

Integrated Lesson Plan

Instructor: **Charles Kessler**

Program: Agricultural Mechanics

Unit: **Concrete and Masonry**

Lesson Title: **Determining the proper cement: water ratio for quality concrete.**

Terminal Objective:

The student will be able to predict with 85% accuracy the effect that different cement: water ratios will have on the quality of the concrete.

Enabling Objectives:

1. The student will be able to predict with 85% accuracy to calculate the amount of water and cement needed to produce the proper concrete mix.
2. The student will be able to mix properly with 85% accuracy the proper concrete mix.
3. The student will be able to predict with 85% accuracy compare and report to the class their findings.

Related PA Academic Standards:

Reading, Writing, Speaking and Listening

Standards completed during this lesson

1.4.11.B, 1.6.11.C, 1.6.11.E

Mathematics

Standards completed during this lesson

2.5.11.D, 2.8.11.A

Introduction:

The lesson will begin with the students guessing the compressive strengths of 3 concrete samples. The class will use the hydraulic press to test the concrete samples. Results of the samples and the cement to water ratio will be given at the completion of the students results. The class will speculate what the differences in the mix was.

Body/Main Content:

1. Each group of 3 students will be assigned to mix 4 samples of concrete in 4 - 4" PVC tubes with the following cement: water ratios (information on amounts needed or how to be calculated will be given according to class abilities) .4:1 .5:1 .6:1 .7:1
2. The students will need calculate the amount of water, sand, stone, and cement needed to fill the tubes.
3. The students will use the scientific method to hypothesize and conduct their experiment.
4. The students will mix the concrete for each ratio, pour and settle in each tube and identify the tube.

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5. After curing the samples for 7 days in a bucket of water, the groups will remove the PVC pipe from the sample.
6. The groups will use the hydraulic press to test each sample.
7. The groups will need to convert the pressure of the press to pounds per square inch of each sample.
8. The groups need to Complete a graph with their results and develop a report.
9. Each group will report their findings with a chart to the remainder of the class.

Summary:

The class will discuss the results and compare to their predictions. A class graph will be completed and compared to their reference materials.

Materials Needed:

Cement, water, stone, sand, cans, 1/2" PVC tubes, trowels, hydraulic press, safety glasses, scales,

Evaluation:

Group report and graph
Unit test and quizzes.