Engin 103 February 19, 2009 back to e-syllabus	Topics: Differences between Science & Engineering A design example CW2 Project 1 Logbook questions

Differences between Science and Engineering:

Copy this page and fill in your team response below. Then save as a web page: name "engsci.**html**" and upload to your *files* folder.

Indicate at least one difference between your engineering field (as assigned in Project 0) and a related science subject such as Physics (including mechanics, thermodynamics, electricity and magnetism, static, fluids), Chemistry, Biology, Computer Science. Please try to be specific. Since they are not the same thing, avoid words like "engineering science", or "engineering is a branch of physics". Since they have different missions, avoid comparisons such as one is generally better than the other, etc.

Team #	Difference between Engineering and Science	Rating (1-5)
1	??	
2	BME applies knowledge of science to build as opposed to simply gaining understanding of science concepts.	5
3	Chemists study chemistry, chemical engineers apply chemistry concepts to new products	3
4	Engineering is definitive while science is progressive based on hypothetical theories	3
5	Computer Engineering applies theories from physics and math.	
6	Engineers use known facts to build new devices, Scientists test new theories to come up with new facts	5
7	Science is theoretical—engineering is applied.	3
8	??	
9	Engineering is application, result of science.	3
10	Thermodynamics contributes as only one part of many in a mechanical engineering project	4

Team #	Explain any connection between what you said above and any difference between the outcomes of a science/math homework and an engineering project	Rating (1-5)
1	??	
2	Science/math homework as well as engineering projects advance our understanding of science and math, however the solutions to the former are rigid whereas the solution to an engineering project can be numerous, all of which can be valid solutions to the problem.	5
3	Science is the theory of concepts, and engineering is what the	3

	actual outcome is.	
4	Both engineering and science projects or thesis have to tested and proven correct and the difference is that a science/math homework has laid down principles while an engineering project can be diverse.	4
5	Homework strengthens theoretical skill while a project applies those skills towards a particular purpose or objective.	5
6	In science and math homework you are trying to prove an unknown, in engineering homework you're trying to design something using known information.	5
7	Science/Maths homework would be abstract problems—engineering projects are completing a specific concrete task.	4
8	??	
9	The use of science of math homework gives one the ability to trouble shoot an engineering project.	4
10	The homework only teaches you what you will later need to know to complete an engineering project	4

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A Design Example

Science	Engineering
Theory/General Research Observation/Measurement/Equation	Application/Specific Building and testing

Math/Physics homework	Engin 103 projects
Unique solution	Many solutions

"Peak Performance Competition"

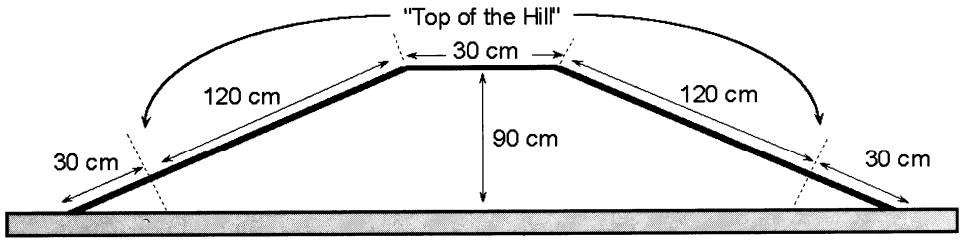


Figure 2.5. Ramp specifications for the Peak Performance Design Competion.

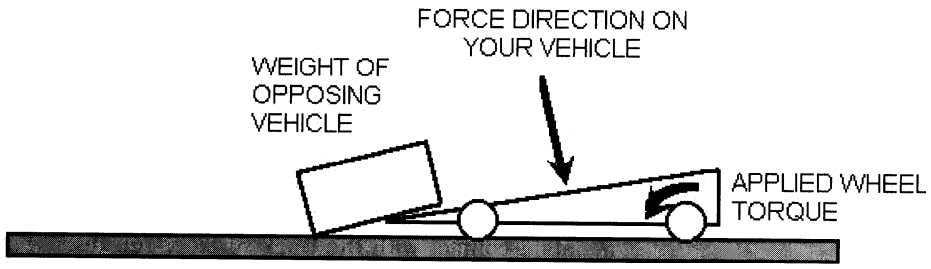
Design Strategies: what to keep in mind? -> Competition rules

-Active defense

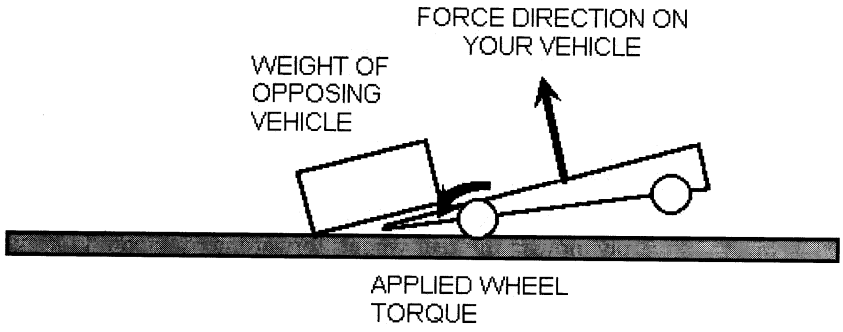
-Passive defense
-Engine location
-Vehicle length

The Design Cycle: building, testing, documenting, modifying, testing,…

REAR WHEEL DRIVE:



FRONT WHEEL DRIVE:



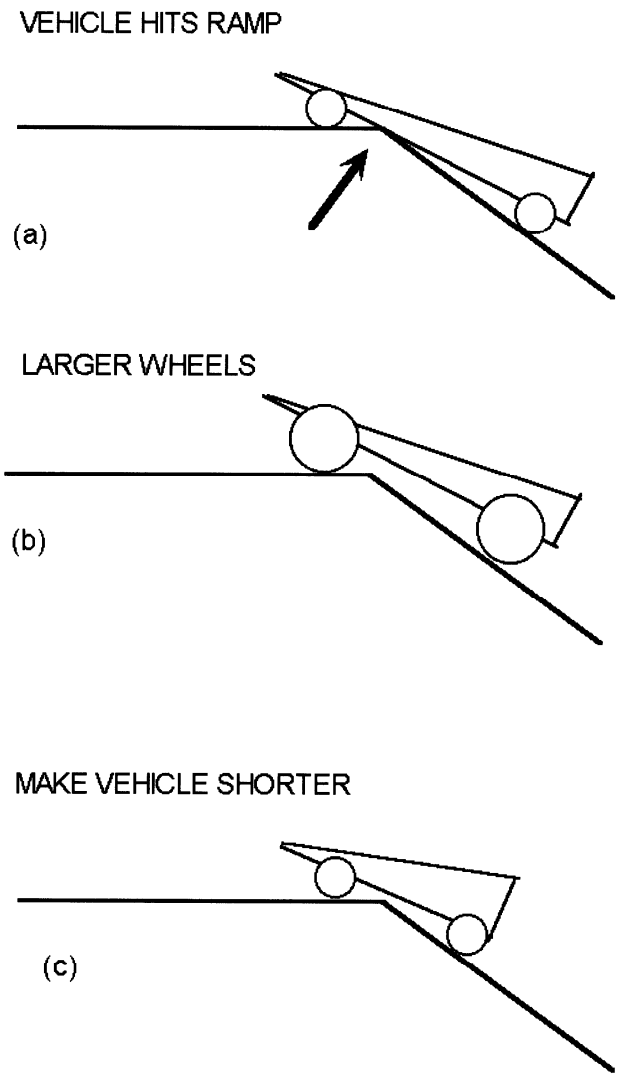


Figure 2.10. Vehicle at the top of the ramp. a) Bottom of vehicle hits the ramp; b) vehicle with larger wheels; c) a shorter vehicle.

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Engineering 103 -UMass Boston

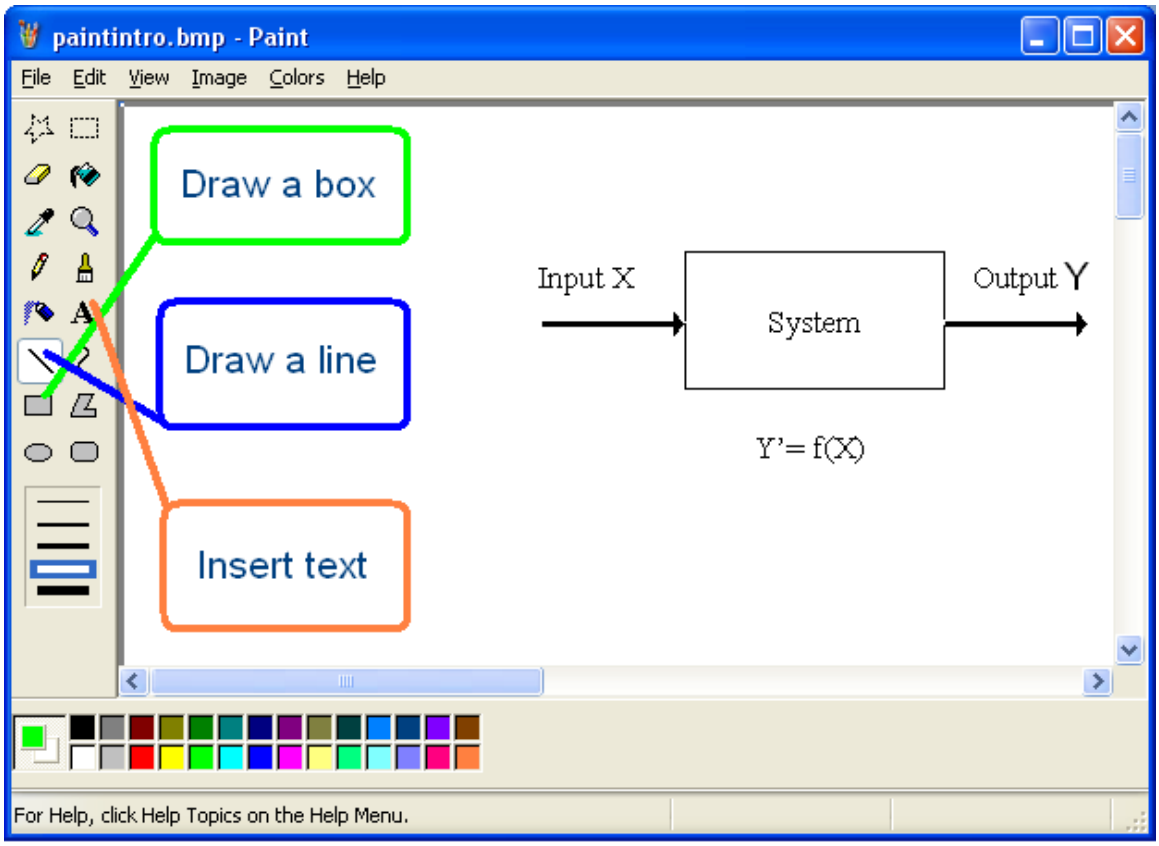
CW 2

(Class Work #2)

1) Why do we have cycles in engineering design? Draw a flow chart with four most important steps in an engineering design cycle.
2) Draw a flow chart for an in-out system. Label the input and output variables as X and Y, respectively, and explain what are they for at least two simple systems based on gravity. Given a value for an input X, is it possible to determine exactly the value of the output, yes or no, explain why.

In each team, students working together at a computer numbered between 1 and 10 will submit

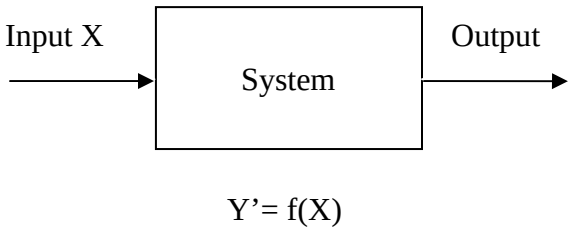
file cw2_XX_a.html and folder cw2_XX_a_files, students working at a computer numbered between 11 and 20 will submit file cw2_XX_b.html and folder cw2_XX_b_files, to the *files* folder in the server. Replace XX by 01 if team 1, etc. Include your names within the files.



Introduction to Project 1

Systems

A system is a physical object that produces a measurable output (Y) for every measurable input (X).



Examples of a system could be a catapult (X=initial height of a weight; Y=range for a clay ball), a pendulum (X=period; Y=length needed to produce that period), or a car on an inclined ramp (X=ramp angle; Y=distance traveled in 2s). When random factors affecting the system are controlled (task of the engineering design team), it can be described with an equation or model, that is, using this model it is possible to predict the output given an input.

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LOGBOOK: example of a logbook page

-Use a quadrille notebook; number all pages; date all entries
-Write your notes for all activities, thoughts, problems and solutions, and learning conclusions related to Engin 103. You should write down progress, outcomes, and conclusions on projects and teamwork; conclusions from class work (including LabVIEW) and homework.
-In addition you should answer in the logbook all questions listed in these notes in blue, as shown below:

13) Explain in your own words at least two main differences between science and engineering, for the field you worked with in Project 0.

14) Write your answer to CW2 here.

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