

C3 Project Title: How Much Green in the Machine?

Team: Lonnie Harwell and Margie BradyLong

Industry Sector: Auto Pathway: Auto CCSS Math Unit: Linear Systems

Description of Final Student Product: Students will adjust the coolant in a car. They will drain an anti-freeze/water solution of unknown proportions, and replace some of it with 100% antifreeze to make a 70% solution.

How does the student demonstrate or document evidence of:

CCSS (Content)

Standard: A-REI 5 Solve a system of linear equations approximately.

Evidence: Student will make approximately 70% solution.

Standard: A-REI 6 Solve a system of linear equations by graphing and elimination.

Evidence: Students will solve raw math system/mixture problems in multiple ways.

CCSS (Practices)

Standard: 1. Make sense of Problems and Persevere in solving them.

Evidence: Students will struggle and eventually solve the mixture problem.

Standard: 4. Model with mathematics

Evidence: Students will mathematize the mixture problem

CTE

Standard: C 6.2 Maintain, diagnosis, service and repair lubrication and cooling systems.

Evidence: Students will be able to change a 50/50 solution to a 70/30 solution.

Project Outline Part I

Intro: Scenario of being invited by Sid Hansen of the Northwestern to go fishing.

Benchmark 1: Understand Coolant- read label about requirements and freeze different antifreeze mixtures

Estimated time for Benchmark 1: 2 days

Evidence from Students: Draw or write a summary of understanding

Benchmark 2: Students will be given a small (10 oz) 50/50 oil and water mixture, and additional oil to model problem (physically solve problem)

Estimated time for Benchmark 2: 1 block

Evidence from Students: Student will make a 70% solution (visually/trial and error)

Benchmark 3: Students will be given a small (10 oz) 50/50 antifreeze mixture, and additional antifreeze to solve problem

Estimated time for Benchmark 2: 1 block

Evidence from Students: Student will make a 70% solution

Freeze to test. Variety of solution methods will be presented to class.

Benchmark 4: Linear System Unit. Students will use math to solve similar but different antifreeze and other mixture problems in a variety of ways. (Graphing, substitution, linear combination)

Estimated time for Benchmark 2: 4 blocks

Evidence from Students: Student will solve naked math systems of linear equations

Final Product: Students will be given car with unknown mixture and have to change to 70%

Estimated time for Final Product: 2 blocks

Evidence from Students: Student will solve, make and test their 70% solution
(Use hydrometer to test unknown solution and finished solution.)

Project Outline Part II- More Detail

Intro:

Lessons/Activities: Power-point, set up of problem, and allow student to make sense and ask questions/ plan of action to get more information

Roles/Responsibilities: Margie

Benchmark 1:

Lessons/Activities: All about Coolant (freezing)

Roles/Responsibilities: Lonnie

Benchmark 2:

Lessons/Activities: 50/50 Oil and Water

Roles/Responsibilities: Lonnie

Benchmark 3:

Lessons/Activities: 50/50 Antifreeze

Roles/Responsibilities: Margie set up, Lonnie experiment

Benchmark 4:

Lessons/Activities: Linear System Unit

Roles/Responsibilities: Margie

Final Product:

Lessons/Activities: Change mixture in actual car

Roles/Responsibilities: Set up (initial measurements) Lonnie, Math Margie, Experiment and test, Lonnie