

Title: Teaching Basic Mechanics of Materials Concepts Through Biomedical Problem Based Learning Case Studies

Objectives : For students to learn concepts such as area moment of inertia for compound sections, modulus of elasticity, and beam deflection. The students are motivated through examples to help babies breathe.

Activity description: Students will be motivated through viewing videos of premature babies. They will learn the concepts of area moment of inertia for rectangular and circular cross sections. They will calculate the area moment of inertia for a single and compound cross-section. Using a beam deflection equation they will experimentally determine the modulus of elasticity of the wood dowels provided. This value will then be used to predict the deflection of a composite beam and compared to the experimental results. Instructions for follow up laboratories using logic breadboards will be provided. The ultimate product is a system to simulate a basic device to determine when a baby stops breathing (apnea) and sound a warning alarm.

Grade levels intended: High School

Time required: 90 Minutes

Equipment and supplies needed: LCD Projector, Screen and Speakers, Outlets

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