

LEGO PRESENTATION

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1. What comes after Technic I :

- Technic Mini Series, gears, levers, pulleys, wheels and axles
- Motorized Simple Machines
- Introduction to Air Power
- Pneumatics II
- Technic Simple Control
- Structures
- Technic Manufacturing Systems
- LEGO dacta® Control Lab
 - LEGO dacta® Serial Interface Box
 - LEGO dacta® Control Lab Software for the Macintosh
(Also available for a PC)
- LEGO dacta® Intelligent House
- LEGO RoboLab (Mindstorms)
- LEGO CAD
- LEGO Technic Racers
- eLab

2. Brief outcomes for each set :

- Technic Mini Series - familiarizing the students with the concepts of gearing up and gearing down as well as simple machines.
- Motorized Simple Machines - promotes an awareness of the evolution of technology and deepens the understanding of mechanical principles through the building of realistic motorized models.
- Pneumatic Sets - enables students to construct a wide variety of working models of pneumatic devices (air systems).
- Simple Control - introduces the students to exploration, investigation and invention as well as science and math related concepts.
- Structures - provides students with a constructive approach to exploration of the stability and forces within structures, eg. bridges, towers
- Manufacturing Systems - these sets let students focus on material handling and processing concepts; introduces important concepts in manufacturing technology with connections to areas of science and mathematics.

- eLab - enables students to explore alternative forms of energy.
- Control Lab - students can use the computer to program their creations to move, sense changes in temperature, light and movement and create routines that operate their creations using the computer language LOGO. They learn through an interdisciplinary approach integrating technology, science, math, language arts and social studies.
- Intelligent House - simulates the use of advanced technology used in today's modern homes to increase the security and comfort of the inhabitants.
- LEGO RoboLab - students learn about science, technology, math and design through making, programming and testing autonomous LEGO Robots
- LEGO CAD - students can use LEGO CAD to produce high quality LEGO blueprints and designs
- LEGO Technic Racers - students build and race 5 models

3. Some of the things that can happen in a group using LEGO dacta kits :

- Development of reasoning skills
 - Applying
 - Analyzing
 - Synthesizing
 - Evaluating
- Personal Work Skills
 - Assuming responsibility
 - Following classroom guidelines
 - Organizing tasks
 - Organizing time
 - Setting opportunities
 - Working in a varied setting
 - Keeping records
- Cooperative Learning Skills
 - Working in teams of two or three
 - Recognizing and respecting capabilities of others
 - Learning to take responsibility for tasks
 - Working with students from different grades and schools
- Communication Skills
 - Participating in discussions

4. Skills that can be developed :

- | | | |
|-----------------|----------------|-----------------------|
| • Discussing | • Justifying | • Forming Conclusions |
| • Investigating | • Examining | • Collecting |
| • Grouping | • Illustrating | • Researching |

- Classifying
- Describing
- Observing
- Charting
- Expressing Ideas
- Cooperating
- Predicting
- Modifying
- Questioning
- Measuring
- Estimating
- Building
- Designing
- Recording
- Verifying

5. Pneumatic Activities bring students into contact with important ideas, including :

- Force
- Pressure
- Energy
- Mechanical Advantage
- Principles of the Lever

6. Modular Manufacturing systems units explore :

- Belt and Chain Drives - Mechanical advantage, relative speed, crossed belts, slippage, direction of motion
- Spur Gears - Direction of rotation, idler effect, gearing up and down, mechanical advantage
- 90 Transmission Gears - Direction of Rotation, gearing down, slippage, worm drive, mechanical advantage
- Pulleys - Mechanical advantage, fixed and movable pulleys
- Eccentric Motion - Cam movement, periodic motion, oscillating motion, reciprocating motion
- Rack and Pinion - Horizontal movement, changing rotational motion into linear motion
- Differential Gear - Variable output, averaging effect

7. Control Lab :

- Students study systems in the areas of
 - Bio - related technology
 - Communication
 - Production/Construction
 - Production/Manufacturing
 - Transportation
- Students build experiences in three steps
 - Explore
 - Investigate
 - Invent

8. Simple Control :

- Students build such things as robotrike, hand-operated winch, walking dinosaur, revolving stage and elevator

9. My experience

- Fun and a great cooperative activity
- Students learn about math, science and engineering
- Appeals to all students, boys and girls, of all ages
- Engineers are great allies
- Pros and Cons
 - kits with trays are great

- smaller parts get lost easily
- more kits you have, the more students can be involved
- work space a factor
- Sorting the kits a real problem
- build true to life models of things they see in real life
- build to problem solve
- use software to help, eg. How Things Work
- plan field trips to see real workings of models, eg. Grouse Mountain Sky ride
- Use LEGO curriculum guides
- Management
 - use library card sign out system
 - have spare parts on hand
 - trusted monitors to sort out the kits
 - Rubber maid containers great for storage and transportation
 - Spreadsheet tracking chart
 - Use a camera or Quickcam to take pictures of models
 - have shelf space available strictly for LEGO
 - work in pairs
 - use cooperative learning model
- Funding
 - kits are expensive
 - takes time to build a supply of LEGO dacta kits
 - kits are cost effective over time

10. Related Computer Software

- Widget Workshop from Maxis
- Adventures with OSLO CD, Tools and Gadgets from Science for Kids
- Simple Machines from Science for Kids
- Forces and Motion from Science for Kids
- How Things Work from Darling Kindersley Multimedia

11. Books

- Brick Layers, Creative Engineering with LEGO Constructions, 1996
AIMS Education Foundation
- UNDER CONSTRUCTION, AIMS Education Foundation

12. WWW site for LEGO

- <http://www.lego.com/>
- <http://www.legomindstorms.com/>
- <http://www.bced.gov.bc.ca/branches/pser/welcome.htm>

13. Spectrum

- John Morrow, Spectrum, 604 942 5835