Applications of Engineering

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1. **Introduction**
   - Classical dynamics
   - Friction demonstrations
   - Hovercraft demonstration
2. **Ideal gas law**
   - Introduction to the behaviour of the ideal gas
   - Air gun demonstration
3. **Propulsion in air**
   - Introduction to thrust and propellers
   - Make a propeller
4. **Wind Turbines**
   - Derive equations for the power extracted
   - Find the Bertz Limit
   - Make a fan powered by a computer
5. **Electric motors**
   - Introduction to electro-magnetic induction
   - Make a simple motor from AA batteries
6. **Solar panels**
   - How solar panels work
   - Find the open circuit voltage
7. **Engineering stresses and strains**
   - Introduction to Hooke's law
   - Differentiate between plastic and elastic behaviour
   - Demonstrate principals with elastic band gun
8. **Thermodynamics**
   - Demonstrate 1st, 2nd and 3rd laws of thermodynamics
   - Demonstrate thermal heat coefficients with balloon experiment
9. **Nuclear Fission**
   - Introduction to binding energy and half lives
10. **Economics**
    - Show that basis for engineering projects is profit