



MIDDLE AGES - *Drawbridge Design*

LESSON PLAN

Objectives:

Students will draw scatterplots and analyze data from operating a drawbridge. After completing this lesson students will be able to:

- collect data within given parameters.
- draw a scatterplot from their data.
- draw a trend line that best describes the data.
- describe the correlation between variables.

Course / Grade Level:

Pre-Algebra / Algebra

Pre-Activities:

- Discuss with students selecting a range and scale for drawing a scatterplot.
- Discuss positive, negative, and no correlation.

Activity Procedure:

1. Read information about drawbridge operation from the Teacher's Guide or have students listen to the audio description of the simulation.
2. Make a copy of the *Drawbridge Worksheet* (found on the next page) for each student.
3. Have the students do the *Drawbridge Design* activity and fill in the worksheet. On the worksheet, students will select a wheel radius (4 feet or 6 feet) and force applied (1-2 adults or 1-2 youths or any combination of the adults and youths). Once these parameters are set the students can begin selecting counter weights of their choice. The students will record their findings for working counterweights in a data table.

4. Once they have found 10 working counterweights (these may be in non-optimal time) they will construct a scatterplot and decide if there is a correlation or not. Since the objective of the simulation is to find an optimal time, the students will need to decide whether this can be obtained by continuing to select different counter weights or make changes in the wheel radius or force applied. If the latter is true, the students should begin the activity again using these changes.

Discussion / Questions:

Questions for the students are provided on the worksheet.

Extensions:

- This activity may be used with other activities within the *Time Engineers* game.

Pyramid Building: Students can compare data collected comparing ramp length and number of workers needed to build a level of a pyramid. NOTE: They do not need to create a Data Table to record their data since a summary of their selections is provided by selecting the REPORT button.

Crop Irrigation: Students can compare data collected comparing channel width and weir height needed to irrigate the Pharaoh's crops.

