

Independent School District of Boise City  
 Technology – Exploring High Technology Course No. 1605

Open to: 9<sup>th</sup> Grade One Semester Course

Prerequisite: None

Lab Fee: \$8.00

Content: Introduction to Technology is a course of study designed to enable students to gain an understanding of the concepts of technological systems. Students will learn about the influence of technology in their lives and will develop critical thinking and problem solving techniques that contribute to their personal development and technological awareness. Focus will be on the five broad content areas of technology education, which are: communications, construction, robotics, manufacturing, and transportation.

Table of Contents

ACTIVITIES and SEQUENCE	TIME	APPENDIX
Unit I: Technology and Society	(8 days)	
Technology Diary	homework	
Technology Timeline	8 days	A
Unit II: Principles of Design	(47 days)	
Principles of Design (examples and discussion)	1 day	B
Suggested Activity: Castles and Catapults	15 days	C, D, E
Suggested Activity: Golf Course Design	15 days	F, G, H, I, J, K, L
Suggested Activity: CO2 Dragsters	6 days	M
Suggested Activity: Mousetrap Race Cars	10 days	N
Unit III: Manufacturing		
Suggested Activity: Metal Casting Chess Pieces		O, P
Suggested Activity: Mini Lathe Pen Kits		
Suggested Activity: Peanut Butter Assembly Line		
Suggested Activity: Box Production		
Unit IV: Computer Aided Design	(35 days)	
Suggested Activity: Wild Photo Effects	5 days	Q
Suggested Activity: Morphing	5 days	R
Suggested Activity: Virtual Makeover	5 days	R
Suggested Activity: Animation	5 days	R
Suggested Activity: Web Page Design	15 days	S
Suggested Activity: Google Earth (create a virtual tour)	7 days	
TOTAL Number of Class Days in a Semester	85	
Supplies and List of Vendors		T

<b>9<sup>th</sup> Grade Exploring High Technologies</b>		<b>District Reference</b> 1605
<b>Unit No. 1</b>	<b>Technology and Society</b>	<b>10 days</b>

<b>Instructional Objective</b>		<b>Standard Reference</b>	
1605.01 Students create a list of every piece/type of technology they use in a 24 hour period.		01.03, 01.06	

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Students will write down each piece of technology they use in one full 24 hour period.	See Appendix A	
02	Students will be able to discuss the impact technology inventions and innovations have had on their lives.		
03	Students will be able to define “invention” and “innovation”.		EOC

<b>Instructional Objective</b>		<b>Standard Reference</b>	
1605.02 Students will use the Internet and books to research the top 25 inventions and/or innovations and present their findings to the class.		01.03, 01.06	

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Students will be able to use the Internet to find accurate information on inventions and innovations.		
02	Students will be able to use books to find accurate information on inventions and innovations.		
03	Students will be able to explain the reason a product was invented or improved.		EOC
04	Students will be able to name the inventor or innovator for each product researched.		
05	Students will be able to explain why a product is important to modern life.		
06	Students will be able to explain why a product is important to their life.		
07	Students will be able to present their findings to the class or teacher using presentation software.	See Appendix B	

<b>9<sup>th</sup> Grade Exploring High Technologies</b>		<b>District Reference</b> 1605
<b>Unit No. 2</b>	<b>Principles of Design</b>	<b>10 days</b>

<b>Instructional Objective</b>		<b>Standard Reference</b>	
1605.03 Students will understand the elements and process of good design.		02.07	

No.	Performance Objective	Resource Reference	Assessment
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			<b>Correlation</b>
01	Students will be able to list the steps in the design process.		EOC
01	Students will be able to explain the goal of good design.		EOC
<b>Instructional Objective</b> 1605.04 Students will better understand the history and construction of siege engines.		<b>Standard Reference</b> 01.01, 01.02, 01.05, 01.09	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to explain the role siege engines had in medieval warfare, including their advantages, disadvantages, and eventual replacement.	Video: <u>Medieval Siege</u> (NOVA) See Appendix C	EOC
02	Students will be able to construct a tabletop catapult or trebuchet.	See Appendix D	
03	Students will be able to use their siege engine to hit a small target. (“Catapult Basketball”)	See Appendix E	
04	Students will be able to use their catapult or trebuchet to attack a castle made of sugar cubes.	See Appendix F	
<b>Instructional Objective</b> 1605.05 Students will participate in a computer simulation to role-play castle attack and defense.		<b>Standard Reference</b> 01.01, 01.02, 01.05, 01.09	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to use the computer simulation “Stronghold” to attack real and fictitious castles	Computer game: <i>Stronghold</i> , found at computer stores or <a href="http://www.fireflyworlds.com/stronghold_frameset.htm">http://www.fireflyworlds.com/stronghold_frameset.htm</a> See Appendix G	
<b>Instructional Objective</b> 1605.06 Students will gain an understanding of the game of golf; its rules and its history.		<b>Standard Reference</b> 01.01, 01.03, 01.04, 01.05	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to play 18 holes of virtual golf while learning the game’s rules and nuances.	See Appendix H	
02	Students will be able to explain the history of the game of golf.	See Appendix I	
03	Students will be able to define common terms used in golf such as birdie, bogie, par, chip, bunker, eagle, gimmie, green, fringe, hook, fairway, and slice.	See Appendix J	

<b>Instructional Objective</b> 1605.07 Students will practice good design principals in the design of a championship golf course.			<b>Standard Reference</b> 01.01, 01.03, 01.04, 01.05
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to design an 18 hole golf course using paper and pen or C.A.D.	See Appendix K	
02	Students will be able to “play” another student’s designed golf course using a pencil.	See Appendix L	
<b>Instructional Objective</b> 1605.08 Students will create one miniature marble-golf hole as part of a class miniature marble-golf course.			<b>Standard Reference</b> 01.01, 01.03, 01.04, 01.05
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to construct a tabletop miniature golf hole playable with a marble.	See Appendix M	
02	Students will be able to “play” each student-created miniature golf hole by flicking a marble with their finger and attempting to make par.	See Appendix N	
<b>Instructional Objective</b> 1605.09 Students will design an 18-hole Frisbee golf course for the school and then play at least one round.			<b>Standard Reference</b> 01.01, 01.03, 01.04, 01.05
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to use a Frisbee and a football field to determine the average Frisbee throw for a male and female their age.		
02	Students will be able to use school landmarks and average throw distances to design a Frisbee golf course around the school building.	Your P.E. department may already have equipment for Frisbee golf; if not, simply use Frisbees and printed signs hung on trees (etc) for targets.	
03	Students will be able to participate in a Frisbee golf tournament.	See Appendix O	
<b>Instructional Objective</b> 1605.10 Students will use carbon dioxide as an energy source to propel a car.			<b>Standard Reference</b> 09.01, 09.04, 09.05, 09.08, 09.09, 09.10, 09.11
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to use a C.A.D. program to test a dragster design for aerodynamics.	See Appendix O	
02	Students will be able to draw five concept sketches for a CO2 dragster.	See Appendix O	
03	Students will be able to draw a design sketch for	See Appendix O	

	one selected dragster design.		
04	Students will be able to produce a working drawing for a CO2 dragster.	See Appendix O	
05	Students will be able to construct a working model of their CO2 dragster that meets specific criteria.	See Appendix O	
06	Students will be able to launch their CO2 dragster and determine its speed in miles per hour.	See Appendix P	EOC
<b>Instructional Objective</b> 1605.11 Students will use a mousetrap as the energy source in competitions for acceleration and distance.		<b>Standard Reference</b> 01.01, 01.02, 01.05	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to safely set and snap a mousetrap.		
02	Students will be able to use the snap of a mousetrap to propel the mousetrap (and the chassis it is attached to) forward as quickly as possible.	See Appendix Q	
03	Students will be able to explain the affect larger or smaller wheels have on a vehicle's acceleration and distance.		EOC
04	Students will be able to use the snap of a mousetrap to propel the mousetrap (and the chassis it is attached to) forward over as long a distance as possible.	See Appendix Q	

<b>9<sup>th</sup> Grade Exploring High Technologies</b>		<b>District Reference</b> 1605
<b>Unit No. 3</b>	<b>Manufacturing</b>	<b>10 days</b>

<b>Instructional Objective</b> 1605.12 Students will understand the history and uses for metal casting.		<b>Standard Reference</b> 01.08, 02.01, 02.12	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to explain a brief history of metal casting.		
02	Students will be able to name each piece on a chess board.	See Appendix M	EOC
03	Students will be able to set up a chess board.	See Appendix M	
04	Students will be able to explain how each piece moves on a chess board.	See Appendix M	
05	Students will be able to explain chess' history.	See Appendix N	EOC
06	Students will be able to play computer chess online while learning the rules.	<a href="http://www.nabiscoworld.com">www.nabiscoworld.com</a> or other online chess games not blocked by the	

		district.	
<b>Instructional Objective</b>		<b>Standard Reference</b>	
1605.13 Students will understand the tools, methods, and safety measures required in metal casting.		01.01	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to cast a chess piece of pewter and mount it to a wooden base.	<a href="http://www.miniaturemolds.com/mainframe.htm">http://www.miniaturemolds.com/mainframe.htm</a>	
02	Students will be able to explain what happens when pewter is dipped in acid for a short time.		
03	Students will be able to play a chess match using their cast piece with and against the other students in the class (on one board).		
<b>Instructional Objective</b>		<b>Standard Reference</b>	
1605.14 Students will experience the advantages of mass production and organized assembly.		02.13, 02.07, 02.02, 01.08	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to list the steps involved in manufacturing a peanut butter and jelly sandwich.		
02	Students will be able to follow another student's written directions during the manufacturing of a peanut butter and jelly sandwich.		
03	Students will be able to work in a team to design an efficient peanut butter and jelly sandwich assembly line.		
<b>Instructional Objective</b>		<b>Standard Reference</b>	
1605.15 Students will use flat material to create a strong, reliable packaging container (box).		02.13, 02.07, 02.02, 01.08	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to work in a team to design a strong box that would be a reliable shipping container.		
02	Students will be able to design a box that opens and closes without adhesive.		
03	Students will send or receive an item through the mail using the container they manufactured.		
<b>9<sup>th</sup> Grade Exploring High Technologies</b>		<b>District Reference</b>	
		1605	
<b>Unit No. 4</b>	<b>Computer Aided Design</b>	<b>20 days</b>	

<b>Instructional Objective</b>		<b>Standard Reference</b>	
1605.16 Students will use computer software to create 3D drawings, 3D graphics, and special effects.		01.03, 01.04	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to use a CAD program to design an architectural, mechanical, or graphic image.	See Appendix O	
02	Students will be able to use a 3D program to design a 3D logo.	See Appendix O	
03	Students will be able to use a morphing program to create a morphing special effect.	See Appendix O	
04	Students will be able to use a makeover program to give someone in their group a complete makeover.	See Appendix O	
<b>Instructional Objective</b>		<b>Standard Reference</b>	
1605.17 Students will use a web page design program, like FrontPage, to create a web site.		01.02, 01.03, 01.04, 01.06, 01.09	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to create at least five web pages using a web design program.		
02	Students will be able to create a custom logo or banner.	See Appendix Q	
03	Students will be able to draw a design sketch for one selected dragster design.	See Appendix Q	
04	Students will be able to create a table with working hyperlinks.	See Appendix Q	
05	Students will be able to create a back button on each web page they create.	See Appendix Q	
06	Students will be able to insert graphics into a web page.	See Appendix Q	
07	Students will be able to insert a working hit counter into the HTML of their index page.	See Appendix Q	
08	Students will be able to insert a background image into at least one web page.	See Appendix Q	
09	Students will be able to insert a background sound into at least one web page.	See Appendix Q	
10	Students will be able to insert a scrolling marquee into at least one web page.	See Appendix Q	
11	Students will be able to insert external links into their web pages.	See Appendix Q	
12	Students will be able to publish their web site to a free server as demonstrated in class.	See Appendix Q	

<b>Instructional Objective</b>		<b>Standard Reference</b>	
1605.18 Students will use Google Earth, a free 3D mapping program, to create a virtual tour of the world.		01.02, 01.03, 01.04, 01.06, 01.09	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Students will be able to find and bookmark twenty places on earth that look interesting from a satellite photo.	<a href="http://earth.google.com">http://earth.google.com</a>	
02	Students will be able to create a folder to save their twenty favorite places to.		
03	Students will be able to name the location of each object or place they bookmarked.		
04	Students will be able to list two facts about each object of place they bookmarked.		
05	Students will be able to play their virtual tour using Google Earth for others to see.		

## **01.0 EXPLORING TECHNOLOGY**

**Prerequisite:** None

Exploring Technology is designed to introduce students to basic technological principles, processes, and skills such as design and problem solving, team decision making, information gathering, and safety. A systems model of communication, manufacturing, power/energy and transportation and construction is presented. Students are exposed to sketching, technical drawing, screen printing, logo and poster development, building of model rockets and bridges, experimentation with computer-assisted graphics, computer-aided design software, electronic devices, and video production. This program is designed to develop an appreciation of technical fields and occupations while learning about skills essential to these systems.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Exploring Technology

IDAHO CODE NUMBER: TE 1901

- 01.01 Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems, and materials.
- 01.02 Exhibit positive human relations and leadership skills (standard leadership skills task list).
- 01.03 Demonstrate computer application and literacy.
- 01.04 Apply basic skills in communications, mathematics and science appropriate to technological content and learning activities.
- 01.05 Utilize the systems approach in technology.
- 01.06 Demonstrate technological literacy.
- 01.07 Discuss individual interests and aptitudes as they relate to a career.
- 01.08 Demonstrate the use of technological systems in processing resources.
- 01.09 Discuss the outcomes of technology on society and the environment.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Exploring Technology

IDAHO CODE NUMBER: TE 1901

01.01 DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS--

The student will be able to:

1. Follow laboratory safety rules and procedures.
2. Demonstrate good housekeeping within total laboratory.
3. Conduct laboratory activities and equipment operations in a safe manner.
4. Exercise care and respect for all tools, equipment, and materials.
5. Identify color-coding safety standards.
6. Safely use hand tools and power equipment.
7. Explain fire prevention and safety precautions and practices for extinguishing fires.
8. Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

01.02 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS (STANDARD LEADERSHIP SKILLS TASK LIST)--

The student will be able to:

1. Work cooperatively with others.
2. Demonstrate ability to do individual and cooperative planning of an activity.

01.03 DEMONSTRATE COMPUTER APPLICATION AND LITERACY--

The student will be able to:

1. Define terms related to computer parts and usage.
2. List ways in which computers are used in technology.
3. Discuss advantages and disadvantages in the use of computers.
4. Demonstrate the application of a computer.

01.04 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES-

The student will be able to:

1. Find, understand and apply information from a variety of sources, written and electronic to produce a technical report.
2. Apply proper grammar and spelling in Technology Lab assignments.
3. Properly use math and science concepts in lab activities, using all available resources.

01.05 UTILIZE THE SYSTEMS APPROACH IN TECHNOLOGY--

The student will be able to:

1. Identify and define four systems of Technology Education taught in Idaho technology Labs.
2. Complete a communications activity.
3. Take part in a manufacturing activity.
4. Take part in a construction activity.
5. Take part in a transportation assignment.
6. Define and apply Energy as it relates to Technology Education.
7. Define and apply Power as it relates to Technology Education.
8. Take part in an assignment using basic electronics/electricity theory.

01.06 DEMONSTRATE TECHNOLOGICAL LITERACY--

The student will be able to:

1. Outline major historical technological developments or events.
2. Identify recent advances in technology.
3. Explain problem-solving roles of technology.
4. Define and apply a system.
  5. Define and apply a systems model.
6. Define Technology.

01.07 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER-

The student will be able to:

1. Describe individual strengths and weaknesses.
2. Discuss individual interests related to a career.
3. Identify careers within specific areas of technology.
4. Explore a career within a specific area of interest.

01.08 DEMONSTRATE THE USE OF TECHNOLOGICAL SYSTEMS IN PROCESSING RESOURCES--

The student will be able to:

1. Define the term Resource.
2. Identify four types of materials conversion.
3. Identify the types, sources and conversions of energy.
4. Identify the steps in processing information.
5. Construct a product using the materials conversion processes.
6. Construct a product that converts energy.
7. Use a computer to process information.

01.09 DISCUSS THE OUTCOMES OF TECHNOLOGY ON SOCIETY AND THE ENVIRONMENT--

The student will be able to:

1. Discuss the outcomes of technology, now and in the future.
2. Discuss the impacts of technology on work, job opportunities, and careers.
3. Discuss how technology can solve and/or create problems.
4. Discuss expected and unexpected outcomes of technology.
5. Discuss desired and undesired outcomes of technology.

## 02.0 FUNDAMENTALS OF TECHNOLOGY

**Prerequisite:** None

Fundamentals of Technology is a prerequisite course for most of the Technology Education systems. Communication skills and tools are the major focus of this course. These same skills are central to all subsequent technology courses. The computer and other electronic devices are necessary for teaching an understanding of contemporary communications, manufacturing, power/energy/transportation and construction systems. An engineering focus of problem solving requires students to define a given problem, conduct appropriate research, develop solutions to the problem, construct prototypes, and evaluate their work.

Fundamentals of Technology is designed to introduce students to those principles and skills used in subsequent technology courses. Students learn to sketch solutions to problems, create technical drawings and presentations, build models, and apply creative problem solving methods. Emphasis is placed on accessing and communicating information, using simple and complex tools in a safe manner, and increasing the students' awareness of the historical and contemporary implications of technology. Students are introduced to computer-aided graphics, design software, and computer-aided manufacturing. Students develop an understanding of the tools, techniques, and processes of technology using design principles, computers, problem solving and model making.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Fundamentals of Technology

IDAHO CODE NUMBER: TE 1905

- 02.01 Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems and materials.
- 02.02 Exhibit positive human relations and leadership skills (standard leadership skills task list).
- 02.03 Demonstrate computer application and literacy.
- 02.04 Integrate basic academic skills and concepts.
- 02.05 List requisites and employment opportunities for employment in today's and our future technological world.
- 02.06 Identify evolving technologies in our technological world.

- 02.07 Demonstrate and apply design/problem-solving processes.
- 02.08 Demonstrate basic knowledge of communications technology.
- 02.09 Demonstrate basic knowledge of transportation systems.
- 02.10 Demonstrate knowledge of robotics.
- 02.11 Demonstrate knowledge of power and energy.
- 02.12 Demonstrate basic knowledge of construction technology.
- 02.13 Demonstrate a basic knowledge of manufacturing technology.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Fundamentals of Technology

IDAHO CODE NUMBER: TE 1905

02.01 DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS AND MATERIALS--

The student will be able to:

1. Follow laboratory safety rules and procedures.
2. Demonstrate good housekeeping within total laboratory.
3. Conduct laboratory activities and equipment operations in a safe manner.
4. Exercise care and respect for all tools, equipment, and materials.
5. Identify color-coding safety standards.
6. Safely use hand tools and power equipment.
7. Explain fire prevention and safety precautions and practices for extinguishing fires.
8. Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

02.02 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS (STANDARD LEADERSHIP SKILLS TASK LIST)--

The student will be able to:

1. Work cooperatively with others.
2. Demonstrate ability to do individual and cooperative planning of

an activity.

02.03 DEMONSTRATE COMPUTER APPLICATION AND LITERACY--

The student will be able to:

1. Define terms related to computer parts and usage.
2. List ways in which computers are used in technology.
3. Discuss advantages and disadvantages in the use of computers.
4. Demonstrate the application of a computer.

02.04 INTEGRATE BASIC ACADEMIC SKILLS AND CONCEPTS--

The student will be able to:

1. Find, understand, and apply information from a variety of sources, written and electronic, to produce a technical report.
2. Read and follow complex written instructions.
3. Answer and ask questions coherently and concisely, and follow spoken instructions.
4. Make and use measurements in both traditional and metric units.
5. Solve work-related problems involving basic arithmetic.

02.05 LIST REQUISITES AND EMPLOYMENT OPPORTUNITIES FOR  
EMPLOYMENT IN TODAY'S AND OUR FUTURE TECHNOLOGICAL  
WORLD--

The student will be able to:

1. List occupations, job requirements and employment opportunities in communications technology.
2. List occupations, job requirements and employment opportunities in construction technology.
3. List occupations, job requirements and employment opportunities in manufacturing technology.
4. List occupations, job requirements and employment opportunities in energy, power, and transportation technology.

02.06 IDENTIFY EVOLVING TECHNOLOGIES IN OUR TECHNOLOGICAL  
WORLD--

The student will be able to:

1. List evolving technologies.
2. Report on a recent or evolving technology.

02.07 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING  
PROCESSES--

The student will be able to:

1. Describe and explain steps in the design/problem-solving process.
2. Propose solutions to given problems.
3. Design and implement the optimal solution to a given problem.

02.08 DEMONSTRATE BASIC KNOWLEDGE OF COMMUNICATIONS TECHNOLOGY--

The student will be able to:

1. Discuss the history of communications systems.
2. Identify and apply common terms and definitions associated with communications.
3. Discuss the use of computers in communications.
4. Demonstrate computer literacy through use and application of computers in communication systems.
5. Understand the use and function of telecommunication components.
6. Illustrate knowledge of graphic arts concepts.
7. Demonstrate knowledge of drafting/design concepts, manual and electronic.
8. Understand how information is exchanged between humans and machines.
9. Discuss the influences and effects of communications technology on society, culture and the environment.

02.09 DEMONSTRATE BASIC KNOWLEDGE OF TRANSPORTATION SYSTEMS--

The student will be able to:

1. Discuss the history of transportation (Systems/Future/Impacts).
2. Discuss and demonstrate Land Transportation (Systems/Future/Impacts).
3. Discuss and demonstrate Water Transportation (Systems/Future/Impacts).
4. Discuss and demonstrate Atmospheric Transportation (Systems/Future/Impacts).
5. Discuss and demonstrate Space Transportation (Systems/Future/Impacts).
6. Discuss the future of Transportation.

02.10 DEMONSTRATE KNOWLEDGE OF ROBOTICS--

The student will be able to:

1. Define the term "Robots".
2. Discuss uses of Robots.
3. Define common parts of a Robot.
4. Demonstrate/construct a Robot.

02.11 DEMONSTRATE KNOWLEDGE OF POWER AND ENERGY--

The student will be able to:

1. Identify Fossil Fuels and uses.
2. Define wind and water resources.
3. Demonstrate a wind or water resource.
4. Define/discuss Solar Energy.
5. Define/discuss Nuclear Energy resources.
6. Discuss Energy Conservation.
7. Demonstrate application of power/energy to technology systems.
8. Define/demonstrate basic electronic/electrical theory.

02.12 DEMONSTRATE BASIC KNOWLEDGE OF CONSTRUCTION TECHNOLOGY--

The student will be able to:

1. Apply blueprint reading skills.
2. Discuss/demonstrate basic construction concepts/techniques.
3. Identify construction materials and processes.
4. Discuss uses of new technology in construction.
5. Define basic construction vocabulary.
6. Discuss the future of construction.
7. Discuss the types of construction (land, space, and underwater).

02.13 DEMONSTRATE A BASIC KNOWLEDGE OF MANUFACTURING TECHNOLOGY--

The student will be able to:

1. Demonstrate the essential elements and organization of the free enterprise system.
2. Discuss the history of Manufacturing.
3. Identify types of Production Systems.
4. Demonstrate/define Research and Development.
5. Discuss financial aspects of Manufacturing.
6. Define Industrial Relations.
7. Define materials, material processing, material testing, and material recycling.
8. Discuss/explore traditional and innovative equipment.
9. Discuss/demonstrate the use of robotics/computers (CAM) in manufacturing.
10. Demonstrate the mass production process.

## **09.0 POWER/ENERGY AND TRANSPORTATION SYSTEMS I**

### **Prerequisite:** Fundamentals of Technology

Students enrolled in this course will explore sources, storage, transportation, consumption, control, environmental impacts, and conservation of power, energy and transportation. Land, ground effects, water, air, space, and intermodal transportation systems will be explored with practical activities emphasizing relevant scientific and engineering concepts. Activities include defining problems, designing prototypes, using computer-assisted applications, constructing models, and testing prototypes using appropriate tools such as wind tunnels and performance tests.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Power/Energy and Transportation Systems I

IDAHO CODE NUMBER: TE 1940

- 09.01 Demonstrate the ability to work safely with a variety of technologies.
- 09.02 Demonstrate interpersonal skills as they relate to the workplace.
- 09.03 Identify and apply methods of information acquisition and utilization.
- 09.04 Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.
- 09.05 Demonstrate and apply design/problem-solving processes.
- 09.06 Discuss individual interests and aptitudes as they relate to a career.
- 09.07 Make an informed and meaningful career choice.
- 09.08 Demonstrate technical knowledge and skills about energy technology.
- 09.09 Demonstrate technical knowledge and skills about power technology.
- 09.10 Demonstrate technical knowledge and skills about transportation technology.
- 09.11 Perform independent-study and technical skills related to energy, power, or transportation technology.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

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09.01 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--

The student will be able to:

1. Select appropriate tools, procedures, and/or equipment needed to produce a product.
2. Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
3. Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.
4. Follow laboratory safety rules and procedures.
5. Demonstrate good housekeeping at work station within total laboratory.
6. Identify color-coding safety standards.
7. Explain fire prevention and safety precautions and practices for extinguishing fires.
8. Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

09.02 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--

The student will be able to:

1. Perform roles in a student personnel system or in the Idaho Technology Student Association (Idaho TSA).
2. Participate as a member of a team.
3. Teach others new skills.
4. Identify skills needed to serve clients/customers.
5. Demonstrate leadership skills.
6. Describe strategies necessary for negotiating agreements.
7. Demonstrate the application of skills necessary to work with people of diverse backgrounds.
8. Form an understanding and appreciation for work after listening to or observing technology workers.
9. Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
10. Form an understanding and appreciation for the roles and work of co-workers.

09.03 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATION--

The student will be able to:

1. Define terms related to computers.
2. Identify and describe methods of information acquisition and evaluation.
3. Discuss advantages and disadvantages in the application of technologies.
4. Produce a plan to organize and maintain information relevant to emerging technologies.
5. Comprehend and communicate information relevant to emerging technologies.
6. Demonstrate the use of computers to process information.
7. Demonstrate the ability to gather information using media centers, electronic communications (i.e. computer networking) and emerging media (CD-ROM, laser disk, etc.)

09.04 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--

The student will be able to:

1. Identify and explain the main and subordinate ideas in a written work.
2. Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.
3. Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.
4. Distinguish fact from opinion.
5. Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.
6. Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.
7. Improve one's own writing by restructuring, correcting errors, and rewriting.
8. Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.
9. Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.
10. Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.
11. Compose unified and coherent correspondence, directions, descriptions, explanations and reports.
12. Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.
13. Conceive and develop ideas about a topic for the purpose of speaking to a group; choose and organize related ideas; present them clearly in Standard English; and evaluate similar presentations by others.

14. Use the mathematics of:
  - integers, fractions, and decimals;
  - ratios, proportions, and percentages;
  - roots and powers;
  - algebra;
  - geometry.
15. Make estimates and approximations, and judge the reasonableness of a result.
16. Use elementary concepts of probability and statistics.
17. Draw, read, and analyze graphs, charts, and tables.
18. Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and field work.
19. Organize and communicate the results obtained by observation and experimentation.
20. Apply the basic principles of biology, physics, and chemistry. (Properties of matter; structure of compounds; concepts of motion; temperature, pressure and volume; work, power, force and energy; machines; human cell structure).
21. Identify problems rooted in basic biology, physics, or chemistry (effects of hazardous materials on health and safety, effects of drugs on health, trouble shooting problems on a machine).

09.05 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--

The student will be able to:

1. Describe and explain steps in the design/problem-solving process.
2. Propose solutions to given problems.
3. Design and implement the optimal solution to a given problem.
4. Document each step of the design/problem-solving process.
5. Demonstrate "Brainstorming" as a process to solve problems.
6. Define "critical thinking" and its value in the problem-solving process.

09.06 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--

The student will be able to:

1. Describe individual strengths and weaknesses.
2. Discuss individual interests related to a career.
3. Identify careers within specific areas of technology.
4. Explore careers within specific areas of interest.

09.07 MAKE AN INFORMED AND MEANINGFUL CAREER CHOICE--

The student will be able to:

1. Make a tentative occupational choice based on the information learned and interest developed in this course.
2. Review tentative occupational choices based on the information learned and interest developed in this course.

09.08 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ENERGY TECHNOLOGY--

The student will be able to:

1. Demonstrate knowledge and understanding of sources of thermal energy.
2. Demonstrate knowledge and understanding of sources of radiant energy.
3. Demonstrate knowledge and understanding of sources of nuclear energy.
4. Demonstrate knowledge and understanding of sources of chemical energy.
5. Demonstrate knowledge and understanding of sources of electrical energy.
6. Demonstrate knowledge and understanding of sources of mechanical energy.
7. Demonstrate knowledge and understanding of sources of fluid energy.
8. Define Energy.
9. Use units of energy measurement to calculate input and output.
10. Apply knowledge of energy technology in making a working system.

09.09 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT POWER TECHNOLOGY--

The student will be able to:

1. Define Power
2. Demonstrate method of measuring power
3. Demonstrate knowledge, understanding and application of simple machines.
4. Calculate problems using power ratio.
5. Demonstrate an understanding of hydraulic/pneumatic power control.
6. Set up and Calculate power problems.
7. Demonstrate knowledge and applications in controlling power.  
Electricity/Electronics - AC/DC, Components, Digital electronics/logic circuits, Hydraulic/pneumatic, Mechanical
8. Identify methods of power transmission.
9. Demonstrate knowledge and understanding of heat engines, their parts and operation.
10. Students will be able to solve problems using more than one method of power control.

09.10 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT TRANSPORTATION TECHNOLOGY--

The student will be able to:

1. Understand historical development of each transportation system.
2. Understand and apply the theories of each transportation system in developing efficient working models.
3. Design and construct vehicles in each transportation system.
4. Demonstrate knowledge of land transportation.
5. Demonstrate knowledge of ground effect transportation.
6. Demonstrate knowledge of air transportation.
7. Demonstrate knowledge of space transportation.
8. Demonstrate knowledge of marine transportation.
9. Illustrate or design an intermodal transportation system.

09.11 PERFORM INDEPENDENT-STUDY AND TECHNICAL SKILLS RELATED TO ENERGY, POWER, OR TRANSPORTATION TECHNOLOGY--

The student will be able to:

1. Select an individual or group project in cooperation with the teacher.
2. Work with a mentor from the school or community to help complete the project.
3. Develop a written plan of work to carry out the project.
4. Show evidence of technical study in support of the project.
5. Perform skills related to the project.
6. Complete the project as planned.
7. Collect or produce data on energy and power through the operation of computer.