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ABSTRACT

This report includes a description of a project to develop and field-test competency-based instructional materials for handicapped students enrolled in regular vocational agriculture programs; a list of project advisory personnel; the clusters of skills identified as appropriate for handicapped students enrolled in courses in dairy production, horse husbandry, plant production, and agricultural mechanics; and sample task instruction sheets. Checklists for use in evaluating students' skills in the following areas are provided: employability; occupational safety; production economics, management, and mechanics; and broiler and egg, dairy, swine, and beef cattle production. Included among the topics covered in the sample task instruction sheets provided are various recordkeeping, technical, feeding, breeding, calving, grooming, handling, planting, and growing skills. Each task instruction sheet contains some or all of the following: a task statement, a task description, a list of materials and tools needed, a description of information to be provided to students, lists of skills addressed and new words, and student evaluation criteria in the form of task statements. During the course of the project, materials for use in teaching 53 separate skills in the 4 target subject areas were developed and field-tested. The personnel list, skills lists, and task instruction sheets are contained in appendixes which constitute the bulk of the document. (MN)

FINAL REPORT

Development of Competency-Based Vocational Agricultural Instructional Materials for Handicapped Students Enrolled in Regular Agriculture Programs Other than Horticulture

(Pennsylvania Department of Eduction Contract 93-4007)

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and

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in
cooperation with

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Abstract

Background

Teachers of vocational agriculture are frustrated with the lack of competency-based instructional materials designed to help handicapped students who are enrolled in their programs. About 99 percent of the resources materials (text books) used by vocational agriculture teachers are designed for the "regular" secondary school student. National publishers of agricultural resource materials (Interstate Publishers and Printer for example) do not publish any instructional materials appropriate for handicapped nor disadvantaged students. Yet, teachers of vocational agriculture are expected to provide an equal educational to handicapped students although they have not receive proper training or have access to appropriate instructional materials. Teachers of vocational agriculture need appropriate competency-based instructional materials to use when working with handicapped students. This project sought to identify or develop materials to use when working with handicapped stude..cs.

Rationale

According to the 1982 Pennsylvania Advisory Council on Vocational Education, about 14,000 handicapped students are enrolled in secondary vocational education programs. Additionally, vocational agriculture claims about 6 percent of this handicapped student population. Therefore, nearly 1,000 handicapped students may be enrolling in vocational agricultural programs each year and needing appropriate instructional materials.

Project Objectives

a) To identify existing agricultural instructional materials appropriate for handicapped students.

b) To identify areas where agricultural competency-based vocational instructional materials are needed.

c) To field test agricultural agricultural competency-based instructional materials, and

d) To distribute research and instructional materials to secondary vocational agriculture programs throughout the Commonwealth.

Introduction

The Vocational Rehabilitation Act of 1973, Section 503 and 504 guaranteed that all handicapped persons shall have equal access to all programs, jobs, and housing (Cartwright, Cartwright and Ward, 1981, p. 3). Thusly, educators were legally bound by law to open their facilities and programs to the handicapped. As the need for vocational training became more recognized, more tax dollars were invested in vocational programs. Likewise, vocational educators were held increasingly accountable for their actions in meeting the needs of the handicapped.

In 1975, Congress passed into law The Education of All Handicapped Children Act (P. L. 94-142). This Act mandated that all phyically, mentally, and emotionally and sensorly handicapped children be provided with the opportunity to receive a free appropriate public education (Simonson, 1980, p. 1). This Act was reinforced and expanded with the passage of the Educational Amendment of 1976 (P. L. 94-482). The 1976 Amendment defined the different handicap student categories who require special education and related services and because students with these handicapping condition cannot succeed in the regular vocational education program without special assistance. Congress also allocated over 500 million dollars to educational agencies to operate programs for the handicapped population (Simonson, 1980, p. 1).

Research conducted by Mallilo, Baggett, and Curtis (Status of Pennsylvania Special Needs Students in Agriculture, 1982) indicated that little or no materials are available for use with handicapped students enrolled in regular vocational agricultural programs. An overwhelming 73.4 percent of the teachers surveyed substantiated this finding. Only 4.5 percent of the teachers

attempted to modify regular materials for use with handicapped students. The need for appropriate instructional materials is a document need.

Methodology

An outline defining the procedures to conduct the project was established. This outline listed specific steps and appropriate actions needed to complete the project within the time frame specified. It included the following:

1. Determination of skills needed by persons serving on the advisory capacity.
2. Determination of skills needed by project personnel.
3. Determination of skills thought to be appropriate for handicapped students enrolled in vocational agriculture.
4. Other sources of appropriate instructional materials.
5. Determination of content, approach, and reading level to be used in producing instructional materials.
6. Determination of which skills are most appropriate for writing competency-based instructional materials.
7. Determination of dates and time to accomplish steps to complete the project.

Selecting the Advisory Personnel

Since the advisory personnel was felt to be an intergral and valuable part of this project, it was a necessity to select persons with respected expertise in the different areas of the practical and scientific aspects of agriculture and persons with a strong knowledge of teaching handicapped students. The advisory personnel included persons skilled in agricultural mechanics, animal

production, and plant production, a public school teacher, and special needs educators at the intermediate unit and university levels. A list of these individuals is found in the Appendix A. These indivduals provided valuable advise during the duration of this project.

Selecting Personnel

The project director identified several individuals that made an important contribution in the completion of this project. Two graduate assistants were selected for this project. In identifying these individuals, the primary consideration was given to skills, interest, and academic preparation. It was felt that two area of academic preparation was important--knowledge of special needs education and knowledge of the practical and scientific aspects of agriculture. In addition to these skills, interest and attitude were important factors. These individuals worked very closely with the project director and other personnel associated with this project. The names of these individuals appear on the cover of this report.

Determination of Skills Thought to be Appropriate for the Handicapped

This phase of the project was accomplished through a review of tasks and skills listed in the National Agriculture Occupations Competency Study (McClay, 1978). Skills under the categories of employability skills, occupational safety practicies, production economics and management, beef cattle production, dairy production, swine production, broiler and egg production, and production mechanics. Skills listed in these broad categories are felt to be essential for all students enrolled in vocational agriculture programs. However, it was well understood that many special needs students may not be able to master all of these skills given the constraints of their handicapping conditions. A list of these skills is found in Appendix B.

Other Sources of Appropriate Instructional Materials

Two methods were used in an effort to locate "ready-made" instructional materials appropriate for use with handicapped students. One method involved a broad based search through The Pennsylvania State University's computerized literature search system. After reviewing the descriptions of many pieces of materials, it was determined that few, if any, were appropriate for handicapped students enrolled in vocational agriculture programs. Materials located did not address the subject of agriculture, especially the practical and scientific nature.

Another method used to locate appropriate instructional materials in agriculture was telephone contact with other institutions of higher education. This activity was directed toward those landgrant institutions established under the 1862 and 1890 legislation. Departments specializing in the different domains of the agricultural science were contacted. These domains in beef production, dairy production, poultry production, horse husbandry, and agricultural engineering and mechanics. Communication with institution with instructional responsibility in these domains did not indicate the availability of any materials appropriate for the special needs student although much materials were said to be adaptable for use with this student population. Generally, materials were produced or developed for the "normal" students.

Determination Content, Approach and Reading Levels

The task instruction sheet approach was felt to be most appropriate for instructional materials development. This approach is consistent with task instruction sheets developed for the "normal" student and with task instruction sheets developed by the Department of Agricultural and Extension Education for use with special needs student enrolled in horticultural programs. This task

instruction sheet approach includes six areas. These include 1) the name of the task along with the instructional area in which it fits, 2) the statement of student objective to be accomplished by the student, 3) a description of the task indicating how or why the task is important, 4) all materials and equipment needed to accomplish the objective or task activity, 5) clear and concise directions needed to perform the task and 6) an evaluation component to determine proficiency in completing the activity.

Advisory personnel with expertise in readability and special education indicated that the reading level of most students needing special assistance is at or about the fourth grade level. The highest recommended reading level for these types of materials was grade six. Therefore, efforts and energy were directed toward maintaining a reading level between grades four and six. To help accomplish this goal, a software program titled Readability Formulas, produced by Computer Based Learning, Encyclopaedia Britannica Educational Corporation, was heavily used.

Determination of Appropriate Skills for Developing Instructional Materials

Much thought went into determining which skills would be most appropriate for developing instructional materials for use with handicapped students. Factors guiding this decisions were cognitive abilities of the students, the manipulative abilities of the students, the difficulty level of the task or skill to be performed, the time required to perform the skill, the motivational aspect of the skill, and the subject matter relativeness to the job market. All of these factors made the job of selecting a number of skills very difficult. Through a consensus of advisory personnel, the following skills were selected.

DAIRY PRODUCTION

Learning the body parts of a dairy animal

How to tell when a cow or heifer is going to have a calf

Ear tagging young dairy calves

Dipping the navel cord of a newborn calf

Ear tattoing young dairy calves

Using a weighing tape to find the weight of a dairy calf

Using a measuring stick to find the height of a dairy calf

Feeding colostrum milk to newborn calves

Feeding sour colostrum to dairy calves

Haltering a dairy calf

Winter clipping a dairy cow

HORSE HUSBANDRY

Learning the body parts of a horse

Checking horses for signs of illness or injury

Cleaning the saddle

Cleaning the bridle

Checking the saddle and bridle for signs of weakness

Cleaning the stall

Leading a horse

Bridling a horse

Haltering a horse

Cleaning the front feet

Cleaning the rear feet

Checking the hooves for dryness

Checking the hooves for thrush

Sponging down a horse

Cooling down a horse

Grooming a horse

Bathing a horse

AGRICULTURAL MECHANICS

Cutting metal with a hacksaw

Drilling holes in metal

Cutting threads on a bolt

Threading nuts

Riveting

Dressing to weld

Preparing metal for welding

Setting up gas welding equipment

Adjusting torch and flame on gas welding equipment

Shutting down gas welding equipment

Cutting pipe with a pipe cutter

Reaming a pipe

Threading a pipe

Making a flare joint

Sweating cooper joints

Laying out fence line

Digging post holes

Setting fence posts

Bracing corner posts with brace member

Bracing corner post with a brace wire

PLANT PRODUCTION

Choosing seeds based upon seed label information

Choosing seed based upon seed pack information

Performing seed germination tests

Planting seeds

Preparing the soil for planting

Planting practices

Copies of these task instruction sheets are found in Appendix C.

Objectives Not Accomplished

As of the writing of this project report, the project is still incomplete to the extent of accomplishing all of the objectives identified at the start of the project. This was due mainly to the large number of tasks or skills identified for the writing of instructional materials. These task instruction sheets have been field tested to determine if they are usuable ,as written, in the classroom. However, the Agricultural and Extension Education Department has adopted field testing of instructional materials as standard procedures. Therefore, work will continue until the project is completed to the satisfaction of our procedures although the funded period has expired. At that time, copies of the finished product will distributed to vocational agriculture teachers of handicapped students.

Appendix A

Advisory Personnel

Advisory Personnel

Connie D. Baggett
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Appendix B

Skills Appropriate for Handicapped Students

EMPLOYABILITY SKILLS

		Most Important	Very Important	Of Some Importance	Important	Not Important
1.	Identify job titles and descriptions of occupations that use agricultural skills.	5	4	3	2	1
2.	Identify industries which employ individuals with agriculture skills.	5	4	3	2	1
3.	Write a letter of application in the proper form.	5	4	3	2	1
4.	Complete applications for employment.	5	4	3	2	1
5.	Effectively communicate one's skills and personality during an employment interview.	5	4	3	2	1
6.	Identify credentials one must obtain before starting work.	5	4	3	2	1
7.	Complete tax and other forms for the hiring process.	5	4	3	2	1
8.	Others (list).	5	4	3	2	1

OCCUPATIONAL SAFETY PRACTICES

		Most Important	Very Important	Of Some Importance	Important	Not Important
1.	Read and interpret safety signs and symbols.	5	4	3	2	1
2.	Read and interpret color codes.	5	4	3	2	1
3.	Use standard hand signals in high noise areas.	5	4	3	2	1
4.	Wear protective clothing.	5	4	3	2	1
5.	Wear eye protection.	5	4	3	2	1
6.	Wear hearing protection.	5	4	3	2	1
7.	Use personal protective equipment.	5	4	3	2	1
8.	Install and adjust guards on equipment and machinery.	5	4	3	2	1
9.	Provide adequate lighting.	5	4	3	2	1
10.	Provide adequate ventilation systems.	5	4	3	2	1
11.	Keep work area clean and free from debris.	5	4	3	2	1
12.	Store chemicals correctly.	5	4	3	2	1
13.	Store combustable material safely.	5	4	3	2	1
14.	Select and install proper fire extinguishers for type of fire.	5	4	3	2	1
15.	Identify and correct safety hazzards.	5	4	3	2	1
16.	Interpret safety instructions in owner's manual.	5	4	3	2	1
17.	Maintain equipment to avoid injury.	5	4	3	2	1
18.	Follow state health requirements.	5	4	3	2	1
19.	Be familiar with noise control techniques.	5	4	3	2	1
20.	Dispose wastes without causing environmental problems.	5	4	3	2	1

21.	Use proper lifting and carrying methods.	5 4 3 2 1
22.	Store medicines and poisenous substances properly.	5 4 3 2 1
23.	Use tools, power hand tools and machinery safely.	5 4 3 2 1
24.	Use compressed air safely.	5 4 3 2 1
25.	Ground electrical equipment to prevent shock.	5 4 3 2 1
26.	Others (list).	5 4 3 2 1

PRODUCTION ECONOMICS AND MANAGEMENT

		Most Important	Very Important	Of Some Importance	Important	Not Important
1.	Set realistic goals for a production enterprise.	5	4	3	2	1
2.	Know equipment and labor requirements.	5	4	3	2	1
3.	Keep and analyze production records.	5	4	3	2	1
4.	Keep accounts for income tax reports.	5	4	3	2	1
5.	Budget the annual cost and returns.	5	4	3	2	1
6.	Determine uses of credit and appropriate credit repayment terms.	5	4	3	2	1
7.	Determine the most economical sources of money supply.	5	4	3	2	1
8.	Calculate various efficiency factors to determine the least cost and maximum return to enterprise.	5	4	3	2	1
9.	Determine production performance.	5	4	3	2	1
10.	Determine results to be obtained from the modification or adoption of new practices.	5	4	3	2	1
11.	Compare the results of new practices to those obtained from local tests.	5	4	3	2	1
12.	Analyze the profitability of the business.	5	4	3	2	1
13.	Others (list).	5	4	3	2	1

PRODUCTION MECHANICS

	Most Important	Very Important	Of Some Importance	Important	Not Important
A. Identify and fit shop tools and equipment.					
1. Identify tools and equipment.	5	4	3	2	1
2. Fit handles in hammers, axes, hatchets, and picks.	5	4	3	2	1
3. Fit handles in hoes, rakes, and forks.	5	4	3	2	1
4. Sharpen knife blades.	5	4	3	2	1
5. Sharpen twist drills.	5	4	3	2	1
6. Sharpen shovels and hoes.	5	4	3	2	1
7. Sharpen cold and wood chisels and plane blades.	5	4	3	2	1
8. Sharpen screw drivers.	5	4	3	2	1
9. Sharpen axes, hatchets, and picks.	5	4	3	2	1
B. Use drawings and blueprints.					
1. Read and interpret drawings.	5	4	3	2	1
2. Apply dimensions to drawings.	5	4	3	2	1
3. Figure bills of materials.	5	4	3	2	1
4. Make free-hand sketches.	5	4	3	2	1
5. Make drawings to scale.	5	4	3	2	1
C. Perform farm carpentry skills.					
1. Drive and remove nails.	5	4	3	2	1
2. Operate power saws.	5	4	3	2	1
3. Saw to dimension with hand and/or power saws.	5	4	3	2	1
4. Bore holes.	5	4	3	2	1

5.	Set screws.	5 4 3 2 1
6.	Select appropriate fastners (nails, hinges, etc.)	5 4 3 2 1
7.	Select kinds and grades of lumber for a job.	5 4 3 2 1
8.	Plan to dimension with hand and/or power tools.	5 4 3 2 1
9.	Use wood chisels.	5 4 3 2 1
10.	Glue wood properly.	5 4 3 2 1
11.	Operate jointer.	5 4 3 2 1
12.	Operate thickness planer.	5 4 3 2 1
D.	Use paint and paint equipment.	
1.	Select paints or preservatives.	5 4 3 2 1
2.	Prepare metal surfaces for painting.	5 4 3 2 1
3.	Prepare wood surfaces for staining or painting.	5 4 3 2 1
4.	Mask areas prior to painting.	5 4 3 2 1
5.	Apply paint with brush or roller.	5 4 3 2 1
6.	Apply paint with spray gun.	5 4 3 2 1
7.	Clean and store paint brushes and rollers.	5 4 3 2 1
8.	Clean and store spray gun.	5 4 3 2 1
E.	Welding.	
1.	Practice safety in welding.	5 4 3 2 1
2.	Operate AC welder.	5 4 3 2 1
3.	Operate DC welder.	5 4 3 2 1
a.	select electrodes.	5 4 3 2 1
b.	determine amperage and polarity settings.	5 4 3 2 1
c.	strike arc.	5 4 3 2 1
4.	Operate oxy-acetylene welder.	5 4 3 2 1
a.	turn on equipment.	5 4 3 2 1

b.	check for leaks.	5 4 3 2 1
c.	adjust pressure regulator.	5 4 3 2 1
d.	light and adjust flame.	5 4 3 2 1
e.	shut off equipment.	5 4 3 2 1
f.	clean cutting toarch.	5 4 3 2 1
g.	clean tips.	5 4 3 2 1
h.	change cylinder.	5 4 3 2 1
5.	Prepare metal for welding.	5 4 3 2 1
6.	Lay beads on flat plane with rod.	5 4 3 2 1
7.	Make a corner weld using no rod.	5 4 3 2 1
8.	Construct flat butt weld.	5 4 3 2 1
9.	Construct fillet weld - flat position.	5 4 3 2 1
10.	Adjust cutting assembly.	5 4 3 2 1
11.	Repair cut.	5 4 3 2 1
12.	Cut plate.	5 4 3 2 1
13.	Weld bead on pipe, rolled.	5 4 3 2 1
14.	Hard surface a steel plate.	5 4 3 2 1
F.	Perform skills for hot and cold metal work.	
1.	Cut thread with tap and die.	5 4 3 2 1
2.	Drill holes in metal.	5 4 3 2 1
3.	Use files correctly.	5 4 3 2 1
4.	Identify metals.	5 4 3 2 1
5.	Cut with tin snips.	5 4 3 2 1
6.	Solder metal.	5 4 3 2 1
7.	Cut with cold chisel.	5 4 3 2 1
8.	Cut with hand hack saw.	5 4 3 2 1
9.	Bend metal.	5 4 3 2 1

10.	Use and maintain soldering copper.	5 4 3 2 1
11.	Use power hack saw.	5 4 3 2 1
12.	Form sheet metal joints.	5 4 3 2 1
13.	Anneal, harden and temper metal.	5 4 3 2 1
G.	Operate and maintain farm engines.	
1.	Start and operate gas and diesel engines.	5 4 3 2 1
2.	Operate trucks and tractors.	5 4 3 2 1
3.	Read and follow owner's manual.	5 4 3 2 1
4.	Maintain oil level.	5 4 3 2 1
5.	Change oil and oil filters.	5 4 3 2 1
6.	Service air and fuel filters.	5 4 3 2 1
7.	Maintain battery water.	5 4 3 2 1
8.	Remove and connect battery cables.	5 4 3 2 1
9.	Charge batteries.	5 4 3 2 1
10.	Determine voltage of batteries.	5 4 3 2 1
11.	Read battery hydrometer.	5 4 3 2 1
12.	Clean, gap, and replace spark plugs.	5 4 3 2 1
13.	Clean, gap, and install breaker points.	5 4 3 2 1
14.	Install condensors.	5 4 3 2 1
15.	Time engines using timing light.	5 4 3 2 1
16.	Test anti-freeze.	5 4 3 2 1
17.	Lubricate trucks and tractors.	5 4 3 2 1
18.	Maintain and service tires.	5 4 3 2 1
19.	Check and replace water hoses.	5 4 3 2 1
20.	Replace gaskets.	5 4 3 2 1
21.	Test and replace fan belts.	5 4 3 2 1
22.	Adjust belts and pulleys.	5 4 3 2 1

23.	Install break linings.	5 4 3 2 1
24.	Clean small gasoline engines.	5 4 3 2 1
25.	Operate steam cleaner or high pressure cleaner.	5 4 3 2 1
26.	Clean radiators and cooling systems.	5 4 3 2 1
27.	Load and unload trucks by hand or with mechanical devices (hoists, lifts, winches).	5 4 3 2 1

H. Operate and maintain farm machinery.

1.	Hitch implements.	5 4 3 2 1
2.	Adjust V-belts for tension.	5 4 3 2 1
3.	Clean planting equipment.	5 4 3 2 1
4.	Clean fertilizer equipment.	5 4 3 2 1
5.	Lubricate field machines.	5 4 3 2 1
6.	Assemble new machinery.	5 4 3 2 1
7.	Recondition worn equipment.	5 4 3 2 1
8.	Store equipment.	5 4 3 2 1
9.	Operate crop seeding equipment.	5 4 3 2 1
10.	Operate fertilizing equipment.	5 4 3 2 1
11.	Operate soil tillage equipment.	5 4 3 2 1
12.	Operate crop cultivation equipment.	5 4 3 2 1
13.	Operate crop harvesting equipment.	5 4 3 2 1

I. Perform rural electrification skills.

1.	Use safety measures in electrical wiring.	5 4 3 2 1
2.	Know electrical terminology such as watts, volts, amps, and ohms.	5 4 3 2 1
3.	Select correct fuse sizes.	5 4 3 2 1
4.	Replace fuses.	5 4 3 2 1
5.	Make splices.	5 4 3 2 1
6.	Repair electrical cords.	5 4 3 2 1

7.	Wire on - off switches.	5 4 3 2 1
8.	Select wire sizes.	5 4 3 2 1
9.	Attach wires to terminals.	5 4 3 2 1
10.	Solder splices.	5 4 3 2 1
11.	Install wire nut connectors.	5 4 3 2 1
12.	Install light fixtures.	5 4 3 2 1
J.	Perform home convenience and sanitation skills.	
1.	Repair leaky faucets.	5 4 3 2 1
2.	Thread pipe.	5 4 3 2 1
3.	Assemble pipe and pipe fittings.	5 4 3 2 1
4.	Measure and cut pipe.	5 4 3 2 1
5.	Cut and install glass.	5 4 3 2 1
6.	Measure, cut, and install fiberglass.	5 4 3 2 1
K.	Build and repair farm fences.	
1.	Brace corner posts.	5 4 3 2 1
2.	Repair fences.	5 4 3 2 1
3.	Trouble shoot electric fences.	5 4 3 2 1
4.	Dig post holes.	5 4 3 2 1
5.	Use power posthole digger.	5 4 3 2 1
6.	Set posts.	5 4 3 2 1
7.	Set steel posts.	5 4 3 2 1
8.	Lay out fence lines.	5 4 3 2 1
9.	Stretch wire.	5 4 3 2 1
10.	Splice wire	5 4 3 2 1
11.	Secure wire to posts.	5 4 3 2 1
12.	Anchor fence lines.	5 4 3 2 1
13.	Build wire gates.	5 4 3 2 1

14. Treat fence posts. 5 4 3 2 1

15. Install electric fences. 5 4 3 2 1

L. Other (list).

BROILER AND EGG PRODUCTION

	Most Important	Very Important	Of Some Importance	Important	Not Important
A. Prepare house for baby chicks or started pullets.					
1. Spread litter.	5	4	3	2	1
2. Put out feed and water.	5	4	3	2	1
3. Spread and adjust brooders for baby chicks.	5	4	3	2	1
4 Install brooder guard for baby chicks.	5	4	3	2	1
B. Maintain a healthy environment.					
1. Maintain correct brooder temperature.	5	4	3	2	1
2. Provide proper ventilation.	5	4	3	2	1
3. Maintain correct house temperature.	5	4	3	2	1
4. Provide proper lighting.	5	4	3	2	1
5. Prevent excessive humidity.	5	4	3	2	1
6. Control odors.	5	4	3	2	1
7. Recognize signs of rodents.	5	4	3	2	1
8. Administer rodent control measures.	5	4	3	2	1
9. Recognize insect pests of broilers.	5	4	3	2	1
10. Control insect pests of broilers.	5	4	3	2	1
11. Prevent wild birds from entering the house.	5	4	3	2	1
C. Maintain sanitation and health.					
1. Dispose of dead birds.	5	4	3	2	1
2. Clean drinkers.	5	4	3	2	1

3.	Remove all litter when needed.	5 4 3 2 1
4.	Dispose of manure.	5 4 3 2 1
5.	Recognize unhealthy birds.	5 4 3 2 1
6.	Contact veterinarian if necessary.	5 4 3 2 1
D.	Maintain buildings and equipment.	
1.	Maintain watering equipment.	5 4 3 2 1
2.	Maintain feeding equipment.	5 4 3 2 1
3.	Maintain brooding equipment.	5 4 3 2 1
4.	Maintain egg gathering equipment.	5 4 3 2 1
5.	Maintain curtains and curtain controls.	5 4 3 2 1
E.	Prepare for removal of broilers.	
1.	Dismantle and move equipment out of the way of catching crew.	5 4 3 2 1
2.	Prevent birds from piling up and smothering while catching crew is working.	5 4 3 2 1
F.	Keep records.	
1.	Record chick or hen mortality daily.	5 4 3 2 1
2.	Properly record amount of feed used.	5 4 3 2 1
3.	Properly record number of eggs gathered.	5 4 3 2 1
G.	Care for eggs.	
1.	Gather eggs.	5 4 3 2 1
2.	Wash soiled eggs.	5 4 3 2 1
3.	Remove cracked eggs and leakers.	5 4 3 2 1
4.	Sort eggs according to size and grade.	5 4 3 2 1
5.	Case or rack eggs.	5 4 3 2 1
6.	Refrigerate eggs.	5 4 3 2 1
H.	Others (list).	5 4 3 2 1

SWINE PRODUCTION

	Most Important	Very Important	Of Some Importance	Important	Not Important
A. Perform management practices.					
1. Purchase and produce hogs that will utilize feeds efficiently for profit.	5	4	3	2	1
2. Identify profitable characteristics of breeds.	5	4	3	2	1
3. Complete the registration procedures for registering purebred animals.	5	4	3	2	1
4. Analyze records for selection of breeding stock.	5	4	3	2	1
5. Crossbreed for hybrid vigor.	5	4	3	2	1
6. Select animals for breeding.	5	4	3	2	1
7. Make correct entries in breeding and farrowing records.	5	4	3	2	1
8. Identify estrus.	5	4	3	2	1
9. Artificially inseminate sows and guilts.	5	4	3	2	1
10. Handle sows and gilts at breeding.	5	4	3	2	1
11. Handle and care for boars at breeding.	5	4	3	2	1
12. Care for sows and guilts at parturition.	5	4	3	2	1
13. Safely handle sows and suckling pigs.	5	4	3	2	1
14. Care for baby pigs at birth.	5	4	3	2	1
15. Balance litter numbers.	5	4	3	2	1
16. Clip needle teeth.	5	4	3	2	1
17. Ear notch pigs.	5	4	3	2	1
18. Clip tails.	5	4	3	2	1

19.	Sort and load hogs safely for movement.	5 4 3 2 1
20.	Identify principle body parts of the hog.	5 4 3 2 1
21.	Identify the location of primal cuts of meat on live animal.	5 4 3 2 1
22.	Probe hogs for back fat.	

B. Provide sanitary environment and practices for good animal health.

1.	Determine proper living or growing space requirements at various levels.	5 4 3 2 1
2.	Fill and discharge liquid manure wagon.	5 4 3 2 1
3.	Use a pressure sprayer to clean stalls and equipment.	5 4 3 2 1
4.	Select and use sanitation products effectively.	5 4 3 2 1
5.	Disinfect pens and equipment.	5 4 3 2 1
6.	Disinfect boots and clothing.	5 4 3 2 1
7.	Disinfect navels of pigs.	5 4 3 2 1
8.	Recognize symptoms of swine diseases.	5 4 3 2 1
9.	Identify sick animals.	5 4 3 2 1
10.	Cull and isolate sick animals.	5 4 3 2 1
11.	Treat pigs for scours.	5 4 3 2 1
12.	Identify animals with parasite problems.	5 4 3 2 1
13.	Treat pigs for parasites.	5 4 3 2 1
14.	Operate sprayers and mix spray for external parasite control.	5 4 3 2 1
15.	Mix liquid wormers.	5 4 3 2 1
16.	Mix wormers into feed and feed safely.	5 4 3 2 1

C. Provide for proper feeding and nutrition.

1.	Determine the nutrient requirements of different ages, sex, breed, and weight of swine.	5 4 3 2 1
2.	Identify animals with nutritional deficiencies.	5 4 3 2 1
3.	Determine proper feeding and watering space require-	

	ments.	5 4 3 2 1
4.	Select best grains and other feeds.	5 4 3 2 1
5.	Add correct amounts of feed additives to a mix.	5 4 3 2 1
6.	Add correct amounts of vitamins and minerals to a ration.	5 4 3 2 1
7.	Interpret the information on a feed tag.	5 4 3 2 1
8.	Interpret feed standard tables.	5 4 3 2 1
9.	Know the upper and lower limits of certain feeds to include in a ration.	5 4 3 2 1
10.	Change composition of rations based on poor performance or cost when appropriate.	5 4 3 2 1
11.	Calculate total nutrient cost per unit.	5 4 3 2 1
12.	Compute proper mixer batch quantities.	5 4 3 2 1
13.	Operate scales accurately.	5 4 3 2 1
14.	Operate and service bulk handling equipment.	5 4 3 2 1
15.	Operate and service grinding and mixing equipment.	5 4 3 2 1
16.	Identify storage factors to maintain quality of feeds and prevent contamination.	5 4 3 2 1
17.	Clean equipment and area used for preparing feeds.	5 4 3 2 1
18.	Adjust self feeders.	5 4 3 2 1
19.	Set metering regulators.	5 4 3 2 1
20.	Install and adjust waterers.	5 4 3 2 1
21.	Observe and handle feed and equipment safely.	5 4 3 2 1
22.	Make correct entries in feed records.	5 4 3 2 1
23.	Make correct entries in inventory reports.	5 4 3 2 1
D.	Market animals.	
1.	Determine the proper weight and quality of hogs to market.	5 4 3 2 1
2.	Weigh hogs.	5 4 3 2 1

3.	Estimate the value of meatiness in a carcass.	5 4 3 2 1
4.	Estimate market grades of hogs.	5 4 3 2 1
5.	Operate and maintain scales.	5 4 3 2 1
6.	Mark and sort hogs for market.	5 4 3 2 1
7.	Handle hogs to minimuze bruises.	5 4 3 2 1
8.	Select a hauler for safe and careful handling.	5 4 3 2 1
9.	Evaluate the method of marketing (grade and yield, live weight, etc.)	5 4 3 2 1
10.	Interpret market reports from the media.	5 4 3 2 1
11.	Select best selling market.	5 4 3 2 1

E. Others (list).

DAIRY PRODUCTION

	Most Important	Very Important		Of Some Importance	Important	Not Important
A. Keep records.						
1. Maintain a system of ear tagging, tattooing, etc. for identification purposes.	5	4	3	2	1	
2. Make correct entries in production records.	5	4	3	2	1	
3. Make correct entries in breeding records.	5	4	3	2	1	
4. Make correct entries in health records.	5	4	3	2	1	
B. Follow correct milking procedures.						
1. Follow an efficient and regular milking routine.	5	4	3	2	1	
2. Properly condition heifers for milking.	5	4	3	2	1	
3. Milk rapidly.	5	4	3	2	1	
4. Correct problems of over and under milking.	5	4	3	2	1	
5. Handle cows safely.	5	4	3	2	1	
6. Stimulate cows correctly for proper milk letdown.	5	4	3	2	1	
C. Maintain milking system.						
1. Use milking equipment properly.	5	4	3	2	1	
2. Keep vacuum system operating at correct suction.	5	4	3	2	1	
3. Keep teat inflations in proper condition.	5	4	3	2	1	
4. Operate equipment to properly cool milk.	5	4	3	2	1	
5. Use proper cleaning and sanitizing techniques.	5	4	3	2	1	
6. Follow recommended maintenance programs.	5	4	3	2	1	
D. Keep mastitis losses to a minimum.						

1.	Correct situations which cause mastitis to occur.	5 4 3 2 1
2.	Use a teat-dipping program to lessen new incidence of mastitis.	5 4 3 2 1
3.	Identify mastitis problems.	5 4 3 2 1
4.	Milk cows in order - mastitis cows last.	5 4 3 2 1
5.	Use strip cup to spot abnormal milk.	5 4 3 2 1
6.	Use suitable dry cow treatment.	5 4 3 2 1
E.	Minimize calf losses.	
1.	Prepare cow and facilities for parturition.	5 4 3 2 1
2.	Assist cow when calving.	5 4 3 2 1
3.	Recognize possible calving disorders or problems.	5 4 3 2 1
4.	Assist calf if necessary.	5 4 3 2 1
F.	Identify animals with a health problem.	5 4 3 2 1
1.	Know common cattle diseases, causes, treatment, and prevention.	5 4 3 2 1
2.	Recognize symptoms of sick animals.	5 4 3 2 1
3.	Take animal's temperature if illness is suspected.	5 4 3 2 1
4.	Determine when to call veterinarian.	5 4 3 2 1
5.	Identify common parasites.	5 4 3 2 1
G.	Treat animals with health problems.	5 4 3 2 1
1.	Administer antibiotics and medications correctly in treating minor health problems as directed by veterinarian.	5 4 3 2 1
2.	Drench, spray, dust, or treat animals as directed by veterinarian.	5 4 3 2 1
3.	Use proper parasite control methods.	5 4 3 2 1
4.	Maintain health supply inventory.	5 4 3 2 1
H.	Follow programs to reduce or eliminate health problems.	
1.	Follow recommended sanitation practices.	5 4 3 2 1

2.	Select and use correct disinfectants as needed.	5 4 3 2 1
3.	Maintain an insect control program.	5 4 3 2 1
4.	Follow recommended vaccination program.	5 4 3 2 1
5.	Dip navels of baby calves in iodine.	5 4 3 2 1
6.	Dehorn calves.	5 4 3 2 1
7.	Trim animal's feet when necessary.	5 4 3 2 1
8.	Clip the underline, udder, and rear flanks of cows in production.	5 4 3 2 1

I. Provide adequate amount of nutrients for animals.

1.	Provide an adequate water supply.	5 4 3 2 1
2.	Make efficient use of forage.	5 4 3 2 1
3.	Prepare mineral mixes.	5 4 3 2 1
4.	Feed producing cows a balanced ration based on nutritive needs.	5 4 3 2 1
5.	Balance and feed proper ration for dry cows.	5 4 3 2 1
6.	Determine correct calcium - phosphorus ratio.	5 4 3 2 1
7.	Use crude protein and digestible protein data correctly when balancing rations.	5 4 3 2 1
8.	Collect samples of grain and forage for nutrient analysis.	5 4 3 2 1
9.	Use feed test results in balancing rations.	5 4 3 2 1

J. Feed replacement animals for fast, economical growth.

1.	Force feed colostrum within thirty minutes of birth.	5 4 3 2 1
2.	Select best calf feeding program (whole milk, sour colostrum, or milk replacer).	5 4 3 2 1
3.	Select or prepare an adequate calf starter.	5 4 3 2 1
4.	Feed correct kind and amount of forage.	5 4 3 2 1
5.	Weigh animal.	5 4 3 2 1
6.	Properly feed heifers.	5 4 3 2 1

7.	Wean heifers.	5 4 3 2 1
K.	Manage herd.	
1.	Detect cows in heat.	5 4 3 2 1
2.	Check animals for pregnancy.	5 4 3 2 1
3.	Use individual calf pens for baby calves.	5 4 3 2 1
4.	Group calves according to size after weaning.	5 4 3 2 1
5.	Select cows for best milk production.	5 4 3 2 1
6.	Purchase replacement cows when necessary.	5 4 3 2 1
7.	Cull low milk producers.	5 4 3 2 1
8.	Identify profitable characteristics of breeds.	5 4 3 2 1
9.	Complete the registration procedures for registering purebred animals.	5 4 3 2 1
10.	Analyze records for selection of breeding stock.	5 4 3 2 1
11.	Select animals for breeding.	5 4 3 2 1
12.	Sort and load cows safely for movement.	5 4 3 2 1
13.	Identify principal body parts of the cow.	5 4 3 2 1
14.	Identify the location of primal cuts of meat on live animal.	5 4 3 2 1
L.	Others (list).	

BEEF CATTLE PRODUCTION

A. Tend cattle.

1.	Determine the general condition of cattle.	5 4 3 2 1
2.	Identify unhealthy cattle.	5 4 3 2 1
3.	Detect cattle with injury.	5 4 3 2 1
4.	Treat minor injury of cattle.	5 4 3 2 1
5.	Read medicine labels and directions for use.	5 4 3 2 1
6.	Apply medicants in feed and water.	5 4 3 2 1
7.	Store medications.	5 4 3 2 1
8.	Detect cattle with parasites.	5 4 3 2 1
9.	Spray, dip, and dust cattle for parasites.	5 4 3 2 1
10.	Castrate cattle.	5 4 3 2 1
11.	Dehorn cattle.	5 4 3 2 1
12.	Trim the feet of cattle.	5 4 3 2 1
13.	Fit and show breeding cattle.	5 4 3 2 1
14.	Read brands and other markings.	5 4 3 2 1
15.	Brand cattle.	5 4 3 2 1
16.	Mark cattle using ear tags.	5 4 3 2 1
17.	Move cattle from pasture to pasture or into pens.	5 4 3 2 1
18.	Control movement of cattle between pens.	5 4 3 2 1
19.	Separate cattle according to size and weight.	5 4 3 2 1

20.	Operate cattle handling equipment.	5 4 3 2 1
21.	Rope cattle.	5 4 3 2 1
22.	Cast cattle with a rope.	5 4 3 2 1
23.	Care for animals in stalls, pens, and sheds.	5 4 3 2 1
24.	Load, unload, and stack bales of hay or stray by hand.	5 4 3 2 1
25.	Bed stalls, pens, sheds, and cattle trucks.	5 4 3 2 1
26.	Load cattle on trucks.	5 4 3 2 1
27.	Detect cattle in heat.	5 4 3 2 1
28.	Check for pregnant cattle.	5 4 3 2 1
29.	Detect signs of labor.	5 4 3 2 1
30.	Detect cattle ready to calve.	5 4 3 2 1
31.	Detect cows having calving trouble.	5 4 3 2 1
32.	Pull calves when necessary.	5 4 3 2 1
33.	Care for calves at calving time.	5 4 3 2 1
34.	Care for calves at weaning.	5 4 3 2 1
35.	Identify profitable characteristics of breeds.	5 4 3 2 1
36.	Complete the registration procedures for registering purebred animals.	5 4 3 2 1
37.	Analyze records for selection of breeding stock.	5 4 3 2 1
38.	Select animals for breeding.	5 4 3 2 1
39.	Sort and load cattle safely for movement.	5 4 3 2 1
40.	Identify principle body parts of cattle.	5 4 3 2 1
41.	Identify the location of primal cuts of meat on live animal.	5 4 3 2 1

B. Feed cattle.

1.	Provide proper amount and quality of water.	5 4 3 2 1
2.	Determine feed needs of cattle.	5 4 3 2 1

3.	Read and understand ingredients on a feed tag.	5 4 3 2 1
4.	Operate feed loading and moving equipment.	5 4 3 2 1
5.	Operate grinding, chopping, and mixing equipment for feed.	5 4 3 2 1
6.	Mix feeds and additives.	5 4 3 2 1
7.	Place feed in feed bunks or troughs using hand and power equipment.	5 4 3 2 1
8.	Provide proper minerals for cattle.	5 4 3 2 1
C.	Keep records.	
1.	Make correct entries in cattle and crop expense records.	5 4 3 2 1
2.	Make correct entries in cattle production records.	5 4 3 2 1
3.	Use scales and record obtained weights of crops and cattle.	5 4 3 2 1
4.	Make correct entries in cattle feeding records.	5 4 3 2 1
5.	Make correct entries in cattle gain records.	5 4 3 2 1
D.	Maintain facilities and equipment for cattle.	
1.	Clean cattle pens, stalls, and shelters.	5 4 3 2 1
2.	Clean ditch with a shovel or spade.	5 4 3 2 1
3.	Clean watering places.	5 4 3 2 1
4.	Maintain and repair cattle handling equipment.	5 4 3 2 1
5.	Maintain feeding and feed hauling equipment.	5 4 3 2 1
6.	Maintain feed storage equipment.	5 4 3 2 1
7.	Repair and maintain buildings, pens, stalls, and shelters.	5 4 3 2 1
8.	Repair and maintain fences.	5 4 3 2 1
9.	Build fences.	5 4 3 2 1
10.	Construct shelters for cattle.	5 4 3 2 1
E.	Other (list).	5 4 3 2 1

Appendix C

Sample Task Instruction Sheets Developed

TASK R-4: Using a Measuring Stick to Find the Height of a Calf

Purpose:

Dairy farmers use a measuring stick to find out the height of calves. A measuring stick is a special ruler that allows the farmer to measure the height of the calf. Calves should be measured each month. The height should be put into a record book. These measurements will allow the farmer to check how fast the calf is growing.

Work to be Done:

Use a measuring stick to find out the height of a calf.

Things We Need:

1 or more calves
1 measuring stick
1 pencil
1 calf record book or individual calf records
1 rope halter and lead rope
1 holding pen
1 helper

Things to Do:

1. Get all the things we need to find out the height of a calf.
2. Quietly and slowly move the calf into a holding pen.
3. Have the helper halter a calf as in task sheet ___.
4. Lead the calf to an area that has a hard and level surface.
5. Have the helper hold the calf's head up so the calf's back is not hunched. Make sure all four feet are under the calf's body.
6. Slowly bring the measuring stick neck to the calf's body at the withers. See task sheet ___ to find out where the withers are.
7. Lower the measuring bar until it rests on the highest point of the withers (see picture).
8. Be sure the measuring bar is level.
9. Figure out the height of the calf by reading the numbers at the place the measuring bar is at on the mesuring stick (see picture).
10. Write the height of the calf next to the calf's I.D. number in the record book or on the individual calf record.
11. Put the calf back into its pen and remove the halter.

TASK F-2: Feeding Sour Colostrum to Calves

Purpose:

Farmers feed calves liquid food for 4 to 8 weeks after they are born. During this time calves cannot digest a lot of grain or hay. Sour colostrum can be fed to calves until they can eat solid food.

Work to be Done:

Feed sour colostrum to young calves.

Things We Need:

Sour colostrum milk
A dish of soap
Warm water
1 nippled bucket or bottle
1 stick to stir the colostrum
1 or more calves less than 8 weeks old
A measuring cup

CAUTION:

You must feed the calf the same kind of liquid food all the time. If you begin feeding sour colostrum, keep feeding sour colostrum until the calf is eating solid food. If you change the calf's liquid food it may get sick.

Things to Do:

1. Get all the things we need to feed sour colostrum to young calves.
   a. Calves need to be fed 2 times a day: one time in the morning and one time at night.
   b. Small calves will eat less than large calves. You must give them the right amount of food.
   c. Always stir the sour colostrum with the stick before feeding it to calves.
2. Use the weighing tape as in task sheet ___ to find out how much the calf weighs.
3. If the calf weighs less than 100 pounds:

   MIX AND FEED THEM — 3 cups of warm water and 6 cups of sour colostrum

   If the calf weighs more than 100 pounds:

   MIX AND FEED THEM — 4 cups of warm water and 8 cups of sour colostrum
4. Use the nippled bucket or bottle to feed the calf.
5. After the calf is done eating, wash and rinse the nippled bucket or the bottle with soap and water. Be sure to wash the inside and outside of the bucket or bottle.
6. Put the bottle or bucket back where it belongs.

TASK B-1: Checking Heifers for Signs of Heat

Purpose:

Farmers check heifers for signs of heat every day. Heat means the heifer is ready to be bred. Checking for signs of heat is very important. Heifers should be bred 10 to 24 hours after the first signs of heat. The best time to watch the heifer for signs of heat is in the morning and evening.

Work to be Done:

Watch a herd of mature heifers for signs of heat.

Things We Need:

1 herd of mature heifers
1 paddock
1 pencil
1 notepad

Things to Do:

1. Get all the things we need to check heifers for signs of heat.
2. Quietly and slowly walk to the pen or pasture with the heifers.
3. Now just quietly stand there for about 20 minutes and watch the heifers for these signs:
   a. Standing still and letting other heifers jump upon them.
   b. Hair on top of the tail is messed up.
   c. Following and licking other animals.
   d. Clear mucus discharge from the vulva.
4. Write down on a piece of paper the I.D. number of the heifers showing these signs. Give it to the farmer.

TASK T-2: Ear Tagging Young Dairy Calves

Purpose:

Metal ear tags have numbers stamped on them. Farmers put ear tags on young calves to identify them. Ear tag numbers are used for keeping records on each calf. It is easy to put ear tags on calves when they are young.

Work to be Done:

Put a metal ear tag on a young calf.

Things We Need:

- 1 calf (1 to 6 weeks of age)
- 1 helper
- 1 clean, dry holding pen
- 1 ear tag applicator
- 1 box cotton balls
- 1 halter and lead rope
- 1 box of self-locking, numbered metal ear tags
- 1 herd record book and pencil
- 1 bottle of rubbing alcohol
- 1 bottle of germ killer (7 percent iodine)

Things to Do:

1. Get all the things we need to put an ear tag on the calf.
2. Slowly and quietly enter the pen with the helper.
3. Have the helper halter the calf as in task sheet ___.
4. Have the helper hold the calf so it cannot move.

TEACHER:

5. Teacher will show and tell you how to put a metal ear tag on a young calf.
6. Ask your teacher to give you a numbered ear tag for the calf.
7. Soak a cotton ball with alcohol. Rub it on both sides of the calf's right ear.
8. Rub alcohol on the metal ear tag.
9. Place the metal ear tag into the applicator the way your teacher showed you.
10. Place the ear between the "jaws" of the applicator.
11. Make sure that the ear tag will not puncture a blood vessel.
12. Quickly squeeze the handles together until the ear tag locks in place.
13. Put germ killer on the ear around the ear tag.
14. Ask the helper to take the halter off and release the calf.

TASK R-4: Using a Measuring Stick to Measure the Height of a Calf

Purpose:

A measuring stick is a special ruler to measure how high the calf has grown. Dairy farmers use it to measure the height of calves. Calves should be measured once a month. The height is written into a record book. These measurements will show the farmer how fast the calf is growing.

Work to be Done:

Using a measuring stick to measure the height of a calf.

Things We Need:

1 or more calves
1 measuring stick
1 pencil
1 calf record book or individual calf records
1 rope halter and lead rope
1 holding pen
1 helper

Things to Do:

1. Get all the things we need to find out the height of a calf.
2. Quietly and slowly move the calf into a holding pen.
3. Ask the helper halter a calf as in task sheet ___.
4. Lead the calf to an area that has a hard and level surface.
5. Ask the helper hold the calf's head up so the calf's back is not hunched. Make sure all four legs are placed squarely under the calf's body.
6. Slowly bring the measuring stick next to the calf's body at the withers. See task sheet ___ to find out where the withers are.
7. Lower the measuring bar until it rests on the highest point of the withers (see picture).
8. Be sure the measuring bar is level.
9. Reading the number where the measuring bar crosses the measuring stick (see picture). This is the calf's height.
10. Write this number next to the calf's I.D. number in the record book or on the individual calf record.
11. Lead the calf back to its pen and remove the halter.
12. Make sure everything is put back where it belongs.

TASK C-3: Dipping the Navel Cord of a Newborn Calf

Purpose:

The cord that feeds the calf while inside its mother breaks off after it is born. This cord is called the navel cord. Farmers "dip" the navel cord with a germ killer. This stops germs from getting into the calf's body and making it sick.

Work to be Done:

Dip the navel cord of a newborn calf.

Things We Need:

1 spray can of germ killer (7 percent iodine)
1 clean, dry calving pen
1 or more newborn calves
1 helper

CAUTION:

Be careful when you get near the cow and her calf. She can be dangerous.

Things to Do:

1. Get all the things we need to dip the navel cord on the calf.
2. Let the cow lick her calf.
3. Carefully and slowly enter the pen with a spray can of germ killer along with your helper.
4. Ask the helper to hold the calf so it cannot move.
5. Take the cap off the spray can.
6. Hold the can of germ killer about 2 inches from the navel cord.
7. Spray the entire navel cord with germ killer.
8. Put the cap back on the spray can.
9. Now the helper can release the calf.
10. Put the germ killer back into the medicine cabinet.

TASK C-1: How to Tell When a Calf is Going to be Born

Purpose:

Dairy farmers check cows every day to watch for signs when the calf will be born. After writing on the wall chart when the cow was bred, look for signs of a calf being born about 9 months later. Cows show signs about 3 weeks before the calf is born.

Things to Do:

Look at a cow for signs when a calf is going to be born.

Things We Need:

1 or more pregnant cows
1 wall chart
1 calving pen
1 pencil
1 piece of paper

Things to Do:

1. Get all the things we need to figure out when a calf is to be born.
2. Quietly and slowly walk around the pregnant cow and look for these signs: (see picture)
   a. A full and swollen udder
   b. Swelling of the vulva.
   c. Muscles around the tailhead and pin bones pull in
   d. A "drooping" belly
   e. Getting up and laying down often
3. If the cow has on or more of these signs, put her into a clean calving pen.
4. Write the cow's I.D. number and the date when she was put into the calving pen on a piece of paper. Give this piece of paper to the farmer.

TASK C-2: Cleaning a Pen for a Cow to Give Birth

Purpose:

Calving pens need to be clean, dry, and not windy. Cows can give birth to a calf on a clean pasture when it is warm and sunny. When it is cold, raining, snowing, or sleeting, cows should have their calf born in a calving pen. The calving pen has to be clean and dry so the cow and her calf do not get sick. The calving pen should be ready 3 weeks before the cow's calf is born.

Work to be Done:

Clean a calving pen.

Things We Need:

- 1 calving pen
- 1 bucket
- 1 brush with stiff bristles
- 1 bottle of disinfectant (see your teacher for this)
- 1 wheelbarrow
- 1 shovel
- 1 push broom
- 1 ruler or yard stick
- 1 or more bales of straw
- 1 pitchfork

Things to Do:

1. Get all the things we need to clean a calving pen.
2. With a pitchfork and wheelbarrow, fork out the straw and manure and put it into the wheelbarrow.
3. With a shovel, scoop the rest of the straw and manure out of the pen.
4. With a push broom, sweep the rest of the straw and manure into a pile. Scoop it out with a shovel and put it in the wheelbarrow.
5. Now empty the wheelbarrow (Ask your teacher where to put the manure.)
6. Get a bucket of disinfectant from your teacher.
7. With a brush, scrub the walls, floor, hay racks, and waterer's with the disinfectant.
8. Allow the pen to dry for 2 days.
9. Open a bale of straw, separate, and shake the straw wafers.
10. Spread about 12 inches of loose straw on the floor.
11. Now wait for the date Bossie the cow is to have her calf born.

TASK G-1: Haltering a Calf

Purpose:

The farmer needs to hold calves to do some tasks. Halters may be bought from livestock catalogs and farm stores. They can be made from leather, rope, or nylon.

Work to be Done:

Halter a calf.

Things We Need:

1 or more calves
1 holding pen
1 calf halter and lead rope

Things to Do:

1. Get all the things we need to halter a calf.
2. Ask your teacher if the calf is used to wearing a halter. If the calf is not used to wearing a halter, make sure your teacher is there when you do this task.
3. Quietly and slowly move the calf into a holding pen with the calf halter.
4. Quietly and slowly move over next to the calf.
5. Talk to the calf in a quiet voice so it knows you are there.
6. Put your hand on its shoulder and softly pet it.
7. Hold the headpiece (top of the halter) in your right hand and the lead rope in your left hand.
8. Slowly place the headpiece on the calf's head behind both ears. The lead rope should be on the left side of the calf's head.
9. Slowly slide the nose piece over the calf's head.
10. Fix the halter so the nose piece is between the muzzle and the eyes.
11. The halter should be snug; not too loose and not too tight.
    NOTE: Make sure the side pieces are not in or over the top of the calf's eyes.
12. After you have haltered the calf, remove the halter and return to where you got it.

TASK I-1: Learning the Body Parts of a Dairy Animal

Purpose:

Dairy farmers need to know what the outside parts of a cow are called. If the cow gets hurt, the farmer can tell the animal doctor where it is hurt.

Work to be Done:

Learn the names of the outside body parts of a cow.

Things We Need:

1 cow
1 marking crayon
1 pointer (optional for teacher)
1 halter and lead rope
1 pencil
1 xeroxed "cow" with areas to fill in the names of the body parts

Things to Do:

1. Get all the things we need to learn the outside parts of a cow.
2. Catch and halter a dairy cow as in task sheet ___.

TEACHER 3. Tie the cow where all the students can see it.

TEACHER 4. Using a marking crayon, draw lines showing these body parts marked with an asterisk (*) on the cow.

Body Parts to be Identified

1. Throat	10. Rump*	19. Legs
2. Muzzle	11. Tail	20. Knee
3. Horns	12. Tail Head*	21. Pine Bone*
4. Neck*	13. Thigh*	22. Eyes
5. Heart Girth*	14. Hock	23. Ears
6. Withers*	15. Switch	24. Jaw
7. Ribs*	16. Hoof	25. Loin
8. Barrel*	17. Udder	26. Vulva
9. Back*	18. Teats	

5. Listen to the teacher tell what the body parts are called on the dairy cow.
6. Using the picture on the back of this sheet, write the names of the body parts on the cow.
7. Keep this picture of the cow to help you do other tasks.

TASK F-2: Feeding Sour Colostrum to Calves

Purpose:

Colostrum is a special milk produced by the mother cow. She produces this milk for 3 days after giving birth to her calf. This milk helps the calf from getting sick. When it is stored at room temperature, it turns sour. This is called "sour colostrum." This food is tasty for calves and does not need to be in a refrigerator. Dairy farmers feed calves sour colostrum until they can eat hay or grain (usually 4 to 8 weeks old).

Work to be Done:

Feed sour colostrum to young calves.

Things We Need:

Sour colostrum milk
A bottle of liquid soap
Warm water
1 nippled bucket or bottle
1 stick to stir the sour colostrum
1 or more calves less than 8 weeks old
A measuring cup

CAUTION:

If you begin feeding a calf sour colostrum, keep feeding sour colostrum until it is eating hay or grain.

RULES:

a. Calves need to be fed 2 times a day: One time in the morning and one time at night.
b. Small calves will eat less than large calves. You must give them the right amount of food.
c. Always stir the sour colostrum with the stick before feeding it to calves.

Things to Do:

1. Get all the things we need to feed sour colostrum to young calves.
2. Your teacher will show and tell how to mix and feed sour colostrum milk to a calf.

3. Use the weighing tape as in task sheet ___ to see how much the calf weighs.
4. If the calf weighs less than 100 pounds: Mix 3 cups of warm water and 6 cups of sour colostrum in the nippled bucket or bottle and feed it to the calf.
   If the calf weighs more than 100 pounds: Mix 4 cups of warm water and 8 cups of sour colostrum in the nippled bucket or bottle and feed it to the calf.
5. After the calf is done eating, wash and rinse the nippled bucket or bottle with soap and water. Be sure to wash the inside and outside of the bucket or bottle.
6. Put the bottle or bucket back where it belongs.

TASK R-2: Using a Weighing Tape to Weigh a Calf

Purpose:

A weight tape is a special tape to weigh a calf. Dairy farmers use it to measure how many pounds a calf has gained. Calves should be weighed once a month. The weight is written on the calf's individual record. These weights show the farmer how fast the calf is growing. These weights can be used to figure how much to feed the calf.

Work to be Done:

Use a weighing tape to weigh a calf.

Things We Need:

1 or more calves
1 weighing tape
1 pencil
1 calf record book or individual calf records
1 calf halter
1 holding pen
1 helper

Things to Do:

1. Get all the things we need to find out the weight of a calf.
2. Quietly and slowly move the calf into the holding pen.
3. Ask the helper to catch and halter a calf as in task sheet ___.
4. Make sure that all four legs are placed squarely under the calf's body.

TEACHER:

5. Show and tell how to use a weight tape.
6. Slowly place the weight tape around the calf's heart girth (see task sheet ___).
7. Make sure the tape is not twisted. Remove any dirt or manure that is under the weighing tape.
8. Pull the tape until it feels snug.
9. Read the numbers on the tape the way your teacher told you. This is the weight of the calf.
10. Write this weight on the calf's individual record.
11. Lead the calf back to its pen and remove the halter.
12. Make sure everything is put back where it belongs.

TASK G-2: Winter Clipping Calves/Cows

Purpose:

Farmers clip calves/cows in the winter. That is why it is called "winter clipping." Mud, dirt, and manure stick to the long hairs on the calves'/cows' belly, legs, and tail. Winter clipping removes these long hairs. This helps keep the calf/cow clean.

Work to be Done:

Winter clip a calf or cow.

Things We Need:

- 1 or more calves or cows
- 1 set of clippers
- 1 extension cord
- 1 halter and lead rope
- Clipper oil
- A source of electricity

CAUTION:
Keep all electrical cords out of chewing range of the animals.

NOTE:
Be careful when winter clipping. The animal may not like the noise and move around a lot.

TEACHER:
Make sure the clippers are properly grounded.

Things to Do:

1. Get all the things we need to winter clip a calf/cow.
2. Quietly and slowly catch and halter the calf/cow.
3. Have your teacher tie the calf/cow to a pole/post near an electrical outlet.
4. Oil the clippers (see picture).
5. Plug the clippers into an outlet.
6. Hold the clippers away from the animal and turn them on. This is to let the animal get used to the noise.
7. With the clippers running, grasp the tail and clip the hairs off 3 to 4 inches above the switch (see picture). DO NOT CLIP THE SWITCH OFF.
8. Place the clippers behind the elbow of the right front leg (see picture).
9. Clip one straight line to the flank (see picture).

10. Do the same thing on the left side.
11. Clip all the hair on the belly between these two paths (see picture).
12. Clip the hair above the dew claws on the rear legs, up to the flank.
13. Return the animal to its pen.
14. Remove the halter.

TASK F-1: Feeding Colostrum Milk to Newborn Calves

Purpose:

Calves must be fed colostrum milk within two hours after being born. She produces this milk for three days after she gives birth to her calf. This colostrum milk is special. It helps keep the calf from getting sick.

Work to be Done:

Feed colostrum milk to a newborn dairy calf.

Things We Need:

2 quarts or ½ gallon of colostrum
1 two-quart milk bottle with a nipple
A sink with hot and cold water
1 funnel
1 bottle of liquid soap

CAUTION:
Never pour colostrum milk down a calf's throat.

Things to Do:

1. Get all the things we need to feed a newborn calf colostrum milk.
2. Using soap and warm water, wash and rinse the bottle and the nipple.
3. Place the funnel into the bottle.
4. Fill the bottle with colostrum.
5. Place the bottle into a sink filled with hot water. This will warm the colostrum up. Let the bottle of colostrum sit in the hot water for 15 minutes.
6. After 15 minutes have passed, stick your finger into the colostrum. If it is warm, go to instruction 7. If it is cool, let the colostrum sit in the sink of hot water for 10 more minutes, then go to instruction 7.
7. Put the nipple onto the top of the bottle.
8. Quietly and slowly go over to the calf with the full bottle of colostrum.
9. Gently hold the head of the calf in one hand. Put one of your fingers of your other hand into its mouth. NOTE: The calf will not bite you. It does not have any teeth.
10. Carefully place the nipple into the calf's mouth and slide it along side of your finger.

TASK T-1: Using a Rectal Thermometer to Figure Out the Body Temperature of a Dairy Animal

Purpose:

Dairy farmers take the body temperature of cows to tell if they are sick. They use a rectal thermometer to take a cow's temperature. A healthy cow will have a temperature of 100.9° to 102.0° F. When a cow's temperature is more than 102.0° F, call your animal doctor.

NOTE:

Body temperatures may be higher if the weather is hot or if the cow has been running around. Body temperatures may be lower if the weather is cold or if it was taken in the morning.

Work to be Done:

Take the rectal temperature of a cow.

Things We Need:

- 1 or more dairy cows
- 1 rectal thermometer with string tied to one end
- 1 clipboard
- 1 pencil
- 1 notepad
- 1 helper
- 1 watch
- 1 towel
- 1 holding pen
- 1 halter and lead rope
- 1 jar of vaseline (vaseline of K.Y. jelly)

CAUTION:

*Be careful when taking the temperature of a cow; they can kick with their hind legs.

*Make sure your teacher is there when you take the temperature of a dairy cow.

Things to Do:

1. Get all the things we need to take the body temperature of a cow.
2. Quietly and slowly move the cow into a holding pen.
3. Quietly and slowly halter the cow as in task sheet ___.
4. Have your teacher tie the cow to a fence post or a stanchion.
5. Hold the end of the thermometer with the string tied to it and shake the silver or red line down.
6. Rub some vaseline on the end without the string.
7. Slowly and carefully walk to the rear of the cow and place one hand on its hip.

8. Pet the hip of the cow so that it knows you are back there.
9. With the other hand, place the end of the thermometer without the string gently into the anus under the tail.
10. Slowly turn the thermometer back and forth while gently pushing it into the rectum.
11. Keep pushing the thermometer into the rectum until about one inch is sticking out.
12. Push the thermometer to one side so it touches the side of the rectum.
13. Let the thermometer stay in the rectum for 3 minutes.
14. After 3 minutes, pull the thermometer out and clean it off with a towel.
15. Hold the thermometer up in front of you and turn it slowly and look for the top of the silver and red line.
16. Now write down the number on the thermometer next to the top of the silver and red line.
17. If the cow's temperature is more than 102.0° F, call an animal doctor.
18. Return the cow to its pen.

TASK R-3: Using a Wall Chart to Keep Breeding Records

Purpose:

Dairy farmers need to keep records for their dairy cows. Important things about the cows can be written on a wall chart. The farmer writes on the chart when a cow is in heat, when she was bred, when the calf will be born, and the sex of the calf.

Work to be Done:

Write important things on a wall chart.

Things We Need:

1 wall chart
1 pencil
1 or more cows

Things to Do:

1. Get all the things we need to write on a wall chart.
2. Look at the wall chart picture:
   a. Find the months across the top
   b. Find the spaces for I.D. numbers on the left
3. Use these codes to record things on the wall chart:

Code Letter	Things
H	Heat
B	Bred
C	Calved
M	Male
F	Female

4. Write these things for Bossie the cow on the wall chart picture:
   a. Bossie's I.D. number is 007
   b. Bossie was in heat on January 3.
   c. Bossie was bred on January 4.
   d. Bossie had her calf on October 30.
   e. Bossie's calf was a female.
5. Always write the day when these things happened under the correct month using the code letter.
6. Make sure that the code letter and the date are on the same line as the cow's I.D. number.

MONTHS											
ID No	Jan	Feb	Mar	Apr	May	July	Aug	Sept	Oct	Nov	Dec
007	H-1/3 B-1/4								C10/30 F		
944			H-4/11 B-4/11	H-5/2 B-5/3							

TASK T-3: Checking the Saddle and Bridle for Signs of Weakness

Purpose:

When you are cleaning your saddle and bridle, it is important to check the leather for signs of weakness. Areas of rotten stiching, cracked and thin leather, can be dangerous to the horse and rider.

Work to be Done:

Check the saddle and bridle for signs of weakness

Things we Need:

1 bridle
1 saddle and girth

Things to Do:

1. Get all the things we need to clean the saddle and bridle as in task sheets T-1 and T-2.
2. Clean the saddle and bridle as in tasks T-1 and T-2.
3. Before putting the saddle and bridle away, check the following areas for rotten stiching, cracked and thin or torn leather.
   a. where stiching is used to hold pieces of leather together, i.e.:
      1. on sturrip leathers
      2. girth straps
      3. birdle parts
   b. where metal hangs from or rest on leather, i.e.:
      1. sturrip leather fold where sturrip hangs
      2. bridle and girth strap buckles
      3. pieces of bridle that attach to the bit
      4. girth billets

   If any of the above areas show signs of rotten stiching, cracked thin or torn leather, show it to your teacher.

TASK G-1: Sponging Down a Horse

Purpose:

After riding a horse in warm weather, it is good to sponge down the horse. Sponging down means removing the sweat and dirt from the horse's hair. A large sponge and a bucket of lukewarm water are used to sponge down a horse. A sweat scraper and sponge are used to remove the water.

Work to be Done:

Sponge down a horse.

Things We Need:

1 horse
1 bucket of lukewarm water
1 large sponge
1 sweat scraper
1 halter
1 lead rope

CAUTION:

*Never scare a horse. Always talk to the horse as you go near it.
*Never go near a horse directly behind or in front of it; walk next to it from the side.
*When you get near enough, always pet the horse on its shoulder or neck.
*Use caution when walking around a horse.

Things to Do:

1. Get all the things we need to sponge down a horse.
2. Halter the horse according to task sheet H-3.
3. Place the horse in cross ties (see picture).
4. Wet the sponge and squeeze out some of the water.
5. Wipe down these sweaty parts with the wet sponge (see picture):
   a. back
   b. neck
   c. chest
   d. area where saddle was attached
   e. carefully between the hind legs
   Rinse the sponge as needed.
6. When you have rinsed these areas, wet the sponge again.
7. Wring it so that very little water is left in it.
8. Now sponge these parts:
   a. behind the horse's ears
   b. around the cheek bones
   c. around the throat

9. After you have finished sponging down the horse, get the sweat scraper. CAUTION: Never use a sweat scraper.
10. Gently place the sweat scraper against the horse's hair and pull it downward. This removes the water (see picture).
11. After scraping the water off, take the sponge and wipe the legs and face to remove water.
12. Snap the lead rope to the halter.
13. Unsnap the cross-ties.
14. Lead the horse until it is dry (see task sheet #__).
15. Make sure everything is put back where it belongs.

TASK G-2: Cooling Down a Horse

Purpose:

After riding the horse, it needs to be cooled down. Cooling down allows the horse's body temperature to return to normal. There are two ways to cool down a horse. If it is warm outside, sponge down the horse before leading it. If it is cool or cold outside, the horse is wiped with a towel and covered with a cooler before leading.

Work to be Done:

Cool down a horse.

Things We Need:

1 horse
1 halter and lead rope

If it is cold out:
1 cooler
1 towel

If it is warm out:
1 bucket of lukewarm water
1 large sponge
1 sweat scraper

CAUTION:
*Never scare a horse. Always talk to the horse as you go near it.
*Never go near a horse directly behind or in front of it; walk next to it from the side.
*When you get near enough, always pet the horse on its shoulder or neck.
*Use caution when walking around a horse.

Things To Do:

1. Get all the things we need to cool down a horse.
2. Remove the saddle and bridle from the horse.
   CAUTION: Never sponge down a horse when it feels cool or cold outside.
3. Put a halter on the horse as in task sheet H-3.
4. Place horse in cross ties (see picture).
5. If the air feels warm to you, do the following:
   a. Sponge down the horse as in task sheet #__.
   b. Snap on the lead rope and unfrom cross ties. Then lead the horse until it is dry (go to instruction 7).
6. If the air feels cool or cold to you, do the following:
   a. Rub the sweaty parts on the horse with the towel.
   b. Cover the horse with a cooler.

b. Snap on the lead rope and unsnap from cross ties. Then lead the horse until it is cooled down (go to instruction 7).

7. Lead the horse until the body heat on the chest and loin feels the same (see picture). Keep on leading the horse if the chest feels warmer than the loin.
8. Return the horse to its stall; remove the cooler, halter, and lead rope.

TASK G-3: Grooming a Horse

Purpose:

Grooming keeps the horse's hair coat clean. Horses should be groomed each day. While you are grooming, you should check for cuts, sore areas, and harmful insects on the horse's body. Always be careful when grooming horses. They can be dangerous.

Work to be Done:

Groom a horse.

Things We Need:

1 horse
1 halter
1 lead rope
1 body brush
1 dandy brush
1 grooming towel
1 bucket of water
1 sponge
1 tail brush
1 mane comb
1 curry comb
1 hoof pick

CAUTION:

*Never scare a horse. Always talk to the horse as you go near it.
*Never go near a horse directly behind or in front of it; walk next to it from the side.
*When you get near enough, always pet the horse on its shoulder or neck.
*Use caution when walking around a horse.

Things to Do:

1. Get all the things we need to groom a horse.
2. Walk over to the horse with the halter and lead rope in your hand.
3. Talk softly to the horse and pet it on the shoulder so it knows you are there.
4. Halter the horse as in task sheet H-3.
5. Snap the lead rope onto the halter and lead the horse to a set of cross-ties as in task sheet #__.
6. Snap the cross-tie snaps onto the side rings on the horse's halter (see picture).
7. Unsnap the lead rope and hang it up.
8. Clean the horse's front feet as in task sheet H-4.
9. Clean the horse's rear feet as in task sheet H-5.

10. Gently place the curry comb on the horse's neck and rub it in small circles all over the horse's body.
    NOTE: Do not use the curry comb below the knees, hocks, or on the face.
11. Using the dandy brush starting at the neck, firmly brush the horse's hair in short strokes. Brush the hair in the direction it grows. Brush the horse's whole body with the dandy brush.
    NOTE: Rub the dandy brush and curry comb together often to remove dirt and hair.
12. Using the mane or tail comb or brush, brush or comb the horse's mane.
13. Carefully and slowly go to the rear of the horse. Grasp the tip of the tail and lift it over to the side.
    NOTE: We start brushing the tail at the bottom so we do not pull a lot of hair out.
14. Using the tail brush begin brushing the tail with downward strokes 10 inches from the tip.
15. When that part is free from tangles and dirt, move up the tail and brush the next 10 inches out.
16. Repeat this until the whole tail is free from tangles and dirt.
17. Using a body brush starting at the neck, firmly brush the horse's hair in short strokes. Brush the horse's whole body with the body brush.
18. Using the grooming towel starting at the neck, firmly rub in the direction that the hair grows. Rub the horse's whole body with the towel.
19. Rinse the sponge in the bucket of water and squeeze most of the water out.
20. Slowly and gently place the damp sponge above each eye. Pull it down over each eye. This removes the dirt around the eye.
21. Slowly and gently place the damp sponge on each nostril. Slowly wipe the nostrils clean. This removes the dirt from the nostrils.
22. Make sure all the grooming things are put away before you take the horse out of the cross-ties.
23. Snap the lead rope back onto the halter.
24. Unsnap the cross-ties.
25. Lead the horse back to its stall, pasture, or paddock.
26. Remove the halter and lead rope.
27. Make sure everything is put back where it belongs.

TASK H-8: Cleaning the Stall

Purpose:

It is important to keep a horse's stall clean. A dirty stall can make the horse sick. Straw or sawdust are two popular types of bedding. Manure and soiled, wet bedding should be removed daily.

Work to be Done:

Clean a horse's stall.

Things We Need:

1 pitchfork
1 wheel barrow
1 shovel
1 empty stall
1 broom
straw or sawdust

Things To Do:

1. Get all the things we need to clean a stall.
2. Using the pitchfork, pick up all the droppings and place them into the wheel barrow.
3. Starting at one end of the stall, turn all the bedding over with the pitchfork.
4. Remove any soiled bedding with the pitchfork and place into the wheel barrow.
5. After you have removed all the droppings, soiled and wet bedding, it is time to add fresh bedding to the stall. The amount of bedding added to the stall will depend on how much you took out.
   a. If you are using straw, move the remaining straw towards the center of the stall.
   b. Add fresh straw to the sides of the stall by shaking out the wafers. This allows the bedding to constantly be used.
6. If you are using sawdust, mix the fresh sawdust into the remaining sawdust with the pitchfork. This helps cut down on the dust.

7. Move the wheel barrow away from the front of the stall door.
8. Using the broom, sweep the bedding and manure that spilled onto the grount into a pile.
9. Using the shovel, pick up this pile and place into the wheel barrow.
10. After the area in front of the stall door is clean, ask your teacher where to empty the wheel barrow.
11. Return all the tools and wheel barrow where they belong.

TASK G-4: Bathing a Horse

Purpose:

Bathing a horse removes dirt and sweat from its hair. Horses should only be bathed in warm weather. A horse should not be bathed everyday for this will dry out its hair. Lukewarm water and animal shampoo are used to bathe a horse.

Work to be Done:

Bathe a horse.

Things We Need:

1 horse
1 halter
1 lead rope
1 large bucket
1 sponge
1 sweat scraper
1 scrub brush
1 hose
A bottle of animal shampoo

CAUTION:

*Never scare a horse. Always talk to the horse as you go near it.
*Never go near a horse directly behind or in front of it; walk next to it from the side.
*When you get near enough, always pet the horse on its shoulder or neck.
*Use caution when walking around a horse.

Things to Do:

1. Get all the things we need to bathe a horse.
2. Go over next to the horse carrying the halter and lead rope in your hand.
3. Talk softly to the horse and pet it on the shoulder so it knows you are there.
4. Halter the horse as in task sheet H-3.
5. Snap the lead rope onto the halter and lead the animal to a set of cross-ties.
6. Snap the cross-ties' snaps onto the side rings on each side of the halter (see picture).
7. Unsnap the lead rope and hang it up.
8. Wet the horse's hair, mane, and tail with lukewarm water.
   a. If you are using the hose, make sure the water comes out of the nozzle slowly. Start at the horse's neck and wet its whole body.

b. If you are using the sponge and bucket, fill the bucket with lukewarm water. Using the sponge, start at the horse's neck and wet the whole body. Dip the sponge into the bucket as needed. Empty the bucket when you are finished.

9. After the horse's hair is wet, ask your teacher how much animal shampoo to mix in the bucket.
10. Mix water with the shampoo and make it soapy.
11. Using the sponge, soak up some sudsy water.
12. Beginning at the neck, place the sponge on the hair and rub it in circles. Soap the horse's whole body. Make sure you wash the horse's mane and tail.
    NOTE: Do not get soapy water into the horse's eyes or ears.
13. Rewet the sponge as often as needed.
    NOTE: You may need to make more than one bucket of soapy water.
14. Use the scrub brush and brush away dirty areas on the horse's hair.
15. After you are done washing the horse, rinse the soap from the horse's hair with lukewarm water.
    a. If you are using the hose, make sure the water comes out of the nozzle slowly. Start at the horse's neck and rinse the whole body.
    b. If you are using the sponge and bucket, fill the bucket with clean, lukewarm water. Using the sponge, start at the horse's neck and rinse the soap out of the whole body. You may have to use more than one bucket of water to rinse the horse.

    NOTE: It is very important to rinse all of the soap out of the horse's hair, mane, and tail. If the soap is not rinsed out, it will make the hair dry out.
    CAUTION: Never use a sweat scraper on the bony parts of a horse.
16. Gently place the sweat scraper against the horse's hair and pull it downward. This removes the water (see picture).
17. After scraping the water off, take the sponge and wipe off the horse's legs and face to remove water.
18. Make sure all the things used to bathe a horse are put back where they belong.
19. Snap the lead rope onto the halter.
20. Unsnap the cross-ties.
21. Lead the horse until it is dry.
22. Return the horse to its stall, pasture, or paddock.
23. Remove the halter and lead rope.
24. Put the halter and lead rope back where they belong.

TASK H-1: Leading a Horse

Purpose:

People who work with horses need to know the proper way to lead a horse. A lead rope is used to lead a horse. A lead rope can be a strap of leather, rope, or nylon about four feet long. It has a snap at one end. This snap clips onto the round rinfg at the bottom of the halter. A lead rope helps keep the horse under control.

Work to be Done:

Lead a horse.

Things We Need:

1 horse
1 halter
1 lead rope

CAUTION:

*Never scare a horse. Always talk to the horse as you go near it.
*Never go near a horse directly behind or in front of it; walk next to it from the side.
*When you get near enough, always pet the horse on its shoulder or neck.
*Use caution when walking around a horse.

Things to Do:

1. Get all the things we need to lead a horse.
2. Halter a horse as in task sheet __.
3. Snap the lead rope to the round ring at the bottom of the halter (see picture).
   NOTE: Always lead a horse from your right side.
4. Hold the lead rope a few inches from the snap in your right hand (see picture).
5. Hold the other end of the lead rope in your left hand (see picture).
6. Keep your right arm straight while leading (see picture). This helps keep the horse from stepping on your heels.
7. Lead the horse in a large circle.
8. After leading the horse, return it to its stall, paddock, or pasture. Remove the halter and lead rope.

TASK H-2: Bridling a Horse

Purpose:

A bridle is used to control the horse. It has leather head straps, leather reins, and a metal bit. The bit is put into the horse's mouth. The reins are attached to the bit. The head straps hold the bit in the mouth. The rider can slow down, stop, and turn the horse by pulling on the reins.

Work to be Done:

Bridle a horse.

Things We Need:

1 horse
1 snaffle bridle
1 halter and lead rope

Things to Do:

1. Get all the things we need to bridle a horse.
2. Halter the horse as in task sheet __.
3. Place the horse in cross ties (see picture).
4. Saddle the horse as in task sheet __.
5. Loosen the head piece strap on the halter.
6. Drop the halter over the horse's nose and bring it under the head and up around the neck and fasten (see picture).
7. Slowly put the bridle reins over the horse's head.
8. Grasp the crown piece of the bridle in your right hand.
9. Place the bit on your left hand (see picture).
10. Slide the crown piece over the horse's head and the nose piece over the horse's nose (see picture).
11. Holding the bit on your left hand in front where the teeth come together, place the thumb and second finger on each side of the mouth and press.
12. Pull the crown piece upward as you slide the bit into the horse's mouth.
13. Check to make sure the bit is laying on top of the horse's tongue.

14. Slip the crown piece over and behind the horse's ears.1
15. Buckl the throat latch. It should be snug enough to allow your hand to fit under it.
16. Remove the halter and lead rope from the horse's neck.
17. The horse is now ready for riding.

TASK H-3: Haltering a Horse

Purpose:

People who work with horses need to know how to halter a horse. Halters are used to control horses. Halters can be made of leather, rope, or nylon.

Work to be Done:

Halter a horse.

Things We Need:

1 horse (in a paddock or pasture)
1 halter with a snapping throat latch
1 lead rope

CAUTION:

*Never scare a horse. Always talk to the horse as you go near it.
*Never go near a horse directly behind or in front of it; walk next to it from the side.
*When you get near enough, always pet the horse on its shoulder or neck.
*Use caution when walking around a horse.

Things to be Done:

1. Get all the things we need to halter a horse.
2. Snap the lead rope onto the round ring underneath the nose band strap (see picture).
3. Carefully open the paddock or pasture gate and go into the paddock or pasture carrying the halter and lead rope.
4. Lock the gate after you are inside.
5. Softly talk to the horse so it knows you are there.
6. Carefully walk around the horse.
7. Place a hand on its shoulder or neck and softly pet it.
8. Hold the halter in your left hand.
9. Place the lead rope around the horse's neck and hold the 2 pieces together (see picture) with your right hand.
10. Stand next to the right side of the horse's head.
11. Let go of the lead rope.
12. Slide your right hand and arm under the horse's face and around its muzzle.
13. Grasp the top of the halter in your right hand. Hold the left side of the noseband in your left hand.

14. Slowly slip the noseband of the halter over the horse's nose and pull the top of the halter over and behind the horse's ears.
15. Snap the snap of the throat latch to the halter ring (see picture).
16. Slide the lead rope over the horse's head and lead the horse in a large circle as in task sheet ___.
17. Remove the halter and lead rope.
18. Remember to relock the pasture or paddock gate after you have left.
19. Put the halter and lead rope back where they belong.

TASK H-4: Cleaning the Front Feet

Purpose:

Horses that are ridden a lot must have their hooves cleaned each day. The horse's front feet must be lifted up before the hooves can be cleaned. A hoof pick is used to clean the dirt and stones out of the hoof. The horse must be in cross-ties before you begin to clean its feet.

Work to be Done:

Clean a horse's front hooves.

Things We Need:

1 horse
1 halter
1 lead rope
1 hoof pick

CAUTION:

*Never scare a horse. Always talk to the horse as you go near it.
*Never go near a horse directly behind or in front of it; walk next to it from the side.
*When you get near enough, always pet the horse on its shoulder or neck.
*Use caution when walking around a horse.

Things to Do:

1. Get all the things we need to clean a horse's front hooves.
2. Walk over to the horse with the halter and lead rope in your hand.
3. Talk softly to the horse and pet it on the shoulder so it knows you are there.
4. Halter the horse as in task sheet H-3.
5. Snap on the lead rope and lead the horse to a set of cross-ties.
6. Snap the cross-tie snaps onto the side rings on the horse's halter (see picture).
7. Unsnap the lead rope and hang it up.
8. Facing the rear of the horse, gently place your left hand on the horse's left shoulder.
9. Slide your right hand down the inside of the horse's left front leg (see picture)1
10. Lean against the horse's left shoulder and grasp the horse's leg right below the knee.

11. Gently, but firmly lift the horse's leg upward.
    CAUTION: Do not pull the horse's leg outward toward you. This will make the horse uncomfortable.
12. Grab the horse's hoof with your left hand.
13. Gently lean into the horse with your left shoulder.
14. Using the pointed end of the hoof pick, clean the bottom of the hoof (see picture).
15. Begin at the heel and clean out all the manure, dirt, and stones.
16. Gently place the horse's foot on the ground.
17. Clean the right foot in the same way as the left.
18. Go to task sheet __ and clean the rear feet of the horse.

TASK H-5: Cleaning the Rear Feet

Purpose:

Horses that are ridden a lot must have their hooves cleaned each day. The horse's rear feet must be lifted up before the hooves can be cleaned. A hoof pick is used to clean the dirt and stones out of the hoof. The horse must be in cross-ties before you begin to clean its feet.

Work to be Done:

Clean a horse's rear hooves.

Things We Need:

1 horse
1 halter
1 lead rope
1 hoof pick

CAUTION:

*Never scare a horse. Always talk to the horse as you go near it.
*Never go near a horse directly behind or in front of it; walk next to it from the side.
*When you get near enough, always pet the horse on its shoulder or neck.
*Use caution when walking around a horse.

Things to Do:

1. Get all the things we need to clean a horse's rear hooves.
2. Walk over to the horse with the halter and lead rope in your hand.
3. Talk softly to the horse and pet it on the shoulder so it knows you are there.
4. Halter the horse as in task sheet ___.
5. Snap on the lead rope and lead the horse to a set of cross-ties.
6. Snap the cross-tie snaps onto the side rings on the horse's halter (see picture).
7. Unsnap the lead rope and hang it up.
8. Slowly walk with the hoof pick in your hand to the rear of the horse while talking to it softly.
9. Gently place your hand on the horse's left hip and pet it.
10. Using your right hand, grasp the horse's leg below the hock (see picture).
11. Gently squeeze the horse's leg with your right hand while pushing on its hip with your left hand.

12. When the horse raises its foot, grasp the hoof with your left hand. CAUTION: Do not pull the horse's leg outward toward you; this will make the horse uncomfortable.
13. After you have the horse's rear hoof in your hand, bend your knees and slide your left leg under the horse's raised leg.
14. Place the cannon on your left thigh so the horse's hoof is resting slightly over yor knee (see picture).
15. Using the pointed end of the hoof pick, clean the bottom of the hoof (see picture).
16. Begin at the heel and clean out all the dirt, manure, and stones.
17. Gently place the horse's foot on the ground.
18. Clean the right hind foot in the same way as the left.
19. Now the horse is ready to be saddled, put out to pasture, or put back into its stall.
20. If you are putting it out to pasture or back into its stall:
    a. Snap the lead rope onto the halter.
    b. Unsnap the cross-ties.
    c. Lead the horse to its stall or pasture.
    d. Remove the halter and lead rope after the horse is in its stall or in the pasture.
    e. Put the halter, lead rope, and hoof pick where they belong.
21. If you are going to saddle the horse, go to task sheet __.

TASK H-6: Checking the Hooves for Dryness

Purpose:

Horse hooves can become dry and brittle. Dry, brittle hooves can cause sore feet. Dry hooves can be prevented by putting on hoof dressing. When horses have sore feet they limp.

Work to be Done:

Check the four hooves for dryness.

Things We Need:

1 horse	1 halter
1 small paint brush	1 lead rope
1 container of hoof dressing	1 hoof pick

CAUTION:

*Never scare a horse. Always talk to the horse as you go near it.
*Never go near a horse directly behind or in front of it; walk next to it from the side.
*When you get near enough, always pet the horse on its shoulder or neck.
*Use caution when walking around a horse.

Things to Do:

1. Get all the things we need to check the hooves for dryness.
2. Slowly go toward the horse carrying the halter and lead rope in your hand.
3. Talk solfly to the horse and pet it on the shoulder so it knows you are there.
4. Halter the horse as in task sheet ___.
5. Snap the lead rope on the halter and lead the horse to a set of cross-ties.
6. Snap the cross-tie snaps onto the rings on each side of the halter (see picture).
7. Unsnap the lead rope and hang it up.
8. Lift and clean the horse's left front foot as in task sheet ___.
9. Clean mud, dirt, or manure off of the horse's hoof with the scrub brush.
10. Check the hoof for one of the following signs of dry hooves:
    a. hard, dry, cracked sole (see picture)
    b. hard frog (see picture)
    c. hard, cracked hoof (see picture)
    d. hard, dry coronary band (see picture)

11. If any of these signs are on the hoof, ask your teacher how much hoof dressing should be put on.
12. Use the small paint brush, a toothbrush, or your fingers to put on the hoof dressing.
13. After you have put hoof dressing on the horse's left front hoof, gently place the hoof back on the ground.
14. Lift and clean the horse's left rear hoof as in task sheet ___.
15. Lift and clean the horse's right rear hoof as in task sheet ___.
16. Repeat steps 9 through 11.
17. Lift and clean the horse's right front hoof as in task sheet ___.
18. Repeat steps 9 through 11.
19. Put all the things we used back where they belong.
20. Snap the lead rope onto the halter.
21. Unsnap the cross-ties.
22. Lead the horse back to its stall, pasture, or paddock.
23. Remove the halter and lead rope.
24. Put the halter and lead rope back where they belong.

TASK H-7: Checking the Hooves for Thrush

Purpose:

Thrush is a rotting condition under the horse's hooves. If thrush is not treated, the horse will limp. Horses may get thrush when they are in damp pastures or bedding. Cleaning the hooves daily can help prevent thrush. Thrush can be treated with thrush medicine.

Work to be Done:

Check the horse's hooves for thrush.

Things We Need:

1 horse
1 halter
1 lead rope
1 hoof pick
1 bucket
1 scrub brush
1 liquid soap
1 bottle of thrush medicine

CAUTION:

*Never scare a horse. Always talk to the horse as you go near it.
*Never go near a horse directly behind or in front of it; walk next to it from the side.
*When you get near enough, always pet the horse on its shoulder or neck.
*Use caution when walking around a horse.

Things to Do:

1. G t all the things we need to check for thrush.
2. Slowly go toward the horse carrying the halter and lead rope in your hand.
3. Talk softly to the horse and pet it on the shoulder so it knows you are there.
4. Halter the horse as in task sheet ___.
5. Snap the lead rope onto the bottom ring on the halter. Lead the horse to a set of cross-ties.
6. Snap the cross-tie snaps onto the rings on the side of the halter.
7. Unsnap the lead rope and hang it up.
8. Mix soap and warm water in the bucket.
9. Lift and clean the horse's front foot as in task sheet H-4.
10. Check the underside of the hooves for the following signs of thrush:
    a. moist, rotten parts around the frog and heel (see picture)
    b. a rotten, bad smell

11. If one or more of these signs are found, follow these steps to treat thrush.
12. Mix soap and warm water in the bucket.
13. Scrub the hooves with warm, soapy water and a scrub brush.
14. Ask your teacher how much thrush medicine to put on the hooves.
15. Put the thrush medicine on the underside of the horse's hooves (see picture).
16. After you have put thrush medicine on the horse's left front foot, gently place the hoof back on the ground.
17. Lift and clean the horse's left rear foot as in task sheet ___.
18. Repeat steps 10 through 12.
19. Lift and clean the horse's right rear foot as in task sheet H-5.
20. Repeat steps 10 through 12.
21. Lift and clean the horse's right front foot as in task sheet H-4.
22. Repeat steps 10 through 12.
23. When you have finished treating the horse's hooves for thrush, snap the lead rope back onto the bottom halter rings.
24. Unsnap the cross-ties.
25. Lead the horse back to its stall, pasture or paddock.
26. Remove the halter and lead rope.
27. Make sure everything is put back where it belongs.

TASK I-1: Learning the Body Parts of a Horse

Purpose:

People who work with horses need to know what the outside parts of a horse are called. If the horse gets hurt, the person can tell the animal doctor where it is hurt.

Work to be Done:

Learn the names of the outside parts of a horse.

Things We Need:

1 horse
1 pointer
1 halter and lead rope
1 pencil
1 xeroxed "horse" with areas to fill in the names of the body parts

CAUTION:

*Never scare a horse. Always talk to the horse as you go near it.
*Never go near a horse directly behind or in front of it; walk next to it from the side.
*When you get near enough, always pet the horse on its shoulder or neck.
*Use caution when walking around a horse.

Things to Do:

1. Get all the things we need to learn the outside parts of a horse.
2. Catch and halter a horse as in task sheet ___.
3. Place the horse in cross-ties.
4. Using the pointer, point to the outside body parts of the horse listed below:

1. Throat latch	10. Back	19. Ankle
2. Muzzle	11. Neck	20. Hoof
3. Nostril	12. Loin	21. Girth
4. Face	13. Rump	22. Barrel
5. Eye	14. Tail	23. Elbow
6. Ear	15. Thigh	24. Shoulder
7. Forehead	16. Flank	25. Chest
8. Poll	17. Hock	26. Knee
9. Withers	18. Fetlock	27. Cannon

5. Listen to the teacher tell what the body parts are called on the horse.
6. Using the picture on the back of this sheet, write the names of the body parts on the horse.
7. Keep this picture of the horse to help you do other tasks.
8. Snap the lead rope onto the halter.
9. Unsnap the cross-ties.
10. Return the horse to its stall, pasture, or paddock.
11. Remove the halter.
12. Make sure everything is put back where it belongs.

TASK T-1: Cleaning the Saddle

Purpose:

It is important to keep your saddle clean. Cleaning your saddle helps it to last longer. Saddle soap is used to clean the saddle. It removes dirt and keeps the saddle soft. When you finish riding, you should rub the sweat and hair off the saddle with a damp towel. This will make your job cleaning the saddle easier.

Work to be Done:

Clean a saddle.

Things We Need:

1 saddle
1 can saddle soap
1 natural sponge
2 clean towels
1 bucket
a source of lukewarm water
a clean table

CAUTION:

*Do not rub the soap on suede saddle parts.
*Never scare a horse. Always talk to the horse as you go near it.
*Never go near a horse directly behind or in front of it; walk next to it from the side.
*When you get near enough, always pet the horse on its shoulder or neck.
*Use caution when walking around a horse.

Things to Do:

1. Get all the things we need to clean a saddle.
2. Put the saddle onto a clean table.
3. Fill the bucket with lukewarm water.
4. Wet the sponge and squeeze out most of the water.
5. Before cleaning, rub the saddle and girth with a damp sponge (see picture).
6. Rinse the sponge and squeeze out most of the water.
7. Rub the sponge in the saddle soap until it makes suds.
8. Rub the soapy sponge over all the leather parts of the saddle (see picture). Rinse the sponge and rub it into the saddle soap as needed.
9. Rub the soap suds into the leather with a clean, damp towel.
10. Let the saddle dry for about one hour.

11. Now shine the saddle parts by wiping with a dry towel.
12. Place the saddle on a saddle rack in the tack room.
13. Cover the saddle with a clean cloth (see picture).
14. Clean the table and sponge, and put away the things you used.

TASK T-2: Cleaning the Bridle

Purpose:

It is important to keep your bridle clean. Cleaning your bridle helps it to last longer. Saddle soap is used to clean the bridle. It removes dirt and keeps the bridle soft. When you finish riding, you should rub the sweat and hair off the bridle with a damp towel. This will make your job cleaning the bridle easier.

Work to be Done:

Clean a bridle.

Things We Need:

1 bridle
1 can saddle soap
1 natural sponge
2 clean towels
1 bucket
a source of lukewarm water
a clean table

Things to Do:

1. Get all the things we need to clean a bridle.
2. Put the bridle onto a clean table.1
3. Fill the bucket with lukewarm water.
4. Wet the sponge and squeeze out most of the water.
5. Before cleaning, rub the bridle with a damp sponge (see picture).
6. Rinse the sponge and squeeze out most of the water.
7. Rub the sponge in the saddle soap until it makes suds.
8. Rub the soapy sponge over all the leather parts of the bridle. Rinse the sponge and rub it into the saddle soap as needed.
9. Rub the soap suds into the leather with a clean, damp towel.
10. Let the bridle dry for about 1 hour.
11. Now the bridle parts by wiping with a dry towel.
12. Place the bridle on a bridle rack in the tack room (see picture).
13. Clean the table and sponge, and put away the things you used.

TASK T-4: Cleaning Feed and Water Buckets

Purpose:

It is important to keep horse's feed and water buckets clean. A mild bleach solution can be used to clean the buckets. Buckets should be cleaned once a month. Dirty feed and water buckets can make the horse sick.

Work to be Done:

Clean feed and water buckets.

Things We Need:

1 feed and water bucket
1 scrub brush
1 bottle of bleach
1 teaspoon
1 plastic quart container
a source of water

CAUTION:

*Be very careful when pouring bleach. Bleach can burn your eyes and ruin your clothes.
*When mixing bleach and water always put the water into the bucket(s) first then add the bleach.

Things to Do:

1. Get all the things we need to clean feed and water bucket(s).
2. Using the plastic quart container, measure 1 quart of water into each bucket.
3. Using the teaspoon, carefully measure 1 teaspoon of bleach into each bucket.
   NOTE: When using the scrub brush to clean bucket(s), be careful not to splash only bleach water onto yourself
4. Using the scrub brush, carefully scrub the inside of the bucket(s).
5. After you have scrubbed the inside of the bucket(s) using the scrub brush to scrub the buckets rims and outside of the bucket(s).
6. Ask your teacher where to empty the bucket(s) full of bleach water.
7. Rinse the inside and outside of the bucket(s) 3 times with fresh water.
8. Let the bucket(s) dry for 3 hours.
9. Put the bucket(s) back in the stall where they belong.
10. Make sure everything is put back where it belongs.

TASK T-5: Checking Horse's for Signs of Illness/Injury

Purpose:

Sometimes horse's get sick or hurt. It is important for people who work with horse's to recognize signs of illness or injury. Many times an animal doctor must be called to the farm to give medicine to the sick horse.

Work to be Done:

Check a horse for signs of illness or injury.

Things We Need:

1 horse

CAUTION:

*Never scare a horse. Always talk to the horse as you go near it.
*Never go near a horse directly behind or in front of it; walk next to it from the side.
*When you get near enough, always pet the horse on its shoulder or neck.
*Use caution when walking around a horse.

Things to Do:

1. Slowly and quietly move over next to the area where the horse is kept--for example, a stall, paddock, or pasture.
2. Quietly watch the horse for a few minutes for these following signs of illness or injury.
   a. coughing or wheezy breathing
   b. discharge from nose or eyes
   c. not wanting to eat grain, grass, or hay
   d. loss of hair, bald red spots on skin
   e. limping
   f. cuts or wounds
   g. bruises or swollen parts on the body
3. If the horse shows any of the above signs, tell your teacher which horse you think is sick or hurt.

Choosing Seeds Based on Seed Label Information

Work to be Done: Using the information on a seed label, the student will choose seeds for planting. The teacher will check all work by using the guide on the back of this sheet.

Description:

A crop producer should read the seed label before buying any seed or before using seeds stored at home. The seed label has information the crop producer needs to choose a good quality seed.

Materials and Tools Needed:

Labeled containers of seeds

Knowledge:

Percentages

New Words:

kind
variety
purity
germination
germination test date
origin of seed
inert matter
pesticide

Task Statements and Evaluation

1. Find the seed label on the seed container. It may look like the picture (see picture). Or, the information may be printed on the container. |___|___|
2. Find the kind and variety of seed (see picture). The kind of seed might be, for example, corn or soybean. A variety of corn seed might be, for example, ___ or ___. Different varities need different growing conditions. Your seed dealer will help you choose the variety of seed that grows best in your area. |___|___|
3. Find the percent purity (see picture). This is the amount of crop seed. It should be 90 percent or higher. |___|___|
4. Find the percent germination (see picture). Germination is a measure of seeds that grow. It is best at 98 percent or higher. It is usable if higher than 80 percent. |___|___|
5. Find the germination test date (see picture). This is when the seed was tested for percent germination. |___|___|
6. Find this information on the seed label (see picture).
   a. The origin of seed is the state or county that produced the seed.
   b. The amount and kind of weed seed.
   c. The inert matter may be chaff, dirt, stem, and broken seed.
   d. The amount of hard seed is the seed that will not germinate. |___|___|
7. Look for a separate label for seed that is treated with pesticide or chemicals to control insects. Seeds that will be planted early in the season should be treated with pesticides. The label will have the name of the pesticide and the types of insects it will control. The label will also have a red skull and crossbones and the word "POISON" if the pesticide is poisonous. |___|___|
8. Using this information, choose the seed that will best fir your needs. |___|___|

Choosing Seeds Based on Seed Pack Information

Work to be Done: Using the information on a seed pack, the student will choose seed for planting. The teacher will check all work by using the guide on the back of this sheet.

Description:

A crop producer should read the seed pack before buying any seed or before using seeds stored at home. The seed pack has information the crop producer needs to choose the best seed.

Materials and Tools Needed:

Packs of seeds

New Words:

kind
variety
growing conditions
seeding depth
seeding rate

Task Statements and Evaluation

1. Find the kind and variety of seed (see picture). The kind of seed might be, for example, bean or pea. A variety of bean seed might be, for example, ___ or ___. The kind and variety of seed is listed on the front and back of the pack. Often there is a picture of the crop on the front of the pack. Sometimes the crop is described on the back of the pack. |___|___|
2. Find the growing conditions for the seed (see picture). The growing conditions may be the best type of lighting, soil, or moisture for greatest crop yield. Or, sometimes a seed is developed for the growing conditions found in a region of the country or a state. This is listed on the pack as "Developed for Central Pennsylvania." |___|___|
3. Find the date on the seed pack (see picture). The date may be listed as "Packed for 1984." |___|___|
4. Find the planting date (see picture). This may be based on a region of the country or on the weather, such as "after the last frost." |___|___|
5. Find the depth and rate of seedling. The seedling depth is how deep the plant the seed. The seeding rate is how deep to plant the seed and how far apart to make rows. |___|___|
6. Find other planting instructions:
   a. instructions for starting plants indoors.
   b. instructions for transplanting plants that were started indoors, to the outdoors.
   c. instructions for thinning plants.
   d. instructions for neighboring plants in a garden. |___|___|

Performing Seed Germination Test

Work to be Done: Using seeds and supplies, the student will test seeds for germination percentage. The teacher will check all work by using the guide on the back of this sheet.

Description:

A germination on test is used before planting seed. The test measures the percentage of seeds that are expected to grow when they are planted. The test will help you decide the seeding rate or how close the seeds should be planted.

Materials and Tools Needed:

seeds
paper towels
water

Knowledge:

percentages

New Words:

germination
seeding rate
germination percentage

Task Statements and Evaluation

1. Count 100 seeds from the seeds you will be planting.
2. Stack 5 paper towels.
3. Wet the paper towels with water. They should all be damp.
4. Place the seeds evenly on the paper towels.
5. Roll the paper towels so the seeds are inside.
6. Place the roll in the light where it is warm.
7. Check for germination after 7 days. Unroll the paper towels. The seeds should have stem and root sprouts (see picture).
8. Count the seeds with normal stem and root sprouts.
9. Figure the germination percentage:

$$\frac{\text{Number of seeds with normal stem and root sprouts (step 3)}}{\text{100 seeds tested}} \qquad \text{\% germination}$$

Planting Seeds

Work to be Done: Using tools and supplies, the student will plant seeds at the proper time, depth, and rate. The teacher will check all work by using the guide on the back of this sheet.

Description:

Crop producers want high crop yields. The best time and method of planting must first be planned. These plans are then followed when planting the seeds to give the highest crop yields.

Materials and Tools Needed:

___ (Acre) test plot of prepared soil (see preparing the soil).
2 stakes (1½')
String
hoe
seed of choice
yard stick
hammer

Knowledge:

Planting date, planting depth, and seeding rate for chosen seed (see planting practices)

Skills:

Measurement of length
Use of hand tools

Task Statements and Evaluation

1. Begin this task on the planting date. | | |
2. Marking the row:
   a. At one end of the plot, measure 18 inches in from the side with the yard stick (see picture).
   b. Using a hammer, drive the stake into the ground at the point found in Step 1A. The point of the stake should be under the ground about 6 inches. The stake should be firmly in the ground.
   c. Repeat steps 1A and 1B on the other end of the plot.
   d. Tie the string to each stake. The string should be stretched tight between the stakes. The string should be about 4 inches above the ground.
3. Using a hoe, make a straight row in the ground along the string guide (see picture). Cut into the ground with the corner of the hoe. The row should be as deep as the planting depth. | | |
4. By hand, place the seeds into the rows. The seeds should be spaced by the seeding rate. Use the yardstick to space the seeds. | | |
5. By hand, cover the seeds with the soil used to form the row. Smooth the soil to level the row. | | |
6. Repeat Steps 2, 3, 4, and 5 for the whole plot. The rows should be 18 inches apart. Once the string is tied to the stakes, the stakes can be moved 18 inches to make the next row without retieing the string each time. | | |

Preparing the Soil

Work to be Done: Using tools and supplies, the student will prepare the soil for planting seeds. The teacher will check all work by using the guide on the back of this sheet.

Description:

Tillage means to prepare the soil for planting. The soil is tilled in the spring before planting. Lime and fertilizer may be added to the soil before planting.

Materials and Tools Needed:

rototiller
broadcast type spreader
soil test results
__ (acre) test plot
5-10-10 fertilizer
lime
rake

Knowledge:

Planting date for seed chosen

Skills:

Use of broadcast type spreader
Use of rototiller
Use of rake

New Words:

tillage
lime
fertilizer

Task Statements and Evaluation

1. Begin this task at least 3 days before the planting date for the seed chosen. |___|___|
2. Using a rototiller, till the soil in the test plot (see operating a rototiller). |___|___|
3. Plan for the amount of lime to use:
   a. Check pH on soil test results
   b. Compare pH of soil to chart
   c. If the soil needs lime, use about 20 pounds for the test plot. |___|___|
4. Plan for the amount of fertilizer to use:
   a. Check the soil test results. |___|___|
5. Mix lime and fertilizer in the broadcast type spreader. |___|___|
6. Check the instructions to set the spreader for lime and fertilizer. |___|___|
7. Spread lime and fertilizer on test plot. Cover the whole plot. |___|___|
8. Let the plot sit for 3 days to balance the moisture. |___|___|
9. Using the rake, smooth the soil. Rake the lime and fertilizer into the soil. |___|___|

Planting Practices

Work to be Done: Using supplies, the student will plan the proper time, depth, and rate to plant seeds. The teacher will check all work by using the guide on the back of this sheet.

Description:

Crop producers want high crop yields. The best time and method of planting will give the highest crop yields. The time and method of planting will be different for each crop and for each place the crop is grown. The time of planting is the planting date. The method of planting is the planting depth and seeding rate.

Materials and Tools Needed:

FARMER'S ALMANAC
thermometer
germination test results
seed label or seed pack for
seed of choice

Skills:

Use of a thermometer

New Words:

planting date
crop yield
seeding rate
planting depth

Task Statements and Evaluation

1. Plan the time to plant the seed you choose by thinking of these:
   a. check the FARMER'S ALMANAC for the planting date
   b. ask the seed dealer for the planting date
   c. check the seed pack for the planting date
   d. earlier spring plantings give higher yields. But, low soil temperatures may keep some seeds from germinating. Check the soil temperature with a thermometer. It should be above 55° F. |___|___|
2. Plan the depth to plant the seed you chose by thinking of these:
   a. check the seed pack for planting depth.
   b. most seeds are planted about 1 inch deep. Small seeds should be planted close to the soil surface than larger seeds (see picture)
   c. a seed planted too close to the soil surface may die for lack of water
   d. earlier spring plantings should be closer to the soil surface. Soil near the surface is warmer and dryer. Wet, cold soil may cause the soil to rot before it germinates. |___|___|
3. The seeding rate is the distance between the seeds in a row. Plan the seeding rate for the seed you chose by thinking of these:
   a. check the seed pack for seeding rate
   b. ask the seed dealer for the seeding rate
   c. check the germination test results or the seed label for the germination rate. If the germination rate is between 80 percent and 95 percent, the seed should be planted closer than what the seed pack or seed dealer says. |___|___|

Cutting Metal With a Hacksaw

Work to be Done: Using tools and supplies, the student will cut a metal stock with a hacksaw. The teacher will check all work by using the guide on the back of this sheet.

Description:

Some types of metals may be worked cold. The metal stock must be the right type and size. Cold metal work is often easier and less costly than hot metal work.

Materials and Tools Needed:

Hacksaw Frame
Hacksaw blade (16 teeth/inch)
Scriber
Table vise
File
1/8" thick mild steel plate

Knowledge:

Parts of a hacksaw

Skills:

Marking metal with a scriber
Use of a vise
Use of a file

Task Statements and Evaluation

1. Set the hacksaw blade in the hacksaw frame. The blade should be set straight and not curved. The teeth of the blade should be pointing away from the handle of the saw. |___|___|
2. Turn the frame screws to fasten the blade. The blade should be fastened tight so that it does not twist and break. |___|___|
3. Using a scriber, mark the stock at the point is is to be cut. |___|___|
4. Place the stock in the vice. The mark should be close to, but outside of, the jaws of the vise (see picture). Sawing close to the jaws of the vise is easier because the piece is held firmly and does not move. |___|___|
5. Close the jaws of the vise firmly on the stock. |___|___|
6. Cut a notch at the mark with a file. This will help to get the saw started at the right place. |___|___|
7. Saw the stock. Press the saw downward on the forward strokes. Release the pressure on the return strokes. Run the saw evenly using long strokes. Use all the teeth on the blade so it will wear evenly and not just in the middle. |___|___|

NOTE: For thin metal, use a blade with more than 16 teeth to the inch.

Drilling Holes in Metal

Work to be Done: Using a drill press, tools and supplies, the student will drill a hole in metal. The teacher will check all work by using the guide on the back of this sheet.

Description:

Holes may be made in metal with a drill bit. Drilling may be done with a hand drill, a portable power drill, or a drill press.

Materials and Tools Needed:

½" thick mild steel plate
drill press
½" bit
scriber
center punch
hammer
ball peen hammer
wooden block
clamps
oil

Skills:

Use of a drill press
Marking metal with a scriber
Use of hammers

Task Statements and Evaluation

1. Using a scriber, mark an "X" on the metal where the hole will be.
2. Place the point of the center punch in the middle of the "X."
3. Using a hammer, hit the head of the center punch.
4. Check the mark to see if it is in the right place.
   a. if the mark is in the right place, replace the punch on the mark and hit it with the hammer 3 times.
   b. If the mark is not in the right place, hammer out the mark with a pall peen hammer. Then, repeat Steps 2, 3, and 4.
5. Place the stock on a wooden block on the drill stand.
6. Clamp the stock to the block so it will not spin while drillig (see picture).
7. Feed the drill bit down to the center of the mark and just start drilling.
8. Raise the bit to see if the hole is started in the right place.
   a. if the hole is started in the right place, go to Step 9.
   b. If the hole is not started in the right place, remark the hole (start at Step 2).
9. Lower the drill bit into the started hole.
10. Put a little oil on the drill bit 2 inches above the work.
11. Start the drill, using automatic feed. Drill through the metal into the wood.
12. Raise the drill bit.

Cutting Threads on a Bolt

Work to be Done: Using tools and supplies, the student will cut threads on a bolt. The teacher will check all work by using the guide on the back of this sheet.

Description:

Threads, the spiral grooves on nuts and bolts, can be cut with taps and dies. A die is used for cutting the threads on bolts.

There are 3 sizes of threads: course, fine, and special. The width of the bolt and the die should be the same. Dies are stamped with both their width and thread size.

Materials and Tools Needed:

Bolt
Die
Vise
File
Lard oil

Knowledge:

Clockwise - counterclockwise

Skills:

Use of a vise

New Words:

threads
die

Task Statements and Evaluation

1.	Clamp the bolt in the vise upside down (see picture).		
2.	Using a file, smooth the end of the bolt. The end of the bolt should be flat (see picture).		
3.	Check the die to be sure it is the same width as the bolt.		
4.	Put lard oil on the bolt so the die will run smoothly.		
5.	Place the die squarely on the bolt.		
6.	While pressing downward on the die, turn it clockwise ½" turn (see picture).		
7.	Release the pressure on the die and turn it counter clockwise ½" turn (see picture). This back turn will make the chips of metal fall out.		
8.	Repeat Step 6 and then 7 until the bolt is threaded.		
9.	Remove the die by turning it counter clockwise.		

Threading Nuts

Work to be Done: Using tools and supplies, the student will cut threads in a nut. The teacher will check all work by using the guide on the back of this sheet.

Description:

Threads, the spiral grooves on nuts and bolts, can be cut with taps and dies. A tap drill is used for cutting the threads in nuts.

There and 3 sizes of threads: course, fine, and special. The width of the nut hole and the tap should be the same. Tap drills may have their size stamped on the shank. Drills that are too small to be stamped with their size can be measured with a screw pitch guage (see picture).

Materials and Tools Needed:

tap
tap wrench
nut
vise
lard oil

Knowledge:

Parts of a tap drill
Clockwise - counter clockwise

Skills:

Use of a vise

New Words:

threads
tap drill
screw pitch guage

Task Statements and Evaluation

1. Select the right size tap. It should be the same width as the hole in the nut.
2. Place the tap in the tap wrench.
3. Clamp the nut in the vise.
4. Put lard oil on the tap for smooth running.
5. Place the tap straight up and down in the nut (see picture).
6. While pressing downward on the tap wrench, turn it slowly clockwise ½ turn (see picture).
7. Release the pressure on the tap wrench and turn it counter clockwise ½ turn (see picture. This back turn will make the chips of metal fall out.
8. Repeat Step 6 and then 7 until the bolt is threaded.
9. Remove the tap by turning it counter clockwise.

Riveting

Work to be Done: Using tools and supplies, the student will rivet two pieces of metal together. The teacher will check all work by using the guide on the back of this sheet.

Description:

Metal such as ____, that cannot be welded together, is often riveted. Other materials such as leather can also be riveted.

Materials and Tools Needed:

2 pieces, 1/8" thick mild steel plate
rivet
ball peen hammer
washer
drill press
1/8" bit
anvil

Knowledge:

Parts of a hammer

Skills:

Use of hammer
Drilling holes in metal

Task Statements and Evaluation

1. Drill a hole in each piece of metal at the point to be joined (see drilling holes in metal).
2. Choose a rivet that is a little larger than the holes.
3. Put the rivet through both holes in the metal. You may need to place the rivet head on the anvil and tap the metal near the rivet with a hammer (see picture).
4. Place the washer on the rivet (see picture).
5. Place the head of the rivet on the anvil. Twist the metal pieces to place them where you want them (see picture).
6. With the peen of the hammer, strike the center of the rivet a few times.
7. With the face of the hammer, strike the center of the rivet until the metal pieces are joined tightly.
8. Using the peen of the hammer, round the edges of the head. Finish to an oval shape (see picture).

Dressing to Weld

Work to be Done: Using proper clothing, the student will dress to weld. The teacher will check all work by using the guide on the back of this sheet.

Description:

Proper clothes are important for safety during welding. Eyes, skin, and body must be protected from burns caused by molten metal. Molten metal is very hot, liquid metal that often splatters or splashes during welding.

Materials and Tools Needed:

clean shop clothes made of natural fibers (not synthetics)
pants without cuffs
steel-toed, leather, safety shoes, or leather spats
leather apron
leather sleeves
leather welding gloves
leather cap
welding helmet, or goggles with proper lens (see Step 9)

Knowledge:

Basic Welding Process

New Words:

molten metal
natural fibers
synthetics

Task Statements and Evaluation

1. Wear clean shop clothes. Oily clothes can catch on fire.
2. Wear shop clothes made of natural fibers such as cotton or wool. Synthetics, such as polyester and nylon, will melt and burn if they are splattered with molten metal.
3. Wear pants that do not have cuffs (see picture). Sparks may fall into the cuffs and set the pants on fire.
4. Wear steel-toed, leather safety shoes. Or, wear leather spats over leather shoes (see picture).
5. Wear a leather apron (see picture).
6. Wear leather sleeves (see picture).
7. Wear leather welding gloves (see picture). Welding gloves have long cuffs.
8. Wear a leather cap (see picture).
9. Wear eye protection.
   a. When using an arc welder, wear a welding helmet with a number 10 shade lens (see picture). Never look at the electric arc with the naked eye.
   b. When using an oxyacetylene welder, wear a welding helmet or goggles with a proper lens for gas welding (see picture).

NOTE: A person who looks at an electric arc without the proper eye protection may receive an eye burn. Eye burn is painful, but it can be treated without damage to the eye.

Preparing Metal for Welding

Work to be Done: Using the tools and supplies, the student will prepare the parts to be welded. The metal will be cleaned, formed, cut, and placed in position for welding. The teacher will check all work by using the guide on the back of this sheet.

Description:

A clean, bright surface is easier to weld than a dirty surface. Wire brushes are used to remove rust from metal surfaces. Rust will prevent a weld. Thick metal must be beveled or cut to aid the welding process. For butt welds, the metal pieces should be placed 1/16 inch apart to permit a deep weld.

Materials and Tools Needed:

metal for welding
cold chisel
wire brush
(tools for cutting, grinding, and filing)
vise-grip welding clamps

Knowledge:

Types of welds

Skills:

Use of hand tools
Cutting, grinding, and filing metal
Measurement of size

New Words:

bevel
fit joints

Task Statements and Evaluation

1. Clean and dry the metal. Remove all dirt, oil, and rust. Rust may be removed with a cold chisel or wire brush. Fit the joints if 2 pieces of metal are to be welded together. | | |
2. Form the edges to be welded for an even fit. Forming can be done by cutting, grinding, or filing (see picture). | | |
3. For flat butt welds, measure the thickness of the metal. Bevel metal that is over 1/8 inch thick. | | |
   a. For metal that is between 1/8 and 3/8 inch thick, only one bevel is needed. Cut the edges of the metals to form a "V" (see picture).
   b. For metal that is over 3/8 inches thick, bevel both the top and bottom. Cut the top and bottom edges of the metals to form "V's" (see picture). | | |
4. Place the metal in position for welding. For butt welds, the edges to be welded should be 1/16 inch apart. Use vise-grip welding clamps to hold the metal in place for corner and fillet welds. | | |

Setting Up Oxyacetylene Welding Equipment

Work to be Done: Using tools and supplies, the student will set up an oxyacetylene welding outfit. The student will make clean, tight connections and check for leaks.

Description:

Correct set-up of an oxyacetylene outfit is important. All connections must be clean, tight, and without leaks.

NOTE TO THE TEACHER: This task should be used in combination with the task "Shutting Down Oxyacetylene Welding Equipment." The task begins with both cylinder regulators connected. The oxygen cylinder valve should be set fully open. The oxyacetylene cylinder valve should be set at ¼ to ¾ turn open. The cylinders should be fastened in a vertical position. Insure that all regulators have reversed flow valves.

Materials and Tools Needed:

oxyacetylene welding outfit
proper welding clothing (see Dressing to Weld)
clean cloth
#3 tip
mild, liquid soap and water
regulator wrenchs
blowpipe wrench

Knowledge:

Parts of an oxyacetylene welding outfit
How to read a pressure guage
Turning directions: clockwise and
counter clockwise

Skills:

Use of hand tools

New Words:

purge

Task Statements and Evaluation

1. Check both cylinders. They should be fastened upright. Both regulators should be attached to the cylinders. Tell your teacher if the cylinders and regulators are not set up. |___|___|
2. Connecting the acetylene hose to the acetylene regulator. The acetylene cylinder is black (see picture).
   a. Check the connections. They should be clean for a tight fit. Wipe them with a clean, dry cloth to remove all dirt.
   b. Connect the acetylene hose (red) to the acetylene regulator (on black cylinder). Turn the nut counter clockwise. Tighten the nut with a regulator wrench.
   c. Purge the hose by first checking to be sure the torch body is not connected to the hoses. Then quickly open and close the adjusting screw on the acetylene regulator.
3. Connecting the oxygen hose to the oxygen regulator. The oxygen hose is green and has a right hand nut. The oxygen cylinder is green (see picture).
   a. Check the connections. They should be clean for a tight fit. Wipe them with a clean, dry cloth to remove all dirt.
   b. Connect the oxygen hose (green) to the oxygen regulator (on green cylinder). Turn the nut clockwise. Tighten the nut with a regulator wrench.
   c. Purge the hose by first checking to be sure the torch body is not connected to the hoses. Then, quickly open and close the adjusting screw on the oxygen regulator. |___|___|
4. Connecting the torch body to the oxygen and acetylene hoses (see picture).
   a. Open both valves on the torch body.
   b. Check the connections. They should be clean for a tight fit. Wipe them with a clean, dry cloth to remove all dirt.
   c. Attach the oxygen hose (green) to the torch body. Turn the nut clockwise. Tighten the nut with a regulator wrench.
   d. Attach the acetylene hose (red) to the torch body. Turn the nut counter clockwise. Tighten the nut with a regulator wrench.
   e. Close both valves on the torch body. |___|___|
5. Using a blowpipe wrench, attach a #3 tip to the torch body (see picture). |___|___|
6. Slowly open the adjusting screw on the oxygen regulator (on green cylinder). Stop when the low pressure guage reads 10 psi. (see picture). |___|___|
7. Slowly open the adjusting screw on the acetylene regulator (on black cylinder). Stop when the low pressure guage reads 10 psi. (see picture). |___|___|
8. Check the equipment for leaks at five places numbered on the picture (see picture). Drip soapy water on these places. There is a leak if the water bubbles. Tell your teacher if you find any leaks. |___|___|
9. Shut down the equipment (see Shutting Down Oxyacetlene Welding Equipment). |___|___|

Adjusting Torch and Flame of an Oxyacetylene Welder

Work to be Done: Using an oxyacetylene welding outfit and supplies, the student will adjust the torch and flame. The student will produce a neutral, an oxidizing, and a carburizing flame. The teacher will check all work by using the guide on the back of this sheet.

Description:

The proper type of flame must be used for each welding task. In a neutral flame, all gases are burned. In an oxidizing flame, there is extra oxygen that is not burned. In a carburizing flame, there is extra acetylene that is not burned.

Materials and Tools Needed:

- oxyacetylene welding outfit
- #3 tip
- lighter
- proper welding clothing (see Dressing to Weld)

Knowledge:

- Parts of an oxyacetylene welding outfit
- How to read a pressure guage

New Words:

- neutral flame
- oxidizing flame
- carburizing flame
- feather
- inner core

Task Statements and Evaluation

1. Set up welding equipment (see Setting Up Oxyacetylene Welding Equipment). |___|___|
2. Adjusting acetylene pressure.
   a. Open the acetylene valve on the torch 1 turn.
   b. Turn the adjusting screw on the acetylene regulator until the oxygen pressure guage reads 5 psi.
   c. Close the acetylene valve on the torch. |___|___|
3. Adjusting oxygen pressure.
   a. Open the oxygen valve on the torch 1 turn.
   b. Turn the adjusting screw on the oxygen regulator until the oxygen pressure guage reads 5 psi.
   c. Close the oxygen valve on the torch. |___|___|
4. Hold torch in right hand if right handed. Hold torch in left hand if left handed. |___|___|
5. Open the acetylene valve on the torch ¼ turn. |___|___|
6. Light the torch with the lighter. Do not point the torch at anyone while lighting it. |___|___|
7. Slowly adjust the acetylene valve on the torch until there is no smoke on the flame. The flame should be clear. |___|___|
8. Adjusting to carburizing flame.
   a. Open the oxygen valve on the torch slowly.
   b. Adjust the oxygen valve on the torch until the feather is 2 times longer than the inner core (see picture). |___|___|
9. Adjusting the neutral flame.
   a. Open the oxygen valve on the torch a bit more.
   b. Adjust the oxygen valve on the torch until only traces of the feather are on the inner core (see picture). |___|___|
10. Adjusting the oxidizing flame.
    a. Open the oxygen valve on the torch a bit more.
    b. Adjust the oxygen valve on the torch until there is no feather on the flame. The color of the flame should be ice blue (see picture). |___|___|
11. Shut down the welding outfit (see Shutting Down Oxyacetylene Equipment). |___|___|

Shutting Down Oxyacetylene Welding Equipment

Work to be Done: The student will shut down an oxyacetylene welding outfit.

Description:

It is important to release the pressure in the lines for safe storage of gas welding equipment.

NOTE TO TEACHER: This task should be used in combination with "Setting Up Oxyacetylene Welding Equipment" and other gas welding tasks.

Materials and Tools Needed:

- oxyacetylene welding outfit
- blowpipe wrench
- proper welding clothing (see dressing to weld)

Knowledge:

- Parts of an oxyacetylene welding outfit

Task Statement and Evaluation

1. Close the acetylene valve on the torch (see picture).
2. Close the oxygen valve on the torch (see picture).
3. Close the oxygen and acetylene cylinder valves.
4. Releasing the acetylene pressure (see picture)
   a. Open the acetylene valve on the torch.
   b. Let the gas pressure release into the air.
   c. Close the acetylene valve on the torch.
5. Releasing the oxygen pressure (see picture).
   a. Open the oxygen valve on the torch.
   b. Let the gas pressure release into the air.
   c. Close the oxygen valve on the torch.
6. Using a blowpipe wrench, remove the tip from the torch body (see picture).
7. Place torch and hose on hanger. Store the tip.

Cutting Pipe

Work to be Done: Using a wheel pipe cutter, the student will cut a pipe. The teacher will check all work by using the guide on the back of this sheet.

Description:

Galvanized and copper pipes are cut with a pipe cutter. A hacksaw can cut any pipe. Tubings and thin pipes are cut with a hacksaw because a cutting wheel would crush them.

Materials and Tools Needed:

Copper or Galvanized pipe
wheel pipe cutter
pipe vise
pencil
lard oil

Knowledge:

types of pipe
parts of a wheel pipe cutter

Skills:

Use of a pipe vise

Task Statements and Evaluation

1. Using a pencil, mark the pipe where it is to be cut.
2. Tighten the pipe firmly in a pipe vise. The line to be cut should be 5 inches from the vise jaws.
3. Slide the cutter onto the pipe. The pipe should be between the 2 rollers and the cutting wheel (see picture).
4. Place the cutting wheel on the mark. Turn the knob just until the cutting wheel bites into the pipe. Be careful not to bend the wall of the pipe.
5. Oil the pipe with lard oil where it is to be cut.
6. Turn the cutter once around the pipe.
7. Tighten the knob of the cutter ¼ turn.
8. Repeat steps 5, 6, and 7 until the pipe is cut.

Reaming Pipe

Work to be Done: Using tools and supplies, the student will ream a pipe that has been cut. The teacher will check all work by using the guide on the back of this sheet.

Description:

Pipe should be reamed after it is cut. All the burr, or the bits of metal on a pipe cut, should be removed. Burr is reamed from the inside of a pipe. Burr in a pipe will keep the water from flowing smoothly. Burrs may cause clogs in the pipe.

Materials and Tools Needed:

cut pipe
pipe vise
brace
pipe reame
file

Skills:

Use of a pipe vise
Use of a brace
Use of a file

New Words:

burr
ream

Task Statements and Evaluation

1. Tighten the pipe firmly in a pipe vise.
2. Tighten the pipe reamer in the chuck of the brace.
3. Fit the tip of the reamer into the cut end of the pipe (see picture).
4. Turn the brace to ream the pipe.
5. Ream the pipe until no raised place can be felt inside the pipe.
6. Remove the pipe from the vise.
7. Using a file, remove the ridge that the cutter left on the outside of the pipe.

NOTE: A pipe cutter may have a triangular blade to ream out the inside burr. The inner burr from a hacksaw cut pipe is removed with a round file.

Threading Pipe

Work to be Done: Using tools and supplies, the student will thread a pipe. The teacher will check all work by using the guide on the back of this sheet.

Description:

A pipe is threaded with a pipe die. A die set has 2 pieces. Each piece has 2 cuttings. Cuttings drop through the spaces between the cutting edges. A guide helps the die cut fine and even. Each pipe die and guide is marked for the size of pipe on which they are to be used.

Materials and Tools Needed:

1" Galvanized pipe
pipe-threading set
pipe vise
lard oil

Knowledge:

Parts of a pipe threading set

Skills:

Use of pipe vise

New Words:

pipe die
die set
guide
die stock

Task Statements and Evaluation

1.	Clamp the pipe in a pipe vise.		
2.	Attach the 1 inch die set to the die stock (see picture).		
3.	Push the 1 inch guide over the end of the pipe.		
4.	Put lard oil on the die.		
5.	Set the stock on the pipe (see picture).		
6.	Start the cut by turning the stock to the right while pressing inward. Stop pressing when the die cuts.		
7.	Oil the pipe often, ahead of the die while threading.		
8.	Thread the pipe by turning the stock to the right (see picture).		
9.	Stop cutting when the outside of the die is even with the end of the pipe.		
10.	Back the die by turning it to the left. If the die catches, turn it forward again.		
11.	Remove the stock and guide.		
12.	Strike the handle of the stock on the pipe to remove metal chips from the die and the pipe.		

Making a Flare Joint

Work to be Done: Using tools and supplies, the student will make a flare joint for copper tubing. The teacher will check all work by using the guide on the back of this sheet.

Description:

Cooper tubing is not threaded. Some fittings for copper tubing fit inside a flared end of the tubing. The fitting is held with a flare nut (see picture).

Materials and Tools Needed:

½" Copper tubing (cut and deburred)
flare nut and fitting
flaring tool and die
2 wrenches

Knowledge:

Use of fittings

Skills:

Use of wrenches

New Words:

flaring die
flaring tool

Task Statements and Evaluation

1. Stip the flare nut over the end of the tube. The threaded end of the nut should be toward the cut end of the pipe (see picture).
2. The flaring die shapes the cut end of the tube like a bell (see picture).
   a. Loosen the nuts on the top half of the flaring die.
   b. Put the tube in the ¼ inch hole. The cut edge of the tube should be even with the front side of the die.
   c. Tighten the nuts of the die to hold the tube in place.
3. Put the flaring tool under the tube and die (see picture).
4. Turn the handle of the flaring tool until the point starts to enter the tube.
5. Adjust the point so it is centered in the tube.
6. Turn the handle of the flaring tool until the point is tight against the tube and die.
7. Loosen the tool and die and remove the tube.
8. Making the joint:
   a. Set the domed end of the fitting into the flared end of the tube (see picture).
   b. Slide the flare nut up and tighten it to the fitting by hand.
   c. Place a wrench on the flare nut.
   d. Place a wrench on the fitting.
   e. While holding the wrench on the fitting, turn the wrench on the nut until it is tight.

Sweating Cooper Joints

Work to be Done: Using tools and supplies, the student will sweat a tee joint onto copper tubing. The teacher will check all work by using the guide on the back of this sheet.

Description:

Some fittings are soldered onto copper tubing to form joints. This is called sweating the fitting or joint.

Materials and Tools Needed:

½" copper tubing
½" tee joint
½" wire brush
emery cloth
flux
asbestos piece
propane torch
solder

Skills:

Use of a propane torch
Soldering

New Words:

sweating

Task Statements and Evaluation

1. Using a wire brush, scour the inside of the tee joint sockets. Do not touch the cleaned surface. |___|___|
2. Using the emery cloth, clean the outside end of the pipe that will slide into the fitting socket. Rub the surface until it is bright. Do not tough the cleaned surface. |___|___|
3. Brush a light coating of flux over the cleaned surface. |___|___|
4. Put the tubing into the fitting socket. |___|___|
5. Turn the tubing once so the flux coats the surfaces only. |___|___|
6. Place the asbestos in back of the joint to protect background from the flame of the torch. |___|___|
7. Light the torch. Play the flame over the fitting and nearby pipe. Heat them evenly. |___|___|
8. Touch a piece of solder to the fitting and then to the pipe (see picture). If the solder melts on both parts, the joint can be soldered without more heating. If the solder does not melt, keep heating the fitting and pipe as in step 7. |___|___|
9. Touch the solder tip to the point where the pipe enters the fitting. The flux will draw the melted solder into the fitting. If the solder does not melt, take it away and heat the joint again as in step 7. Do not let the flame tough the solder. |___|___|
10. Repeat step 9 all around the fitting, until a bead of metal forms around the rim and begins to drip (see picture). |___|___|

NOTE: Touching a surface that has been cleaned will caken the joint.

Laying Out Fence Line

Work to be Done: Using tools and supplies, 2 students will lay out a straight fence line. The teachers will check all work by using the guide on the back of this sheet.

Description:

The first job in building a fence is to plan where the fence line will be. This is done by laying out the fence line. A fence that is planned by first laying out the lines will be straight and even.

Materials and Tools Needed:

300' open, level area
5' wooden stakes
2 flags
hammer

Skills:

Estimate distances
Direction: Left, right

New Words:

laying out fence, line
sight line

Task Statements and Evaluation

1. Decide where each end of the fence will be.
2. Using a hammer, drive a stake into the ground at each end point of the fence. The stakes should be straight (see picture). The stakes should be about 6 inches deep.
3. Using string, tie a flag to the top of each stake (see picture).
4. One student stands at one end of the line. The student stands behind stake #1 and looks toward the other end of the line or stake #4 (see picture). This is the sight line.
5. The other student starts at stake #1. With a stake and the hammer in hand, the student moves about 100 feet toward stake #4. This is about 50 steps.
6. The student at stake #1 helps the other student line up stake #2. The student uses left and right hand signals to help the other student place stake #2 on the sight line between stakes #1 and #4 (see pictures).
7. Using the hammer, the student at stake #2 drives it 6 inches deep into the ground. The stake should be straight.
8. The students change places.
9. Repeat steps 4, 5, 6, and 7 to place stake #3. The student moves 100 feet from stake #2 toward stake #4. Stake #3 should be on the same sight line as all the other stakes.

Digging Post Holes

Work to be Done: Using tools and supplies, the student will dig a post hole. The hole will be the proper depth. The teacher will check all work by using the guide on the back of this sheet.

Description:

All posts should be the same height above the ground. This can be done by adjusting the depth of the post hole.

Materials and Tools Needed:

8' post
crayon
measuring tape
post hole digger
13' gage pole

Knowledge:

Types and purposes of fence posts:
anchor, brace, line, cornor,
horizontal brace

Skill:

Measure of distances

New Words:

Ground line

Task Statements and Evaluation

1. Marking the ground line on the post.
   a. Decide on the height of the fence.
   b. Add 4 inches to the height of the fence. This is the length the post will be above the ground.
   c. Using the tape measure, measure the length found in step 1b from the top of the post.
   d. Using the crayon, mark the length on the post. This is the ground line. |___|___|
2. Placing the post hole.
   a. An anchor post is at the end of a fence line.
   b. A corner post is at a turn in the fence line.
   c. A brace post is about 10 feet (or the length of the horizontal brace) from the anchor or corner post.
   d. Line posts for barbed-wire fences are about 13 feet apart. Use a 13 foot gage pole to measure the distance between the line posts. For the last 5 line posts, divide the remaining distance evenly. |___|___|
3. Digging the post hole.
   a. Hold the handles of the post hole digger together.
   b. Push the digger into the ground at the place found in step 2.
   c. Pull the handles of the digger apart and pull up to remove the dirt.
   d. Repeat steps 3a, 3b, and 3c until the hole is the right depth and about 12 inches wide. Check the hole depth by putting the post in the hole. The ground level should be at the ground mark on the post.

NOTE: Anchor, brace, and corner posts should be at least 3 feet, 6 inches into the ground.

Setting Fence Posts

Work to be Done: Using tools and supplies, the student will set a fence post. The post will be level. The teacher will check all work by using the guide on the back of this sheet.

Description:

After fence post holes are dug, the posts are put or set in the ground. The posts must be set level to make a strong fence.

Materials and Tools Needed:

8' post (marked ground line)
post hole
spade
tamping bar
carpenter's level

Skills:

Use of hand tools: spade, tamping bar, and carpenter's level

New Words:

Setting posts
tamp

Task Statements and Evaluation

1. Place the post in the post hole. Check to be sure the ground line on the post is at ground level.
2. Using the spade, place a small amount of soil in one side of the post hole.
3. Move the post until it is straight.
4. Using the carpenter's level, check to see that the post is straight (see picture). If the post is not straight, repeat step 3.
5. Using the tamping bar, pound the soil to pack it tightly around the post (see picture). This is tamping the soil.
6. Repeat steps 2, 3, and 5 around the post until the hole is filled with soil. Check the level as in step 4, a few times to be sure the post is straight.

NOTE: If a post is in a curved part of the fence, lean the top of the post outside of the curve about 2 inches.

Bracing Corner Posts With a Brace Member

Work to be Done: Using tools and supplies, the student will brace a corner post with a brace member. The teacher will check all work by using the guide on the back of this sheet.

Description:

A good, strong fence must have strong anchor and corner posts. Anchor and corner posts are made strong by bracing them with a horizontal brace or a brance member and brace wire.

Materials and Tools Needed:

corner post (set)
8' brace post
10' horizontal brace
post hole digger
rule
crayon
brace and ½" bit
2½" X 4" stud dowels

Knowledge:

Types and uses of posts: corner, anchor, and brace

Skills:

Use of hand tools
Digging Post holes
Setting fence posts

New Words:

bracing posts
brace member

Task Statement and Evaluation

1. Use the brace member to measure for the brace post hole. Set one end of the brace member to the corner post in the direction of the fence. The brace post hole will be at the other end of the brace member (see picture).
2. Dig the brace post hole at the place found in step 1 (see digging post holes).
3. Place the brace post in the hole.
4. Using the rule, measure 12 inches from the top of the brace and corner posts. Mark these spots with the crayon. The marks on the posts should face each other (see picture).
5. Using a brace with a bit the same size as the dowels, drill 4 holes, 2 inches deep. Drill 2 holes at the marks found in step 4. Drill a hole in the middle of each end of the brace member.
6. Remove all shavings from the holes.
7. Placing the brace member.
   a. Put a dowel in the hole in each post (see picture).
   b. Place one end of the brace member on the dowel of the corner post (see picture).
   c. Place the other end of the brace member on the dowel in the brace post (see picture).
8. Set the brace post (see setting fence post).

Bracing Corner Posts with a Brace Wire

Work to be Done: Using tools and supplies, the student will brace a corner post with a brace wire. The teacher will check all work by using the guide on the back of this sheet.

Description:

A good, strong fence must have strong anchor and corner posts. Anchor and corner posts are made strong by bracing them with a brace member and a brace wire.

Materials and Tools Needed:

corner and brace post set with
brace member
hammer
2 staples
wire
wire cutters
2 pliars
18" rod

Knowledge:

Types and uses of posts: corner, anchor, and brace

Skills:

Use of hand tools
Estimate distance

New Words:

brace wire
splice

Task Statements and Evaluation

1. Using the hammer, drive a staple halfway into the brace post. The staple should be about 4 inches above and on the other side of the brace member (see picture). |___|___|
2. Using the hammer, drive a staple halfway into the corner post. The staple should be about 4 inches above the ground and on the other side of the brace member (see picture). |___|___|
3. Threading the brace wire. Thread the wire in this order, through: (see picture).
   a. The brace post staple, from front to back.
   b. the corner post staple, from back to front.
   c. the brace post staple, from front to back.
   d. the corner post staple, from back to front. |___|___|
4. Wrap the wire around the corner post and through the staple (see picture). |___|___|
5. Bring the wire two-thirds of the way back to the brace post (see picture). |___|___|
6. Let enough wire on the roll end to wrap around the brace post and go 12 inches past the threaded end of the wire (see picture). |___|___|
7. Using wire cutters, cut the wire from the roll at the point found in step 6. |___|___|
8. Making a splice. The splice connects the ends of the wire.
   a. Fold the ends of the wires over each other (see picture).
   b. With one pliars, hold the end of one wire against itself (see picture).
   c. With the other pliars, wrap the end of the other wire around itself (see picture).
   d. Repeat steps 8b and 8c both wires are wrapped. |___|___|
9. Twisting the brace wire.
   a. Place the rod in the middle of the wire (see picture).
   b. Turn the rod to twist the wire until it is tight.
   c. With the hammer, tap the wire where it wraps around boh posts. This will make it fit smoothly.
   d. Turn the rod again to tighten the wire. |___|___|