Activities versus Scientific Inquiry & Engineering Design Examples

Focusing on a Well-defined Question or Problem Makes the Difference!

Exploratory Activities _	→ Scientific Questions &	→ Scientific Inquiry &
	Engineering Problems	Engineering Design
Characteristics: Simple activity or confirmation lab Question or problem not clearly stated in advance Exploration of natural or manmade materials or phenomena Little organized data gathered	 Characteristics: Questions are generated by students or teacher No limit on questions Should be mostly student directed but teachers provide clues 	 Characteristics: Student proposes possible answers to the question or solutions to the problem Includes a design based on important science background knowledge Investigation allows students to collect data that can be analyzed
Water evaporates	SQ: How does temperature affect the speed that water evaporates?	SI: Evaporation is proportionate to temperature.
Make a air-pressure rocket and launch	EP: How can we make a rocket go straight up?	ED: The placement and shape of the rocket's fins affect the stability of the rockets flight.
Magnets can attract metals	SQ: What types of materials can magnets attract or not attract?	SI: Magnets attract metals that contain iron but don't attract materials that lack iron.
Newspaper slows the transfer of heat	EP: How can we efficiently use everyday materials to be used to form effective insulation?	ED: Arranging materials to impede the circulation of air over a particular distance will produce good insulation and use materials efficiently.
Solids dissolve in water	SQ: Which materials dissolve slowly or quickly?	SI: Surface area affects the rates that solids dissolve.
Wind Turbines and how they work	EP: How can wind turbines produce more electrical energy?	ED: The shape and angle of the a turbine's blades affect its efficiency.
Bugs stand on water	SQ: How many drops of water will fit on a penny?	SI: Different substances have different surface tensions.
Plant a seed and watch it grow	EP: How can we maximize plant growth?	ED: The right combination of light, moisture, and nutrients will produce maximum growth with the minimum use of energy and materials.