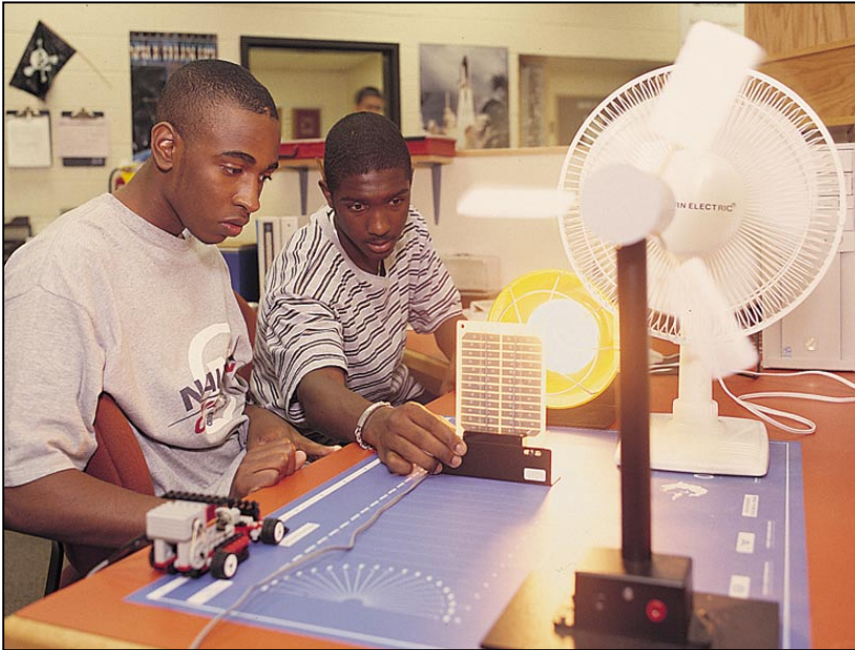


Alternative Energy (40-assignment)



This is an integrated instructional module designed specifically to operate within the LJ ScanTEK Modular Technology Program environment. It includes a 10-assignment exploratory curriculum and a further 30-assignment in-depth curriculum. The exploratory curriculum and the in-depth curriculum are each split into two parts. Each part includes a pre-test and post test. The module includes hardware, software and curriculum materials sufficient to provide a complete learning experience.

The curriculum incorporates continuous assessment through questions. When used in conjunction with a ClassAct networked management system, this provides instant feedback of student performance. The assessments begin with a comprehensive pre-test. This quiz includes questions for each subsequent assignment, together with questions that will specifically test math and reading ability.

Every assignment starts with a series of questions designed to track inventory. These ensure that any missing items are located before they are needed.

Each assignment is divided into a series of tasks. Hands-on tasks form the core of the student work. Where appropriate, these are accompanied by research tasks based upon illustrated text and software applications. Assessment questions are incorporated into each task.

Typical 10-assignment topic areas include:

- Acidity testing of water samples
- Environmental problems
- Transformation of energy
- Fossil fuels
- Potential and kinetic energy
- Testing a solar powered conveyor
- Transducers
- Compressed air powered rocket
- Energy generation from wind
- Hydro-electric power plant
- Geothermal energy
- Investigation of various power sources
- Applications of alternative energy
- Nuclear power production
- Global effects
- Fuel consumption
- Conservation of energy
- Viable alternative resources

Typical 10-assignment activities include:

- Test water samples to determine the amount of acidity.
- Look at pH scale.
- Investigate ways of generating energy.
- Launch a compressed air powered rocket.
- Identify how potential energy is transformed to kinetic energy.
- Research the types of energy.
- Test a solar powered conveyor.
- Relate the speed of the conveyor to the amount of solar energy available.
- Perform an experiment to generate energy from wind.
- Investigate the amount of energy generated by different numbers of wind turbine blades and the importance of the positioning of a turbine for maximum efficiency.
- Use a software program to investigate a hydro-electric power plant.
- Research hydro-electric, geothermal and tidal power systems.

Typical 30-assignment topic areas include:

- Fossil fuels and pollution
- Fuels
- Power generation limits
- Population growth and energy demands
- Air polluting gasses
- Heat, energy, power and work
- Ascent, descent, maximum height and velocities
- Kinetic and Potential Energy
- Tangent of an angle
- Solar energy
- Transformation of energy
- Wind Generator
- Blade angles and area
- Hydro-electric power, dams
- Quantifying environmental impact
- Solving energy problems
- Energy costs
- Nuclear power and hazards
- Radiation, half-life, Isotopes
- The equation $e=mc^2$
- Heat insulation
- Housing and Energy Conservation

Typical 30-assignment activities include:

- Explore different types of energy.
- Evaluate types of fuel used to produce power.
- Extract information to decide on the best type of power plant in a problem solving exercise.
- Investigate the main problems with using fossil fuels and learn of the need for alternative power generation.
- Find out the sources of, and types of pollution.
- Identify different mathematical units used in energy and work calculations.
- Distinguish between power and work.
- Measure the height of a tall building using the altitude indicator and tangent ratio.
- Launch a model rocket, and measure the height of a moving rocket.
- Calculate potential and kinetic energy of the model rocket.
- Analyze data from a NASA flight and make calculations on flight energy transformations.
- Measure the angle the Sun makes with the Earth's surface using the tangent ratio.
- Plot the angle of the Sun against time and make predictions about shadow length at particular times of the day.
- Use a solar panel to convert solar energy into electrical energy.
- Research solar energy, solar cells and solar power plants.
- Experiment with a wind powered generator to produce electrical energy.
- Plot a graph of blade angle (of a wind powered generator) against current output to determine the best angle of pitch for the wind generator blades.

Alternative Energy (40-assignment)

Typical 30-assignment activities include (continued):

- Plot a graph of current output against blade area of a wind powered generator.
- Calculate the efficiency of the wind-powered generator.
- Calculate the power output of a hydroelectric power scheme.
- Start to solve a design problem considering the environmental impacts of a proposed site for a hydroelectric dam project.
- Watch a video to gain an overview of the future of alternative energy and outlines of some solutions to energy problems.
- Use a software program to investigate renewable energy sources.
- Make comparisons using a software program to determine the cheapest way of producing energy in a particular town or city.
- Investigate the advantages and disadvantages of alternative energy.
- Research nuclear fission and radiation.
- Use a model room to investigate insulation materials.
- Assess how effective insulating materials are.
- Explore the insulation properties of single and double-glazing.

Each assignment is designed around a list of performance objectives. These lists include academic, technical and occupational objectives. The assignments are written in such a way as to enable a student to attain the performance objectives, with the assessment questions linked to these in order to provide a measure of true competency.

The performance objectives are used by the ClassAct management system to generate a comprehensive portfolio of student competency reports. Default reports supplied with this module include:

- Entry report
- Technical/Occupational Exit report
- Basic Skills report based upon the federal SCAN's report.

The items supplied with this instructional module include:

- 10-assignment On-Screen Student Assignment Guide CD
- 10-assignment Student Assignment Guide
- 10-assignment Student Workbook
- 10-assignment Instructor's Guide
- 30-assignment Student Assignment Guide
- 30-assignment Student Workbook
- 30-assignment Instructor's Guide
- Computer Aided Instruction Software
- Producing Energy software
- 'Energy for Societies' video
- Energy fact file
- Alternative Energy base mat
- Wind powered generator
- Solar powered conveyor
- Acid rain test kit
- Solar cell
- Solar lamp
- Electric fan
- Multimeter
- Propagator
- Water powered rocket
- Model house
- Insulation kit
- Safety goggles

Additional items required:

- Computer

Module Facts

For Technology Program, order as: ST100/40 Alternative Energy

	No.	Average time
Assignments	40	45 minutes
Extension Activities	4	45 minutes
Total		33 hours



LJ Technical Systems
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