students will analyze there graphs that they created on a graphing calculator.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students learn to examine data and create summary reports, tables, and graphs that show relationships. The advantages and disadvantages of using verbal descriptions, tables, or graphs to represent a situation are explored. Students understand the relationships among these representations and move freely among them.</td>
</tr>
</tbody>
</table>
Objective:
• Collect data from an experiment and then make a table and a graph to organize and represent the data.
• Search for explanations for patterns and variations in data.
• Understand that a variable is a quantity that changes and to recognize variables in real world.
• Understand that in order to make a graph that shows the relationship between two variables, you need to identify the two variables, choose an axis for each and select an appropriate scale for each axis.
• Interpret information given in a graph

Materials:
• Graphing Calculators
• Timers
• Grid paper
• Rulers

Procedures
1. Discuss with students how many jumping jacks they think they could do in 2 minutes. Have students begin thinking about how the rate they are doing the jumping jacks would change over the course of the experiment as well as what would affect their jumping jack rate.
2. Have students conduct a jumping jack experiment. Students should work in groups of 4. Each member will do one of the following jobs: a jumper (does the jumping jacks), a timer (keeps track of the time), a counter (counts the jumping jacks), and a recorder (writes down the number of jumping jacks). Students can decide as a group who does what or the teacher can assign roles.
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5. At the conclusion of the lesson, as a summary have groups share their results.

Homework

Connected Mathematics- Variables and Patterns: ACE question #5 on page 14

Name__________________________________

Worksheet 1

Jumping Jack Experiment
This experiment requires four people:
- a jumper (does the jumping jacks)
- a timer (keeps track of the time)
- a counter (counts the jumping jacks)
- a recorder (writes down the number of jumping jacks)

As a group, decide who will do each task.

Here’s how to do the experiment: When the timer says “go”, the jumper begins doing jumping jacks. The counter counts the jumping jacks out loud. Every 10 seconds, the timer says “time” and the recorder records the total number of jumping jacks the jumper has done so far.

1. Record your total number of jumping jacks after each 10 seconds, up to a total time of 2 minutes (120 seconds) in the table below:

<table>
<thead>
<tr>
<th>Time (seconds)</th>
<th>0</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
<th>110</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jumping Jack Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use your table to answer the following questions:

1. How did the jumping jack rate (the number of jumping jacks per second) change as time passed?

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________.

2. How is this change shown in your table?

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________.

3. Explain and give reasons why your jumping jack rate might change over time.

________________________________________________________________________________

________________________________________________________________________________
4. During which 10-second intervals did you do the least number of jumping jacks? How can you tell from the table?

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

5. During which 10-second intervals did you do the most number of jumping jacks? How can you tell from the table?

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

ANSWERS TO WORKSHEET 1

Tables will vary.

1. The jumping jack rate will vary. If students got tired during the experiment the rate would slow down. If students saved their energy the rate may have increased.
2. A slower rate may be shown when the numbers increase less and less or decrease between intervals. A faster rate may be shown when the jumping jacks increase more and more between intervals.

3. Rate my change is you get tired, get a cramp, or save your energy.

4. Answers will vary.

5. Answers will vary.

DAY 2

Topic: Making and Analyzing Graphs - a Connected Mathematics Lesson

Objective:
• Collect data from an experiment and then make a table and a graph to organize and represent the data.
• Search for explanations for patterns and variations in data.
• Understand that a variable is a quantity that changes and to recognize variables in real world.
• Understand that in order to make a graph that shows the relationship between two variables, you need to identify the two variables, choose an axis for each and select an appropriate scale for each axis.
• Interpret information given in a graph

Materials:
• Graphing Calculators
• Normal Grid paper
• Poster grid paper
• Rulers

Procedures

1. Review with students the characteristics of a coordinate graph and how to find points.
2. Explain that a variable is a quantity that changes or varies. In the jumping jack experiment, the number of jumping jacks and time are variables. The previous day, students recorded their data for the variables in a table. Another way to display the data is in a coordinate graph.
3. Have the students input their jumping jack data into a graphing calculator.
4. Have the students follow the steps for inputting the data and creating a line graph in the calculator.
5. Have student input the data into the calculator following these steps:
   a. Press STAT
   b. Press 1 to Edit lists
   c. Make sure L1 and L2 are cleared. Cursor up so that L1 is highlighted. Press CLEAR and then ENTER. Do the same thing for L2.
   d. In L1 input the time data (0, 10, 20, 30, … , 120).
   e. In L2 input the jumping jack totals that correspond to each time.
   f. Have students save this data for tomorrow.
   f. Press 2^{ND} Y= to get to STAT PLOT.
   g. Press 4 and then hit ENTER so that all plots are off.
   h. Go back to STAT PLOT by pressing 2^{ND} Y=.
   i. Press 1.
   j. Highlight ON and press ENTER.
   k. Arrow down to get to Type.
   l. Cursor one to the right so that the middle line graph on the top row is highlighted. Press ENTER.
   m. Cursor down to get to Xlist.
   n. Press 2^{ND} 1 to enter L1 into XList.
   o. Cursor down to get to Ylist.
   p. Press 2^{nd} 2 to enter L2 into Ylist.
   q. Press ZOOM then the number 9 to show the graph.
6. Have students share their graphs using the graphing calculator overhead unit.
7. Have students compare their graphs with their classmates’ graphs.
8. Encourage students to think about how the shape of the line on their graph relates to how they were jumping.
9. Have students complete Worksheet 2.

**Homework**

Connected Mathematics- Variables and Patterns: ACE questions #3-4 and #6-8 on pages 11-15

**Jumping Jack Experiment**

Input your jumping jack data into your calculator and create a line graph.
Sketch your line graph below, labeling your intervals, and then answer the questions.

1. What does your graph show about jumping jack rate as time passes? (Another way to say this is, What does your graph show about the relationship between the number of jumping jacks and time?)

_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

2. If you extended the experiment for another minute how do you think the direction of your line would change? Why?

_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

3. What if during the experiment you got a cramp and had to stop jumping for 10 seconds. How do you think the line would look on your graph for that 10 second interval?

_________________________________________________________________________________
_________________________________________________________________________________
4. Is the relationship you found between the number of jumping jacks and time easier to see in the table or the graph? Explain your answer.

Graphs will vary.
1. As time passes the jumping jack total will usually increase, unless the student doesn’t do any jumping jacks or they stop.

2. Answers will vary. The line will probably go down because you be more tired.

3. Line will be horizontal. There will be no increase when you are stopped.

4. Answers will vary.

**DAY 3**

**Topic:** Scatterplots
**Objective:** Students will create and use a scatterplot to make predictions.

**Materials:**
- Graphing Calculator
- Meter Sticks

**Procedures**

1. Two-dimensional scatterplots are often used to compare two sets of data and to see whether there is any relationship or correlation between the data. These relationships may show a positive correlation, a negative correlation, or no correlation. Give examples of these situations.

**Example**

- An example of two sets with a positive correlation – temperature and the number of air conditioners sold. As the temperature increases, you would expect more air conditioners to be sold. A graph with a positive correlation could look like this:

![Positive Correlation Graph]

- An example of two sets with negative correlation – temperature and the number of heaters sold. As the temperature increases you would expect fewer heaters to be sold. A graph with a negative correlation could look like this:

![Negative Correlation Graph]
• An example of two sets with no correlation – temperature and the number of dishwashers sold. There is no relationship between temperature and number of dishwashers sold. A graph with no correlation could look like this:

2. Introduce the background information for the activity. Tell the students that the activity is based on the television show “NUMB3RS”. Read out loud the introduction (located on the top of the student page):

“Agent Eppes is tracking an unknown criminal. As the criminal was escaping the crime scene, witnesses saw him jump out of a window and land on his side in wet grass. Much of the impression of the criminal is obscured by footprints, but the criminal’s leg from knee to hip was measured to be 47 cm.”
Agent Eppes has taken this information and thinks that there is a relationship between the height of a person compared to the length of his or her femur (the bone in your leg from your hip to your knee). Here is your chance to help.”

In the episode “Judgment Day”, Charlie shows FBI agents a scatterplot of data from their case files in order to quickly see which cases are relevant to their current investigation and which are not. By looking at where and how the data is spread on the graph, Charlie may find a rule of pattern that describes this cluster of data. The scatterplot allow Charlie and the agents to easily see which cases fit the criteria without having to go through each one individually. They can see more than one characteristic of the case based on where it lies.

2. Have students measure your leg from the center of your kneecap to the bone on the outside of your hip. Record this length and your own height in the table. Fill in the table with similar measurements from the classmates.

3. Have students plot the data on a scatterplot, using a graphing calculator or by hand.

4. Read over the questions with the students and then have them answer them, referring to the data they collected.

5. Have students share their conjectures.

**Homework**

Connected Mathematics- Variables and Patterns: ACE question #1 and 2 on pages 10-11
**NUMB3RS Activity: How tall is the Criminal?**

“Agent Eppes is tracking an unknown criminal. As the criminal was escaping the crime scene, witnesses saw him jump out of a window and land on his side in wet grass. Much of the impression of the criminal is obscured by footprints, but the criminal’s leg from knee to hip was measured to be 47 cm.

Agent Eppes has taken this information and thinks that there is a relationship between the height of a person compared to the length of his or her femur (the bone in your leg from your hip to your knee). Here is your chance to help.”

**Step 1:** Measure your leg from the center of your kneecap to the bone on the outside of your hip. Record this length and your own height in the table below. Fill in the table with similar measurements from your classmates. Use the chart below to record your data.

| Femur Length (cm) | | | | | |
|-------------------|---|---|---|---|
| Height (cm)       | | | | |

**Step 2:** Plot the data on a scatterplot, using a graphing calculator. Draw your graph below.
1. Describe the pattern you see in the scatterplot. Explain the relationship.
________________________________________________________________________________
________________________________________________________________________________

2. Based on the data, what is your estimate for the height of the criminal?
________________________________________________________________________________
________________________________________________________________________________

3. Anthropologists have developed a formula to determine the height from the femur length. In cm, a man’s height is given as $2.59(\text{femur length}) + 66.4$. Use this formula to determine the height of the escaping criminal and compare it to the height that you found in #2.
________________________________________________________________________________
________________________________________________________________________________

4. What might explain the difference in the height that you found using the scatterplot and the height you found using the formula?
________________________________________________________________________________
________________________________________________________________________________
1. Describe the pattern you see in the scatterplot. Explain the relationship.

**Answers will vary; positive**

2. Based on the data, what is your estimate for the height of the criminal?

**Answers will vary; should be around 190 cm**

3. Anthropologists have developed a formula to determine the height from the femur length. In cm, a man’s height is given as $2.59(\text{femur length}) + 66.4$. Use this formula to determine the height of the escaping criminal and compare it to the height that you found in #2.

**188.13 cm; this may be more or less than the height they found.**

4. What might explain the difference in the height that you found using the scatterplot and the height you found using the formula?

**Using the scatterplot, the student must estimate where to put the point. There are many places that make sense on the graph. The formula only gives one answer. Also, the class may not be a good representation of the population.**
Topic: Graphing your Motion

Objective:
• use a motion detector to measure distance and velocity
• produce graphs of your motion
• analyze the graphs you produce

Materials:
• CBR 2™ motion detectors
• Graphing Calculators
• Cable to connect calculator to detector (either I/O unit-to-unit cable (TI-83) or a Standard-B to Mini-A USB cable (TI-84)
• Meter Sticks
• Centimeter rulers
• Masking tape

Procedures

1. Explain to students that graphs made using a motion detector can be used to study motion. In this experiment, you will use a CBR 2™ motion detector to make graphs of your own motion.

2. Place a motion detector on a tabletop facing an area free of furniture and other objects. The motion detector should be at a height of about 15 centimeters above your waist level.

2. Use short strips of masking tape on the floor to mark the 1-m, 2-m, 3-m, and 4-m distances from the motion detector.

3. Connect the motion detector to the calculator using an appropriate cable and firmly press in the cable ends.

4. On the calculator, press APPS and select EasyData to launch the EasyData App.
5. To set up the calculator for data collection:
   a. Select Setup (press WINDOW) to open the Setup menu.
   b. Press 2 to select 2: Time Graph to open the Time Graph Settings screen.
   c. Select Edit (press ZOOM) to open the Sample Interval dialog window.
   d. Enter 0.1 to set the time between samples to 1/10 second.
   e. Select Next (press ZOOM) to advance to the Number of Samples dialog window.
   f. Enter 50 to set the number of samples to collect.

   The experiment length will be 5 seconds (number of samples multiplied by the sample interval).

   g. Select Next (press ZOOM) to display a summary of the new settings.
   h. Select OK (press GRAPH) to return to the main screen.

6. Explore making distance vs. time graphs. Model the procedure in front of the class first.
   a. Stand at the 1.0-m mark, facing away from the motion detector.
   b. Signal your partner to select Start (press WINDOW).
   c. Slowly walk to the 2.5-m mark and stop.
   d. When data collection ends, a graph plot is displayed.
   e. Sketch your graph on the empty graph provided.

   f. Select Main to return to the main screen.

7. Repeat Step 6, this time standing on the 2.5-m mark and walk towards the 1.0-m mark. One time walking slowly, and again walking more quickly.
8. Describe the differences between the graphs.

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

9. Repeat Step 6, while standing still on the 2.5-m mark.

10. Sketch your new plot below.

11. How is this graph different from the other ones?

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

12. Explain how the speed you walk is related to how the line looks.

_______________________________________________________________________________

DAY 5
**Topic:** Exploring Differences in Growth by analyzing graphs, tables, and reports

**Objective:**
- analyze line graphs, tables, and reports of plant growth.
- Use a given representation (graph, table, and/or report) to match up/or create a line graph, table, and/or report.

**Materials:**
- Graphing Calculators
- Poster grid paper
- Grid paper
- markers
- Rulers

**Procedures**

1. Explain the problem to the students.

Roxanne, Jamal, Leslie, and Ada did a group project on sunflower growth for their biology class. They investigated how different growing conditions affect plant growth. Each student chose a different growing condition.

The students started their experiment with plants that were 10 centimeters tall. They collected data every week for five weeks. At the end of the five weeks, they were supposed to write a group report that would include a table, a graph, and a story for each of the four growing conditions.

Unfortunately, when the students put their work together, the pages were scattered and some were lost. The student page shows the tables, graphs, and written reports that were left.

2. Have students work in pair or small groups to find which table, graph, and written report belong to each student. Have groups create the missing tables, graphs, and reports.

3. Have groups transfer their findings and creations onto poster grid paper for presentation.

4. Have groups present and explain their work.

*A graphing calculator is optional if students want to input data and create graphs.

**Homework**

Connected Mathematics- Variables and Patterns: ACE questions #5 on page 29 and #11 on page 33
<table>
<thead>
<tr>
<th>Time (weeks)</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (cm)</td>
<td>10</td>
<td>12.5</td>
<td>17.5</td>
<td>25</td>
<td>35</td>
<td>47.5</td>
</tr>
</tbody>
</table>

I put my plant in poor soil and didn’t give it much water. It did grow a bit, but every week less and less.

I treated my sunflower very well. It had sun, good soil, and I even talked to it. Every week it grew more than the previous weeks.

I planted my sunflower in a shady place. The plant did grow, but not so fast. The length increased every week by equal amounts.
• Written description F
• Line Graph G
• Create table where the height slowly increases by equal amounts each day

**Jamal**

• Written description C
• Table A
• Create line that shows an increase where the line gets steeper each day.

**Leslie**

• Written description B
• Line graph D
• Create a table that has increasing height values but each day increasing less

**Ada**

• Table E
• Line graph with a horizontal line at y = 10.
• Written description that tells how the plant didn’t grow at all.