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ABSTRACT

These criteria are designed for use by teachers and administrators to conduct a self-assessment of an industrial arts program for students and thus identify outstanding programs. General criteria are grouped under 12 standards: purpose, administration and supervision, learning resources, finances, instruction, equipment, facilities, instructional staff, leadership training, safety and health, recordkeeping and evaluation, and student populations served. Ratings are yes, no, or but, with a space for comments. It is suggested that after conducting a thorough and satisfactory self-assessment, the teacher and administrator submit the program for consideration. Specific criteria are also provided for these programs, eligible for submitting an application for consideration as an exemlary program: junior high/middle school power technology, junior high/middle school industrial materials, junior high/middle school visual communications, senior high drawing/design, senior high electricity/electronics, senior high graphic arts, senior high metalworking, senior high photography, senior high power technology, and senior high woodworking. (The program for which application is made must meet all general criteria and the set of specific criteria for that program.) (YLB)

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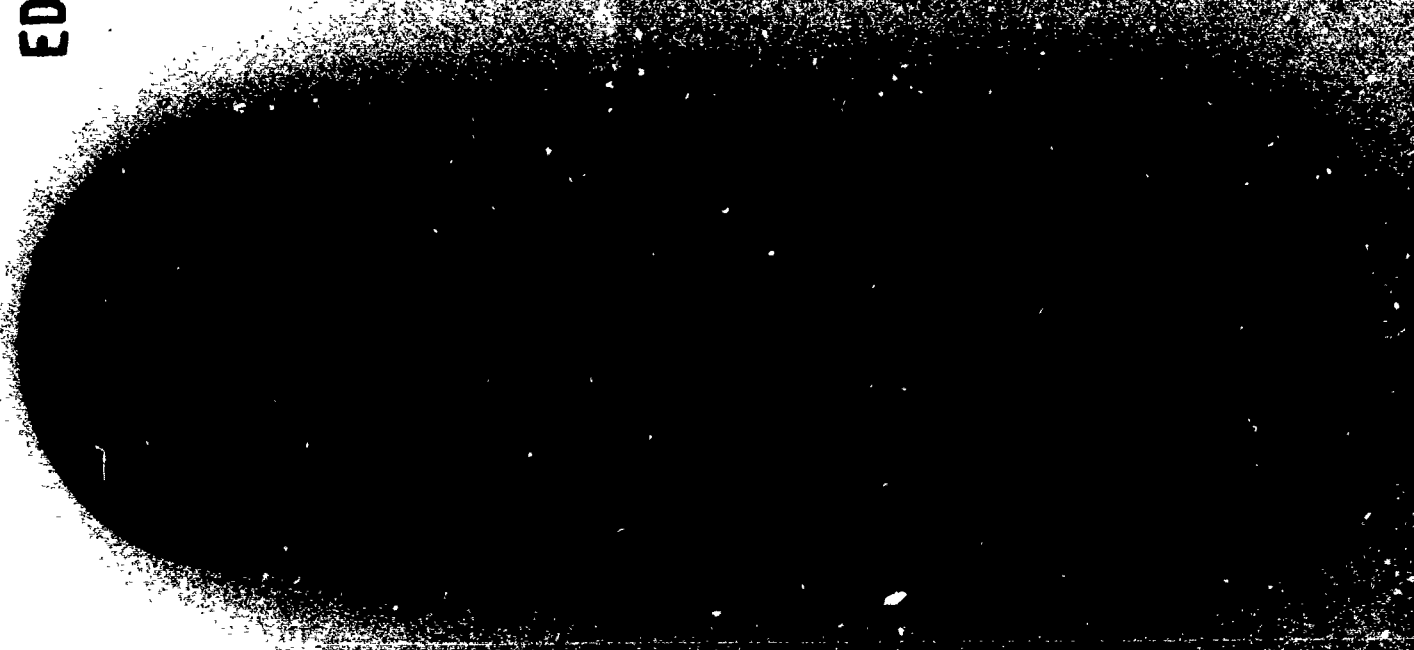

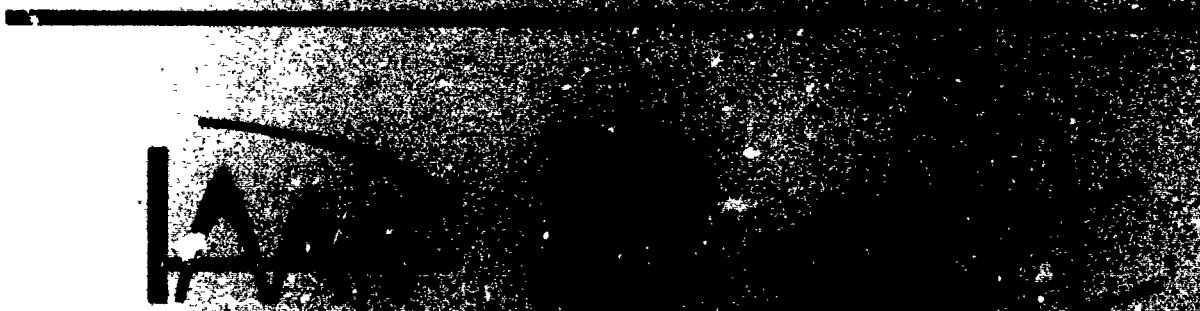

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BUREAU OF VOCATIONAL EDUCATION'S

EXEMPLARY PROGRAM

CRITERIA

FOR

INDUSTRIAL ARTS EDUCATION

Revised September 26, 1985

PENNSYLVANIA DEPARTMENT OF EDUCATION
333 MARKET STREET
HARRISBURG, PA 17126-0333

October 8, 1985

Dear Colleague:

Attached is the third edition of criteria for the Bureau of Vocational and Adult Education's Exemplary Program Project "In Search of Excellence." The Exemplary Program Project is beginning its second year and is providing the impetus for vocational education program development and improvement.

There are many exemplary programs being conducted for students in Pennsylvania schools. I think it is our collective professional responsibility to identify them and replicate the methods and materials, insofar as possible, to give other students and teachers the means to continue program development and improvement.

I hope you will take time from your busy schedule to review the criteria and discuss it with your appropriate staff. Please give participation in this project consideration.

Sincerely,

Jerry C. Olson, Director
Bureau of Vocational and Adult Education

Introduction

The Bureau of Vocational and Adult Education's Exemplary Program Project, "In Search of Excellence" is designed to identify outstanding vocational education programs in Pennsylvania and attempt to adopt/adapt the successful practices that make them exemplary.

The following criteria are presented by the Pennsylvania Department of Education for use by teachers and administrators to conduct a self assessment of a vocational education program for students. The criteria set high standards to be used to evaluate curriculum, facilities and instruction. Administrators and teachers of programs which meet or exceed these standards should take satisfaction in knowing that students are receiving superior education and training.

If after conducting a thorough and satisfactory self assessment using criteria for sex equity, the teacher and administrator wish to share their practices with others, they are invited to complete the application form attached to these criteria and send it along with a copy of the checklist to Vernon L. Register, c/o Pennsylvania Department of Education, Bureau of Vocational and Adult Education, 333 Market Street, Harrisburg, PA 17126-0333.

We hope these criteria are helpful and encourage you to participate in this effort to improve vocational education in Pennsylvania.

INDUSTRIAL ARTS TECHNOLOGY EDUCATION EXEMPLARY PROGRAM CRITERIA

TABLE OF CONTENTS

NOTE: Junior High and Senior High can both include grade nine.

The program for which application is made must meet all general criteria and the set of specific criteria for that program as found in the attachments corresponding to the letter of the program in the above list.

Senior High cluster programs are eligible as exemplary programs by meeting unit criteria as specified in the following list of clusters:

Program	Unit Criteria
Visual Communications	F, D
Power Technology	I, E
Industrial Materials/Manufacturing	J, G

Exemplary Criteria for Industrial Arts
Technology Education

GENERAL CRITERIA

Standard 1 - Purpose	Yes	No	But	Comment
The program must have clearly stated program goals, relative to the needs of the students and the school curriculum.				
1.1 The program is provided by a school which is accredited by regional or State agencies.				
1.2 Program goals are consistent with state guidelines, are written and on file.				
1.3 Emphasis is placed upon assisting students in developing insight and understanding of our industrial and technological society.				
1.4 Emphasis is placed upon improving scudent ability to make informed and meaningful career choices.				
1.5 Emphasis is placed upon preparing students for entry into specialized technical training and/or advanced professional programs in technology.				
1.6 Emphasis is placed upon developing student's skills, creative abilities, positive self-concepts, and individual potentials in technology.				
1.7 Emphasis is placed upon applying tools, materials, machines and processes and technical concepts safely and efficiently.				

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Standard 1 - Purpose (Cont.)	Yes	No	But	Comment
1.8 Emphasis is placed upon developing student problem-solving and decision-making abilities involving human and material resources, processes, and technological systems.				
1.9 Emphasis is placed upon reinforcing the basic skills and interrelating the content of technology with other school subjects with specific integration of math and science.				
1.10 Emphasis is placed upon developing leadership ability, encouraging and promoting responsibility, developing a relationship with the free enterprise system and developing positive social interaction through AIASA.				
1.11 Emphasis is placed upon computer and technological literacy.				
1.12 Emphasis is placed upon communication skills.				

Standard 2 - Administration/Supervision	Yes	No	But	Comment
Program administration must insure that instructional activities support and promote the goals of the program.				
2.1 The administration and teacher agree to schedule at least two (2) days per month for visitations to the program.				
2.2 The administration and teacher agree to make exemplary program curricular material available upon request.				
2.3 The administration agrees to release the exemplary teacher without cost to the school for up to at least three days to assist other schools replicating the exemplary program.				
2.4 A maximum of 20 students are enrolled per teacher, per period of laboratory activity.				
2.5 Planned courses are 120 hours in duration and carry full unit of credit. Courses in grades 9-12 qualify for graduation required credits.				
2.6 Annual observations by administrator and/or supervisor are on file.				
2.7 An accurate description for each course is available to all students prior to enrollment.				

Standard 3 - Learning Resources	Yes	No	But	Comment
Support materials consistent with both program goals and performance objectives must be available to staff and students.				
3.1 Books and other instructional materials are provided to meet the unique requirements of students with special needs.				
3.2 A display case is available and utilized regularly and is visible for all students enrolled in the school.				
3.3 Audiovisual materials including prerecorded tapes are available and utilized. Includes provisions for recording and playing of video tapes for instruction.				
3.4 Resource books and other instructional materials are supplied in sufficient quantity to meet program goals and course objectives and are utilized in instruction.				
3.5 Textbooks are utilized in instruction.				
3.6 Computers and appropriate software are available and utilized in instruction.				
3.7 Business, industry and labor resources from the community are utilized for instruction.				

Standard 4 - Finances	Yes	No	But	Comment
Funding must be provided to meet the approved program goals and performance objectives.				
4.1 A budgeting system is utilized to ensure the identification and procurement of all resources essential for the accomplishment of program goals and course objectives, consistent with student enrollment and unique student needs.				
4.2 Funds are budgeted for purchase of equipment and supplies to accomplish course objectives.				
4.3 Funds are budgeted for instructional materials to accomplish course objectives including AIASA activities.				
4.4 Funds are budgeted for equipment maintenance and facility improvements to accomplish course objectives.				
4.5 Funds are budgeted for staff development including release time, substitutes, and travel for inservice, professional, and AIASA activities.				

Standard 5 - Instruction	Yes	No	But	Comment
Instruction must be systematic and reflect program goals. Specific performance objectives with criterion referenced measures must be used.				
5.1 The program is competency-based and includes: a) occupational analysis and validated competencies; b) a systematic instructional process; c) clearly stated predetermined performance standards.				
5.2 Both teacher-centered and student-centered instructional methods are utilized.				
5.3 Instructional methods include both group and individual student learning activities.				
5.4 Field trips are regularly scheduled instructional activities coordinated with classroom instruction.				

Standard 6 - Equipment	Yes	No	But	Comment
Equipment and tools used in the program must reflect technology and industry and must also be the type needed to meet the program goals and performance objectives.				
6.1 Tools and equipment are adequate in type and quantity to meet program goals and performance objectives.				
6.2 Equipment and tools and their utilization meet all recommendations in the Pennsylvania Industrial Arts Safety Guide.				
6.3 Equipment is available for student orientation to computer applications in the specific program area.				
6.4 An accurate up-to-date tool and equipment inventory is on file.				
6.5 A policy for equipment replacement and maintenance is in operation.				

Standard 7 - Facilities	Yes	No	But	Comment
Physical facilities must be adequate to permit achievement of the program goals and performance objectives.				
7.1 The facility and program site is architecturally accessible to students with handicapping conditions.				
7.2 Industrial arts technology education laboratories average 1800-2400 square feet or meet the square feet per student recommended in the Pennsylvania Industrial Arts Safety Guide.				
7.3 Physical resources such as the facility, equipment, and instructional materials are provided to assist in achieving the program goals and course objectives.				
7.4 Industrial arts technology education ancillary space, at an average of 500 square feet for each laboratory, is provided for storage of materials, projects/products, tools and equipment.				
7.5 The facility meets all recommendations in the Pennsylvania Industrial Arts Safety Guide.				

Standard 8 - Instructional Staff	Yes	No	But	Comment
The instructional staff must have technical competency and meet all the state and local requirements for certification/ credentialing.				
8.1 The teacher of the program possesses a currently valid Pennsylvania certificate for the area/subject that he/she teaches.				
8.2 The teacher is technically competent.				
8.3 Industrial arts technology education teachers are members of and participate in professional and technical organizations related to industrial arts and their area of specialization.				

Standard 9 - Leadership Training	Yes	No	But	Comment
Written procedures and curriculum for integrating leadership training must be provided.				
9.1 Local AIASA chapter activities are integrated into planned courses of study and are utilized in conducting classroom and laboratory activities.				

Standard 10 - Safety and Health	Yes	No	But	Comment
A written, comprehensive safety and health program is implemented to ensure safe working conditions and practi.				
10.1 An instructional plan for safety and health is prepared utilizing community resources, administrative personnel, instructors, and safety literature.				
10.2 Safety and health instruction is included in classroor. and laboratory activities.				
10.3 Teachers and administrators review each recorded accident and all unsafe practices to correct deficiencies.				
10.4 The Pennsylvania Industrial Arts Safety Guide is utilized as the guide for all safety programming and all items on the safety check list are satisfactory in the program.				
10.5 Records are on file to document the existence of an effective safety and health program.				

Standard 11 - Record Keeping and Evaluation Process	Yes	No	But	Comment
Systematic, continuous record keeping and program evaluations exist to assess all elements of the program and student achievement.				
11.1 Student achievement is measured through a variety of testing techniques and other evaluation methods.				
11.2 Homework and assignments that require the use of written and oral communication skills are required and utilized in student evaluation.				
11.3 Competency measures are used to define student skill levels.				
11.4 Instruments are administered annually to collect valid and reliable data on selected aspects of the program.				
11.5 Safety records are kept.				
11.6 Demographic data about all industrial arts technology education students are available by grade level and by course, including but not limited to course enrollments by racial and ethnic categories, by sex, and by type and number of students with special needs.				

Standard 12 - Student Populations Served	Yes	No	But	Comment
All students regardless of their race, sex, creed, national origin, or special needs are admitted to and served by the industrial arts program.				
12.1 The school or program has a written policy which includes prohibition of discriminatory practices and procedures for all offered programs.				
12.2 Supportive services are available to special need students who are mainstreamed into the regular instructional program. Support services include, but are not limited to, remedial reading, remedial math, instructional aides, etc.				
12.3 Placement of special needs students into the program includes a systematic evaluation of each student.				

ATTACHMENT A

Junior High/Middle School
Industrial Materials

Program Description	Yes	No	But	Comment
Industrial materials in the junior high/ middle school deals on an exploratory level with both the processes and materials of the manufacturing and construction industries. Learning experiences include using tools and equipment in working with metals, plastics/synthetics, woods, and other materials. Special attention is given to career exploration, planning, health and safety and personal relationships.				
Specific Criteria				
1. The industrial materials area in the junior high/middle school is taught as one of three clsuters (industrial materials, visual communications, power technology) constituting a minimum of a 120 hour planned course.				
1.1 A minimum of 40 clock hours of instructional time, one third of the 120 hour planned course requirement for all students, is allotted to this cluster of instruction.				
1.2 Industrial materials is taught in either its own facility or in a comprehensive general facility with power technology and visual communications.				
2. Industrial materials deals with both the materials and the processes of the manufacturing and construction industries.				

Program Description (Cont.)	Yes	No	But	Comment
2.1 The students gain experience in the processes of combining, conditioning, forming and separating materials through hands-on activities.				
2.2 Industrial materials includes instruction in metals, plastics/ synthetics, woods and other materials.				
2.3 Oral discussions and/or written assignments deal with the application of tools, machines, materials, and processes of industry.				
2.4 Students demonstrate basic skills in the handling of tools and use of techniques in the construction and manufacturing industries.				
2.5 The curriculum calls for the production of useful products.				
2.6 Conservation of materials is addressed in the instructional program.				
3. Planning and design are important components of the industrial materials course.				
3.1 The students use available resources in the research and development process.				
3.2 Characteristics of materials, processes and machines/tools are considered in the planning and design process.				

Program Description (Cont.)	Yes	No	But	Comment
3.3 Measurement is done using the Systems International (SI metrics) and customary units of measure.				
3.4 Beginning drawing techniques including sketching and blueprint reading are used whenever possible.				
3.5 Problem solving techniques are utilized in the instructional process in industrial materials.				
4. Emphasis is placed upon career awareness to enable the student to begin to make meaningful career decisions.				
4.1 Course content is organized to make the student aware of potential career opportunities in fields related to industrial materials.				
4.2 Resources are made available that the students use to obtain occupational information.				
4.3 Differences are discussed between vocational and avocational interest.				
5. Industrial materials helps the student develop his/her self-image as well as understanding the differences of others.				
5.1 Students are made aware of the fact that all jobs are important and that work has self-gratifying value.				

Program Description (Cont.)	Yes	No	But	Comment
5.2 Students work both cooperatively and independently.				
5.3 Leadership and responsibility is developed in the student through the use of an effective personnel organization.				
5.4 Opportunities are available for students to enter the AIASA sponsored manufacturing contest and "Metric 500" as well as other local and regional competitions.				

ATTACHMENT B

Junior High/Middle School
Power Technology

Program Description	Yes	No	But	Comment
Power technology in the junior high/middle school deals by cluster with electricity, electronics, transportation, power mechanics, hydraulics and pneumatics. Emphasis is an exploration of the technology and the industry involved with energy sources, energy conversion devices, transmission, application and conservation.				
Specific Criteria				
1. The power technology program in the junior high/middle school is taught as one of three clusters (industrial materials, visual communications, power technology) constituting a minimum of a 120 hour planned course.				
1.1 A minimum of 40 clock hours of instructional time, one third of the 120 hour planned course requirement for all students is allotted to this cluster of instruction.				
1.2 Power technology is taught in either its own facility or in a comprehensive general facility with visual communications and industrial materials.				
2. Class instruction, resources or assignments provide for the following concepts:				
2.1 Awareness of natural sources of energy including geothermal, gravitational, nuclear, chemical, fossil, and solar.				

Specific Criteria (Cont.)	Yes	No	But	Comment
2.2 Awareness of energy conversion devices including internal combustion engines, external combustion engines, and nuclear power generation.				
2.3 Awareness of methods of energy and power transmission including mechanical, electrical, hydraulic, pneumatic, acoustic, laser, and microwave.				
2.4 Understanding of energy control and storage.				
2.5 Awareness of conservation including alternate sources of solar, wind, hydro, and geothermal.				
3. Instruction in fundamental principles is provided through experimentation, application and construction activities for understanding that encompasses the following:				
3.1 The properties and interrelationships inherent in electrical voltage, current, resistance and power.				
3.2 The characteristics of series, and parallel circuits.				
3.3 The use of Ohm's Law and its required mathematical procedures in the interpretation and analysis of simple electrical and electronic circuits.				
3.4 The operating characteristics and safe usage of residential wiring systems.				

Specific Criteria (Cont.)	Yes	No	But	Comment
3.5 The properties and applications of electrostatics and electromagnetism.				
3.6 Characteristics of common solid-state electronic components and typical circuit applications in which each are found.				
3.7 In-depth instruction in the fundamentals of reciprocating spark ignition engines.				
3.7.1 The fundamental mechanics, components and subsystems.				
3.7.2 The operation of the engine				
3.7.3 Tear down and assembly of the engine.				
3.7.4 Testing, performance, applications, and environmental aspects of the engine.				
4. Instruction is provided about products, devices and processes, and students are required to demonstrate proficiency in the following ways:				
4.1 The correct and safe utilization of test equipment encompassing all areas of instruction.				
4.2 The interpretation of common schematic symbols and diagrams in the breadboarding and analysis of simple electrical and/or electronic circuits.				

Specific Criteria (Cont.)	Yes	No	But	Comment
4.3 The correct and safe utilization of tools, materials, measuring devices and procedures associated with all units of instruction.				
4.4 The utilization of printed circuits and solid-state electronic components in the construction of simple electronic projects.				
4.5 The application of mathematics and science.				
4.6 The understanding and ability to use service manuals, instructions and procedures for assembly.				
5. Instruction is provided about careers associated with industries and occupational clusters encompassed by the content.				
5.1 Careers related to power occupations.				
5.2 The importance of electrical and electronic, mechanical, hydraulic, pneumatic, and knowledge in a variety of related fields.				
5.3 The occupational clusters of transportation and communications are addressed.				
6. The program provides for student growth through leadership activities and exposure to new technologies.				

Specific Criteria (Cont.)	Yes	No	But	Comment
6.1 An opportunity for students enrolled to enter the AIASA-sponsored electronic project and "Metric 500" contests as well as other local and regional competitions.				
6.2 Identify applications and use computer technology in power and energy including: - Technical applications in rocketry o engine systems o guidance systems o aerodynamics - Energy saving devices - Power controlled devices				
6.3 Robotics: Including introduction to an understanding of servo systems, digital and binary notation control, and actuators (electro-mechanical, pneumatic, hydraulic).				

ATTACHMENT C

Junior High/Middle School
Visual Communications

Program Description	Yes	No	But	Comment
Visual communications in the junior high/ middle school deals by cluster with drawing, design, graphic arts and photography. Emphasis is on exploration of the technology and the industry involved in communicating ideas, information and attitudes through the sense of sight. Attention is given to generating, reproducing and transmitting visual images.				
Specific Criteria				
1. The visual communications program in the junior high/middle school is taught as one of three clusters (industrial materials, visual communications, power technology) constituting a minimum of a 120 hour planned course.				
1.1 A minimum of 40 clock hours of instructional time, one third of the 120 hour planned course requirement for all students is allotted to this cluster of instruction.				
1.2 Visual communications is taught in either its own facility or in a comprehensive general facility with power technology and industrial materials.				
2. The visual communications program provides for concepts in communicating visual images.				
2.1 Students trace the major stages of communicating a visual message.				

Specific Criteria (Cont.)	Yes	No	But	Comment
2.2 Students identify significant inventions and developments in the evolution of visual communications technology.				
2.3 Students describe the applications of visual communications technology in communications, manufacturing, construction and transportation.				
2.4 Students evaluate the contributions of visual communications technology to society.				
2.5 Students communicate with humans and machines using the language of visual communications.				
3. Instruction in fundamental principles is provided through planning, producing, finishing and presenting products in graphic reproduction and photography.				
3.1 Students plan graphic products through a layout of sequence that incorporates principles of good design.				
3.2 Students compose and proof hot and cold type.				
3.3 Students prepare line artwork and describe tonal illustrations.				
3.4 Students assemble graphic images and prepare image carriers.				

Specific Criteria (Cont.)	Yes	No	But	Comment
3.5 Students transfer images by the relief, planographic, stencil, intaglio, photographic and electrostatic reproduction processes.				
3.6 Students learn finishing and binding techniques.				
3.7 Students describe the characteristics of cameras and light sensitive materials.				
3.8 Students compose, produce and finish continuous tone photographs.				
4. Instruction in fundamental principles is provided through basic drafting and design.				
4.1 Project orthographic views having normal, inclined and cylindrical surfaces with hidden features.				
4.2 Explain the types of pictorial drawings including isometric, oblique and perspective.				
4.3 Represent the alphabet of lines in orthographic and pictorial drawings.				
4.4 Execute freehand drawings with and without grid paper.				
4.5 Perform quality freehand lettering.				
4.6 Dimension image sizes and locations on drawings.				

Specific Criteria (Cont.)	Yes	No	But	Comment
4.7 Describe the elements and principles of good two and three dimensional product design.				
5. Instruction is provided in occupational/career opportunities related to visual communications.				
5.1 The communications cluster of occupations is addressed.				
5.2 Activities provide occupational/ career information encompassing drafting, design, graphic arts and photography.				
6. The program provides for related student knowledge and skills in the following:				
6.1 Comprehension of the English, metric and point systems of measurement.				
6.2 Problem solving in planning, producing and finishing graphic images and products.				
6.3 Identification of consumer guidelines in selecting and using graphic images and products.				
6.4 Basic inquiry in obtaining and applying visual communications information.				
6.5 Selection, use and care of basic communications materials, tools and equipment.				

Specific Criteria (Cont.)	Yes	No	But	Comment
7. An opportunity exists for students enrolled to enter the AIASA sponsored toothpick bridge, safety poster, graphic arts, photography, "Metric 500" and "Dream House" contests as well as other local and regional competitions.				

ATTACHMENT D

Senior High Drawing/Design (Unit)

	Yes	No	But	Comment
An exemplary senior high school drawing/ design program provides for basic instruction in sketching, design, visualization, presentation, and descriptive geometry. Engineering drawing and architectural drawing are courses and sequences within the program. The primary objective of the program is literacy, with the language of industry in construction and production.				
Specific Criteria				
1. Basic as well as advanced courses are offered in engineering drawing and architectural drawing including independent study options.				
2. Careers in drafting and design are discussed and students have the opportunity to examine occupations through class experiences.				
3. The importance of the language, instrument and tool, and process knowledge of drafting and design as it relates to life skills and related occupations and careers is provided.				
4. Opportunities are available for students to enter the AIASA-sponsored "Dream House", "Metric 500" and Toothpick Bridge contests as well as other local and regional competitions.				
5. The program provides for:				
5.1 Skill with a wide variety of industrial drafting equipment, including its safe use, proper care and maintenance.				

Specific Criteria (Cont.)	Yes	No	But	Comment
5.2 Instruction in freehand single-stroke engineering and architectural style lettering and the use of dry transfer and mechanical lettering devices.				
5.3 Knowledge of the alphabet of lines and their conventional representation in orthographic and pictorial views.				
5.4 Freehand drawing with and without the use of grids, and emphasis on the importance of freehand drawing as a tool in problem-solving and in the design process.				
5.5 Knowledge and understanding of drawing reproduction processes in the area of drafting and design.				
5.6 Experience with simplified drawing techniques to understand their importance in industry.				
5.7 Instruction in the SI metric system of measure and its increasingly important role in industry and technology.				
5.8 Demonstrated knowledge of general industrial processes and how they are represented on drawings.				
5.9 Instruction in orthographic drawing including normal, inclined, oblique, curved and hidden surfaces, presented in a manner to develop problem-solving ability.				

Specific Criteria (Cont.)	Yes	No	But	Comment
5.10 Demonstrated ability to understand and draw geometric constructions as they apply to typical drawing problems.				
5.11 Pictorial drawing instruction for understanding the advantages and disadvantages of each type: axonometric (isometric), oblique and perspective.				
5.12 Instruction in selecting and drawing appropriate sectional views using proper drawing conventions to show full, half, removed, revolved, offset and broken-out sections.				
5.13 Instruction in primary and secondary auxiliary views.				
5.14 The students' ability to specify and draw threads and other standard fastening devices using their varied methods of representation.				
5.15 Intersection and development problems by varied methods.				
5.16 Instruction in conventional practices dealing with symbols used for schematic representation of welding/fabrication and electrical/electronic drawings.				
5.17 Appropriate selection of major classifications of working drawings: detailed drawings, assembly drawings and isometric exploded assembly drawings.				

Specific Criteria (Cont.)	Yes	No	But	Comment
5.18 Civil engineering problems to include topographical drawings developed from field notes arrived at by student surveying teams.				
5.19 Problem solving in basic descriptive geometry dealing with points, lines and planes (true length of a line, point view of a line, edge view of a plane and true shape of a plane).				
5.20 Activities in illustration using pencil, ink, washes and airbrush techniques, selecting appropriate materials for the most effective presentation.				
5.21 Basics of graphic design and layout procedures, with an emphasis on industrial design processes.				
5.22 Knowledge of residential construction practices, materials, systems, procedures and terminology as they relate to contemporary buildings, modular construction, energy conservation, and site selection and orientation.				
5.23 Understanding architectural design processes and the importance of working with client specifications in the development of a quality design and a professional set of working drawings.				
5.24 Knowledge of conventional representation of architectural features and use of proper symbols in representing information needed in residential construction drawings.				

Specific Criteria (Cont.)	Yes	No	But	Comment
5.25 Understanding the importance in architecture of making presentation drawings and building models.				
5.26 Awareness that local building codes, standards and specifications exist and understanding of how they apply in the design process.				
5.27 Understanding of fundamental techniques for proper placement of location and size dimensions, applications of general and local notes, knowledge of fits, tolerances, surface finishes and specifications, using fractional, decimal and dual dimensioning for metric conversion.				

ATTACHMENT E

Senior High Electricity-Electronics (Unit)

	Yes	No	But	Comment
An exemplary senior high school electricity-electronics program will provide both theoretical information and abundant opportunities for students to work with applications of the theory and other information studied. Instruction in both electricity and electronics is included, and opportunities are provided for students to pursue areas of individual interest. A multi-level sequence of courses is available for those who wish to pursue advanced study in the area.				
Specific Criteria 1. Instruction is provided in the areas of electricity, analog electronics and digital electronics. The following content areas will be included:				
1.1 Information on voltage, current, resistance and power, including both their properties and their interrelationships.				
1.2 The characteristics of series, parallel and combination AC and DC circuits, and the use of appropriate mathematical equations and procedures to analyze their operation.				
1.3 The properties and applications of both electrostatics and electromagnetism.				
1.4 The operation of inductance and capacitance in both AC and DC circuits.				

Specific Criteria (Cont.)	Yes	No	But	Comment
1.5 The operating characteristics, wiring systems and safe utilization of residential wiring.				
1.6 Operating principles and applications of a variety of discrete solid-state components and both analog and digital integrated circuits.				
1.7 Instruction about electronic circuits, to include power supplies, AF and RF amplifiers, oscillators, AM and FM receivers and transmitters, and control circuits.				
1.8 Instruction in digital electronics, to include gating and multivibrator elements, arithmetic systems, and timing, counting, and display systems.				
1.9 Instruction in computers and microprocessors, to include information about central processing units, memory, input and output devices, and a variety of high technology applications for the computer and the microprocessor.				
2. Instruction is provided about electrical and electronic products, devices and procedures, and students are required to demonstrate proficiency in the following ways:				
2.1 The use of component manufacturer's data books and other technical references to determine specifications and appropriate applications for electrical and electronic components.				

Specific Criteria (Cont.)	Yes	No	But	Comment
2.2 The design and fabrication of printed circuit boards using both hand and photograhic processes.				
2.3 The completion of all phases required in the construction of an electronic project, including achieving proper operation of that project.				
2.4 The utilization of analytical and problem solving skills in the troubleshooting of electrical and electronic devices.				
2.5 The use of tools and materials required for the wiring of typical residential electrical circuits.				
2.6 The utilization of schematic diagrams and required components to breadboard and analyze experimentally the operation of both electrical and electronic circuits.				
2.7 The use of electrical and electronic meters, both analog and digital, to measure voltage, current and resistance.				
2.8 The use of AC and DC power supplies, oscilloscopes, audio and RF generators, frequency counters, and component testers.				
3. Instruction is provided and opportunities are available for students to examine first-hand, careers associated with the electrical and electronics industries as follows:				

Specific Criteria (Cont.)	Yes	No	But	Comment
3.1 Careers in the areas of electrical and electronic servicing, technical processes, sales, manufacturing, installation, and engineering.				
3.2 The importance of electrical and electronic knowledge in a variety of related career fields.				
4 The program contains the following general features:				
4.1 Opportunities for students to research and to report upon topics of individual interest.				
4.2 Opportunities for students to enter the AIASA-sponsored electronic project contest as well as other local and regional competitions.				
4.3 At all times, theoretical principles and operations are related to real life applications.				

ATTACHMENT F

Senior High Graphic Arts (Unit)

	Yes	No	But	Comment
Graphic arts is a comprehensive industrial arts unit area of graphic communications technology and the industries that contribute to the manufacture of graphic products. Emphasis is on the major graphic reproduction processes of lithography, gravure, screen, flexography, letterpress, engraving, inkjet, photography and electrophotography. Experiences deal with typographical layout and design, hot and cold composition, reproduction photography, image assembly, image carriers, image transfer, auxiliary operations, finishing and binding, papers and inks.				
Specific Criteria				
1. Basic as well as advanced courses are offered in graphic arts including independent study options.				
2. Careers in communications are discussed and students have the opportunity to examine occupations through class experiences.				
3. The importance of material, tool, machine, and process knowledge of graphic arts and photography as it relates to life skills and related occupations and careers is provided.				
4. Opportunities are available for students to enter the AIASA-sponsored graphic arts and photography contests as well as other local and regional competitions.				
5. The graphic arts (communications) education program in the high school provides content for students to:				

Specific Criteria (Cont.)	Yes	No	But	Comment
5.1 Identify significant inventions and developments in the evaluation of graphic communications technology.				
5.2 Describe the applications and importance of graphic communications technology.				
5.3 Describe the size and growth of the graphic communications industries.				
5.4 Demonstrate layout techniques for thumbnail sketches, rough layouts, comprehensive layouts, dummies, manuscript copy and specifications.				
5.5 Apply the elements and principles of good design in planning single page, signature, single color and multiple color graphic products.				
5.6 Compose, proof, proofread and correct foundry, hand mechanical/ dry transfer, impact and photographic type.				
5.7 Prepare and paste-up line and tonal artwork for single and multiple color graphic products.				
5.8 Prepare mechanical negatives and positives.				
5.9 Produce quality continuous tone photographs for graphic reproduction.				

Specific Criteria (Cont.)	Yes	No	But	Comment
5.10 Demonstrate reproduction photography for line, halftone, special effects and process color separations.				
5.11 Calibrate process cameras, contact printers and proofing/platemaking equipment for proper exposures of line, halftone, special effects and process color copy.				
5.12 Lay out, strip and proof flats for single page, signature, single color, multiple color, step-and-repeat, surprint, reverse, screen tint and halftone images.				
5.13 Prepare rubber and photopolymer flexographic/letterpress plates.				
5.14 Prepare knife-cut, washout and photographic screen printing stencils.				
5.15 Describe the major gravure cylinder preparation methods.				
5.16 Prepare electrostatic and presensitized offset lithographic plates.				
5.17 Make ready, operate and maintain offset, intaglio, screen, letterpress, photographic and electrostatic graphic reproduction equipment.				

Specific Criteria (Cont.)	Yes	No	But	Comment
5.18 Explain offset, gravure, screen, letterpress, flexography, inkjet, photographic, electrostatic, thermographic, spirit and mimeograph graphic reproduction processes.				
5.19 Perform auxiliary, finishing and binding operations for loose sheet and signature printed products.				
5.20 Identify, select, manufacture, estimate and cut paper for various graphic products and reproduction processes.				
5.21 Describe the manufacture, ingredients, kinds, characteristics, mixing and color matching of printing inks.				
5.22 Apply the English, metric and point-system of measurement.				

ATTACHMENT G

Senior High Metalworking (Unit)

	Yes	No	But	Comment
An exemplary senior high school metalworking program provides for designing, planning, constructing and manufacturing products in metal. Instruction covers occupational information of industry and technology. Students use hand tools and power equipment as they develop avocational interests, acquire technical literacy, explore self for decision making, develop problem solving skills, and gain understanding of manufacturing and construction through fundamentals of metalworking.				
Specific Criteria				
1. The program enables students to explore metalworking technology as well as meet exploratory and preparatory needs.				
2. General metalworking is taught as a beginning course with advanced courses offered including independent study options.				
3. Careers in metalworking are discussed and students have the opportunity to examine occupations through class experience.				
4. The importance of material, tool, machine, and process knowledge of metalworking and manufacturing as it relates to life skills and related occupations and careers is provided.				
5. Opportunities are available for students to enter the AIASA-sponsored manufacturing contest as well as other local and regional competitions.				

Specific Criteria (Cont.)	Yes	No	But	Comment
6. Instruction in planning and layout is preliminary to construction and manufacturing activities in metalworking.				
7. Material characteristics, by-products and construction techniques are taught as necessary for design, planning and process selection.				
8. Instruction in and activities requiring layout, pattern, and transfer operations are part of the program.				
9. Instruction and learning activities are provided in bench metal, sheet metal, art metal, forging, foundry, welding and machining.				
9.1 Instruction and learning activities are provided in quality control technology and destructive and non-destructive testing as well as metals research				
10. Basic tool and machine skills are taught as they relate to manufacturing and construction.				
11. Manufacturing and construction activities in metalwork include:				
11.1 Methods of separating metals, cutting, drilling, and threading				
11.2 Both hot and cold methods for forming				

Specific Criteria (Cont.)	Yes	No	But	Comment
11.3 Cohesion and adhesion metal joining such as oxyacetylene, stick electrode, TIG/MIG and spot welding and soldering methods to combine or join steel, stainless steel, aluminum, copper alloys and other metals				
11.3.1 Mechanical fastening techniques, tools and devices are taught.				
12. Manufacturing and constructing activities in sheet metal and art metal include:				
12.1 Cutting, forming, shaping and assembling sheet and solid stock				
12.2 Forming techniques in metal spinning				
13. Manufacturing and construction activities in forging and foundry include:				
13.1 Forging metal as a forming process as well as a hand craft				
13.2 Metal conditioning techniques in the heat treating processes				
14. Manufacturing and construction activities in foundry include:				
14.1 Pattern making and casting processes in core making, sand molding, shell molding and other industrial applications for aluminum and brass				

Specific Criteria (Cont.)	Yes	No	But	Comment
14.2 Sand conditioning for casting processes				
14.3 Foundry metal characteristics, conditioning techniques and alloying				
15. Manufacturing and construction activities in machining include:				
15.1 Techniques in drilling, turning, milling, grinding, and shaping				
15.2 Techniques in electric discharge machining, powdered metals and high energy rate forming.				
16. Both SI metrics and customary units of measure are applied and understood.				
17. Activities to demonstrate the importance and application of computer controlled or activated metalworking equipment are provided.				
17.1 Hands-on computer experience for the primary purpose of teaching problem solving and analytical thinking is provided.				

ATTACHMENT H

Senior High Photography (Unit)

	Yes	No	But	Comment
An exemplary senior high photography program provides information on chemistry and the principles of continuous tone photography for both avocational interests and future training and/or employment. Attention is given to camera operation, film and print processing procedures and comprehensive composition techniques.				
Specific Criteria 1. Basic as well as advanced courses and independent study options are offered in the photography area.				
2. Careers in photography are examined and amateurs, professionals and other resource people from the local community are used to stimulate student interest.				
3. Opportunities are available for students to enter AIASA-sponsored photography contests as well as other local, regional and state competitions.				
4. Classroom lectures and demonstrations, resources from outside institutions, (colleges, universities, art schools), and private visual collections aid in providing the following concepts:				
4.1 Awareness of camera operations, including use of f-stops, shutter speeds, depth of field, focal length, light meters (built in and hand held) and other camera accessories. Inclusive in this process is knowledge of types of cameras available for use.				

Specific Criteria (Cont.)	Yes	No	But	Comment
4.1.1 Knowledge of camera settings producing specific lighting situations, stop action, motion blur, peak action, depth of field, the zone system, and time exposures.				
4.1.2 Demonstrate available camera accessories such as flash, tripod, slave, bellows, extension tubes, matte box, alternate lenses and filters.				
4.2 Awareness of types of film, structure of film, correct exposure of film, film handling, and reciprocity failure.				
4.2.1 Demonstrate the correct processing for black and white panchromatic film.				
4.3 Demonstrate black and white darkroom techniques including the correct use of the enlarger, reductions and enlargements on the enlarger, paper processing chemistry, safe lights, use of the enlarger easel, focusing aids and paper identification in the darkroom facility.				
4.3.1 Instruction in processing techniques as they relate to print making in the darkroom. Experience in printing techniques by contact printing, enlarging prints, use of polycontrast filters, types of print papers, paper grade variations and surfaces, dodging and burning in, vignetting, multiple exposures and special effects. Also, application of exposure meters and densitometers for correct color printing.				

Specific Criteria (Cont.)	Yes	No	But	Comment
4.3.2 Awareness of black and white and color print material costs (for further reference as a photographer or hobbyist).				
4.4 Demonstrate use of filtering with color printing filters and color enlargers.				
4.4.1 Demonstrate correct use of color chemistry, knowledge of types of color chemistry, and motor base for processing color print materials.				
4.4.2 Application of color printing techniques to produce high quality, color corrected prints including skin tones on color print material.				
4.4.3 Demonstrate the ability to color correct any color print produced from negatives or slides/transparencies.				
4.4.4 Develop an understanding of the additive and subtractive theory of color.				
4.5 Concepts identified as sound and tested compositional techniques are applied. Techniques such as balance, harmony, proportion and contrast are explored. Emphasis is placed on a visual awareness or visual literacy about that which is seen.				

Specific Criteria (Cont.)	Yes	No	But	Comment
4.5.1 Application of compositional skills in portraiture, nature, existing light (indoors, outdoors), close up photography and other specialized photographic techniques.				
4.5.2 Applications of good design and principal compositional elements found in basic black and white photography should be utilized to produce high quality black and white and color prints from color slides or negatives.				
4.6 Facility appropriated for use as a portrait studio, complete with lights (studio portrait lights), background, and props.				
4.7 Demonstrate and apply correct visual presentation techniques through the use of mounting or matting prints, or slide presentations.				
4.7.1 Knowledge of video photography and cinematography in industry and individual situations.				
4.8 Description of significant historical happenings and new technology in photography.				
4.9 Knowledge of chemical safety and electrical safety procedures when using the darkroom and chemistry for developing.				

ATTACHMENT I

Senior High Power Technology (Unit)

	Yes	No	But	Comment
An exemplary senior high power technology program is characterized by content in power source, conversion, transmission and utilization. A major emphasis is devoted to theory, maintenance and servicing of machines and devices for conversion of power into useful forms. Experiences include designing, constructing, evaluating, and testing power devices. Emphasis is on applications such as transportation.				
Specific Criteria				
1. Power technology is taught as a beginning course with advanced courses offered including independent study options.				
2. Careers in power technology and transportation are discussed and students have the opportunity to examine occupations through class experiences.				
3. The importance of power devices, tools, test equipment and procedures as related to life skills and related occupations.				
4. Opportunities are available for students to enter the AIASA-sponsored "Metric 500" contest as well as other local and regional competitions.				
5. The program provides for instruction in:				
5.1 Tools and measuring devices - specifications and shop manuals.				

Specific Criteria (Cont.)	Yes	No	But	Comment
5.2 Natural energy devices - solar, wind, water, chemical and nuclear.				
5.3 Steam power - reciprocating and turbine.				
5.4 Power today - devices used in conversion, transmission, control and utilization.				
5.5 Nuclear power reactors - fission and fusion.				
5.6 Power for tomorrow.				
5.7 Exotic devices - thermionic converters, magnetohydrodynamic, biocells, plasma jets and free piston engines.				
5.8 Types and uses of internal combustion two stroke cycle engines.				
5.9 Types and uses of internal combustion four stroke cycle engines.				
5.10 Fluid power - its history and development and utilization computers for ignition and fuel control.				
5.11 Electrical-mechanical mechanisms - computer controlled servo devices (robots).				
6. The program provides for instruction and hands-on activity with:				
6.1 Two stroke cycle engine operation, disassemble and assemble, testing, static and dynamic				

Specific Criteria (Cont.)	Yes	No	But	Comment
6.1.1 Troubleshooting and maintenance of two stroke cycle engines				
6.2 Engine construction and parts				
6.2.1 Engine lubricating systems				
6.2.2 Engine cooling systems				
6.2.3 Engine exhaust systems				
6.2.4 Engine measurement and performance				
6.2.5 Engine fuels				
6.2.6 Engine fuel systems				
6.2.7 Carburation systems				
6.3 Automotives				
6.3.1 Fundamentals of automotive electricity				
6.3.2 Power trains - gear ratios and torque				
6.3.3 Clutches				
6.3.4 Manual transmission and overdrive operation				
6.3.5 Automatic transmission				

Specific Criteria (Cont.)	Yes	No	But	Comment
6.3.6 Drive lines and universal joints				
6.3.7 Rear axles and differential				
6.3.8 Front wheel drive				
6.3.9 Power steering systems				
6.3.10 Automotive brake systems				
6.3.11 Engine emission controls				
6.4 Diesel engines - types, operations and applications				
6.5 Rotary engines - turbine and Wankel				
6.6 Small marine engines				
6.7 Transmission and control of power through use of a gas (pneumatics) and liquid (hydraulics)				
6.8 Design, construction and understanding of hydraulic system application				

ATTACHMENT J

Senior High Woodworking (Unit)

	Yes	No	But	Comment
An exemplary senior high school woodworking program provides for designing, planning, constructing and manufacturing products in wood. Instruction covers occupational information, the industry, and technology. St·dents use hand tools and power equipment as they develop avocational interests, acquire technical literacy, explore self for decision making, and gain understanding of manufacturing and construction through fundamentals of woodworking.				
Specific Criteria 1. The program enables students to explore woodworking technology as well as meet exploratory and preparatory needs.				
2. Basic as well as advanced courses are offered in woodworking technology including independent study options.				
3. The history of the woodworking industry is studied.				
4. Projects and other activities are undertaken using processes and materials appropriate to satisfactory completion of course objectives.				
5. The instructional program addresses wood as a material and the technology of its processing.				
6. Lumbering and timber conservation are studied.				
7. Wood and ɔod by-products are discussed.				

Specific Criteria (Cont.)	Yes	No	But	Comment
8. The characteristics of wood are studied and applied to manufacturing and construction activities.				
9. The students plan and design for their class activities.				
10. Procedures and material lists are developed by the students.				
11. Both SI metrics and customary units of measure are applied and understood.				
12. Lumber sizing is studied and applied to class activities.				
13. Woodworking hand tools, portable power tools and stationary machine tools being used are appropriate to the difficulty of the task at hand.				
14. The students display an understanding of the processes they are engaged in, including material acquisition, cutting, layout, joinery, assembly, surface preparation and finishing.				
15. The students receive basic instruction in residential construction.				
16. Manufacturing activities are an integral part of the program.				
17. Student construction activities involve the utilization of solid lumber, laminates, and composition materials.				
18. Careers in construction and manufacturing are discussed and students have the opportunity to examine occupations through class experiences.				

Specific Criteria (Cont.)	Yes	No	But	Comment
19. The importance of material, tool and machine knowledge of woodworking as it relates to home and related occupations and careers is provided.				
20. Opportunities are available for students to enter the AIASA-sponsored manufacturing and "Metric 500" contests as well as other local and regional competitions.				