INTRODUCTION TO THE MANUAL

Welcome to the Registered Applicator Approved Trainer Program. This program was developed to prepare qualified individuals to become trainers of registered applicators under the Natural Resources and Environmental Protection Act, Act 451, Public Acts of 1994, Part 83, Pesticide Control and Regulation 636, Pesticide Applicators.

To better serve those certified applicators wishing to become trainers of registered applicators, the program consists of a self-study manual followed by an exam administered online. This allows you the flexibility to pursue approved trainer status at a time which suits your needs. You are also able to proceed through the program at your own pace, keeping in mind that you may not begin training your registered applicators until all requirements have been met.

Please refer to the following pages for the table of contents and important instructions on how to use this manual.

Contents

SECTION 1: UNDERSTANDING THE MANUAL AND TRAINER REQUIREMENTS

This manual is a self-study guide. After reading the manual and successfully completing the Registered Applicator Trainer Exam over its contents, you will receive an Approved Trainer credential, providing the other requirements (2 years of experience or equivalent and possession of a Michigan pesticide certification credential) have been met.

Before applicator training can begin, you are required to develop a category specific training program and submit it to Michigan Department of Agriculture & Rural Development (MDARD) for approval. MDARD will issue a letter upon approval. Once the training program has been approved, you may begin training registered applicators.

The sections of this manual are named, numbered, and outlined in red. The first page of each section gives an overview of the contents of that section and sets forth learning objectives. Each new topic is introduced within a double-lined box.

Read and study the manual until you are familiar with the information contained in the learning objective boxes. When you are comfortable with the information contained in the manual, contact Michigan State University's Pesticide Safety Education Program (MSU PSEP) Coordinator, Dr. Safa Alzohairy, to schedule a Registered Applicator Trainer Exam. Safa can be reached at msu.psep@msu.edu and 517-353-9903. Addition information can be found on the Pesticide Safety Education Program webpage.

The trainer exam will contain 25 questions over material covered in manual sections 1-7. ***You will not be allowed to use the manual or notes during the exam***. Questions are multiple choice, fill in the blank, and true/false. The exam pass score is 72. MDARD will inform you of your results upon completion of the exam. If you pass the exam, an approved trainer letter will be emailed to you. Please note that you may not begin training registered applicators until MDARD has approved your training program.

If you have questions over the material in the manual, please contact the Pesticide Certification Specialist Lauren Gott at GottL@michigan.gov. Additional pesticide applicator information can be found on MDARD's Pesticide Applicator webpage.

Learning Objectives for Section 1:

After you complete your study of this section, you should be able to:

- Understand the manual structure.
- Recognize registered applicator trainer requirements.
- How to start the registered applicator process.

REQUIREMENTS AND RESPONSIBILITIES OF AN APPROVED TRAINER

AN APPROVED TRAINER OF REGISTERED APPLICATORS MUST:

- be currently certified as a pesticide applicator in Michigan.
- have 2 years of experience (or equivalent) as a certified applicator.
- have shown they understand program requirements by passing the trainer exam.
- only train in categories in which they are currently certified.

THE APPROVED TRAINER STATUS REMAINS CURRENT AS LONG AS THE TRAINER'S PESTICIDE CERTIFICATION IS VALID IN THE SPECIFIC CATEGORIES.

THE APPROVED TRAINER IS RESPONSIBLE FOR THE FOLLOWING:

- Studying this manual and ***demonstrating a practical knowledge, by exam***, of the requirements and principles of pesticide applicator training.

A certified approved trainer who wishes to teach category-specific information must then:

- develop a thorough category-specific training program.
- submit the training program for approval to MDARD.
- ensure the complete MDARD-approved training program is implemented.
- verify that training has occurred by signing off on the Pesticide Commercial REGISTERED Applicator Application or Applicator Renewal Application.
- maintain records of who has attended training.

SECTION 2: THE MICHIGAN DEPARTMENT OF AGRICULTURE & RURAL DEVELOPMENT AND THE MICHIGAN STATE UNIVERSITY EXTENSION SERVICE

The Registered Applicator Approved Trainer Program is a joint effort between the Michigan Department of Agriculture & Rural Development (MDARD) and the Michigan State University (MSU) Extension Pesticide Safety Education Program (PSEP). MDARD and MSU cooperate in many areas of pesticide applicator training and training material development. The goal is consistency and quality in applicator training to maintain competency while applying pesticides.

Michigan Department of Agriculture & Rural Development

MDARD has the responsibility for setting training standards and enforcing law and regulations related to certified and registered pesticide applicators. MDARD's main office is in Lansing but there are pesticide lead workers and inspectors located throughout the entire state. Exam monitors are responsible for administering the core exams, the fumigation standard, and the aerial standard exams for pesticide certification and registration. MDARD staff are available to answer questions related to pesticide issues. MDARD can be reached at MDARD-Pesticide@michigan.gov and 800-292-3939. Visit MDARD's webpage for additional information.

Michigan State University Extension

MSU Extension is involved with the educational materials and the training side of the certified applicator process. The Pesticide Applicator Core Training Manual and the category specific manuals are MSU Extension publications. Manuals are available on a limited basis from the extension office in your county. Each county office also stocks a large quantity of extension publications on diverse topics that may be useful for your training classes. Many county extension offices also offer core and category specific training classes or review sessions on a regular basis. Visit MSU's Pesticide Safety Education Program webpage for additional certification information and training resources.

Learning Objectives for Section 2:

After you complete your study of this section, you should be able to:

- Locate the address of your local county extension office.
- Find the website for the MSU Study Manual Store.
- Find the website where you can schedule an exam.

EXTENSION OFFICE DIRECTORY

MSU has an extension office in every county. Visit MSU Extension's webpage to locate the county extension office nearest to you.

ORDERING STUDY MANUALS

Study manuals are available as printed copies and can be ordered online through MSU's Pesticide Study Manual Store. Manuals are available on a limited basis from the extension office in your county. Visit MSU's Pesticide Safety Education Program webpage for additional information about study manuals.

SCHEDULING AN EXAM SESSION

Only the commercial and private core, fumigation standard, and the aerial standard can be taken at a paper based and in person exam session. An applicator must attend the entirety of a MSU PSEP core review before the exam session to qualify to take exams. There is a registration fee associated with the core review. These reviews and exam sessions are scheduled on a limited basis throughout the state. Sessions starts in late Fall and conclude end of May. Visit MSU's Pesticide Safety Education Program webpage for more information about the core review sessions scheduling and registration.

All certification exams are proctored by Metro Institute, a private pesticide exam administration company authorized to conduct testing on MDARD's behalf. The exams are computer based. There are 2 options available to applicators to take computer-based certification exams through Metro Institute.

- Schedule an exam at one of their established computer labs around the state.
- Have the exam remotely proctored online.

Metro Institute requires an account to sign up for exams. A company can sign up multiple applicators using one account. Exams can also be scheduled by calling Metro Institute at 877-533-2900. Visit Metro Institute's webpage for additional information.

Visit MDARD's Pesticide Applicator webpage for additional information on certification exams.

SECTION 3: REGULATIONS AFFECTING PESTICIDE USERS

Many federal and state laws and regulations have been enacted to help protect the public, the environment and pesticide applicators from possible adverse effects caused by pesticide use. In this section, you will learn about the state and federal laws that regulate pesticide applicators.

Although only brief summaries are provided here, as a trainer you should be very familiar with these laws and regulations and related terminology, so that applicable information may be included in your training program. Copies of the Michigan acts and regulations relating to pesticide use can be found on MDARD's Law and Regulations webpage.

Learning Objectives for Section 3:

After you complete your study of this section, you should be able to:

- Discuss the laws and regulations affecting pesticide users.
- Describe the difference between a private certified pesticide applicator and a commercial certified pesticide applicator.
- Define a registered applicator.
- Name the two requirements that must be met to become a registered applicator.

HISTORY OF MICHIGAN PESTICIDE REGULATION

- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA):
  - Date: 1972.
  - This Act from the US Congress contains all federal regulations relating to pesticides and pesticide use. Each state must frame their pesticide regulations within the context of FIFRA.
  - States may make pesticide regulations more restrictive than FIFRA, but never less restrictive. The Environmental Protection Agency (EPA) administers FIFRA.
- Michigan Pesticide Control Act (Act 171):
  - Date: 1976.
  - This Act creates pesticide rules and regulations specific to Michigan, including:
    - All pesticides used in the state must be registered with MDARD.
    - Licensing requirements for businesses selling restricted use pesticides and for businesses offering pesticide application services for hire.
    - Requirements for private and commercial certified applicators.
  - In 1988, Act 171 was amended to include requirements for registered applicators.
  - In 1994, Act 171 was amended to include:
    - Exemptions for applications of ready-to-use pesticides*
    - Giving parents rights to be notified when pesticides are applied in schools.
    - Pre-empts local pesticide application ordinances.
- Regulation 636, Pesticide Applicators:
  - Date: 1991
  - Amendments include:
    - Creation of registered applicator status.
    - Creation of approved trainer status.
    - Additional pesticide recordkeeping requirements for commercial applicators.
    - Creation of incidental use permits.
    - New registration subcategories for commercial applicators.
- Regulation 637, Pesticide Use:
  - Date: 1992.
  - Rules include:
    - Written service agreements.
    - Mix/load and wash/rinse operations.
    - Drift management plans.
    - Pesticide use in and around schools.
    - Posting/notification following pesticide applications.

        - Personal protective equipment requirements for making pesticide applications.
- In 1995, Act 171 was amended and recodified as part of Act 451, Part 93, the Natural Resources and Environmental Protection Act.

GENERAL DEFINITIONS

Approved Trainer - A certified applicator with two years of experience (or equivalent educational experience) and who has completed the Registered Applicator Trainer Program.

Commercial Certified Applicator - Person applying restricted-use or general-use pesticides as a scheduled or required work assignment, holding out for hire, or advertising the business of applying pesticides.

Commercial Pesticide Applicator Business License (PABL) - A business license for firms who apply pesticides commercially for hire.

Direct Supervision - A certified applicator must be physically present at the time and place a pesticide is being applied by an employee.

General-use Pesticide - Can be purchased without restriction.

Incidental Use - The application of a general-use pesticide as an accompanying minor occurrence to a primary work assignment.

Pest - Insect, rodent, weed, terrestrial or aquatic plant or animal, nematode, fungus, bacteria, virus, or other form of microorganism that is harmful to the system in which it is living.

Pesticide - A substance or mixture of substances for preventing, destroying, repelling, or mitigating pests, or intended for use as a plant regulator, defoliant, or desiccant.

Private Certified Applicator - Person applying restricted-use pesticides on his/her own property or leased land to engage in the production of a commodity. Includes employees of these operations.

Ready-To-Use Pesticide - Used from the manufacturer's original container (aerosols, pump sprays, strips, baits) with no need to mix or load into application equipment.

Restricted-use Pesticide - One whose sale is restricted because of detrimental effects to the applicator and/or the environment. Can only be used by (or under the direct supervision of) a certified applicator.

Supervise - A certified applicator may direct the application of a pesticide by an employee even though the certified applicator is not physically present at the time and place of application.

REGISTERED APPLICATOR INFORMATION

The Natural Resources and Environmental Protection Act defines two types of pesticide applicators: private and commercial.

- Private applicators include persons using or supervising the use of restricted-use pesticides in the production of an agricultural commodity on their own or their employer's land, or on lands rented by them.
- A commercial applicator is applying pesticides as a normal job duty. Commercial applicators can either be *certified or* ***registered.***

All people involved in a licensed commercial pesticide application must be either a certified applicator or a registered applicator.

Registered Applicator Definition

A "Registered Applicator" is a classification of pesticide applicator who may purchase and apply general-use pesticides.

Registered Applicator Requirements

There are two requirements to becoming a registered applicator:

A) Registered applicators must pass the commercial core applicator exam to demonstrate knowledge of the basic principles of pest management. A passing score of 70% is required. **The Pesticide Commercial REGISTERED Applicator Application (Page 29) and $45 application fee (for commercial registered applicators) must be provided to MDARD to complete the registration process.**

The principles involved in the core examination are:

1) Pest Identification and Pest Management
2) Pesticides and Pesticide Label Comprehension
3) Pesticide Handling, Disposal and Transportation
4) Pesticide Safety
5) Environmental Consequences of Pesticide Misuse
6) Basic Equipment Knowledge

7) Applicable State and Federal Laws

B) Registered applicators must receive MDARD-approved category specific training conducted by an Approved Trainer.

The below information identifies the 3 types of credentialed pesticide applicators as defined by Act 451.

- Certified private applicators:
  - Can apply restricted use pesticides (RUPs) as certified applicators.
  - Become privately certified to apply RUPs on their own (or their employers) property or leased land to engage in the production of a commodity.
  - Receive a purple certification card upon becoming certified.
  - Must take the private core exam. If applying pesticides aerially or as a fumigant, the aerial and fumigation standard exams must be passed.
- Certified commercial applicators:
  - Can apply RUPs as certified applicators.
  - Become commercially certified to apply RUPs or other pesticides as a part of their routine job duties at work.
  - Receive a green card upon becoming certified.
  - Must take the commercial core exam and any other applicable category exam. See the Commercial Pesticide Application Certification Categories List or Categories of certification/registration for the complete list.
- Registered commercial applicators:
  - CANNOT apply RUPs.
  - Become registered to apply general-use pesticides as a part of their routine job duties at work.
  - Receive a grey card upon becoming registered.
  - Must take the commercial core exam and receive category specific training from an MDARD approved trainer and training program.

CATEGORIES OF CERTIFICATION/REGISTRATION

The Natural Resources and Environmental Protection Act, P.A. 451, As Amended, requires any person who applies a pesticide product for a commercial purpose, in the course of his or her employment, or other business activity for any purpose to be either a commercially certified applicator or a registered applicator.

Pesticide applicators not required to be licensed by the Act and only using general-use, ready-to-use pesticide products are exempt from the certification and registered applicator requirements. Certification and/or registered applicator status is achieved by taking exam(s) and/or receiving training.

Commercial applicators who apply for certification or registration status must designate the category or categories of certification or registration on the appropriate application.

1A. FIELD CROPS - Includes agricultural crops such as cereal grains, feed grains, beans, soybeans, sugar beets and forage.

1B. VEGETABLE CROPS - Includes vegetables crops such as tomatoes, potatoes, snap beans, celery, onions, cucurbits, cole crops and sweet corn.

1C. FRUIT CROPS - Includes tree fruits, blueberries, strawberries, and raspberries.

1D. LIVESTOCK PEST MANAGEMENT - The application of pesticides to animals and to places on or in which animals are confined. (Doctors of veterinary medicine engaged in the business of applying pesticides for hire, aside from the normal practice of veterinary medicine.)

2. FORESTRY - Includes forests, forest nurseries and forest seed producing areas, Christmas trees and Spongy Moth.

2A. WOOD PRESERVATION - Includes the use of pesticides for preserving wood products such as poles, timbers, and lumber.

3A. TURFGRASS - Includes persons who use or supervise the use of pesticides to manage pests of turfgrasses.

3B. ORNAMENTAL - The use of pesticides to manage pests of ornamental plants in exterior areas such as evergreens, shrubs, and shade trees.

4. SEED TREATMENT - The application of pesticides on seeds.

5. AQUATIC - The application of pesticides to standing or running water, i.e., lakes, ponds, streams, marshes, or ditches and tributaries which flow into them or the surfaces that contact such bodies of water for the purpose of managing aquatic pests. This category does not include applicators who engage in mosquito management.

5A. SWIMMING POOLS - Includes pesticides used in maintaining public or private swimming pools to control algae, bacteria, or other swimming pool pests.

5B. MICROBIAL PEST MANAGEMENT - The use of pesticides to manage bacteria, fungi, algae or viruses in cooling towers, air washers, evaporative condensers, pulp and paper mills, sewer treatment, cutting tool lubricants, etc.

5C. SEWER LINE ROOT CONTROL - The use of pesticides to control roots and other vegetation in sewers.

6. RIGHT-OF-WAY - The use of pesticides to maintain public roads, electric power lines, pipelines, right-of-way, parking lots, tennis courts or similar non-crop areas are included in this category. Applicators engaged in regulatory activities such as those included in Category 9 are excluded.

7A. GENERAL PEST MANAGEMENT - Is comprehensive and intended to include aspects of pest control in and around structures, including rodents and ants.

7B. MANAGEMENT OF WOOD DESTROYING PESTS - Includes the use of pesticides for the management of wood-destroying pests such as the following: termites, powder post beetles, carpenter ants, wood destroying fungi, etc.

7D. VERTEBRATE PEST MANAGEMENT - Includes the use of pesticides to manage vertebrate pests, i.e., birds, rats, mice, etc.

7E. INTERIORSCAPE - Includes the use of pesticides in the maintenance of plants at inside locations.

7F. MOSQUITO - Includes pesticides used to manage mosquitoes in an outside environment.

7G. DOMESTIC ANIMAL PEST MANAGEMENT - Refers to pesticide applications made on animals or in places where animals are kept. Includes pest management for small domestic animals. This category of pesticide application does not apply to large agricultural animals.

8. PUBLIC HEALTH PEST MANAGEMENT - Includes state, federal or other governmental employees who use or supervise the use of pesticides in public health programs for the management of pests that have medical and public health importance excluding mosquitoes.

9. REGULATORY PEST MANAGEMENT - Includes state, federal or other governmental employees who use or supervise the use of pesticides in the control of regulated pests.

10. DEMONSTRATION AND RESEARCH - Includes individuals who demonstrate to the public the proper use and techniques of the application of pesticides or who conduct field research with pesticides.

ADDITIONAL STANDARDS ARE REQUIRED OF INDIVIDUALS WHO USE THE FOLLOWING:

AERIAL - Apply to applicators who apply pesticides by aircraft.
FUMIGATION - Includes the application of a fumigant for:

A. structural pests
B. soil borne pests
C. stored commodity
D. greenhouse pests

SECTION 4: RENEWAL PROCESS

The Natural Resources and Environmental Protection Act, Act 451, and Regulation 636, as amended, requires all pesticide applicators to renew their certification/registration every three years with expiration occurring on December 31.

To qualify for recertification/registration an applicator must pass the required renewal exam(s) OR attend training seminars that have been approved by MDARD for recertification credits.

In this section, you will learn about the renewal process for certified and registered applicators. Additional information can be found on MDARD's Pesticide Applicator Recertification webpage.

Learning Objectives for Section 4

After you finish your study of this section, you should be able to:

- Describe the two options for completing the renewal process.
- Identify how often a certified applicator or registered applicator must renew their credentials.
- Describe the options available when renewing a commercial certification credential.
- Describe the options available when renewing a registered applicator credential.

HOW TO RENEW

Pesticide applicator certification or registration cards are three-year credentials. All applicators will receive a recertification/reregistration packet approximately three months prior to the expiration date on the applicator's certification/registration card.

Applicator renewal packets contain the official Applicator Renewal Application, which must be submitted along with the appropriate application fee to MDARD.

Certified and registered applicators have two options for renewing their credentials, renewal by examination or renewal by seminar attendance.

Recertification/Reregistration by Examination:

Examinations are based on information contained in the study manuals for private, commercial, and registered applicators and will consist of true/false and multiple-choice questions. A passing score of 70% is required for each exam. Visit MDARD's Pesticide Applicator webpage for information about pesticide exam locations and how to schedule an exam.

In addition to the core renewal examination, registered applicators are required to receive category-specific refresher training from an approved trainer and program. If completing refresher training, the trainer will document training completion on the Applicator Renewal Application.

Recertification/Reregistration by Seminar:

Recertification/reregistration may be obtained by attending seminars approved by MDARD for recertification credits. A partial list of meetings approved for recertification credits is available at MDARD's Recertification by Seminar webpage. Other information on recertification opportunities from MSU can be found on MSU PSEP Pesticide Applicator Recertification webpage.

The number of credits needed is based on the type of applicator and the categories/standards in which they are certified or registered. If enough credits have been accumulated by the end of the three-year period, the applicator will be recertified or re-registered without having to take exams again.

- Private applicators need to earn a minimum of 16 private core credits or re-take the private core exam.
  - The Private Applicator Renewal Application and $50 application fee need to be sent to MDARD.
- Commercial and registered applicators need to earn 8 commercial core and 8 credits in each category listed on their credential. Applicators can also re-take the applicable certification exams.

    - Commercial applicators need to provide the Commercial Applicator Renewal Application and $75 application fee to MDARD.
    - Registered applicators need to provide the Registered Applicator Renewal Application and $45 application fee to MDARD. Applicators can also re-take the commercial core exam and receive category specific training.
- Applicators with aerial or fumigation standards need to earn 2 credits for each standard.

The Applicator Credit Report is updated daily on MDARD's Pesticide Applicator webpage outlining how many credits MDARD has on file for each applicator. The total number of credits MDARD currently has on file for each applicator is also included on their Applicator Renewal Application.

SECTION 5: REGISTERED APPLICATOR CATEGORY-SPECIFIC TRAINING STANDARDS AND GUIDELINES

Training programs for registered applicators must be category specific and must contain specific information as required by Regulation 636, Pesticide Applicators.

In this section, you will learn about developing your training program. In addition to presenting the components which must be included in your training, this section presents guidelines for developing and submitting your training program for approval.

Also contained in this section is a copy of the Pesticide Commercial REGISTERED Applicator Application and instructions for its use.

Learning Objectives for Section 5

After you complete your study of this section, you should be able to:

- Design your training program.
- Submit your completed training program for approval.
- Plan for completing and verifying registered applicator training requirements.
- Assist the applicator in completing the Registered Applicator Application.

REQUIRED TOPICS FOR TRAINING

All registered applicators must demonstrate, by written examination, practical knowledge of the basic principles and practices of pest management. They must also receive category-specific verifiable training.

All registered applicator training programs shall be approved by MDARD and shall include training in all the following areas:

1. Pests commonly encountered by the applicator
2. Environmental fate of pesticides
3. Pesticide formulations in use
4. Application equipment
5. Equipment calibration
6. Methods of application
7. Safety procedures to protect non-target species
8. Principles of integrated pest management
9. Container handling, storage, and disposal
10. Worker safety

These are the required components, or topic areas, of all registered applicator approved training programs. You must add the information necessary to illustrate and reinforce each topic as it applies in each category. The information covered in your training program must be category specific and apply directly to the type of pesticide application(s) being performed by the registered applicators.

Within a specific category, the registered applicator training should be task specific. For example, registered applicators are hired by a lawn care company to perform only the following: spot spray lawn weeds with herbicide using a hand-can. The required training topics would look like this.

1. Weeds commonly encountered in lawns in the area
2. Environmental fate of herbicides
3. Herbicide formulations used
4. How to use a hand-can
5. How to calibrate a hand-can
6. Methods of application using a hand-can
7. Safety procedures to protect non-target hosts such as avoidance or shielding
8. Principles of Integrated Pest Management as it applies to lawn weeds
9. Herbicide handling: mixing/loading, storage, and disposal
10. Worker safety as it applies to the equipment and chemicals used for the application.

Train to the pesticide-related tasks in the registered applicators' job descriptions. If the registered applicators' responsibilities change, a new or additional training program must be approved by MDARD and administered prior to the applicator assuming the new responsibilities.

A *sample* training program outline begins on the next page. **Remember, training programs must be specific to your company.**

SAMPLE TRAINING PROGRAM OUTLINE

I. **Pests Commonly Encountered by the Applicator**
   a. Identification of common pests (list all pests)
   b. The habits and damage caused by these pests
   c. Pest life cycles in relation to timing control measures

II. **Environmental Fate of Pesticides**
   a. Pesticides and the Environment
      i. Drift/Volatilization
      ii. Run-off
      iii. Leaching
      iv. Crop Removal
      v. Microbial Degradation
      vi. Chemical Degradation
   b. Surface and Groundwater Contamination

III. **Pesticide Formulations Used**
   a. Classification
      i. Specific pesticides used (list all pesticides)
      ii. How these pesticide work (mode of action) For example...
         1. Protectants
         2. Sterilants
         3. Broad spectrum
         4. Contacts
      iii. Pesticide formulations in use and characteristics of each
      iv. Compatibility of pesticides
      v. How these pesticides are applied
         1. Label review
            a. Trade name/Product name
            b. Ingredient statement
            c. Use classification
            d. Signal words
            e. Precautionary statements
            f. Environmental precautions
            g. Statement of practical treatment
            h. Use consistent with label instructions
         2. Hands-on review of actual pesticide labels.

IV. **Application Equipment**
   a. Methods of application
   b. Types of application equipment (list all application equipment commonly used)
   c. Components of application equipment
   d. Operation and maintenance
   e. Equipment calibration
   f. Drift control measures
   g. Hands-on demonstration of each type of equipment

V. Safety Procedures to Protect Non-target Species

VI. Principles of Integrated Pest Management

a. Definition
b. Steps involved in an IPM program
    i. Identification
    ii. Defining the area of control
    iii. Planning strategy
    iv. Monitoring
    v. Evaluation
c. Techniques used in pest management
    i. Natural
    ii. Applied
        1. Biological
        2. Cultural
        3. Mechanical
        4. Physical
    iii. Chemical

VII. Container Handling, Storage and Disposal

a. Mixing and loading pesticide
b. Pesticide storage
    i. Storage Area
    ii. Pesticide containers
    iii. Triple rinsing of empty containers
    iv. Container disposal
    v. Field demonstration: mixing, loading and disposing of excess pesticides and empty pesticide containers.

VIII. Worker Safety

a. Human health
    i. Exposure routes
        1. Inhalation
        2. Dermal
        3. Eye
        4. Oral
b. Toxicity and potential effects
    i. Acute
    ii. Chronic
    iii. Signs and symptoms
c. First aid
d. Personal protective clothing and equipment
    i. Minimum requirements
    ii. Label requirements
    iii. Hands-on demonstration of correct use of PPE

Other Information to Include with the Outline

1. A timeline for each training topic (indicated by Roman numerals above).
2. A list of the resource materials that will be used in training.
3. The Pesticide Commercial REGISTERED Applicator Application or Applicator Renewal Application is used to document that each trainee has completed each training topic. Maintain a copy of this application for reference.
4. If other individuals will be presenting information during the training program, indicate who they are and what they will present.

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If you were to compare this sample outline and/or the required components of registered applicator training with the Pesticide Applicator Core Training Manual, you will notice there are distinct similarities in content. You may wish to keep this in mind as you are developing and conducting your registered applicator training programs. Because of the similarities in content, your training program can also help prepare your trainees for their general standards core exam. Additional tips for preparing trainees to take the core exam are covered in detail in Section 6.

TRAINING PROGRAM GUIDELINES

Pesticide safety training is important, not only for the protection of the applicator, but for the protection of the environment and other persons or non-target species in the area. For this reason, pesticide safety training should be covered in detail with trainees before they begin performing any hands-on pesticide application activities.

Hands-On Training

As noted in the sample training program outline, an ideal training program will contain interactive "hands-on" activities for trainees. Hands-on activities involving pesticide label review, in-field pest diagnosis, hands-on pesticide application practices, equipment usage etc., are extremely useful training tools for trainers. These activities are also extremely beneficial for trainees and aid tremendously in the learning process.

Two Week Training Period

Regulation 636 allows noncertified applicators who are undergoing approved training to apply general-use pesticides for two weeks without being registered if they are under the direct supervision of a certified applicator. This is referred to as the "two-week training period" and allows for the hands-on training involving pesticides as mentioned above. It is important to remember that the two-week training period has several requirements:

1. It *applies only to applications of general-use pesticides*. It does not apply to restricted-use pesticide applications.
2. It *requires the direct supervision by a certified applicator*. The certified applicator must be physically present at the time and place the pesticide is being applied, in order to supervise the application made by the non-registered applicator.
3. The online Two-week Training Notification Form must be submitted to MDARD before a noncertified applicator starts handling pesticides as a part of the training program as the training period starts the moment the applicator begins handling pesticides.
4. Upon submittal, the trainer will receive an email from MDARD confirming the submission of the form. A copy of MDARD's acknowledgement of the submission must be printed and provided to the applicator in training **before** the training period begins.
5. The two-week training period is two *consecutive weeks.*

Please note, the Two-week Training Period is not a mandatory requirement for registering applicators but is highly encouraged by MDARD.

Length of the Training Program

All registered applicator training programs will vary considerably in length and content due to the number and complexity of the pesticide-related tasks that the registered applicators are required to perform. The category(ies) of training, the number and types of pests controlled, the various types of application equipment used, the pesticides used, etc. are some of the factors affecting length. Your

training program must be long enough to cover all training areas thoroughly. ***List the timetable for coverage of each topic area in your training outline.***

Resources Used for Training

In the training program you may use any type of resource material that you wish such as slides, videos, handouts, pesticide labels, etc. It is NOT necessary for you to submit this information for review; however, *you must list the resource materials which you plan to use in your training program, in your training program outline.*

Keeping Records

You are responsible for keeping records to prove that the registered applicators you train have completed all parts of the designated training. *Identify in your training program the method you will use to verify that all stages of training have been completed*. One suggestion would be to have trainees “sign off” after receiving training in each required area. This is for your protection as well as theirs. Verification of training is documented on the Pesticide Commercial REGISTERED Applicator Application or Applicator Renewal Application.

Using Others to Assist with Training

As an approved trainer, you are responsible for ensuring that the training program is conducted in a complete and thorough manner. This, however, does not mean that you must conduct all of the training yourself. It is acceptable to involve other individuals who may not be approved trainers, but they must be able to cover the subject matter in your program outline in a competent manner. You are responsible for ensuring that the appropriate information is being covered. *Your training program should include a list of all trainers that you will use in your training program.*

SUBMITTING YOUR TRAINING PROGRAM FOR APPROVAL

You can submit your training program to MSU PSEP Coordinator Dr. Safa Alzohairy at msu.psep@msu.edu for pre-review to determine if it meets all MDARD's requirements. Include a cover letter giving the business name(s), business address(es), telephone number(s) of the approved trainer(s) who will be using the program, and which categories you are seeking approval.

When the program is ready, submit your category specific training program to the MDARD at MDARD-Pesticide@michigan.gov. Please allow four weeks for review and approval.

A paper-copy may be submitted via mail to the following address:

ATTN: Pesticide Certification Program Specialist
Michigan Department of Agriculture & Rural Development
Pesticide and Plant Pest Management Division
P.O. Box 30017
Lansing, MI 48909

REGISTERED APPLICATOR APPLICATION PROCESS – TRAINER SIGN OFF AND TAKING THE EXAM

Category specific training may occur prior to or after the core exam has been taken by the prospective registered applicator. The name of approved trainer, trainer certification number, date of training, and trainer's signature should be filled in by the trainer upon completion of the training program (see page 29, Pesticide Commercial REGISTERED Applicator Application). If receiving refresher training, verification of training is documented on the Applicator Renewal Application.

The Registered Applicator then signs off on the Registered Applicator Application (or Applicator Renewal Application) to verify training has been completed. The trainer should maintain a copy.

The Pesticide Commercial REGISTERED Applicator Application (or Applicator Renewal Application) will need to be filled out entirely and mailed to MDARD along with the $45 registered applicator fee upon completion of the training program.

Registered applicator application and fees are due to MDARD again if an applicator fails to pass the commercial core exam within 6 months of the initial application.

A copy of the Pesticide Commercial REGISTERED Applicator Application, proof of financial payment, and proof of passing the commercial core exam serve as a temporary credential until the registration card arrives in the mail.

Pesticide Commercial REGISTERED Applicator Application

Applicant (Applicator) Information (Please print)

Name:_____
First, middle initial, last

Home Address:_____
Include apartment number if applicable

City:_____ State: _____

County:_____ Zip:_____

Phone: (_____)_____ Cell Phone: (_____)_____

Email:_____

Date of Birth: ____/____/_____ Social Security Number:_____-____-_____
MM DD YYYY

Blank Space
For Official Use Only

Employer Information

Employer Name: _____

Street Address of Employer:_____

City:_____ State: _____ County: _____Zip:_____

Phone: (_____)_____ Fax: (_____)_____ Email:_____

Core (need to take exam) Categories (Please check all categories in which you have been trained by a MDARD approved trainer)

☐ Registered Core	☐ 1A Field Crops	☐ 1B Vegetable Crops	☐ 1C Fruit Crops	☐ 1D Livestock Pest Mgmt.	☐ 2 Forest Pest Mgmt.	☐ 2A Wood Preservation	☐ 3A Turfgrass Pest Mgmt.	☐ 3B Ornamental Pest Mgmt.	☐ 4 Seed Treatment	☐ 5 Aquatic Pest Mgmt
☐ 5A Swimming Pools	☐ 5B Microbial Pest Mgmt.	☐ 5C Sewer Line Pest Mgmt.	☐ 6 Right-of-Way Pest Mgmt.	☐ 7A General Pest Mgmt.	☐ 7B Wood Destroying Pest Mgmt.	☐ 7D Vertebrate Pest Mgmt.	☐ 7E Interior Plant Pest Mgmt.	☐ 7F Mosquito Mgmt.	☐ 7G Domestic Animal Pest Mgmt.	☐ 8 Public Health Pest Mgmt.

Application Fees (Non-refundable)

☐ **Commercial Registered Applicator**
$45 Application Fee

AOBJ: 0187

Name of Approved Trainer:_____ Trainer Certification #:_____

Signature of Approved Trainer:_____ Date Trained:_____

By signing below I certify that the foregoing is true and accurate to the best of my knowledge and belief and that I will comply with the provisions of 1994 Public Act 451, Part 83, as amended, and all regulations promulgated thereunder.

Payment Method: Check/Money Order No. _____ Amount enclosed: _____

Please make check/money order payable to the State of Michigan (see instructions on back of form).

Applicant Signature:_____ Date:_____

Please print your name here:_____

This credential will NOT be issued without the above signature and date!

Instructions on the back of this form

www.michigan.gov/mdard-licensing

SECTION 6: PREPARING FOR THE CORE EXAM

All registered applicators must successfully complete the commercial core exam. It is likely that you will be helping your trainees prepare for the commercial core exam as well as doing category specific training. This section contains some resources for study aids to assist with core training.

If taking an in-person, paper-based testing exam, the scantron machine used to score bubble sheets can look intimidating to some. Explaining how the bubble sheet is filled out prior to taking the exam can relieve anxiety for participants and allow them to concentrate on the exam knowing that their answers are entered correctly. Included here is a copy of the bubble sheet (see page 32) and a list of points to make when explaining how to fill it out.

If taking exams through Metro Institute, the proctor will assist in verifying the applicant's identity and administer the exam via computer (whether in person or remote proctored). Metro Institute will provide exam instructions to the email address provided after signing up an applicant for a session.

Each chapter of the core manual contains Learning Objectives and Terms to Know at the beginning and Review Questions at the end. The review questions are in assorted format (short answer, true or false, multiple choice and fill in the blank). All questions on the core exam are true or false, or multiple choice. The learning objectives, terms to know and review questions can all be used in preparation for the core exam.

Learning Objectives for Section 6

After you finish your study of this section, you should be able to:

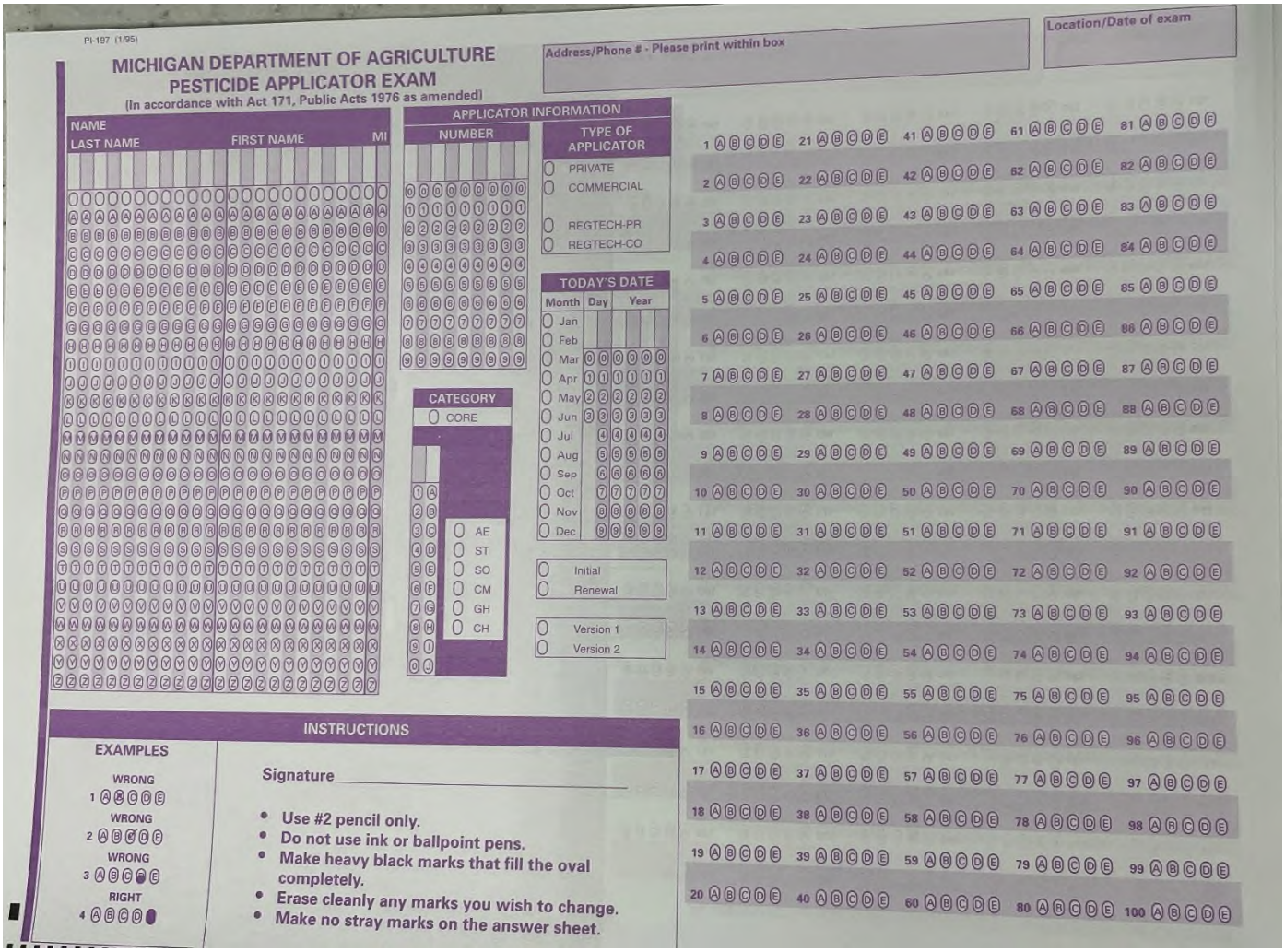
- Recognize the advantages of familiarizing trainees with the core exam answer form.
- Identify sources of training materials

PREPARATION FOR FILLING OUT THE CORE EXAM BUBBLE SHEET

Taking an exam can be very stressful. The better prepared an individual is for the exam, the less stress they will feel.

The machine-scored answer bubble sheet (see next page) for the core exam can look very confusing. If you are training employees for in-person paper-based testing, it will be helpful to go over the bubble sheet with the trainees prior to the exam. On page 33 there is a list of points that may be used for your presentation.

The best way to prepare your trainees for in-person, paper-based testing is to make a copy of the core exam answer bubble sheet for each trainee and allow them to fill in the information as you go through the points on the next page with them. Practice filling in the ovals with a heavy mark and erasing marks cleanly.



PI-197 (1/95)

MICHIGAN DEPARTMENT OF AGRICULTURE
PESTICIDE APPLICATOR EXAM
(In accordance with Act 171, Public Acts 1976 as amended)

Address/Phone # - Please print within box

Location/Date of exam

NAME
LAST NAME | FIRST NAME | MI

APPLICATOR INFORMATION

NUMBER

TYPE OF APPLICATOR
- PRIVATE
- COMMERCIAL
- REGTECH-PR
- REGTECH-CO

TODAY'S DATE

Month	Day	Year
Jan		
Feb		
Mar	0 0	0 0 0 0
Apr	1 1	1 1 1 1
May	2 2	2 2 2 2
Jun	3 3	3 3 3 3
Jul	4	4 4 4 4
Aug	5	5 5 5 5
Sep	6	6 6 6 6
Oct	7	7 7 7 7
Nov	8	8 8 8 8
Dec	9	9 9 9 9

CATEGORY
- CORE
- AE
- ST
- SO
- CM
- GH
- CH

- Initial
- Renewal

- Version 1
- Version 2

1 A B C D E 21 A B C D E 41 A B C D E 61 A B C D E 81 A B C D E
2 A B C D E 22 A B C D E 42 A B C D E 62 A B C D E 82 A B C D E
3 A B C D E 23 A B C D E 43 A B C D E 63 A B C D E 83 A B C D E
4 A B C D E 24 A B C D E 44 A B C D E 64 A B C D E 84 A B C D E
5 A B C D E 25 A B C D E 45 A B C D E 65 A B C D E 85 A B C D E
6 A B C D E 26 A B C D E 46 A B C D E 66 A B C D E 86 A B C D E
7 A B C D E 27 A B C D E 47 A B C D E 67 A B C D E 87 A B C D E
8 A B C D E 28 A B C D E 48 A B C D E 68 A B C D E 88 A B C D E
9 A B C D E 29 A B C D E 49 A B C D E 69 A B C D E 89 A B C D E
10 A B C D E 30 A B C D E 50 A B C D E 70 A B C D E 90 A B C D E
11 A B C D E 31 A B C D E 51 A B C D E 71 A B C D E 91 A B C D E
12 A B C D E 32 A B C D E 52 A B C D E 72 A B C D E 92 A B C D E
13 A B C D E 33 A B C D E 53 A B C D E 73 A B C D E 93 A B C D E
14 A B C D E 34 A B C D E 54 A B C D E 74 A B C D E 94 A B C D E
15 A B C D E 35 A B C D E 55 A B C D E 75 A B C D E 95 A B C D E
16 A B C D E 36 A B C D E 56 A B C D E 76 A B C D E 96 A B C D E
17 A B C D E 37 A B C D E 57 A B C D E 77 A B C D E 97 A B C D E
18 A B C D E 38 A B C D E 58 A B C D E 78 A B C D E 98 A B C D E
19 A B C D E 39 A B C D E 59 A B C D E 79 A B C D E 99 A B C D E
20 A B C D E 40 A B C D E 60 A B C D E 80 A B C D E 100 A B C D E

INSTRUCTIONS

EXAMPLES

WRONG 1 A B C D E
WRONG 2 A B C D E
WRONG 3 A B C D E
RIGHT 4 A B C D E

Signature _____

- Use #2 pencil only.
- Do not use ink or ballpoint pens.
- Make heavy black marks that fill the oval completely.
- Erase cleanly any marks you wish to change.
- Make no stray marks on the answer sheet.

HOW TO FILL OUT THE CORE EXAM ANSWER FORM

1. Use #2 pencil only (pencils will be available at the exam site).
2. At the very top of the form are 2 shaded boxes (one toward the middle of the page, one to the right). In the first box print your home address and phone number. In the second box put the location and date of the exam.
3. Under the ***Name*** section, fill in your **last** name first, then **first** name and middle initial in the boxes. Blacken the corresponding letter oval underneath each letter of your name. Fill the oval completely with a heavy black mark. Erase cleanly any mark you wish to change. Make no stray marks on the answer sheet.
4. Under ***Applicator Information***, applicants becoming certified or registered for the first time should enter their social security number. Applicators renewing their certification or registration should enter their nine-digit assigned certification or registration number.
5. Under ***Type of Applicator***, blacken the appropriate oval for REGTECH-PR (registered applicator-private) or REGTECH-CO (registered applicator-commercial).
6. Under ***Today's Date***, blacken the oval for the appropriate month, write in the day and year, then blacken the corresponding number ovals beneath.
7. Under ***Category***, blacken the oval beside Core (the number and letter ovals are for category exams and the letters such as AE and ST are for additional standards in aerial application or structural fumigation, etc.). *Only the Core oval applies to registered applicators.*
8. Fill in the oval to indicate whether this is an initial or renewal exam.
9. Fill in the oval that indicates whether you have version 1 or version 2 of the exam, which is printed on the front of the exam booklet.
10. Under ***Instructions,*** sign the form on the Signature line.
11. The right half of the form and the back will be used for answering the exam questions. NOTICE THAT THE QUESTION NUMBERS GO DOWN THE COLUMN, NOT ACROSS.
12. There will be an MDARD representative at each exam site. They will give instructions for filling out the form before the exam begins and will help answer any questions you have related to completing the bubble sheet.

SECTION 7: TECHNIQUES FOR TEACHING ADULTS AND STRUCTURING YOUR CLASSROOM PRESENTATION

Adult learners bring a very different set of skills, knowledge, and expectations to the classroom than do children. Those differences can be tapped by the instructor to make the class more fruitful and productive for the learners.

The first article (by Dr. Joseph Levine) describes the characteristics of adult learners and discusses how those characteristics should influence your teaching techniques (see pages 35-55). The article lists five principles to consider when organizing and presenting your information in the classroom and explains various teaching strategies.

The second article focuses on how to be an effective trainer: why and how to create lasting change among your class, how to write and use learning objectives, and the essential elements for conducting a training class (see pages 56-64).

Learning Objectives for Section 7

After you finish your study of this section, you should be able to:

- Describe six characteristics of adult learners and the implications for teaching
- Name five principles used in organizing presentations for adult learners
- List the various strategies that can be used to teach information
- Identify the three stages of change in the classroom
- Explain why it is important to write learning objectives prior to teaching a class
- Identify 10 essential elements for conducting a training class

EFFECTIVE TEACHING

A set of papers focusing on the teaching of technical information to adults

S. Joseph Levine, Ph.D

1. CHARACTERISTICS OF ADULT LEARNERS AND IMPLICATION FOR TEACHING TECHNICAL INFORMATION

2. PRINCIPLES FOR TEACHING TECHNICAL INFORMATION TO ADULTS

3. TEACHING STRATEGIES TO HELP PEOPLE LEARN TECHNICAL INFORMATION

4. IDEAS FOR IMPROVING YOUR TECHNICAL TEACHING

5. APPLYING TEACHING STRATEGIES

Department of Agricultural and Extension Education
412 Agriculture Hall
Michigan State University
East Lansing, MI 48824 USA

CHARACTERISTICS OF ADULT LEARNERS AND IMPLICATIONS FOR TEACHING TECHNICAL INFORMATION

S. Joseph Levine, Ph.D.

Probably the single most important concern for the teacher of technical information to adult learners is a thorough understanding of the learner. Through such an understanding it is possible to direct your teaching to the specific needs and interest of the adult.

Characteristic #1

The adult learner is primarily independent/self-directed in what he/she learns.

Implications for Teaching:

Try not to treat the adult like a child. Introduce yourself to the group and have them introduce themselves. Use name tags and try to call the adults by name. Make sure you allow ample time for discussion. Don't assume that you're the only one with the answer – try having the adults in the group also provide answers to each other. Handouts and materials that you provide during your teaching can help the adults learn on their own after your session is over. When the adult is learning on their own they can use the speed or rate of learning that best fits their own learning style. Different learners learn at different rates.

Characteristic #2

The adult learner has considerable experience to draw upon.

Implications for Teaching:

Provide opportunities for the adults to work together and share their ideas/experiences in small groups. Present some information and ask the adults what experience they have had in the past with the topic. Ask the adults to suggest solutions to problems/questions from the experiences they have had. Each learner's experience is unique and different. Sometimes experience may be a barrier – bad experiences may make it more difficult to teach an adult. Try and understand the experiences of your learners.

Characteristic #3

The adult learner is most apt to be interested in topics that relate to the developmental stage of their life.

Implications for Teaching:

Don't assume that young adults and older adults are interested in the same things. When you organize small groups for discussion try organizing them according to their stage in life – adults who are beginning their career in one group, those in mid-career in another group, and those who are well established in their career in another group. Provide opportunities for the learners to talk about why an idea/concept is or is not important to them. Try to hear from all the adults in the group – don't just hear from a few of the more vocal ones

Characteristic #4

The adult learner is most interested in information and ideas that solves problems that they are presently faced with.

Implications for Teaching:

Try to make your presentations problem-focused rather than just information-focused. Start your presentation by identifying the problems that you will be helping the learners solve. Provide opportunities for questions from the adults an urge them to describe their own specific situation and the problems they face. Try to focus your instruction on responding to the problems that they identify.

Characteristic #5

The adult learner is most interested in information that can be immediately applied.

Implications for Teaching:

Try to focus on ideas that the adults can put to use immediately after your teaching is finished. Ask the adults how they will be using, making application of the ideas and information presented. If the adults are not able to provide examples of how they will be using the information, try to find out why. Are they not understanding your information? Is your information not applicable to them? Are they unsure of what application opportunities they have?

Characteristic #6

The adult learner is motivated from within themselves.

Implications for Teaching:

Offering rewards for learning usually doesn't work very well with the adult learner. You must appeal to the learner at an adult level. Try and find out what the adult places value on. Recognize and respect those things that the adult values. Let

the adult know that you are concerned with those things that he/she values. And then, really be concerned!

PRINCIPLES FOR TEACHING TECHNICAL INFORMATION TO ADULTS

S. Joseph Levine

The following is a set of basic principles that can guide the technical expert in organizing instructional presentation for adult learners. The ideas are straight forward and not meant to be very elaborate – just presented to help you realize that the task of teaching technical information can be made very effective if clearly conceived and presented.

PRINCIPLE #1

TELL THE ADULTS WHAT YOU'RE ABOUT TO TELL THEM

Probably the best place to start in planning a technical information teaching session is to realize that you and the adults are on the same side in this thing. Your goal is not to fool them or otherwise confuse them. Your goal is not to impress them with how smart you are. Your goal is to help them learn what you're about to teach.

Anything that you can do to enlist their help in getting this done is to your advantage. So, let's start with the most obvious. Start by telling the adults what you're about to teach them.

This can be done in a number of different ways. If you've prepared a printed program/agenda for them, make sure that it's clear (try and stay away from "cute" titles) and show them that you're concerned that they know what's in it by talking them through the schedule. Cover the main ideas of each of the events of the program.

Whatever you do to tell the adults what they're about to learn, make sure you really teach these things. There's nothing quite so frustrating as a teacher who doesn't deliver what they said they would.

An interesting way of letting the adults know what's about to happen is to prepare a simple "test" for them to take at the very beginning of the program. The test can present questions on each of the main topics of the day. You can have the adults "correct" their own test by providing the answers on the back of the sheet. The test lets the adults know what's going to be covered and can also be used afterward to let them know that they've learned the information.

Let’s try it:

TEST

Principles for Teaching Technical Information to Adults

1) Probably the best way to help adults learn what you’d like to them to learn is:
    a) To speak slowly.
    b) To use colorful slides.
    c) To tell them what you’re about to teach them.
    d) To use a short test at the end.
2) It’s important to always organize the sequence of your presentation around your content.
    a) Absolutely, the content is your guide!
    b) Sometimes, but there can also be other things to guide us!
    c) Never, you should work from the advertised schedule!
3) It’s really hard to affect how much people will remember from your lecture:
    a) True.
    b) False.
4) Adults attend technical classes to:
    a) Pick up some new information.
    b) Improve their understanding of something that concerns them.
    c) Learn some things that can be put to use.
    d) Reflect on what they already know so they can share it with others.
5) A really good teacher:
    a) Knows when to switch between being a learner and a teacher.
    b) Defines a clear distinction between themselves and the adult.
    c) Sees themselves only as a learner.
6) The best way to conclude a presentation is to:
    a) Tell the adults how to use the ideas presented.
    b) Review the major concepts that were presented.
    c) Have the adults discuss what they’ll do with the information.

(See page for 47 answers).

PRINCIPLE #2

ORGANIZE YOUR MATERIAL FOR PRESENTATION IN A LOGICAL ORDER

The more organized you are the easier it will be for others to learn. Sometimes the best way to organize technical information is to start with the beginning “stuff”, proceed through the middle stuff, and conclude with the end stuff. However, this may not be the easiest way for the learners to learn your material. There are different ways to logically organize your material for presentation.

Content Ordered Look at your content and see how the concepts are built. Which ideas are foundational and which ideas are built on the foundation. Sometimes it helps in you planning to start by thinking through the concluding ideas that you want to get across. Then, work backwards until you uncover each previous idea. When you get all the way back to the beginning you’re ready to start.

Experience Ordered If you know who the adults are you will also know the sorts of experiences they’ve had that relate to your technical information. Start your planning by identifying their relevant experiences and then building on them. Present content that links with their experience.

Interest Ordered Identify the most interesting things you have to share and then organize your presentation to allow these interesting aspects to periodically emerge. For instance, you’d like to get their interest at the beginning of the presentation so start out with something that will capture their interest. Any time there’s a break in the program can probably also use a high interest item to get them back and tuned in again.

PRINCIPLE #3

DON’T TELL THEM EVERYTHING

Many teachers intent are on trying to tell the adult everything there is to know on the topic. This may be okay if the adult doesn’t know anything, but usually they know something. So, how is it possible to tell them everything if they already know something? The answer is to tell them a bit and then create ways to let them tell you what else they need to know.

Here’s how it works:

> First, start by making a short presentation. Cover the main points, but don’t get too detailed.

Next, give the adults a chance to discuss what you've just said. Have them get into small groups and share their ideas.

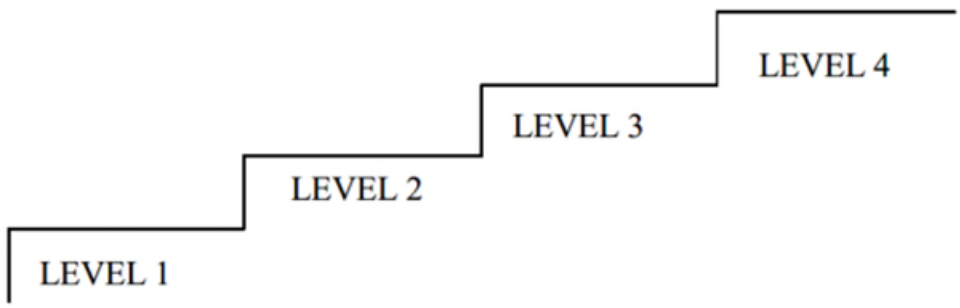
Now, bring everyone back together and open it up for questions and answers. The session will now easily turn toward ideas that need further clarification, new ideas that had not been previously presented, and implications drawn from the ideas.

This procedure is a much more efficient use of everyone's time since the adults are the ones pulling the information from you and specifically that information that they need/want to know.

PRINCIPLE #4

DECIDE WHAT YOU WANT THE ADULTS TO DO WITH YOUR TECHNICAL INFORMATION

Before you begin your technical teaching make sure you understand what you want the adults to do with the information. Maybe this sounds a bit absurd but think for a minute. Do you want them to learn it for a rainy day? Do you want them to learn it so they can use it tomorrow? Do you want them to learn it to help others use it? Once you know what you want the adults to do with the information you can decide on how to best teach it. Here are four levels to consider. Each level, like stairs on a staircase, builds one on another and leads you progressively higher.



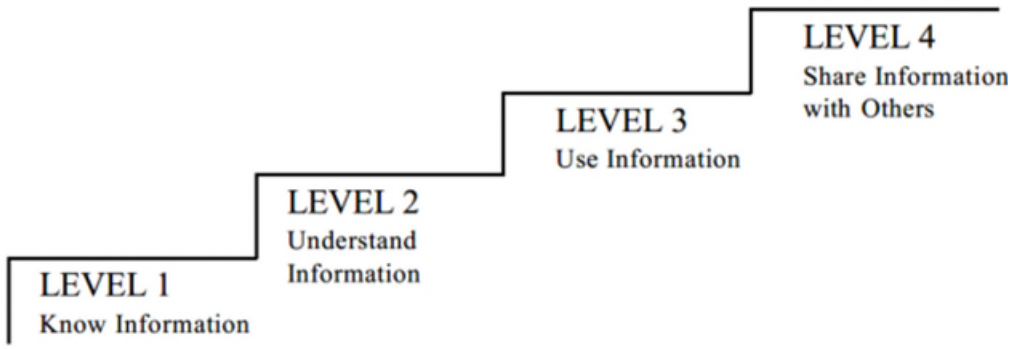
Level 1 - **They should know the information in case they need it in the future.** This sounds like a college course! However, a lot of technical teaching is of this sort. Lecturing often works well and can be greatly improved through visuals. A handout is essential since the adult will have it available in the future when they need to know the information. You want to make sure there is time at the end for questions so that everyone can leave with the "correct" information. However, don't be disappointed if few questions arise. If the adults are only learning for future use then questions will probably appear in the future. You may want to leave your name and address with them so that they can follow up with you at a time when they need to put the information to use.

Level 2 - **They should understand the information so that they might apply the ideas in other areas.** This level is more than just remembering – it's also understanding the technical information. Though the adults may not have a particular application for the information, there may be other areas in which these same ideas can be most useful for them. Make sure you provide ample opportunity during you presentation time to allow them to discuss the ideas and concepts in small groups. This will allow them to see how each other may be trying to use the information. It also helps them get clarity on their own understanding. Often the adults will shy away from asking a question in front of the entire group but will ask the question in the "privacy" of a small discussion group. Again, a handout is essential, but also some form of Note Taking Guide will really help. The main points from your presentation can be included in the Note Taking Guide with space provided for the adult to write in their own comments.

Level 3 - They want to be able to use the information so they can put it to work for them. This is probably the level that is most fun for the teacher. When you've got a group of adults who want to put your information to immediate use the attention moves away from "how can I get them to learn it" and focuses more directly on "how can I get out of the way between them and the information." So much of teaching seems to be focused on tricking the adult into learning something that this level sometimes comes as a surprise to us. The adult, though, may become a bit impatient! They may not want to be lectured at but instead want to try to immediately put the information to use. So, be prepared! This is a great time for a "hands on" demonstration. Try to do a lot of showing at the beginning rather than telling. Let the adults see the information being put to use and then have them do it. You may have to create some simulated opportunities for doing. Once you've given them an opportunity to see and to do, then it's time to talk. First in small groups so that everyone can have a chance to share their thinking. Then, in the large group so that you can give specific technical answers to their technical questions. Handouts are essential, essential, especially those that document the specific steps of doing that were demonstrated and tried during the program. Diagrams and pictures in the handouts can often spell later success as they make application after they return home.

Level 4 - They want to be able to share these ideas with others so that others can know about it. If the adults are wanting to learn at this level they have now become your peers! Your task should be more focused on helping them be able to communicate in the same ways that you are able to. It stands to reason, of course, that as a peer they already have a good grasp of the technical information and have already been able to put it to use. If this is not the case, maybe they really aren't at Level 4! Let's assume, however, that they know that stuff and have put it to use prior to this program. They really are at Level 4 and now they want to be able to help others know about it. You should focus your presentation around case studies and problem scenarios. Give them a problem scenario to solve that you have run into in the past. It often helps if the problem scenarios have been prepared and printed ahead of time. Divide up

the adults into small groups and have them tackle one of the problem scenarios. After ample time for small group discussion, have them share their solutions and approaches in the large group. Have all groups work on the same scenario so that when the large group sharing occurs everyone knows what is happening. Try and have a selection of problem scenarios for them. Some scenarios should focus on specific technical information aspects ("What types of information should you provide if the problem is...") and other problem scenarios should focus on how to help people learn the information ("What should you do if the person doesn't understand the concept of ..."). Provide a time when you ask the adults to share their experiences in helping others learn this type of information. What works for them? What things should be avoided? Be ready to describe your own successes and failures for others to learn from. Don't make yourself the center of attention but try and turn questions directed to you around so that the adults have the opportunity to respond to each other's questions.



PRINCIPLE #5

KNOW WHEN TO TEACH AND WHEN TO LEARN

Most technical teachers assume that the reason they're up in front of the group is because they've got something to teach the others. This makes a lot of sense, but can be interpreted along a continuum. At one end of the continuum is the idea that:

"I know something that I want you to know."

And, at the other end of the continuum is the idea that:

"You know something that I'd like to know."

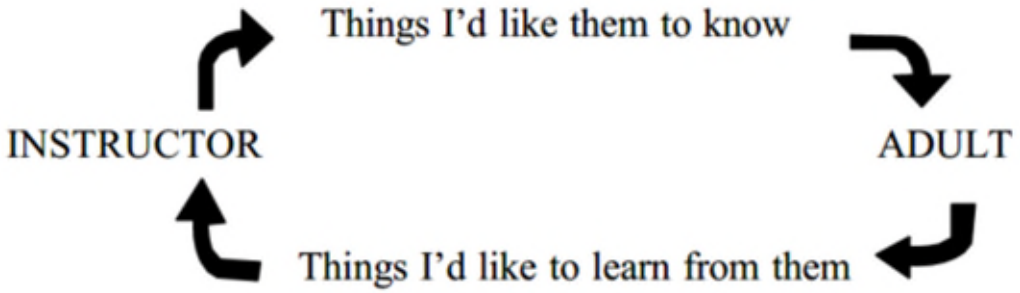
This later position is one that is often rejected without really thinking about it. It's important for learning, almost essential, that the learner feel that they are an important part in the process. One way to have this happen is for the teacher to

learn from the learner. And probably the very best position to find yourself in as the technical teacher is:

> "Between the two of us there's got to be some new insights – let's share what we know."

Sounds rather confusing!! "How can I be the expert if I'm going to learn from them?" Or, "I'm the expert, what can they expect to teach me?" No one said that the content that each of you will teach and learn must be the same. The key is that you, as the teacher, can make the adult feel a lot more willing to learn if the adult feels that they are being listened to.

Make sure you provide ample opportunities for the adults to do some talking. And, listen when they speak. Assume that their questions are all good and work to give each questioner your full attention through your response. Try jotting down your thoughts as the adults are talking. Once written down you can go back to listening rather than having to interrupt them before you forget what you want to say. Try to provide opportunities for different people to speak. Don't let just one or two control the discussion.



PRINCIPLE #6

HELP THE ADULTS TRANSFER THE CONCEPTS TO THEIR OWN SITUATIONS

A real challenge for the teacher of technical information is to get the adult to make the shift in their mind from the classroom to their own situation. This concept, often referred to by educators as "transfer of learning", is the essence of what we're all about. If we can't stimulate our learners to make this transfer of information, to generalize to their own situation, then there really isn't' much point in wasting their time listening to us.

Now it would seem that transfer can be best accommodated when we stick closely to your plan for presentation. We can then plan carefully ahead of time about how to make the transfer. But what if we allow the adults to ask questions during the program? Or, what if topics and ideas are brought out that we hadn't planned for? Is this bad or can we still help the adults to make the transfer?

Probably the easiest way to have transfer occur is through a series of very obvious questions that can be part of the concluding discussion. There are really only three questions that need to be asked. The key is that you must ask them at the right time and in the right way. They are:

Question #1 – What are the key ideas that were brought out during this session? (Identify)

Question #2 – From your own perspective, why are these ideas important? (Analyze)

Question #3 – How will you be using these ideas in your own situation? (Generalize)

In actual use Questions #1 and #2 seem to be used the most with individuals moving back and forth between them. We start by asking someone to identify something from the session and then have them or someone else analyze why it was important. We try and stay tuned in, interjecting every once in a while to keep things going smoothly, and then when things quiet down a bit we again ask Questions #1 and Question #2. This process is repeated until the main ideas of the session, from the adult's perspective, are brought forward. Then, when it's time to finally wrap everything up we move to Questions #3 – "How will you be using these ideas in your own situation?"

This last question sets the stage for the transfer of learning. Hopefully all of the adults will have a chance to share their ideas on how they will be making use of the information. Sometimes this can be helped along by moving through the group and giving everyone an opportunity to speak. The usual effect of this final sharing of insights is very powerful with the group strongly reinforcing all of the many things that were learned. In fact, it is often the case that the instructor

learns about many things that were learned that weren't realized nor planned for. What a great way to end a program!

Answers to the test:

1. C
2. B
3. F
4. All
5. A
6. C

TEACHING STRATEGIES TO HELP PEOPLE LEARN TECHNICAL INFORMATION

S. Joseph Levine, Ph.D.

There are many different teaching strategies that can be used to help learners gain the understandings that you'd like. The following list/description presents some of the strategies that can be particularly helpful when trying to teach technical information to adults. These strategies can be used individually or in conjunction with each other.

Demonstration

Demonstrations can be classified in two ways:

Result Demonstration shows the results of some activity, practice or procedure through evidence that can be seen, heard or felt.

Method Demonstration illustrates how to do something in a step-by-step fashion.

Demonstrations are most effective when the learners are concerned with an issue or problem and are looking for an answer. In such cases the demonstration can deal directly with their concern. It is important that the person doing the demonstration know the content very well and is able to answer questions as they arise during the demonstration.

Lecture

The lecture is the most commonly used instructional strategy for working with groups of learners. Ideas for improving the effectiveness of lectures include:

Be organized – plan your lecture ahead of time and be logical in your order of presentation.

Allow for periodic breaks – don't have the learners sit and listen too long. Provide frequent breaks when they can relax and informally discuss the ideas that have been presented.

Use visuals – charts, slides and overhead transparencies all help by allowing the learners to see what they have been hearing.

Allow for questions – periodically provide a time for questions and answers. Try to respond to each question in a way that lets the learner know that you appreciate that he/she has asked the question.

Arrange the seating – try to arrange the seating so that it is less formal and allows the learners to see each other along with seeing the instructor. This can allow for more interaction between the learner.

Provide opportunities for small group discussion – once or twice during the lecture provide a question or two that can be used as a discussion topic for small groups. Allow the groups 5 to 10 minutes to discuss the topic and then have them share their ideas with the total group. When appropriate continue your lecture.

Note Taking Guide

If you are presenting detailed information it is usually most helpful to provide the learner, at the beginning of the presentation, with an outline or guide by which they can follow the material being presented and also take notes when appropriate. The note taking guide doesn't have to be exceptionally detailed but should provide the structure to help the learner progress through the content that you are presenting.

Group Discussion

Group discussion is an organized opportunity for the learners to discuss selected topics/issues/ideas in a group setting. Group discussion allows more of the learners to actively participate and therefore can help to increase learning. Before organizing a group discussion it is important to make sure that the learners have a certain level of understanding that will allow them to share their ideas in the group. A group discussion that is held too close to the beginning of an instructional program may not work effectively since the members of the group may not have the basic information to be discussed.

Group discussion often works better with a group leader. This can be assigned by the instructor or selected by the group members.

Exhibit

An exhibit is a collection of materials that are displayed to help people learn. Exhibits can be very helpful as a strategy to help learners gain new understandings without the necessity of a formal course or training program. Exhibits should be set up in areas that are frequented by the learners. It is often helpful if the exhibit includes a selection of objects or pictures and also appropriate signs and written information. In addition, handouts and printed material available for the learner to take along with them is most beneficial. Don't forget to periodically change the exhibit – don't let it stay there too long.

Field Trip

A field trip is usually a well-planned visit by a group of learners to some place or organization that can provide new ideas and insights to the learners. Field trips can be planned around the visiting or experts/specialists on a certain topic, manufacturing facilities, demonstration programs, and other locations that can't come to the learners. Field trips are often used to show the results of a certain practice.

Case Study

Used to allow the learners to examine or analyze a specific situation that they may be facing in the future. Usually the situation is prepared ahead of time and distributed in written form. The learners, often working in teams, discuss how they might solve the situation that has been presented. This strategy can be very helpful following the presentation of technical information whereby the learners can then apply the information to specific problems/situations. It is also helpful for allowing the learners to assess how much they have learned and how comfortable they will be in using the information to solve problems in the future.

Brainstorming

Used when you'd like to encourage the learners to freely share their ideas. All ideas are accepted at the beginning of the process and no response, regardless of how useless or impractical it may seem, is omitted from the first stages of brainstorming. As ideas are contributed by members of the group, they are listed for all in the group to see and discuss. Discussion can include the development of spin-off ideas, the refining of ideas, the combining of ideas and reinforcing of existing ideas. Brainstorming can be excellent to help a group of learners think creatively of new ideas to solve difficult problems.

Movies/Slides/Transparencies

Visual aides to instruction can help learners better understand the ideas that are being presented. Try to make sure that the visual aids clarify the ideas that are being presented and don't confuse them. Use the same words in your presentation as are used on the visuals.

Role Playing

When learners will be expected to interact with other people as a key part of effectively using the technical information, role playing can be most helpful. In role playing two or more learners are provided with a role to play and a situation in which they are involved. The learners then act out their roles and try to solve the situation. Role playing can be done as a demonstration in front of the total group or, of it is a large group, role playing can be done simultaneously by small groups. At the conclusion of role playing the learners should be given an opportunity to talk about how they feel, what they observed, what they learned, and what they'll do differently the next time.

Independent Study

Most adult learners do most of their learning through independent study. Independent study allows the learner to select the content that he/she is most interested in learning and also to select the best time for learning. In addition the independent study learner can move through the content at his/her on pace. An instructor can help learners do independent study by providing study materials, resource guides, self-testing materials, and by being available to answer questions as they arise.

Newsletters

A periodic newsletter that reinforces the key ideas and concepts that you want to teach can be very helpful. The newsletter can also introduce ideas that will be the focus of upcoming training sessions.

Tutorial

A tutorial learning situation is most helpful when a single learner is needing specific help. The focus for a tutorial is usually the specific problems of concerns of the learner. The teacher then becomes a form of consultant to the learner and attempts to assist in helping the learner deal with his/her concerns.

SELECTING THE APPROPRIATE TEACHING STRATEGY

	Doesn't Require Reading	Concrete Ideas	Abstract Principles	Draws on Learner Experiences	Stimulates Dialogue/ Discussion	Problem Focused
Demonstration	++	++	+	++	++	++
Lecture	++	+	--	--	--	-
Note Taking Guide	--	++	+	--	+	-
Group Discussion	++	-	++	++	++	++
Exhibit	++	++	-	-	-	-
Field Trip	++	++	-	+	++	++
Case Study	-	++	++	++	++	++
Brainstorming	+	+	++	++	++	++
Movies/Slides	?	++	-	-	-	-
Role Playing	++	-	++	++	++	++
Independent Study	--	++	+	++	-	++
Newsletters	--	++	-	+	-	+
Tutorial	+	++	+	++	+	+

IDEAS FOR IMPROVING YOUR TECHNICAL TEACHING

S. Joseph Levine, Ph.D.

Before your class:

Prepare a class schedule ahead of time and distribute it to the learners before the session.

Arrive ahead of time and arrange the room for learning.

During your class:

Try and be honest with the learners.

Stay on schedule.

Call learners by name.

Provide appropriate handouts.

Don’t spend time telling information that can be given out ahead of time.

Try to summarize your ideas at periodic intervals – don’t wait only until the end to summarize.

Schedule breaks for the learners.

Ask open-ended questions.

Start and finish on time.

After your class:

Follow-up with additional information.

Be available for questions.

Check to see if learners are applying the ideas.

APPLYING TEACHING STRATEGIES
SMALL GROUP ACTIVITY

Working as a team with one or two other participants:

1. Identify a specific sub-topic that could be taught to a pesticide applicator.

2. What teaching strategies could be used to teach this sub-topic?

3. What are the strengths of teaching this way?

TIPS FOR TRAINERS

CREATIVE SUGGESTIONS FOR:
-CREATING CHANGE
-PREPARING LEARNING OBJECTIVES
-PLANNING YOUR PROGRAM

(Adapted by Sandy Perry from a seminar by Edward E. Jones, Jr., Management Training Consultants)

HOW DO WE TRAIN TO CREATE MAXIMUM AND LASTING CHANGE?

We train to elicit a CHANGE in attitude/behavior, skill and/or knowledge.

- When we ask for change it's uncomfortable to the learner.
- There are elements of fear/anger associated with change.
- Change is very slow at the outset.
- Change takes practice, practice, practice.

There are 3 stages of change in the classroom:

1. Unfreezing

   Handle this in the classroom by getting the group ready for change.

   Make housekeeping announcements, brief introductions, state objectives of the class.

2. The Change Process

   Move people (get them out of their comfort zone and then you are the leader. Announce that the last one seated in each group is the group leader – this speeds the moving process).

   Plan activities to encourage networking within the new groupings. Make your presentation as interactive with the audience as possible. Give rewards.

   Have fun.

3. Refreezing

Give time during class to reinforce new learning by review of by hands-on activity.

Don't expect the learners to walk out the door and be able to apply the knowledge without allowing time for practice.

IN ORDER TO TRAIN WELL, YOU NEED A LESSON PLAN WITH SPECIFIC LEARNING OBJECTIVES (OR what do I want them to be able to do when I am through with my training session?)

You need a written lesson plan to be a good and effective teacher.

A lesson plan serves as a road map to keep you on track. The lesson plan helps keep you organized by containing the lists of materials needed to teach the subject. The lesson plan can be immediately updated after a class to continually improve your teaching.

The most important part of the lesson plan is the learning objectives.

1. Why write learning objectives?
   - To define where you are going.
   - To communicate your expectations to trainees
   - To use as a guide for selecting training activities and evaluation techniques.

2. A learning objective is a measurable statement describing an intended or expected outcome.
   - State the objective in terms of learner behavior: state what the learner will do, not what the trainer will do.
   - Objectives are built around change in the individual, not around the course description or other learning activity.

3. Start from your goal (what you want the students to learn) and work backward to write the objectives for the training session.

HOW TO WRITE AND USE LEARNING OBJECTIVES

An objective needs 3 parts to be complete:

1. A statement of **outcome or action** (what is to be accomplished? Use only action verbs. You cannot evaluate or measure non-action verbs).

2. A statement of **conditions** (what tools do you want the students to use to accomplish the objective?)

3. A statement of **minimum acceptable performance** (usually a quality, quantity, or time)

Here are some examples of class objectives using the terms listed above:

- Describe the major pesticide laws in Michigan. (*States outco*me)
- Describe the major pesticide laws in Michigan by using the manual. (*States outcome and conditions*)
- Describe 3 major pesticide laws in Michigan by using the manual. (*States outcome, conditions, and minimum acceptable performance*)

Some helpful action verbs for writing objectives:

to apply	to defend	to distinguish	to locate	to plan	to select
to arrange	to define	to estimate	to match	to prepare	to separate
to assemble	to demonstrate	to explain	to measure	to rate	to show
to choose	to describe	to find	to name	to recognize	to solve
to compare	to design	to identify	to operate	to relate	to state
to construct	to differentiate	to inspect	to organize	to report	to tell
to contrast	to discuss	to list	to perform	to reproduce	to write

Some not so helpful verbs for writing objectives:

to know

to understand

to really understand

to appreciate

to fully appreciate

to grasp the significance of

to enjoy

to believe

Write all 3 parts of the objective for yourself to help with identification of materials and methods.

- Usually the statement of outcome is enough to tell the student.

In writing objectives, include only the <u>need</u> to know. Put the <u>nice</u> to know in handouts or a manual.

- Concentrate on the important stuff in your presentation – you can't and shouldn't present every detail.

Aim to teach 5 objectives for a full day, 3 for a half day, 1 per 1-hour class.

To reinforce learning, it is important for the class to review each objective before moving on. USE REVIEW TO BRIDGE BETWEEN OBJECTIVES.

- Review is best done by the student. (Ask them what they've learned or make it interactive with pictures, games, demos, etc.). Hands-on practice is the very best form of review.

What are "good "objectives?
- specific
- attainable (within the session)
- measurable.

PROGRAM PLANNING

10 Essential elements for conducting a training class:

1. Know the subject.

2. Know the audience.

3. List audience needs (what does the learner want?)

4. Know if you are teaching knowledge, behavior and/or skills. If you're teaching knowledge only, make it short and lecture with as much class interaction as possible. If skills and/or behaviors are to be taught, make it H.O.T. (hands-on-training).

5. Evaluation. Evaluation should be on-going throughout the training (do quick reviews frequently to make sure they're getting the point).

6. Set up a file in which to keep hints and techniques that will make you a more effective trainer.

7. Set up a lesson plan for yourself:

   - Goals
   - Objectives
   - what methods will be used
   - what materials are needed
   - windows of training (class schedule)
   - evaluation form

8. Methods. Avoid long lectures. Break it up with overheads, video, group discussion, handouts, demonstration, panel discussion, slides, competitions, puzzles, questions and answers, review, guest speaker, role-playing, tests, hands-on-training, flip charts, flash cards, one-on-one, props, fill-in-the-blanks, graphs, games, etc.

9. How will the training be used? Plan class activities (or lecture examples) around real-life situations.

10. Use the sandwich method by giving the daily objectives at the beginning and end of the day (tell them what you're going to tell them, tell them, tell them what you told them).

"Windows Of Training"

Lay out your training schedule on paper:

- Put in start time, lunch, breaks and end time (end 15 minutes later than you think you'll need so there will be a built-in fudge factor if discussion goes long).
- Decide what you want to do during the introduction (minimum of housekeeping announcements, brief introductions, and statement of objectives.

Other things you may want to do are to ask the audience individually or in groups what 2 questions they want answered during the session or if it is the second day, use the introduction time for restating objective and review yesterday's information.

- Place objectives in the open time spaces.

Handouts

A. Advantages

- Key ideas remembered longer – your points are reinforced.
- No need for your audience to take detailed notes.
- You can provide additional/supplemental information not delivered in your presentation.
- Can keep you and your audience organized.

B. Disadvantages

- Can be distracting if handed out during the session. "Don't read this now..." won't work. People are curious.
- If poorly done (bad quality printing or typing) they will give you a bad image.

- Need to keep the information in the handout current if it is going to be effective.
- It takes time to do handouts well and customize them for your specific audience.
- Handouts can become a crutch causing the speaker to get lazy in the presentation – "It's in the handouts".

C. Handouts should be CRISP:

Colorful

Readable

Interactive

Simple

Pictures if possible (graphics, diagrams, etc.)

Seating arrangement

- The best way to seat for interactive learning is at round tables of 5-7 (go for large numbers of small groups – 15 people into 5 groups of 3 rather than 3 groups of 5).
- Arrange the tables in a half-circle or horseshoe.
- If the instructor's table is rectangular, turn it perpendicular to the front of the room and put the overhead projector on the end nearest the audience. This way the table does not block you in and you can lay overhead and handouts in sequential order behind the projector where they are easy to get at but hard for the audience to see what you have.

Evaluation

- Always have the class fill out an evaluation form on the content and quality of the material and the presentation style of the instructor.
- Evaluation forms can be very brief and still be very effective.
- Evaluations will show you the weak as well as the strong points of your presentation. It will allow you to understand the way in which the information you presented is received.

PROGRAM PLANNING: A REVIEW

Before Class

1. Plan every detail of your presentation in advance by writing a lesson plan for yourself (or review your plan if you have taught the class before).

   Goals

   Objectives

   Methods (What teaching strategies and review methods will you use to teach the subjects?)

   Materials handouts?, manuals?

   Windows of training (class schedule)

   Evaluation

2. Review and update all lecture and handout material that will be needed.

3. Get organized.

During Class

1. Stay on schedule: start and finish on time, allow enough breaks.

2. Present the material in the clearest, most interactive method you can.

3. Teach only the “need to know.” Put the “nice to know” in handouts or in a manual.

4. Use the sandwich method to get your points across.

5. Use review, demonstration, and hands-on activities to reinforce learning.
6. Encourage learners to fill out an evaluation on both the content and method of your presentation.

After Class

1. Immediately, fill out an evaluation on yourself (you will have noticed parts of the presentation that went better or worse than expected and now is the time to write it down before you forget).

2. Review the learners' evaluations.

3. Make notes on the lesson plan about where and what kind of changes need to be made.

4. Keep up to date on your subject.

Prepared originally by Sandy Perry, Michigan State University Pesticide Education Program. Revised by Lauren Gott, MDARD Certification Program Specialist, and Dr. Safa Alzohairy, MSU PSEP Coordinator, in June 2025.