# Gulf Oil Spill: Rate of Absorption

**Text: CORD**
**Volume: _____ Chapter: _____**
**Unit number:** 16 **Title of unit:** Solving problems that involve linear equations.
**Developed by:** Jeannita Milton
**Date:** June 28, 2012

## 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):**

| |
|---|
| Students will measure and graph the absorption of oil by paper towels. They will increase the thickness of the paper towels and determine whether the thickness affects the rate of absorption. Students will make an inference about the materials needed to clean up the Gulf Oil Spill of 2010. |

# Gulf Oil Spill: Rate of Absorption

## LAB PLAN

**TEACHER:**

- **Lab Objective**
  Students will be able to determine whether the thickness of the absorbing material determines the rate of absorption.
  Students will be able to make an inference about the materials needed to clean up the Gulf Oil Spill of 2010
- **Statement of prerequisite skills needed**
  - Measure the diameter of a circle
  - Graph data collected
  - Collect data in a T-chart
  - Compare data
  - Have worked with linear equations
- **Vocabulary**
  - Diameter, graphing coordinates, t-chart, linear equations, and absorbency

- **Other Resources:**

- **http://www.cnbc.com/id/37593652/17_Ways_To_Clean_Up_The_Gulf_Oil_Spill?slide=1**
- **http://www.cbsnews.com/8301-505123_162-34244288/seven-technologies-used-to-clean-the-gulf-oil-spill/**
- **http://en.wikipedia.org/wiki/Deepwater_Horizon_oil_spill**

- **State Standards addressed:**
  **Math:** A1.1.B Solve problems that can be represented by linear functions, equations, and inequalities (P)
  **Reading:** (Reading)
  **Writing:** (Writing)
  **Leadership:** Students will be working in groups to complete the lab, graph data, and make inferences.

- **Teacher Preparation:**
  - Materials:
    - Paper Towels
    - Water droppers
    - Vegetable oil
    - Rulers
    - Pencils
    - Markers
    - Attached recording sheet
  - Set-Up Required:
    - Separate paper towels and stack
    - Pour vegetable oil into smaller cups (one per group)
    - Place pencils, markers, rulers, and recording sheet on table

- **Lab Organizational Strategies:**
  - Grouping/Leadership/Presentation Opportunities: Students will be divided into pairs and will share responsibilities during the lab.
  - Cooperative Learning: Students must work together to complete the lab but are responsible for each turning in their own sheet.
  - Expectations: Students will stay on task during the activity and will support each other to help each other complete the activity.
  - Time-line: The lab will take 45-55 minutes.

- **Post Lab Follow-Up/Conclusions** *(to be covered after student completes lab)*
  - Discuss real world application of learning from lab:
    - This lab has the students investigate current events connects classroom learning to these events.
    - Students discuss the impact of current events
    - Students use mathematical concepts in a meaningful way in the context of current social situations
  - Career Applications:
  - Optional or Extension Activities:
    - Discussing the impacts of the chemical dispersants
    - Oil skimmers effectiveness versus the amount of oil
    - Inventing and building a machine that will help to clean up oil spills more effectively

- Students can do additional investigation into the cause of the explosion and how it could have been prevented.

# Gulf Oil Spill: Rate of Absorption Lab

Name _____ Date _____

**Objectives**:

a. You will be able to determine whether the thickness of the absorbing material determines the rate of absorption.
b. Students will be able to graph the data collected and make an inference about the materials needed for cleaning up oil spills.

**Procedure:**

**1)** Pair up with a partner
**2)** Collect materials from the back table
    **a.** You will need
        **i.** 6 paper towels
        **ii.** 1 dropper
        **iii.** 1 cup of oil
        **iv.** 1 marker
        **v.** 2 recording sheets
        **vi.** 1 ruler
**3)** Fold all paper towels so that they are divided into six equal squares.
**4)** Label each square with your marker 1-6
**5)** In the first square use the dropper to place one drop of oil in the middle of the square
**6)** Use the ruler to measure in centimeters the diameter of the circle the oil creates
**7)** Record your data in your table (found on your recording sheet)
**8)** In the second square, use your dropper to place two drops of oil
**9)** Measure the diameter of the circle
**10)** Record data in your table
**11)** Repeat steps eight through ten for each of the six squares.
**12)** Stack two paper towels on top of each other and repeat steps three through eleven placing your data in the second table.
**13)** Stack three paper towels on top of each other and repeat the activity again, placing your data in the third table
**14)** Once you have all three tables filled in, write an equation to express the data for each of the tables.
**15)** Graph the collected data using the x-axis as the number of drops and the y-axis as the circumference of the circle.
**16)** Label graph and give it a title
**17)** Compare the lines
    **a.** What do you notice?
    **b.** Are they the same?
    **c.** What is different?
18) Complete the questions and summary at the end of the sheet. Be sure to use complete sentences.

**Rubric for Gulf Oil Spill: Rate of Absorption**

**Name** _____ **Date** _____

| Criteria | Meeting | Approaching | Below |
|---|---|---|---|
| Completed Tables | Tables are completed and accurate | Tables are missing some data or are inaccurate | Tables are missing many pieces of data |
| Graph | Graph contains all three lines and each line is labeled clearly | Graph is not labeled clearly or is missing one line | Graph is messy, not labeled, or is missing two lines |
| Graph Labels & Title | Graph is labeled at the x and y axis and has a title | Graph is missing either a title or the x and y axis are not labeled | Graph is missing both a title and labels for the x and y axis |
| Equations | All three equations are present and accurate | One equation is missing or one or more is inaccurate | Two or more equations are missing and two or more are inaccurate |
| Summary & Questions | Answers are in complete sentences and responses show thought and clarity in ideas | Answers are present but are not in complete sentences or responses lack deep thought or clarity | Answers are missing and are not in complete sentences. |

**Gulf Oil Spill: Rate of Absorption**

Name _____ Date _____

Student Recording Sheet

One Paper Towel

| | |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Two Paper Towels

| | |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Three Paper Towels

| | |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |

1) What is your equations for one paper towel? _____

2) What is your equation for two paper towels? _____

3) What is your equation for three paper towels? _____

4) What did you notice about the lines on the graph? _____

_____

_____

5) Were the lines the same or different? Why? _____

_____

_____

6) What can you infer about the materials needed to clean up an oil spill based on your data?

_____

_____

_____

7) Summarize today's activity. Tell me what you did and what you thought.