

17 – Efficiency & Usefulness

<u>Date</u> : Mar 8	<u>Teacher</u> : Dwayne	<u>Length of Class</u> : 62 min (start: 9:06 & 12:55)
<u>Subject</u> : science		<u>Unit</u> : B Energy flow
<u>Outcome(s)(GLO/SLO)</u> : STS 3.c, d, e, f		<u>Grade</u> : 10
<u>Learning Objectives</u> : (Students Will:) 1) recognize limits of useful energy from an energy conversion, 2) explain efficiency related to energy conversions 3) analyze the efficiency of a system		
<u>Materials</u> : slides, camera, LED, flashlight bulb, battery, voltmeter, ammeter, wires/clips/tape, solar cell		
<u>KSAs</u> : 1, 4, 6,		
<u>Background Information</u> : students have been introduced to concepts of usefulness and efficiency, but no deeper thought or analysis.		
<u>Modifications</u> – What activities/learning tools can be used for the students who need extra help?		
<u>Assessment</u> – 1/2: probing, exit slip? 3: unit review problems (53-55)		

Introduction: (5 mins > 9:11 or 1:00) Review from before easter:

thermodynamics laws (energy is constant in a system, energy flows from hot to cold), systems.

Teach: efficiency/usefulness

Purpose: to revive the brain after easter, and to get ready to create our rude goldberg contraption

→ Assignment 3 (check moodle) – page 234.

* Exit Slip

Body: (Activities/Sponge): (25 mins total > 9:36 or 1:25)

Discuss useful energy as the amount energy that can be used to do some work.

Discuss efficiency as the measurement of the ratio between useful work output and total work input

$e = (\text{useful work out}) / (\text{total work in}) \times 100\% \gg = J/J \times \% \gg \%$

Work through example problems pg 217

Work on problems: 53-55 page 234 (from review assignment 3) (25 min > 10:00 or 1:50)

Closure: (review/Preview) (5 mins > 10:05 or 1:55)

Exit Slip – what is the difference between usefulness and efficiency

Preview: next class you'll be designing a rude goldberg contraption, with a minimum of 4 energy conversions, including at least mechanical and either electric, solar, thermal, or chemical energies.

<i>Up Next?</i> – rude goldberg contraption	End time: 10:06 1:55
<i>Art of Teaching</i> – demonstrate via camera, closure timing.	