Crop Production and marketing management Level-IV

Based on September 2021, Version 3 Occupational standards

Module Title: Implementing Pest Management Action Plans

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Contents

LG # 55	LO #1 Schedule pest management activities

Instruction sheet 1

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying activities in the action plan and scheduling daily work plans.
- allocating work time to complete the activities in accordance with the requirements of the action plan, and within realistic expectations.
- allocating employees with relevant skills and competency for the completion of required activities.
- Procuring plant, machinery, equipment and materials required to complete required activities
- consulting relevant stakeholders regarding the scheduling of activities.
- Appling relevant ohs standards and other federal, state and local legislation & regulations in the allocation and procurement of human and physical resources.
- Aligning milestones to critical control points in the target pests' life cycle, behavior patterns and the local land management and production activity cycles.
- determining measurable performance criteria for objectives at each milestone.
- proposing deadlines activities required to achieve objectives.
- Selecting and scheduling activities to comply with the pest management strategy
- Selecting and scheduling monitoring and measurement activities to comply with the vertebrate pest management strategy and in accordance with relevant statutory and regulatory requirements.

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This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify activities in the action plan scheduled within the monthly, weekly, or daily work plans.
- Allocate work time to complete the activities in accordance with the requirements of the action plan, and within realistic expectations.
- Allocate employees or contracted personnel with relevant skills and competence are for the completion of required activities.
- Procure plant, machinery, equipment and materials required to complete required activities for the time the activities are to be carried out.
- Consult relevant stakeholders regarding the scheduling of activities.
- Apply relevant ohs standards and other legislation and regulations in the allocation and procurement of human and physical resources.
- Align milestones to critical control points in the target pests' life cycle, behaviour patterns and the local land management and production activity cycles.
- Determine measurable performance criteria for objectives at each milestone.
- List and propose activities required to achieve objectives by deadlines in consultation with local land users.
- Select and schedule activities and to comply with the pest management strategy, in consideration of community attitudes, and in accordance with relevant statutory and regulatory requirements.
- Select and schedule monitoring and measurement activities are to comply with the vertebrate and invertebrate pest management strategy and in accordance with relevant statutory and regulatory requirements.

Learning Instructions:
1. Read the specific objectives of this Learning Guide. **2.** Follow the instructions described below. **3.** Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them. **4.** Accomplish the “Self-checks” which are placed following all information sheets. **5.** Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks). **6.** If you earned a satisfactory evaluation proceed to “Operation sheets **7.** Perform “the Learning activity performance test” which is placed following “Operation sheets” **8.** If your performance is satisfactory proceed to the next learning guide, **9.** If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet 1- Scheduling identified activities in the action plan

1.1. Introduction

A **pest** is any animal or plant harmful to humans or human concerns. The term is particularly used for creatures that damage crops, livestock, and forestry or cause a nuisance to people, especially in their homes. ... Thus, an elephant is unobjectionable in its natural habitat but a pest when it tramples crops.

Pests include arthropods (insects, spiders, mites, ticks, and related pests), wood- infesting organisms such as fungi, rats, mice, nuisance birds and any other undesirable organisms in, on or under structures, excluding bacteria and other microorganisms on or in humans or other living animals.

Crop pests include plants, insects, birds, mammals, and diseases that reduce crop yield and/or quality.

Pests are known to have negative impact on crop production as well as on human health.

The word “pest” describes an organism that damages crops, injures, or irritates livestock or man. Agricultural pests include animals, insects, fungi, and bacteria that lead to a loss of crops or reduction in crop yield relative to potential yield that would be possible in a world without pests.

Pest attack in agriculture is usually observed both on the field and during period of storage of agricultural crops most especially in cereal production. The attack by various insect pests causes damage to plant foliate, stems, buds, flowers, fruits and seeds resulting in substantial crop losses of marketable yield. However, controlling pests is important in the agricultural industry. Annually, it is estimated to cost farmers worldwide about 10 billion dollars to control pests

1.2. Scheduling activities in the action plan.

Schedules /work orders may include:

- access to work site including timing of access and access and egress points
- budget allocations
- completion times/dates

- job requirements and tasks
- legislative and local government requirements
- OHS requirements and emergency response procedures
- resource requirements – equipment and materials
- specific client requirements e.g., noise control, sensitivity of occupants to pests
- and/or management, relationships with other customer activities, dress and
- presentation requirements
- use of signage and barriers
- work schedules
- work site contact person(s)
- Working in isolated and remote locations.

Planning is at the heart of an IPM program. Every crop has pests that need to be considered. If you wait until problems arise during a growing season, you'll end up relying on pesticides more and more.

As defined by the Structural Pest Control IPM is a pest management system that includes the following elements whenever possible:

- Identifying pests and their natural enemies.
- Establishing an ongoing monitoring and record keeping system for regular sampling
  and assessment of pest and natural enemy populations.
- Determining the pest population levels that can be tolerated based on aesthetic, economic and health concerns, and setting action thresholds where pest populations
  or environmental conditions warrant remedial action.
- Preventing pest problems through improved sanitation, management of waste, addition of physical barriers, and the modification of habitats that attract or harbor pests.
- Relying to the greatest extent possible on nontoxic, biological, cultural, or mechanical
  pest management methods, or on the use of natural control agents.

- Using chemical pesticides, when necessary, with preference for products that are the
  least harmful to human health and the environment; and
- Record keeping and reporting of pest populations, surveillance techniques and remedial actions taken.

A good integrated pest management program has four parts:

- Identifying problems.
- selecting tactics.
- considering economic and environmental factors; and
- Evaluating the program.

Identify Problems:

You have to know what happening in your fields before you can make good management decisions. You should scout your crops often and on a regular basis to identify problems. Scouting is, in fact, the key feature of any IPM program. By scouting, you will be able to detect potential problems early. The earlier you discover a problem, the better your chances are of avoiding economic losses.

To scout effectively, you have to:

- **Know** the crop's growth characteristics to recognize abnormal or damaged plants.
- **Identify** the cause of the problem to know what kind of pest you are dealing with. If you encounter something you cannot identify, contact your county extension educator.
- **Determine** the stage of growth of the pest and the crop. This inessential for proper timing of control methods.
- **Decide** whether the infestation is increasing or decreasing.
- **Assess** the condition of the crop.
- **Map out** problem areas. It may be possible to limit the area that needs treatment.
- **Use** the right scouting method for the specific pest.
- **Select Tactics**

Once you have identified the problem, you should consider how to control it. Your goal in selecting control tactics is to use methods that are effective, practical, economical, and environmentally sound. To select the best control tactics, you have to:

Understand the life cycle and habits of the pest. Some control methods will work only if they are used at the right time.

Decide whether the infestation is serious in terms of economic loss.

Compare the costs and benefits of various control methods.

Make plans for the future. Not every part of an IPM program can be put into effect immediately. Some tactics, such as planting resistant varieties or rotating crops, require long-range planning.

Consider Economic Factors:

Know When It Pays to Use a Pesticide Despite efforts to avoid using chemicals; there are times when only pesticides can control the damage. Even so, it may not pay to use them. Pesticides should be used in an IPM program only when the benefits (yield, quality, aesthetic value) exceed the costs of control. Otherwise, time and money are wasted. It's not easy to figure out when it pays to use pesticides. There are many variables: the pest population, variety, and crop growth stage, value of the crop, weather, and cost of the control. The following economic concepts are helpful in determining the point at which it pays to use pesticides:

- **Economic damage (ED)** occurs when the cost of preventable crop damage exceeds the cost of control. For example, if corn is worth $2.00 a bushel and an insecticide cost $14.00 an acre, then economic damage occurs when insect damage causes a yield loss of seven or more bushels an acre.
- **Economic injury level (EIL)** is the lowest pest population that will cause economic damage. For many pests it is important to use control measures *before* this level is reached.
- **Economic threshold (ET)** is the pest population level at which a control tactic should be started to keep the pest population from reaching the EIL. (The ET is also called the action threshold.) Economic thresholds have been established for a number of crop/pest systems, in particular those involving insects. It has been

harder to develop economic thresholds for weeds and diseases, but research is being done to develop ETs for these systems.

Evaluate Your IPM Program

Evaluation means deciding how effective a program is and whether any changes are needed. To evaluate an IPM program, you should:

- **Monitor** your fields and keep records. Each time you visit your fields, make a note of crop and pest conditions record crop yields and quality and record any counts on pest populations.
- **Record** control measures. Records should include dates, weather conditions, pest levels, application rates and timing, and costs. Good records are a guide if the same problem occurs. They are also a good legal safeguard.
- **Compare** effectiveness. Whatever control tactics are chosen, use different method on some strips. That way you can compare them, which worked better, considering costs and environmental impacts

What is the potential for serious problems?

This depends on the type of pest, the size of the pest population, and the location of the pest. For example, fruit fly is of less concern than one termite, which is likely to indicate the presence of an infestation that can cause serious structural damage.

What is the level of tolerance of the clientele?

Action Level When an IPM program is first implemented for a particular pest or site, guidance on setting the action level may be available from state and county public health codes, data from pilot site

IPM projects, existing field records, literature on the pest, discussions with those who have experience managing the pest elsewhere, and field workers and recollections of the problem in prior years.

Determining action levels is a three-step process:

- Reach consensus with workers on the number of pests that constitute an unacceptable level or how much aesthetic, medical, or economic damage can be tolerated.
- Find out the level of pest infestation that can cause economic damage or medical injury or that reaches a level that is aesthetically unacceptable.

- Establish an “action level”.

Action levels should be reevaluated periodically for each pest and site. As people become more reluctant to have pesticides applied in schools, they become more tolerant of some level of pest presence where previously none was acceptable. This is particularly true if people have been educated as to what levels of pests in the school do or do not cause economic damage

All pests and noxious weeds are of “foreign” origin and introduced into the County through various means including, but are not limited to, contaminated materials such as seed, feed, construction materials, packing material, agricultural, horticultural seeds, and plantings.

All noxious weeds started out as small in significant or inconspicuous infestations. Lack of awareness, concern, or knowledge of the consequences contributed to the establishment and spread of noxious weeds on both private and public lands. Once noxious weeds are introduced, the majority are able to adapt extremely well to Idaho’s environment and, without natural enemies (diseases and/or insects), proliferate and out-compete the native or desirable vegetation.

Evaluative Criteria and Methodology:

- Record pathways of weed species from other areas where potential introduction may occur.
- Conduct weed tours, and education and awareness programs to alert county staff, land management agencies and the general public to be on the alert for these weeds. Identify appropriate quarantine and exclusion procedures.
- Utilize the plant identification program for verification of suspected newly introduced weed species. Once a new noxious weed is confirmed in the county, reclassify it to an appropriate category utilizing the noxious weed action plan.

Control:

Control will be education, awareness, identification, to prevent introduction pathways, with recognition and monitoring to close introduction pathways into the county. Once a

new infestation of an EDRR weed has been verified, it shall be report the infestation to the Department of Agriculture and use any or all integrated pest management strategies available to eradicate the weed during the growing season.

Inspection:

Weed Complaints will be inspected within five working days of the complaint and processed as any other infestation within the respective category. a) This department's employees will conduct ongoing inspections of the county for the purposes of identifying EDRR weed infestations and EDRR pathways. When a new infestation occurs, it will be mapped and logged into a data base for future monitoring and eradication.

- **The five elements of integrated pest management include:**
  - ✓ Preventing pest problems.
  - ✓ Monitoring for presence of a pest problem.
  - ✓ Establishing tolerable levels based on plant/human health, economic and aesthetic thresholds.
  - ✓ Treating pest problems to reduce populations below established tolerable thresholds.
  - ✓ Evaluating the effects and efficacy of pest treatments.

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Give short answer

1. What are the 5 elements of IPM? (3pts)
2. What are the 3 steps on determining action level? (3pts)
3. List the objectives of pest management plan? (3 point)
4. What is action level? (3 points)
5. Why choose IPM? (3 points)

Test II: Fill in the blank spaces.

1. _____**:** is the lowest pest population that will cause economic damage. (3 points)
2. _____**:** is the pest population level at which a control tactic should be started to keep the pest population from reaching the EIL. (2 points)

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

Information Sheet 2- Allocating work time activities.

2.1. Allocating work time activities

Determining Response Times

Response to pest problems must be timely, **consistent**, and effective; however, the school/ staff must recognize that some pest problems are more serious than others. For example, the control of a pest that threatens the safety of students and/or staff should have a higher priority than the mere presence of a single non-threatening insect. Consequently, the IPM coordinator, administrators, and pest control contractors must agree on the response times for pests.

Time allocations are sometimes referred to as CACs, which is an abbreviation of "Charge Account Category". It enables us to do two important things:

- Prioritize your submitted jobs compared to other people's jobs.
- Keep track of how much time that is used each month by different workers and work groups.

Establishing Periodic Inspection, Monitoring and Reporting System

Inspecting

Periodic and thorough inspection of key areas combined with the evaluation of staff pest sighting reports are critical to a successful IPM program. All other IPM actions build upon this foundation. A staff member, specialist with the school district, or a structural pest control technician, may do the inspections. This person must:

Identify or obtain an accurate identification of any specimen.

- know the life cycle and habits of pests most likely found in schools.
- know where the signs of pests are most likely to be found in the facility.
- be familiar with the many ways pests enter the facility.
- have access to all areas of the facility.

talk to the staff person who filed the pest sighting report, evaluate the information, and decide on any subsequent action to be taken.

• be familiar with pesticide safety procedures and respond to emergency situations as needed.

• make written recommendations for upgrading of the facility and for changing procedures to diminish the entry of pests and/or to find harborage areas in the facility.

• note and provide corrective actions for potential pest problem and harborage areas

including water and food sources.

• follow up on the recommendations and/or changes in procedures to confirm that they have been completed; and

• provide a detailed written report for each month

Monitoring

Routine inspection and accurate identification of pests are vital steps in IPM to ensure the effectiveness of control methods. Once a pest has been identified and the source of its activity pinpointed, actions such as habitat modification, primarily exclusion, repair, and sanitation, can greatly reduce pest prevalence's

Reporting

Staff members also need a way to report pest problems between inspection periods. A pest reporting procedure should be outlined so that staff members can promptly report pest sightings. The reporting form should be concise and require specific information so that the staff are not overburdened by a long form and the IPM coordinator is not inundated with extraneous information. The pest sighting report form should be filed with the IPM coordinator for investigation and possible corrective action. Again, if an IPM program is to succeed, response to a pest problem must be timely, consistent, and effective.

Response by Pest Control Staff to Pest Problems

IPM pest response to a pest problem must be both timely and effective. However, the facility managers must recognize that some pest problems are more serious than others and pest problems that threaten the physical safety of students and/or staff should have a higher priority than the mere presence of a single nonthreatening bug.

Response by Pest Control Staff to Pest Problems

Response Time	Condition	Pest
Within four hours	Potential physical harm to students or staff	Rodents where students or staff are likely to contact them;
		Wildlife (raccoons, opossums, feral cats, bats, etc.) where students or staff are likely to contact them
One working day	Potential medical harm to students or staff	Fleas, lice, bed/bat bugs and poisonous spiders
	Potential for food contamination	Cereal pests, roaches, rodents, ants in kitchen or food storage areas and flies around food.
One to two working days	Sighting of large numbers of nonthreatening bugs	Ant or termite colonies in the building; movement into the building of millipedes, crickets, Boxelder bugs, etc

Daily Operations

On an ongoing basis Painted Pony operators conduct non recorded visual inspections of wellsite leases, facilities, roads, and pipeline rights of way (ROW's). If the Operator discovers deleterious vegetation on any Painted Pony site, the Operator completes the Noxious Weed Identification and submits the completed form to the area. The Pest Management Contractor is notified. The Pest Management Contractor will assign a herbicide technician to evaluate and treat the site. The herbicide technician visits the site and determines the need for vegetation removal. The herbicide technician then applies herbicide when optimum treatment conditions allow, or manually removes the vegetation if necessary.

Self-check 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: give short answer

1. **List the response time for pest control staff to pest problems?**

   Response time: A. _____

   B. _____

   C. _____

2. Why allocates time? (3pts)
3. What does IPM coordinator do when he meets with residence? (3pts)
4. Why do IPM coordinators keep check on units until infestations and underlying issues are solved? (3 point)
5. How does accurately managing performance help in IPM program? (3 points)
6. What are the key benefits of job costing and performance management system? (3 points)

Test II: say true or false

1. Response to pest problems must be timely, **consistent**, and effective.

Test III: Choose the correct answers.

2. From the following listed below one is not Conditional response by pest control staff to pest problems.
   A. Sighting of large numbers of nonthreatening bugs
   B. Potential physical harm to students or staff
   C. Potential for food contamination
   D. All
   E. None

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

Information Sheet 3. Allocating employees or contracted personnel.

3.1. **Allocate employees or contracted personnel**

Some district pest managers prefer to use contractors in order to strengthen both district and personal protection against potential litigation involving pesticide use. Contracting in effect transfers pesticide regulatory compliance and pesticide use documentation efforts (though not responsibility) to the contractor. Certain districts have experienced considerable improvement in both these areas as a result of contracting. Another reason cited for preferring contracted services is improved credibility with the public -- school district staff are not associated with pesticide application and any negative images the public may have of applicators by providing effective pest management in a caring, safe, and reliable manner. Employment opportunities may be found in customer service, sales, management, carpenters, and field service departments.

1. Customer Service

Greet and help customers, candidates, and other visitors to office. Answer telephones, forward calls and/or relay messages to appropriate persons. Provide administrative support to management, sales, and service; type letters, proposals, and memos, enter data, print reports, and maintain files and records. Enter notes about important customer comments, needs, and interactions in computer database. Process incoming mail and distribute to appropriate persons, prepare, and drop off outgoing mail and other shipments. Schedule new and current customers for service when needed. Create new customer accounts when needed. Explain company services to prospective customers and close sales. Make collection calls to customers when needed. Process and post customer payments when needed.

2. Management

Determine staffing needs, recruit high quality talent, and effectively match people with jobs. Monitor service team, hold employees accountable for results, and address variances from company policies and procedures. Observe and appraise performance of direct reports, recognize accomplishments, and offer instruction and coaching as

needed. Provide initial and on-going training to service team, ensure all service team members complete training as required. Visit customers to check quality and satisfaction, uncover issues with service, and identify opportunities to improve. Monitor vehicle operation and maintenance, and address variances from company requirements; oversee equipment inventory. Support sales representatives, make joint sales calls, monitor sales activities and opportunities, and encourage cooperation between sales and service. Plan and direct technician routing and scheduling, regularly review service reports, and act as necessary to ensure work is complete, accurate and on-time. Monitor revenue and expenses against budget, and take action as needed to address variances.

3. **Sales**

Cultivate and maintain referral network. Use own initiative, influence, and creativity to generate leads. Maintain accurate and complete records of sales activities and opportunities. Prepare action plans and schedule to achieve sales goals. Conduct inspections for pests at client locations and prepare reports. Prepare presentations, proposals, and sales contracts. Present and sell company services to current and potential customers. Participate in sales and marketing events (e.g., trade shows, card shuffles). Follow up with new customers to ensure satisfaction and build relationship. Coordinate efforts of co-workers as needed to close and start new customers.

4. **Technician**

Perform inspections for pests, pest harborages, and pest entry ways. Determine, recommend, and provide required pest management services. Inform customers on how to reduce pest pressures through proper sanitation, storage, and landscaping. Prepare written reports for customers, and explain services provided when possible. Operate and maintain service vehicle, and other service

Self-check 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test1. Give short answers. 205

1. List the essential elements needed by the plants? (3pts)
2. Discuss the employee opportunity? (3pts)
3. Why allocates employees? (3 points)

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

4.1. Procuring plants, Machinery, and Equipment activities

Selection of tools, equipment, and machinery

Plant protection equipment's use to control various types of crop pests, like weeds, insects and diseases, herbicides, pesticide, and fungicide s are applied .it is there for necessary to select the most efficient equipment's for securing uniform application on target into least time have the minimum labor without any wastage of materials. The tools, equipment and machinery including:

1. Standard tools gardening implements such as garden fork, machete, hoe, shovels and knives, handsaw.
2. Mechanized and manually operated spray equipment's such as knapsack sprayer, motorized sprayer), Granule's applicators and cultivation cultivators, such as field cultivators, rotary hoes, finger weeders.
3. Tractor and trailed equipment may be required.
4. Identify and monitoring equipment's for the implementation of an integrated pest management program may include **microscope, Insect traps light, insect nets, magnify glass, soil, fertilizer and plant tissue test kits, sampling equipment, measure cylinder, Ladders, GPS, GIS.**

Equipment and containers should be made of non-toxic materials, capable of being disassembled to allow proper maintenance, cleaning and inspections.

Equipment should be placed away from the walls to facilitate cleaning and maintenance and to prevent pest infestation.

Equipment designed to achieve and control specific process conditions such as temperature, humidity and air flow should be provided with appropriate metering devices and their accuracy checked regularly. These requirements are intended to ensure that: equipment should be designed to allow essential temperatures, humidity, pressure, and mixing conditions to be monitored and controlled. Any controls implemented should ensure that:

- Equipment that necessarily used for pest control can be efficiently achieved and maintained.
- Calibration methods and frequencies should comply with manufacturers' recommendations for all equipment monitoring and or controlling devices that may have an impact on feed safety.
- Calibration of equipment should be performed by appropriately trained personnel.

Selection of suitable safety equipment and personal protective equipment

Personal protective equipment's: Dermal exposures account for 97 percent of all handler exposures that occur during liquid spray application. Thus, the primary purpose of wearing protective clothing is to prevent pesticides from coming into contact with the skin. Anybody covering will provide some protection, because dermal absorption is reduced to some degree by a fabric barrier. Protective clothing may be classified according to the part of the body it protects, i.e., feet (boots and shoes), hands (gloves), eyes (goggles and face shields), head (hats and hoods), and trunk and arms and/or legs (jackets, shirts, pants, coveralls, overalls, and raincoats). Because of its comfort, conventional work clothing is worn most often.

Lightweight synthetic garments may provide adequate protection from dry pesticides and may be used for spray application when laminated with a plastic coating.

Cleaning/laundering recommendations:

1.Cotton or denim fabric: Clothing exposed to pesticides should be laundered daily. It is much easier to remove pesticides from clothing by daily laundering than attempting to remove residues that have accumulated over a period of time. And wash contaminated clothing separately from the family wash. Pesticide residues may be transferred from contaminated clothing to other clothing in a hamper when they are laundered together.

2. Vinyl-coated fabric, neoprene, or rubber: This type of outer protective clothing should be pan-washed in warm water using a good detergent. Double or triple washing of heavily contaminated outer protective clothing is desirable. Rinse through two water

changes and hang up to air dry. Outer protective clothing should be washed after each use.

3. Gloves and boots should be rinsed before taking them off, then pan-washed inside and out using a good detergent with several rinses. Remember, gloves must be clean inside because they will be in contact with your skin. Wash rubber boots the same as gloves.

4. Respirators require special care. Wash inside with a cloth, detergent, and warm water. Change filters according to instructions on the original container. Keep the respirator in a plastic bag, original container, or some other suitable container when it is not being used. Keep the respirator properly adjusted to your face. Filters and pre-filters should be kept sealed in a plastic bag when not in use.

5. Goggles should be washed with a mild detergent so as not to scratch the lens.

Give all of your protective clothing and equipment the best of care. They may save your life.

Self-check 4	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test:1.

1. What are the types of Plant protection equipment's?
2. What is the difference between manual and mechanical operated spray equipment's.?
3. Why should equipment's be placed away from walls? (5pts)
4. What should equipment's be made of no toxic equipment? (5pts)
5. Any control should ensure? (5point)

Test:2.

1. From the types of personal protections, one requires special care to use.
   A. Gloves
   B. Respirators
   C. Google
   D. Boots
2. Mechanized and manually operated spray equipment's such as knapsack sprayer, motorized sprayer), Granule's applicators and cultivation cultivators, such as field cultivators, rotary hoes, finger weeders.

Test.3. True or Folse

1. Motorized knapsack sprays are the types of manually operated equipment's?

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

Information Sheet 5- Consulting relevant stakeholders

5.1. Consulting relevant stakeholders

Forty-five days prior to completing the Pest Management Plan and submitting a pesticide use notice to the Ministry of Environment, Painted Pony will publish the first of 2 notices, which will be published in a 2-week period in the local newspaper. Painted Pony Energy's local Production Team and Painted Pony representatives will undertake appropriate consultation with local First Nations as well as the general public and follow up on any questions or concerns that may arise.

Concerns and comments resulting from the consultation process will be resolved and documented. At this point the final Pest Management Plan will be completed with all consultation concerns and comments addressed and reflected in the plan. A pesticide use notice will then be submitted to the Ministry of Environment indicating completion of consultation and the final Pest Management Plan.

Once confirmation of receipt of pesticide use notice is received from the Ministry of Environment, Painted Pony will submit an annual notice of intended pesticide use to the Ministry of Environment at least 21 days prior to use of pesticides. Other parties will be notified as required for annual use of pesticides and signs will be posted as required. Records will be maintained, and an annual summary of pesticide use will be submitted to the Ministry of Environment as required. Painted Pony Energy Ltd. is committed to working with stakeholders and the public to ensure that environmentally sound and safe practices are achieved at all times. Through this consultation process stakeholders and the public have the opportunity to provide input into the Pest Management Plan

What are Stakeholders?

Stakeholders are groups who have an interest in an organization's work, and to whom the organization has an ethical duty. Association stakeholders include members, employees, related organizations, potential partners, suppliers, the public, regulatory bodies, and the government. Not-for-profits and the voluntary sector may also add clients, community groups, community leaders, volunteers, funders, and donors to this

list while in the business world; customers and owners are also included as key stakeholders.

Whether your organization is working on a strategic plan, policy development, or creating a new program, consulting with key stakeholders is an important factor in achieving ultimate success. Here are some benefits of reaching out to stakeholders through surveys, one-on-one meetings, and multi-stakeholder consultations.

General guidelines for consulting Stakeholders on pesticide safety

- Before using any pesticide always read the Label! Only use pesticides when necessary. Before using any pesticide product, always read the label, as it is a legal document. The label provides information on which pests can be controlled, on which crops the pesticide can be used, and the recommended rates and times of application. Any “off-label” use is a violation of both federal and state laws. Correct use of pesticides is essential to protect human, animal, and plant health as well as to protect the environment. Additionally, proper use will ensure chemical residues on crops and animals do not exceed legal limits (tolerances). Key words on all pesticide labels identify the toxicity of the product: DANGER POISON (highly toxic), WARNING (moderately toxic), and CAUTION (slightly toxic).
- Become familiar with current federal and state pesticide laws and regulations.
- Follow all safety precautions on the label.
- Wear protective clothing and use protective equipment (both are referred to as “PPE”) according to instructions on the pesticide label. Minimum clothing requires long pants, long-sleeved shirt, socks, and shoes. In addition, one should ideally wear chemically resistant gloves (nitrile, butyl, or neoprene) and unlined, rubber boots.
- Be careful when handling pesticide materials to avoid spilling on skin or clothing.
  - ✓ Never eat, drink, smoke, or use tobacco products while applying pesticides.

- ✓ When selecting pesticides, consider type of formulation and the application equipment required.
- ✓ Avoid drift to non-target areas, which may endanger other plants or animals. Dusts drift more than sprays, and air blast sprayers create more drift than boom sprayers.
- ✓ For record-keeping requirements, record the date, time, location, amount of each pesticide used, and any other required information as soon as possible.
- ✓ Bath or shower in hot, soapy water after applying pesticides.
- ✓ Wash clothing worn while applying pesticides separate from other laundry, in hot, soapy water. Contaminated clothing must be handled with the same precautions as the pesticide itself.

Self-check 5	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test 1. Give short answers. 20%

1. What are the types of safety precautions on the label while using pesticides?
2. Discuss the general guidelines for consulting Stakeholders on pesticide safety
3. What is stakeholder? (5 pts)
4. Why should stakeholders be consulted? (5 pts)
5. What is the benefit of consulting stake holders? (5 point)

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

Information Sheet 6- Applying the relevant OHS standards and legislation and regulations

6.1. Applying the relevant OHS standards

Identifying OHS hazard involves finding all of the foreseeable hazards and understanding the possible harm that the hazards may cause. the occupational health and safety hazards may include Chemicals and hazardous substances, Manual handling, operating machinery tools and equipment, Noise, Dust, Solar radiation, fall and tripping.

Assess risks means a process for developing knowledge and understanding about hazards and risks, so that sound decisions can be taken about control. such as the chemical risks that may be assessed include spillage, contact of chemical with skin or eyes, accidental ingestion, incorrect concentrations in mixtures, faulty or inappropriate storage containers, incorrectly calibrated equipment, spray drift, contamination of waterways, incorrect disposal of unused chemicals or faulty equipment. Once the chemical risks are assessed the control measure should be taken. Meanwhile many employers are not aware of the hazards associated with toxic chemicals and often do not know how to dispose of chemical wastes safely. As a result, these employers often simply “dump” waste chemicals into the environment. The Effects of chemicals on the environment state as following:

1. Effect on drinking water source and cultivate soil. Convenient dumping grounds are the ocean, rivers, lakes, fields, roadsides, etc. Toxic chemicals which are improperly disposed of may eventually end up in your drinking water, in the places where your children play, in the soil where your food is grown, etc. Your home “environment” can be exposed to the chemicals in your workplace, too.

2. Effect on live place. Your family can be exposed to your workplace hazards if you bring chemicals or other workplace contaminants home with you on your clothes, hair, or skin. Therefore, it is not advisable to take workplace hazards home with you.

3. Effect on food. If employers don’t follow on the preharvest interval and dosage application on the label or exceed used dosage will cause some chemical residue content over the limitation.

4. Effect on the pets, fish, and wildlife in habit. All agrichemicals pose a potential risk for causing adverse environmental effects. Commercial herbicide use generally has negative impacts on bird populations, due to habitat changes, the herbicides decrease the abundance of many types of vegetation which the birds rely on.

Risk control requirements. Always following the manufacturers' instructions for storage, transport, use and disposal; Safe application techniques, Safe use and maintenance of personal protective equipment, iv)Safe wash down procedures, Safe procedures for container rinsing and management, using a safer form of the product, Keeping all chemicals locked away and out of reach of children and wear appropriate protective gear.

The main required tasks of an Occupational Health and Safety Practitioner include:

- Systematic evaluations of the working environment
- Endorsing preventative measures which eliminate reasons for illnesses in the workplace
- Giving information in the subject of employees' health
- Giving information on occupational hygiene, ergonomics and also environmental and safety risks in the workplace.

Risk assessment should:

- Identify the hazards
- Identify all affected by the hazard and how
- Evaluate the risk
- Identify and prioritize appropriate control measures

6.2. legislation

The countries which have pesticide legislation implemented on the basis of the FAO/WHO International Code of Conduct on Pesticide Management. The Code of Conduct provides standards of conduct as well as guidance for all public and private entities engaged in or associated with the management of pesticides. In particular, as

outlined in the Guidelines on Legislation, it is especially useful for countries where inadequate, outdated or even no national legislation to regulate pesticides is available.

Legend:

Green color: means there is legislation effective in the country whereas inactive

Red color: stands for no legislation has been implemented yet.

Grey color: means there is no information available from the country. Colors used are illustrative

6.3. Regulations

Regulate pesticides under broad authority granted in two major statutes, the Federal Insecticide, Fungicide, and Rodenticide Act and the Federal Food, Drug, and Cosmetic Act. These laws have been amended by the Pesticide Registration Improvement Act.

- **The Federal Insecticide, Fungicide, and Rodenticide Act**
  - ✓ Requires all pesticides sold or distributed in the United States (including imported pesticides) to be registered by EPA.
  - ✓ Registration is based on evaluation of scientific data and assessment of risks and benefits of a product's use.
  - ✓ Label directions control how products are used.
  - ✓ Authorize limited use of unregistered pesticides or pesticides registered for other uses to address emergencies and special local needs.
  - ✓ Suspend or cancel a product's registration.
  - ✓ Training is required for workers in pesticide-treated areas and certification and training for applicators of restricted use pesticides.
- **The Federal Food, Drug, and Cosmetic Act.**

Requires us to set pesticide tolerances for all pesticides used in or on food or in a manner that will result in a residue in or on food or animal feed. A tolerance is the maximum permissible level for pesticide residues allowed in or on human food and animal feed.

  - ✓ Includes strong provisions for protecting infants and children, as well as other sensitive subpopulations.
  - ✓ Provides for exemption from the requirement for a tolerance.

Self-check 5	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test 1. Give short answers. 20%

1. What is Risk control requirements**?**
2. What is risk assessment?
3. Why do you care about OHS? (3pts)
4. Risk assessment should contain. (3pts)
5. What is the knowledge's required by OHS professionals? (3 point)
6. What are the main required tasks' of OHS? (3 points)

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

Information Sheet 7- Aligning milestone to critical control points

7.1. Alignment of critical points in the activities

Integrated Pest Management programs are designed to prevent pest problems whenever possible. This is done through monitoring, regular inspections, high standards of sanitation and pest-proofing measures, and modification of environmental conditions conducive to pest problems.

The district/facility will establish periodic inspection, monitoring and reporting procedures. All personnel involved in these activities will be informed and trained to perform specific roles within the IPM program. Forms will be provided by the district/facility to aid staff and pest professionals in performing and recording actions.

The district/facility will establish pest tolerance thresholds and response times for common pests. These thresholds will serve as indicators for the implementation of active control measures. Control measures will not be undertaken if pest damage or populations are below threshold levels unless special circumstances necessitate reduction of a pest population. In such cases a review of the tolerance thresholds will be conducted.

When pests exceed tolerance thresholds, non-chemical pest control measures and IPM strategies as described in the IPM pest outlines will be practiced and action will occur within the specified response time.

Pesticides will be used when appropriate, along with other management practices, when other pest prevention and non-chemical control measures have failed to reduce pests below tolerance thresholds. When a pesticide must be used, products that are the least harmful to human health and the environment will be used.

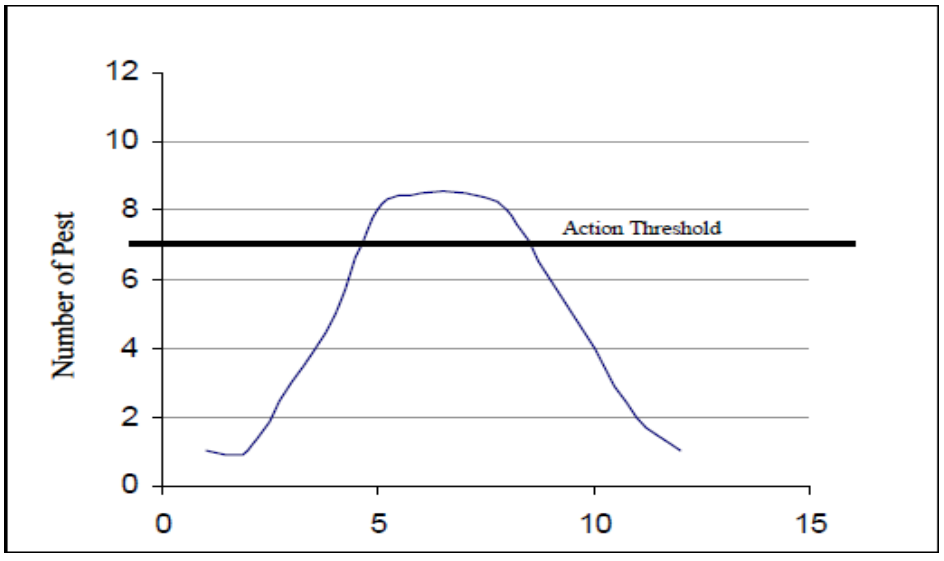
Pesticides will be used only in containerized baits, or for spot treatments targeting insect infestations or problem areas where a minimal amount of material can be used. Routine spraying for pests is prohibited. Rodent baits shall not be used unless in tamper-resistant bait boxes. Bait boxes shall be inaccessible to children and secured when appropriate. Routine general spraying of non-target pests is prohibited.

All pesticide applications must be approved by the IPM coordinator prior to application. All notification requirements will be met before the pesticide application. The application of pesticides is subject to the Federal Insecticide, Fungicide, and Rodenticide regulations, Occupational Safety and Health Administration regulations, and state and local regulations.

Follow-up inspections and monitoring will be performed to determine the effectiveness of the IPM strategies applied. The IPM coordinator will continually update the IPM plan with the knowledge gained from the follow-up inspections.

The IPM plan will be reviewed annually to ensure all activities that take place in the facility are addressed and that current

Risk control requirements. Always following the manufacturers' instructions for storage, transport, use and disposal; Safe application techniques, Safe use and maintenance of personal protective equipment, iv)Safe wash down procedures, Safe procedures for container rinsing and management, using a safer form of the product, keeping all chemicals locked away and out of reach of children and wear appropriate protective gear.



Custom recommendations, including an explanation of the benefits, should be based on the evaluation of available data obtained through inspecting, identifying, and monitoring. Determining tolerance or action thresholds along with response times is one of the keys to a successful IPM program.

7.2. What is the pest life cycle?

A pest's life cycle is the time it takes for an egg to grow, mature, and produce new eggs. Most insects follow three definite stages in their life cycle: **Growth, Maturation, and Reproduction**. Once an egg is laid, it goes through a growth stage.

7.2.1. GROWTH

Once an egg is laid, it goes through a growth stage. Pests that have a shorter life expectancy typically experience rapid growth from egg to reproducing organism. Mice are a good example of this. Some insect populations have multiple, distinct intervals within the growth stage, such as Black Widow spiders. Black widows go through a nymph stage after hatching, prior to becoming a juvenile, and then finally a fully mature adult. During the growth stage, pests are at their most vulnerable to predators, but can be more difficult to target for pest control.

7.2.2. MATURATION

After initial growth, many insects will experience a juvenile stage. This can be a rapid process of only a couple of weeks to a 2–3-month period. These sub-adults may have some of the features of adults of their species, but typically they look physically different (whether it be size or coloring) and most importantly they lack sexual maturity. External factors, such as a drought (like we are experiencing from Newcastle to El Dorado Hills) can also speed up the process. You may have noticed this summer that there are an awful lot of spiders hanging around.

7.2.3. REPRODUCTION

The successful completion of a pest's life cycle ends in their full maturity and the production of offspring. Many pests reach the end of their life cycle when they reproduce. Some pests will produce multiple generations of offspring over several years, such as the Wolf spider, increasing their bloodline's chances of survival. This is all the more reason to control your local pest population as they can and will grow exponentially.

Self-check 7	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

1. What is action threshold? (3pts)
2. When should you start controlling pests? (3pts)
3. What is the difference between action and tolerance threshold? (3pts)
4. What will happen if control is not implemented when the pest population reaches action threshold? (3pts)

Information Sheet 8- Determining measurable performance criteria in the activities

8.1. Measurable performance criteria

Identify pests and associated problems and damage.

- Monitor infestation levels and keep records.
- Be aware that pest management can involve changing human habits that encourage pests through cultural/sanitation control methods as well as mechanical/physical Biological or other methods.
- Know how to minimize pesticide use as well as exposure to humans and other non-target organisms.
- Know the hazards of pesticides and safety precautions for storing, mixing, and applying pesticides.
- Be familiar with the pesticide label's precautionary statements pertaining to exposure to humans and other non-target organisms.

Integrated pest management (IPM) requires

Definitions

- **Cultural control** is the non-chemical management of pests using manual or mechanical means to change the soil and crop environment to discourage pest establishment.
- **Biological control** is where predatory or parasitic insects and mites known as 'beneficials' or 'good bugs' help to control chewing and sucking insects that affect the quality and productivity of crops by killing them or disrupting their breeding cycle.
- **Chemical control** involves the use of pesticides in the management of pests. It is used in IPM when biological and cultural control has not been enough to protect the productivity of the crop. Where chemical control is required, selective insecticides are chosen which target the pest, leaving the beneficial population unharmed.
  - ✓ Monitoring activities for the presence and abundance of pests within the grove.

- ✓ Determining whether pest population densities are high enough to cause economic loss.
- ✓ Selection of a profitable, worker safe and environmentally compatible management option.

Pesticide application should only be considered after the results of monitoring activities have been completed, and other potential causes of tree or grove decline are also evaluated and corrected. In addition, a truly integrated strategy requires consideration of pesticide selection, when the choice exists, prior to application.

Pesticide selection should not be based only on cost effectiveness, but also on toxicity to non-target species, product solubility, persistence, leaching potential, irrigation schedule, soil type, and other site characteristics. Various sources of information are available for characterizing specific soil types and irrigation schedules for predicting and minimizing movement and leaching potential of most citrus agrochemicals.

The timing for application of most pest management/crop production chemicals should be entirely dependent upon pest population biology, abundance, and tree growth periods, and not on the calendar. In some instances, pests may require treatment during times when rainfall can be expected, but application should be delayed if heavy rainfall is imminent, and subsequent irrigations adjusted to account for rainfall amounts.

Cultural practices that promote excessive vegetative growth, such as over-watering and excessive nitrogen fertilization, can intensify some pest problems and should be avoided in the control of some plant diseases (i.e., Alternaria brown spot). Under-canopy weed growth may reduce pesticide effectiveness by interception or absorption of pesticide residues targeted for citrus roots or pests in soil. Under-canopy weeds also interfere with micro-sprinkler operation and prevent uniform coverage of emigrated compounds. At the individual tree level, excessive irrigation coupled with unmanaged weed growth can promote localized deep soil penetration of soil-applied pesticides or fertilizers resulting in groundwater contamination

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

1. Why is necessary to check weather conditions before spray? (3pts)
2. Why IPM does require monitoring activities for the abundance of pests?
3. Pesticide selection should be based on. (3pts)
4. Why it is that pesticide is applied according to the labels? (3 point)
5. Describe the IPM measures? How? (3 points)

Information Sheet 9- Listing activities required to achieve objectives

9.1. Achieving objectives in the activities

Pest management objectives, by necessity, will differ from site to site and these differences need to be considered before setting action thresholds. For example, with buildings or structures, the objective may be to minimize structural damage from termites. For ornamental gardens, the objective might be to maintain aesthetic value, while for a sporting field; it may be to maintain a specific playing surface. The objectives of the IPM program are:

- Manage pests found on local areas to prevent interference with the crop productivity
- Prevent injury to humans
- Prevent pests from spreading in the community or to plant and animal populations beyond the site; and **provide *a safe and healthy environment***

Whenever you try to control a pest you will want to achieve one of these three goals. or some combination of them:

- ✓ prevention - keeping a pest from becoming a problem.
- ✓ suppression - reducing pest numbers or damage to an acceptable level, and .
- ✓ eradication - destroying an entire pest population.

A pesticide can kill or control pests in 4 ways. Click each mode of transmission on the diagram below to find out more.

Modes of pesticide transmission:

- **Contact** - the pesticide must come into contact and penetrate the pest. This can happen by droplets landing on the pest or the pest walking or crawling on the substance.
- **Stomach poison** - The insect needs to ingest the poison.

- **Non-systemic** - the pesticide is absorbed by the plant but is not transferred into its vascular system. Animals are affected by eating the plant parts that have been contacted by the pesticide.
- **Systemic** - the pesticide is absorbed and carried around the plant by the vascular system and the animal eats the plant parts. These pesticides are useful when:

    - ✓ plants have thick foliage
    - ✓ when rain or watering may wash the pesticide off and reduce its effectiveness
    - ✓ or when the pest may have a protective covering or be difficult to see.

Self-check 9	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

Test 2. True/Folse

1. The objectives of pest management activities are different from place to place.

Test1. Give short answers.

1. Describe the objectives of the IPM program
2. Differentiate pest control and pest managements?
3. List 3 categories of pesticide? (3pts)
4. Which chemical would you use to control nematodes? (3pts)
5. List the modes of chemical control? (3 pts)
6. If the pest is difficult to spot which mode of action would you use? (3 points)
7. What is the need of IPM if you can control pests by chemical? (5 points)

Note: Satisfactory rating - 20 points Unsatisfactory – below 20 points

You can ask you teacher for the copy of the correct answers.

Information Sheet 10- selecting and scheduling activities

10.1. selecting and scheduling activities

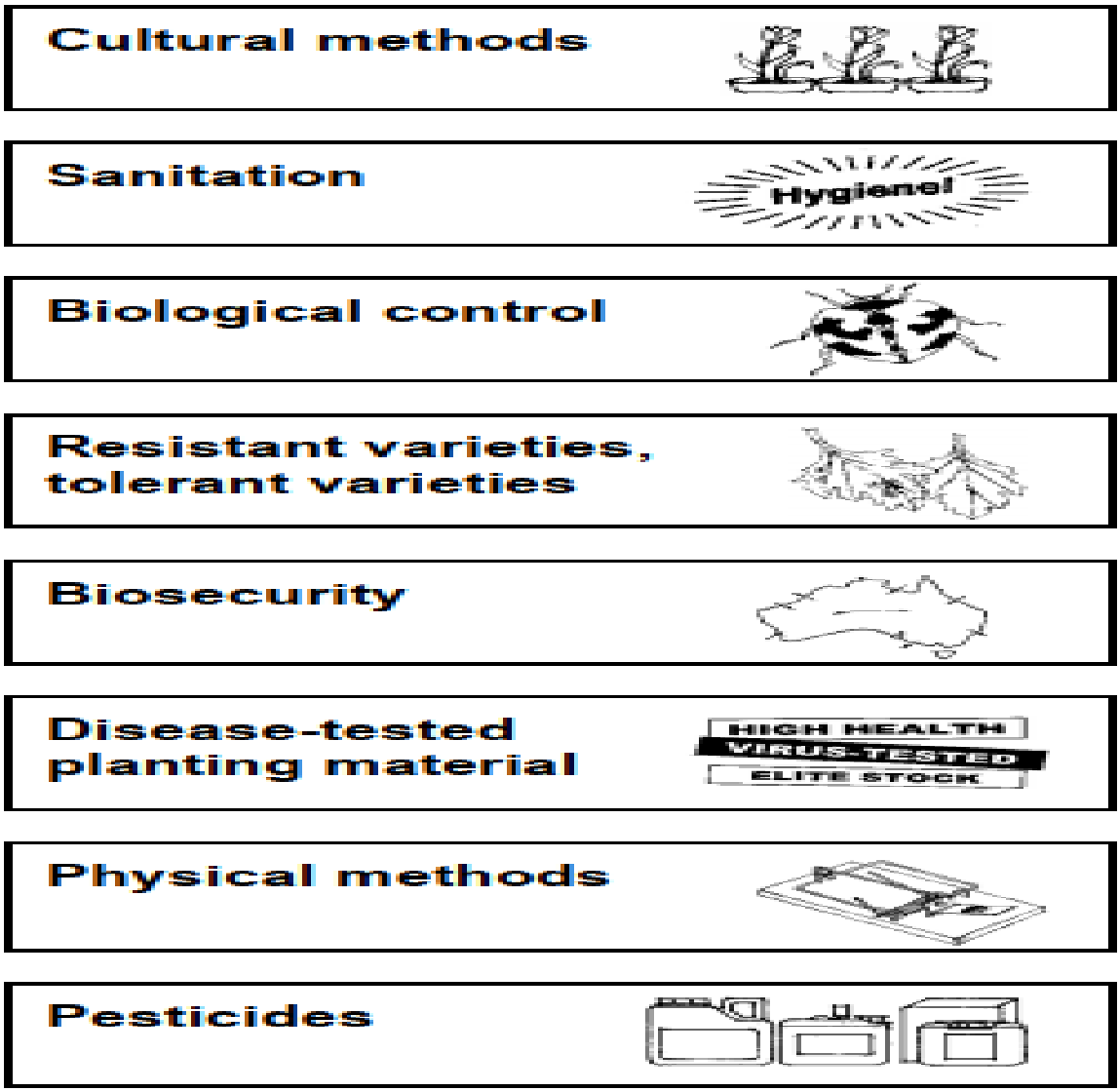
Pest control methods include cultural control, biological control, mechanical control, chemical control.

Cultural control means to reduce the numbers of pests with cultural practices. These practices alter the environment, the condition of the host plant, or the behavior of the pest to prevent or suppress an infestation. They disrupt the normal relationship between the pest and the host plant and make the pest less likely to survive, grow, or reproduce. Control by manage the crop for a vigorous, healthy stand that is better able to withstand pests, By Choose pest-resistant varieties, By Use rotations to reduce or eliminate the conditions the pest needs to thrive, Varying planting and harvest dates can help to prevent certain pest problems, and by eliminate materials or places where pests live and reproduce, this do by purchasing clean treated seed, Cleaning all tillage, seeding and harvesting equipment between fields, Removing contaminated crop residue, Removing nearby plant species that can act as alternate hosts for diseases or insects, such as Use trap strips to draw the pest's attention away from the crop. If possible, leave strips of forage or hay crop standing when harvesting (called strip harvesting). This will prevent the migration of pests to another field, preserve natural enemies of pests and improve snow management.

Biological control can be defined as the control or regulation of pest population by natural enemies. Groups of natural enemies include predator: an organism that lives by preying on animals (prey), Such as ladybird and lacewings feed on aphids, birds feed on insects. Parasites: are species whose immature stage develops on or within a single insect host, ultimately killing the host. Many species of wasps and some flies are parasitoids. Pathogens: are disease-causing organisms including bacteria, fungi, and

viruses. They kill or debilitate their host and are relatively specific to certain insect groups. For example, *Bacillus thuringiensis.* Approaches of biological control:

Pest Control methods



1. Conservation involves preserving and/or enhancing natural enemies that are already present in the environment.
2. Introduction. Use an introduced agent (insect, pathogen) to control the pest. Involve importing and releasing exotic (non-indigenous) natural enemies against foreign and native pests. Introduced pest has to be established in sufficient numbers to be effective.

3. Avoid pesticides that will kill the introduced agent.
4. **Mechanical control** means physically excluding pests from areas where they are not wanted. Mowing, tilling, grazing and hand pulling can be used to control weeds. Silage weedy fields to stop the weeds from going to seeds, or traps, screens, barriers, fences, nets, radiation, and electricity to prevent the spread of pests into an area.
5. **Chemical control** means to control pests by pesticides. Pesticides are chemicals used to destroy pests, control their activity, or prevent them from causing damage. Repellant and growth regulator or remove foliage also are classified as pesticides. Pesticides are generally the fastest way to control pests. In many instances, they are the only tactic available. But the disadvantage is developing resistance of pest to chemical, destroy natural enemies, have contamination and hazard. Select and apply pesticides according to label instructions to minimize harmful effects on non-target species and to reduce environmental hazards.
6. **Pesticides application:** Producers have the legal right to apply pesticides on their property provided that the pesticide application does not contravene any bylaws, regulations, or generally accepted practices. Producers have the legal responsibility to ensure that any pesticide application performed on their property does not cause harm to adjacent properties or people. When use custom applicators, ensure that applicators are certified. Also ensure that the applicator is aware of potential hazards in advance of an application. If pesticides are part of your integrated pest management plan, follow these practices:

1. Deciding if pesticides are needed. Use timely and regular field scouting to accurately assess your pest problems and to assess economic threshold levels, so you can apply pesticides only when they are need.

2. Determining application rates. Apply pesticides according to the label instructions. Avoid over application.

3. Selecting pesticides. Do not use persistent herbicides on flood-prone or sandy soils. Rotate chemical groups to prevent the development of resistant pest populations. Minimizing.

4. Transport of pesticides off the field. Reduce movement of pesticides attached to soil particles through measures that control wind and water soil erosion such as maintaining a crop residue cover, growing shelterbelts and establishing grassed waterways. Leave wide buffer zones around environmentally sensitive areas, including streams, rivers, wells and dugouts. As a minimum, these zones should meet all buffer width regulations. Avoid irrigating soon after a pesticide application. Check the product label for details. Avoid applying pesticides if rain is expected soon. Do not wash spray equipment in a water body or move this equipment through a water body.

5. Reducing spray drift. Reduce sprayer travel speed, lower the boom, use shrouds and/or use a properly adjusted air assist to reduce the risk of spray drift. Increase droplet size to reduce spray drift. Use spray nozzles that deliver a larger droplet size, lower the spray boom, and avoid spraying in high temperatures or low relative humidity. Create less drift-prone sprays by reducing pressure, increasing carrier volume, using low drift nozzles or using a drift-reducing adjuvant. Stop application when wind speeds are above 16 to 20 km/h. Check pesticide labels for wind speed limits to avoid spray drift. If you must spray near environmentally sensitive areas, such as water sources, neighbors' yards and shelterbelts, spray when the wind is blowing away from them. Use a buffer zone to capture the major portion of drifted droplets to minimize risk to adjacent areas. Avoid spraying during a temperature inversion (see Pesticide Drift). Avoid spraying volatile products on or just before hot days to decrease vapor drift.

6. Trap strips. Trap strips are strips of crops grown around the main crop to draw insects away from the main crop. The pest can be more easily controlled while it is contained in a concentrated strip. Typically the timing of the trap crop's growth cycle is somewhat different from that of the main crop. For example, a strip of Polish canola can be seeded around the outside of an Argentine canola crop to control cabbage seedpod weevils. Polish canola blooms earlier so its flowers attract the weevils to the trap strip.

After preventive strategies are in place, the IPM coordinator is responsible for monitoring the facility for potential pest problems.

Monitoring should include

- walk-through visual inspections,
- monitoring traps,
- interviews with staff and occupants, and
- Reviewing pest sighting logs.

Proper monitoring allows an IPM program to be proactive in controlling pests rather than rushed.

Self-check 10	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

Test1. Give short answers.

1. List pest control measures?
2. Differentiate pest control and pest managements?
3. What is the importance of monitoring? (3pts)
4. What should monitoring include? (3pts)
5. What is the need of knowing the cause of infestation if it is controlled? (3 point)
6. What is the benefit of updating control strategy? (3 points)

Information Sheet 11- Selecting and Scheduling Monitoring and measurement activities

11.1. Monitoring and measurement activities for vertebrate and invertebrate pests

Timely monitoring of pests and beneficial organisms, pest damage, and environmental conditions. Monitoring pest populations gives information needed to decide if and when to apply a pesticide for optimal effectiveness. Knowing what and when beneficial organisms are present is useful to time pesticide application to minimize impact on the beneficial organisms. Pest and disease development models use environmental (weather) information to determine what life stage(s) of a pest is present or if plants are at risk of disease infection. This information is useful in timing pest monitoring and management activities.

Vertebrate Pest

All vertebrate animals have a jointed spinal column (vertebrae). These "higher" animal fish, amphibians, reptiles, birds, and mammals. What may be a pest under some circumstances may be highly desirable under others? Your first job in controlling vertebrate pests is to determine if they are actually causing damage.

Fish of certain species may be considered pests by some because they are not useful for sport or for food or because they are harmful to more desirable species. Some fish may be a human health hazard because they serve as intermediate hosts for parasites of humans.

Reptiles and amphibians include snakes, lizards, turtles, frogs, toads, and salamanders. These animals cause more of a psychological problem than an economic one. But snakes and turtles in fish hatcheries or waterfowl production areas can cause some economic problems. Poisonous snakes may be a problem, too, but there are only two poisonous species in Minnesota, both restricted to the southeast corner of the state.

Birds can cause various kinds of damage: structural damage by woodpeckers; killing of fish, livestock, poultry, or game species; and destruction of fruit, nut, grain, timber,

and vegetable crops. Birds can also be a health hazard to animals and humans because they may be hosts for disease or organisms.

Mammals, such as pocket gophers, moles, and rats, can also cause a variety of damage. Livestock may be killed by mammals. Mammals also do significant damage to fruit, vegetable, nut, grain, range, and tree crops. They may interfere with water-retaining structures, causing flooding. They damage such things as lawns, clothing, furniture, and buildings by gnawing and burrowing. They transmit many diseases to livestock and humans, including rabies, plague, typhus, food poisoning, leptospirosis, and tularemia.

Selecting Control measures

Choose control measures that are effective, selective, humane, and cause the least possible environmental damage, such as traps, sound, or barriers.

Know the local, state, and federal regulations that apply. It is especially important to know which animals are protected by the federal and state government. Protected species include the gray wolf, bald eagle, and peregrine falcon. Two mammals considered by some as pests are the eastern spotted skunk and the woodland vole. These are classified as special concern because of their low population but are not legally protected.

Rodent pest definition: any of various mammals of the order Rodentia, such as a mouse, rat, characterized by large incisors adapted for gnawing or nibbling.

Habits

- Burrowing: efficient burrowers for building their nests.
- Sense: having a keen sense of hearing and chemical senses of smell and taste.
- Movement: determined by the availability of food, water and shelter.
- Social behavior: tending to live in groups.
- Reproduction: a huge ability to reproduce, e.g. In a single year, a female Norway rat may have five to 10 litters of usually five or six young each.
- Feeding habits: omnivorous, ranging from seeds, grain, fruit to the vegetative parts of plants.

Damages: -

- **Pre-harvest damage**: serious pest of groundnuts, sweet potatoes, yams, cassava, melons, maize, pineapple, sugarcane, rice, cocoa, and etc, both on vegetative organs and unripe fruits.
- **post-harvest damage:** serious pests of stored grains, resulting a loss of quantity and quality.
- Damage to structure: damage wooden doors and window frames which food is stored.
- **Disease hazards:** carrying many diseases transmissible to humans---causing plague, e.g., leptospirosis, rat-bite fevers.

Important rodent pest species in Ethiopia

House mouse, Mus musculus L. (hosts: sugarcane, dried stored products).
Roof rat, Rattus Rattus (coconut, banana, rice, sugarcane, dried stored products, cacao). Norway rat, Rattus norvegicus (banana, rice, sugarcane) Unstrapped grass rat Arvicanthis abyssinicus (grass crops) Root rat Tachyoreytes splendens (crop root)

Rodent control methods

- Keep the storage area clean the rubbish and sundries around the storage area should be cleaned.
- Closing holes leading to stores by using wire mesh Preventing them entering into the stores.
- Scaring: By knocking gong and drum, lighting firecrackers to scare them.
- Plant non-attractive plant cultivars
- Attack at nest and roosting area Bunging the hole with stones, filling the hole with water.
- Using chemicals the rodenticides include diphacinone, warfarin, bromadiolone, zinc phosphide etc. Eg. Bromadiolone
- Rate: bromadiolone: water: grain = 1: 15: 100

- Eg: Leach 0.5% Bromadiolone 0.1 kg in 1.5 kg cool water, soak 10kg grains in this solution for 24 hours, then let the grains dry. That is rodent poison bait. Apply this bait near the nest after 4.pm before dark.
- **Biologic methods**
  - ✓ Protecting the natural enemies of the rodents' Natural predators such as owl, yellow weasel, fox, eagle, snakes and the trained dog, cat.
  - ✓ Controlled by microbe Some viruses or bacteria have been found to control rodents.

Self-check 11	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: give short answer

1. What are the important rodent pests in Ethiopia?
2. Explain how rodent pest damage the crop?
3. write parts of good IPM program?

Note: **Satisfactory rating - 12 points** **Unsatisfactory – below 12 points**

You can ask you teacher for the copy of the correct answers.

Operation Sheet 1- estimate resources to complete pest management activity

Tools and Materials

- Notebook
- Computer
- camera
- Pen
- Pencil and ruler

Procedure

1. Brainstorm some resources
2. Search on internet some resources
3. Select the best resources that resemble to the pest management principle of your locality
4. Write and document them properly

Precaution

Do not estimate resources without knowing the pest to be controlled

Quality criteria

All the resources listed must resemble the company resources

LAP TEST	Practical Demonstration

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: You are required to perform any of the following:

Task1: identify pests.

Task2: identify equipment and machinery for controlling pest.

LG #56	LO #2-Estimate resources

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- estimating Personnel required activities.
- estimating Plant and machinery required activities.
- estimating Materials required activities.
- sourcing and coasting Personnel, plant, machinery, and materials

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, **you will be able to**:

- Personnel required to carry out activities are estimated.
- Plant and machinery required to carry out activities are estimated.
- Materials required to carry out activities are estimated.
- Personnel, plant, machinery and materials are sourced and coasted in consultation with other stakeholders.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
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6. If you earned a satisfactory evaluation proceed to “operation sheets
7. Perform “the Learning activity performance test” which is placed following “operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,

9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet 1- Estimating required personnel.

Introduction

Using equipment safely and effectively in structural pest management requires special training and an understanding of the equipment being used. Equipment should be routinely inspected and maintained. Poorly cared-for equipment in bad repair is ineffective and dangerous.

To use pesticides efficiently and economically, without under application (lack of control) or over application (unsafe), applicators must understand the capabilities of their equipment and be able to depend on correct calibration.

They must also be aware of the many types of equipment available. Sprayers, dusters, and foggers are just a few of the devices used in structural pest control.

Other less toxic pest control devices such as traps and bait stations are being used more and more frequently.

These may be used alone or in combination with other devices depending on the needs of the pest management program

2.1 Estimating required personnel

Pest control workers help to eliminate and control undesirable insects and animals. These pests include insects, rats, mice, and other rodents as well as termites, ants, and wasps. Sometimes workers are also asked to rid buildings of birds or snakes. They control or remove pests in private fields, businesses, and institutions. Pest control workers are sometimes called exterminators.

Most pest control workers are employed by firms that specialize in pest control. These may be small independent firms or branches of nationwide chains. Some workers have their own businesses. A few works for local, state, or federal government agencies. Some large institutions and firms, such as food processing companies, have their own staffs of pest control workers. Pest control work is very important in preventing disease and property damage.

Many pest control workers travel regular routes. Route workers make scheduled visits to private homes and businesses, such as restaurants and food stores. They go back to these places regularly to make sure that pests do not return. Some pests, such as cockroaches and mice, are difficult to eliminate. Workers put poison or traps in places where pests are most likely to be found. They often spray large areas to force pests out of their hiding places. They may also advise customers about ways of sealing up holes and destroying nesting and breeding areas. Termite exterminators may need to drill holes in basement floors to pump chemicals into the ground under the house. To insure that termites do not return, foundations may be raised or wood replaced. Builders may be called in for major reconstruction.

Pest control workers are often contacted to solve a particular pest problem. The first thing the workers do is look at the damaged or infested area. They try to locate nests. They may track the pests' movements to uncover their hiding places. Workers must identify what kind of pest has invaded the area. If it is a rare species, they may ask another expert to identify it.

2.2. Pest control inspection tools

- **Inspections of tools becoming a pest investigator**
  - ✓ Moisture Meter
  - ✓ Infrared Thermometer
  - ✓ Fibber-Optic Cameras
  - ✓ Drills and Hole Saws
  - ✓ Sewer Cameras
  - ✓ Motion-Sensing Cameras
  - ✓ Thermal Imaging Cameras.
  - ✓ High-Power Stereo Microscope

2.3. Equipment for applying pesticides

Regardless of how well trained and knowledgeable a pest management professional may be, effective pest management cannot be achieved unless the professional is backed up with high-quality and dependable equipment.

It is essential to know how to choose equipment best suited to each job and how to use it properly and safely to obtain the best results.

Keep in mind that there are many types of pest management equipment, and each type may have many models.

This chapter focuses only on the basic models of each equipment group. New equipment technology and improvements to existing equipment are on-going, so even well-equipped professionals need to regularly reexamine equipment to benefit by new developments. To keep up-to-date, regularly review current trade magazines and equipment brochures, attend educational

- **Sprayers**

Sprayers vary from the hand-pumped flit gun with a tank capacity of as little as one cup to large hydraulic machines powered by gasoline engines and with tanks that can hold several hundred gallons of pesticide formulation.

All sprayers have basic characteristics in common.

There is usually a tank, a device to pressurize the liquid, a delivery line leading to a valve, and another delivery line leading from the valve to a nozzle. All other items found on any sprayer, whether simple or complex, design are merely accessories and are incidental to this basic

- **Dusters**

Dusters apply a fine, dry layer of a powdery mixture containing a small amount of pesticide. Dust applied on porous surfaces is not absorbed as liquids are—it rests on them like a layer of insecticidal powder. This dust accumulates on body parts (insect hairs, legs, and mouthparts) of insects that touch it. The insect absorbs pesticides in dusts in the same way as liquid sprays. Additionally, if the pest ingests particles (when grooming or cleaning itself), the dust can also cause stomach poisoning.

- **Traps**

Traps, Bait Boxes, Monitoring Devices, and Pheromone Dispensers

Traps have been used for pest control for centuries. Rodent control traps range from snap traps to boxes that use trapdoors, spring-loaded multiple catch traps, and small

animal traps. Rodent bait boxes, or bait stations, are containers that hold poisonous baits or glue boards.

Under most conditions, they must be tamper-proof for safety. Other traps to catch pest birds are baited so the bird will enter and cannot get out. Fly traps are sticky tapes or cylinders that hang vertically, taking advantage of the fly's tendency to cling to vertical poles, strings, etc.

These are used to monitor roach populations and to survey for other insects.

Pheromone traps lure insects with a pheromone (a natural attractant) to a sticky holding surface. These traps are used to evaluate insect populations. Their catches indicate which species are present. They may also be used to control or reduce pest populations.

- **Appropriate person(s) of resources** may include:
  - ✓ clients
  - ✓ colleagues
  - ✓ managers
  - ✓ person(s) in control of work site(s)
  - ✓ Supervisors.
- **Clients may include:**
  - ✓ body corporate
  - ✓ building supervisor
  - ✓ company/organization
  - ✓ environmental health officer
  - ✓ executive housekeeper
  - ✓ maintenance manager
  - ✓ owner and so on

Self-Check. 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Teat I: Short Answer Questions

1. List the types of Pest control inspection tools?
2. Discuss types of Equipment which used for applying pesticides?

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

Information Sheet 2. - Estimating plant and machinery

2.1. Estimating plant and machinery requirement

Handle healthy plants and sterilized containers

Before handling diseased plants, contaminated pots, and other items.

Wash and disinfect hands before handling clean planting stock to reduce spread of viruses which may be transmitted on hands, eg orchid viruses and tobacco mosaic virus (TMV) on tomatoes.

In many nurseries it is now standard practice to wash and disinfect hands before commencing propagation activities.

Gloves may be worn when handling propagation materials to prevent re-infection.

Soap, nail brushes, recommended hand disinfectants and paper towels should be available.

Soap decreases the surface tension between cells of microorganisms which can have detrimental effects.

Some diseases may be spread on pruning tools.

A few diseases such as the fungal disease, Eutypa gummosis (Eutypa lata), bacterial canker (Pseudomonas syringe pv. syringae) of Prunus spp. and bacterial gall of oleander, can be spread from pruning cut to pruning cut on secateurs, budding knives and other tools. Some virus diseases may also be spread on cutting tools. If diseases are present which are spread in this way, pruning tools, as a minimum should be sterilized between each plant.

Washing. If dirty, secateurs, etc tools must be washed thoroughly prior to disinfection.

Tools may be sterilized by dipping in 70% methylated spirit, the 30% water prevents fast evaporation and reduces flammability. Alternatively, the blades may be wiped with a cloth moistened with methylated spirit.

Other disinfectants are also available, but many involve soaking the secateurs for a specified period of time. If these are used, it is important that this time be adhered to. otherwise, the sterilization process is not effective.

It may be necessary to rinse the tools with clean water after sterilization as some

disinfectants may cause plant damage.

Careful picking and handling of perishable crops and **proper hygiene** in packing sheds effectively reduces the incidence of some postharvest diseases.

Postharvest fungi may overwinter in fruit bins and packing sheds.

By washing produce, containers, bins and the walls of storage houses, the amount of inoculum and infection may be reduced or contained.

With a lower incidence of disease, there is a lower chance of resistant strains being selected.

Weed seeds may re-contaminate open-stored potting mix ingredients.

Uncleaned grain headers are a source of insect contamination entering bulk grain storages.

Crops infested with insect pests or infected with diseases may introduce these problems to storage areas.

Soil or components of potting mix must be stored under cover until used to prevent contamination by airborne weed seeds, diseases, and pests.

Soil adhering to shoes or boots

- May carry damping-off and other soilborne diseases.
- **Shoe baths** at the entrance to glasshouses and other 'clean' areas are used to disinfect
- shoes preventing spread of soil diseases to clean areas
- **Biosecurity has cleaning** protocols for boots of visitors to properties.
- Phytophthora Dieback Boot Cleaning Station. In WA dieback (Phytophthora cinnamomic)
- is one of the biggest threats to biodiversity. The Phyto Fighter 1000 is ingenious
- wash-down station which aims to stop dieback from being brought into clean areas of
- bush and forest on hikers' boots. It provides a convenient scrubbing mat and a hand powered squirt of disinfectant that cleans the walker's boots of any mud and kills the
- introduced Phytophthora dieback.

- **Other soil diseases, weed seeds and pests** can also be spread in soil attached to boots.

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Self-Check – 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Teat I: Short Answer Questions

1. List the ways of safe healthy plants and sterilized containers?
2. What are post-harvest fungi?
3. How does flashlight and hand mirror help in pest control? (3pts)
4. Mention some traps you have been familiar with? (3pts)
5. How does pheromone dispenser works? (3 point)
6. Which equipment among the listed are commonly used? (3 points)
7. What is bait? (3 points)

Test II: say true or false

1. Ecological management involves the manipulation of the food source or the physical environment.

2. During pest control knowing pest behavior is optional.

Teat III: fill the blank spaces

1. ---------- Pesticides are chemical or biochemical compounds used to kill or suppress the population of organisms deemed to be pests.

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

Information sheet 3- Estimating materials

3.1. Materials required to carry out pest management activities

We've put together a list of the top five products vital to the success of every pest controller to get the ball rolling!

- Sturdy, retractable hose reel. A hose reel is the bread and butter of most pest control spray units
- Space efficient, UV stabilised spray tanks
- Lockable storage boxes
- Reliable sprayer
- Spill Kit.

Essential Miscellaneous Pest Control Equipment and Tools

- Clippers.
- Drills.
- Razorblades.
- Scissors.
- Screws.
- Screwdrivers.
- Pole webster (with duster)

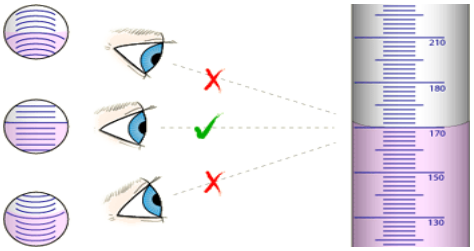
There are substantial resources available to assist growers including:

- Grower industry associations.
- Diagnostic services.
- Training is available for growers practicing organic growing, pesticide
- application and many other aspects of producing the crop.
- Consultants and product companies run workshops.

Application equipments

Measuring containers like graduated cylinders, or measuring cups, spoons and eyedroppers are often used to measure specific amounts of chemical.

Make sure the graduated cylinder is clean before use. Place the graduated cylinder on a flat surface. Pour desired amount of liquid into cylinder. Check amount against graduations on the side of the cylinder.



Some chemicals such as pellets, granules and some powders can be applied by hand. Other chemicals need to be mixed into a *slurry* to be sprayed. We use a range of different equipment to apply chemicals on the farm. These include the following:

Containers, bins, buckets, jars, and bottles are used for storing, mixing, and/ or applying chemicals.

Small vials, test tubes and sample jars are used for performing water quality tests.

Spray equipment like a backpack sprayer or a modified boom sprayer are used for spraying fungicides, herbicides, insecticides, cleaning solutions and liquid fertilizers.

Self-Check – 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: give short answer

1. list of the top five products vital to the success of every pest controller?
2. What are the essential miscellaneous Pest Control equipment and tools? List the essential elements needed to apply pesticides? (3pts)
3. How do you properly read graduating cylinder? (3pts)
4. Mention some pesticides you know? (3 point)

Test II: say true or false

1. Check that the tools are in good working order before you leave the stores.

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

Information sheet 4- Sourcing and coasting personnel, plant machinery and materials

2.2. Sourcing and coasting personnel, plant machinery and materials

Using certified plant material

Source certified disease-tested seed or transplants from reliable suppliers and inspect closely for symptoms of diseases and pests and varietal correctness. Seek advice if unsure.

Plant pests and diseases are major constraints to agricultural production and food security in developing countries. Food security means many things but includes being prepared for diseases which involves:

- Having access to germplasm collections that underpin the development of new cultivars and the pre-emptive breeding of resistant and tolerant varieties.
- Checking the availability of pest / pathogen-tested plant material, seed, etc.
- Having access to a suite of appropriate plant protection chemicals.

Six easy ways to reduce the threat of new pests entering and establishing on your farm, nursery, orchard:

- **Be aware of biosecurity threats.** Make sure workers and contractors are familiar with the most important pest threats. conduct a biosecurity induction session on your farm to explain hygiene practices for workers, equipment and vehicles.
- **Use quality, pest-free propagation material from known sources**
- Ensure all propagation material (seed, transplants, tubers, corms, bulbs, rhizomes etc) and inputs are fully tested and pest-free. Keep records (batch numbers, source, etc) and retain a sample of your farm inputs.
- **Keep it clean.** Practicing good sanitation and hygiene will help prevent the entry and movement of pests onto your property. Workers, visitors, and equipment can spread pests so make sure they are decontaminated before they enter and leave your farm.

- **Check your crop**. Monitor your crop frequently; knowing the usual crop appearance will help you recognize new or unusual pests or plant symptoms. Keep written and photographic records of all unusual observations. Constant vigilance is vital for early detection of any exotic plant pests.
- **Abide by the law** and be aware of laws and regulations established to protect your industry and other horticultural industries in your region.
- **Report anything unusual.** Immediately call the Exotic Plant Pest

✓ *If disease-tested planting material is not available or not being used, collect seed and cuttings from plants which are visually free from diseases and pests.*

Self-Check – 4	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: give short answer

1. Briefly discuss ways to reduce the threat of new pests entering and establishing on your farm, nursery, orchard:

Test II: say true or false

1. Plant pests and diseases are major constraints to agricultural production and food security in developing countries.

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

Operation sheet	Supervising employees

Objectives: to understand and practice supervising employees in pest management

Materials required:

- notebook,
- pen,
- camera,
- PPE

Procedures

1. Prepare yourself to supervise the employee
2. Prepare all materials for supervision
3. Orient your employees that you are a supervisor
4. Supervise the employees
5. Record every one's performance and rank them according to their skill on doing the activity effectively
6. Document the files
7. Report to higher managers Precaution

Treat every employee equally

Quality criteria

Your supervision must be similar with the previous performances of the employees

Document all employees record or file

LG #57	LO #3- Brief employees or contracted personnel

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Informing employees or contracted personnel
- Informing employees or contracted personnel of landowner/manager expectations.
- Advising employees or contracted personnel of **OHS standards**.

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Inform employees or contracted personnel
- Inform employees or contracted personnel of landowner/manager expectations.
- Advise employees or contracted personnel of **OHS standards**.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
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back to “Operation sheets”.

Information Sheet 1- Informing employees or contracted personnel

Introduction

Pests can carry diseases, create unsafe conditions, and cause stress to patients and staff. It's no wonder that when faced with pest introductions, or the prospect of future infestations, we want a fast and simple solution – a silver bullet. As a result, we often depend heavily on chemicals to treat the symptom of our pest issues, rather than resolving the underlying problem that led to the pest presence. The result of this short-sighted approach is that pests are often not managed safely, effectively, or economically.

In contrast, IPM is a science-based decision-making process that emphasizes prevention, knowledge of pest biology, the use of least-disruptive control tactics, and the judicious use of pesticides. Through IPM, we address the reasons why we have pests in the first place and take steps to prevent future pest incidents. Once established, this program can easily be incorporated into any existing environmental and coordinated health program with committee oversight and reporting requirements.

Pests need food, water, and shelter to survive, and the goal of IPM is to deny them these necessities. IPM does this by instituting a combination of commonsense practices that prevent pests from infesting buildings and grounds by both limiting access and reducing their attractiveness. IPM is not a single pest control approach, but rather a strategy of combined approaches that synergize to limit a pest's ability to survive and thrive.

3.1. Informing employees or contracted personnel

Managers and supervisors are responsible for ensuring that outside contractors/contract workers (contract trades, temporary workers, etc.) can perform their tasks safely. This includes providing the contractor with the following information prior to starting a job:

- Hazardous substances that they may encounter during their work activities
- Information on obtaining MSDS's, and on the labeling systems used

- Precautions which the employees may take to lessen the possibility of exposure by using appropriate protective measures

Periodically, employees may be required to perform hazardous non-routine tasks. Prior to starting work on such projects', affected employees are to contact their supervisors for the following information:

- Specific hazards
- Protective/safety measures which must be used
- Measures taken to lessen the hazards including ventilation, PPE, buddy systems, and/or specific emergency procedures

- **What is an Employee Assistance Program (EAP)?**

At some time in their careers, many employees will experience a problem that will affect a major aspect in their work and lives. Examples of these are:

- ✓ Alcoholism
- ✓ Drug abuse
- ✓ Divorce
- ✓ The death of a loved one
- ✓ Bankruptcy
- ✓ Some other family or workplace crisis

The problem might not be the employee's concern; it might be the problem of a contracted personnel in the work place. No matter where the problem originates, these problems can affect an employee's job performance or conduct.

The EAP is a voluntary, work-based program that provides cost-free and confidential assessment, short-term counseling, referral, and follow-up services to employees who have personal and/or work-related problems that may affect attendance, work performance, and/or conduct. Every agency has an EAP which has a goal of restoring valuable employees to full productivity in crop production.

The basic services of the EAP include:

- Confidential, free, short-term counseling to identify and assess problem(s) and to help employees in problem solving.
- Referral, where appropriate, to a community service or professional resource that provides treatment and/or rehabilitation. With the exception of illness or injury directly resulting from employment, medical care and treatment are personal to the employee and, therefore, payment may not be made from appropriated funds unless provided for in a contract of employment or by statute or by regulation.
- Follow-up services to help an employee readjust to his or her job during and after treatment, e.g., back-to-work conferences.
- Training sessions for managers and supervisors on handling work-related problems that may be related to substance abuse or other personal, and/or health-related problems.
- Orientation and educational programs to promote the services of the EAP.
- Briefings to educate management and union officials on the role of EAPs.

In addition, the EAP can be extremely important in:

- Preventing and intervening in workplace violence incidents
- Delivering critical incident stress debriefings
- Helping management and employees during agency restructuring.

Self-Check –1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test: give short answer

1. Briefly discuss ways to reduce the threat of new pests entering and establishing on your farm, nursery, orchard:
2. What are the important of the **EAP?**
3. List the basic services of **the EAP?**
4. What are the major
5. Discuss the major problem that will affect Employee Assistance Program aspect in their work and lives?

Information Sheet 2- Informing farmers employees or contracted personnel of landowner/manager expectations.

3.2. Informing farmers employees or contracted personnel

- **Precautionary Statement**

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store, or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

The pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used.

The label always takes precedence over the recommendations found in this publication. Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product. The author(s), the University of Tennessee Institute of Agriculture and University of Tennessee Extension assume no liability resulting from the use of these recommendations.

Self-Check – 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

1. What is the prior information that supervisors give to contractors?
2. What is the harm if site is not cleaned after any job?
3. Before you but any pesticide Read and follow label directions carefully is needed why?

Information Sheet 3- Advising farmers employees or contracted personnel of OHS

3.3. Advising employees or contracted personnel of OHS

Follow-up services to help an employee readjust to his or her job during and after treatment, e.g., back-to-work conferences.

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Referral, where appropriate, to a community service or professional resource that provides treatment and/or rehabilitation. With the exception of illness or injury directly resulting from employment, medical care and treatment are personal to the employee and, therefore, payment may not be made from appropriated funds unless provided for in a contract of employment or by statute or by regulation.

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In addition, the EAP can be extremely important in:

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What Pest controllers do?

- Record work activities performed.
- Inspect premises to identify infestation source and extent of damage to property, wall, or roof porosity and access to infested locations.
- Spray or dust chemical solutions, powders, or gases into rooms, onto clothing, furnishings, or wood, or over marshlands, ditches, or catch basins.

- Direct or assist other workers in treatment or extermination processes to eliminate or control rodents, insects, or weeds.
- Drive truck equipped with power spraying equipment.
- Measure area dimensions requiring treatment, using rule, calculate fumigant requirements, and estimate cost for service.
- Clean work site after completion of job.
- Set mechanical traps or place poisonous paste or bait in sewers, burrows, or ditches.
- Study preliminary reports or diagrams of infested area and determine treatment type required to eliminate and prevent recurrence of infestation.
- Clean and remove blockages from infested areas to facilitate spraying procedures and provide drainage, using brooms, mops, shovels, or rakes.
- Cut or bore openings in building or surrounding concrete, access infested areas, insert nozzle, and inject pesticide to impregnate ground.
- Post warning signs and lock building doors to secure area to be fumigated.
- Dig up and burn or spray weeds with herbicides.
- Position and fasten edges of tarpaulins over building and tape vents to ensure air-tight environment and check for leaks.

Activities of pest controllers.

- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Communicating with Persons Outside Organization - Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.
- Performing for or Working Directly with the Public - Performing for people or dealing directly with the public. This includes serving customers in restaurants and stores and receiving clients or guests.

- Operating Vehicles, Mechanized Devices, or Equipment - Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or watercraft.
- Evaluating Information to Determine Compliance with Standards - Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
- Inspecting Equipment, Structures, or Material - Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.
- Updating and Using Relevant Knowledge - Keeping up-to-date technically and applying new knowledge to your job.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.
- Scheduling Work and Activities - Scheduling events, programs, and activities, as well as the work of others.
- Monitor Processes, Materials, or Surroundings - Monitoring and reviewing information from materials, events, or the environment, to detect or assess problems.
- Identifying Objects, Actions, and Events - Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.
- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.
- Training and Teaching Others - Identifying the educational needs of others, developing formal educational or training programs or classes, and teaching or instructing others.
- Performing General Physical Activities - Performing physical activities that require considerable use of your arms and legs and moving your whole body, such as climbing, lifting, balancing, walking, stooping, and handling of materials.

- Documenting/Recording Information - Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.
- Establishing and Maintaining Interpersonal Relationships - Developing constructive and cooperative working relationships with others and maintaining them over time.
- Resolving Conflicts and Negotiating with Others - Handling complaints, settling disputes, and resolving grievances and conflicts, or otherwise negotiating with others.
- Organizing, Planning, and Prioritizing Work - Developing specific goals and plans to prioritize, organize, and accomplish your work.
- Developing Objectives and Strategies - Establishing long-range objectives and specifying the strategies and actions to achieve them.
- Selling or Influencing Others - Convincing others to buy merchandise/goods or to otherwise change their minds or actions.
- Judging the Qualities of Things, Services, or People - Assessing the value, importance, or quality of things or people.
- Provide Consultation and Advice to Others - Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics.
- Interpreting the Meaning of Information for Others - Translating or explaining what information means and how it can be used.
- Processing Information - Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.
- Estimating the Quantifiable Characteristics of Products, Events, or Information - Estimating sizes, distances, and quantities; or determining time, costs, resources, or materials needed to perform a work activity.
- Analyzing Data or Information - Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.
- Handling and Moving Objects - Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things.

- Monitoring and Controlling Resources - Monitoring and controlling resources and overseeing the spending of money.
- Coaching and Developing Others - Identifying the developmental needs of others and coaching, mentoring, or otherwise helping others to improve their knowledge or skills.
- Thinking Creatively - Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.
- Coordinating the Work and Activities of Others - Getting members of a group to work together to accomplish tasks.
- Guiding, Directing, and Motivating Subordinates - Providing guidance and direction to subordinates, including setting performance standards and monitoring performance.
- Staffing Organizational Units - Recruiting, interviewing, selecting, hiring, and promoting employees in an organization.
- Developing and Building Teams - Encouraging and building mutual trust, respect, and cooperation among team members.
- Performing Administrative Activities - Performing day-to-day administrative tasks such as maintaining information files and processing paperwork.
- Repairing and Maintaining Mechanical Equipment - Servicing, repairing, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.
- Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information
- Assisting and Caring for Others - Providing personal assistance, medical attention, emotional support, or other personal care to others such as coworkers, customers, or patients.
- Controlling Machines and Processes - Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles).

Self-Check 2 and 3	Written Test

Name: _____
Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

---

1. What is the prior information that supervisors give to contractors? (3pts)
2. Mention some basic EPA services provided? (3 point)
3. Why do you assist employees? (3 points)
4. Why do pest controllers keep record? (3pts)
5. What is the harm if site is not cleaned after any job? (3 pts)
6. Why do you post warning signs? (3 pts)

Note: **Satisfactory rating - 20 points** **Unsatisfactory – below 20 points**
You can ask you teacher for the copy of the correct answers.

LG #58	LO#4 – Assist supervision of farmers employees or contracted personnel.

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Checking plant, machinery, and equipment for serviceability.
- Checking materials for compliance with ohs standards.
- Checking personal protective equipment and clothing
- Monitoring procedures and skills applied by employees.
- Providing feedback, advice, and coaching.

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, **upon completion of this learning guide, you will be able to**:

- Check plant, machinery, and equipment for serviceability.
- Check materials for compliance with ohs standards.
- Check personal protective equipment and clothing
- Monitor procedures and skills applied by employees.
- Providing feedback, advice, and coaching

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished

answering the Self-checks).

6.If you earned a satisfactory evaluation proceed to “Operation sheets

7.Perform “the Learning activity performance test” which is placed following “Operation sheets” ,

8.If your performance is satisfactory proceed to the next learning guide,

9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet 1- • Checking plant, machinery, and equipment

4.1. Checking plant, machinery, and equipment

Supervision Exercised

Supervises or provides technical direction and oversight to gardening staff and other department employees.

Examples of Important and Essential Duties

According to Civil Service Commission Rule 109, the duties specified below are representative of the range of duties assigned to this job code/class and are not intended to be an inclusive list.

- Surveys and inspects trees, shrubs, grass, rights of way and other vegetation, aquatics, and structures for evidence of disease or presence of harmful pests by using visual aids, field observations and history records.
- Monitors pest ecosystems to evaluate the presence of pest species, natural pest predators, and conditions that may contribute to pest problems.
- Assists and provides expertise in the development of integrated pest management program strategy.
- Utilizes traps, chemical and non-chemical methods to manage pests.
- Maintains detailed IPM records.
- Provides expertise, assistance and training to staff, structural contract service providers and the public about pest biology, the IPM approach, new pest management strategies, and toxicology of pesticides for use.
- Mixes, applies and monitors various recommended chemicals, fertilizers, compounds and baits to be used for treatment, elimination or control of specific conditions found.
- Supervises or provides technical direction and oversight to gardening staff and other departmental employees.
- Implements pest control measures in accordance with state Integrated Pest Management Program

- Provides written recommendations for treatment, elimination or control of specific conditions found.
- May operate and maintain specialized equipment such as sprayers of various types, small boat to spray lakes for algae and weed control, and/or large capacity truck sprayer for surface areas.
- May direct the work of a driver in the operation of a spray truck.
- Requisitions and evaluates needed supplies and keeps records of chemicals used and recommendations for spray control operations.
- Performs other duties as required.

  Equipment may include:

  - ✓ Bunding material
  - ✓ camera
  - ✓ dishes or bowls
  - ✓ drills
  - ✓ dusters
  - ✓ electrical extension leads
  - ✓ elevated work platforms
  - ✓ equipment decontamination materials
  - ✓ flexible light
  - ✓ flushing agents
  - ✓ generators
  - ✓ hoses
  - ✓ injectors
  - ✓ knifes
  - ✓ ladders
  - ✓ magnifying glass
  - ✓ measuring jug
  - ✓ mirrors

Self-Check 1	Written Test

Name: _____
Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

Give short Answers

1. Write some of the materials and equipment's for pest management activities?

4.2. Materials for pest management.

Materials may include:

- building components
- chemicals
- cleaning products
- flammable products
- pesticides
- physical barriers
- sealing components

For any hazardous substance, manufacturers, importers, and suppliers must:

- determine if the substance is hazardous
- prepare and provide the relevant information (Material Safety Data Sheet (MSDS)/label).

For any hazardous substance, employers must:

- eliminate so far as is reasonably practicable any risk associated with hazardous substances at the employer's workplace.

This will involve:

- eliminating or control risks to health according to the hierarchy of controls
- ensuring risk control measures are properly used and maintained
- ensuring containers are labelled
- obtaining Material Safety Data Sheets (MSDS) and making them available to employees
- keeping a register of substances that includes product names and MSDSs
- undertaking and recording risk assessments
- reviewing and revising risk assessments

- conducting atmospheric monitoring and health surveillance in certain circumstances
- providing information, instruction, and training to employees
- consulting with health and safety representatives
- performing additional duties for scheduled carcinogens.

Employees also have a general duty of care to take reasonable care of their own health and safety, and that of others and cooperate with employer effort to make the workplace safe.

Self-Check 2	Written Test

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

Give short answers.

1. What are the important things to be considered while employee applies pesticides?
2. Write some of the materials for pest management activities?
3. Discuss the difference between preventing and eliminating?

Information Sheet 3. Checking Personal protective equipment and clothing

4.3. Checking Personal protective equipment and clothing

What is PPE?

PPE is defined in the Regulations as 'all equipment (including clothing affording protection against the weather) which is intended to be worn or held by a person at work and which protects him against one or more risks to his health or safety', eg safety helmets, gloves, eye protection, high-visibility clothing, safety footwear and safety harnesses.

Hearing protection and respiratory protective equipment provided for most work situations are not covered by these Regulations because other regulations apply to them. However, these items need to be compatible with any other PPE provided.

Cycle helmets or crash helmets worn by employees on the roads are not covered by the Regulations. Motorcycle helmets are legally required for motorcyclists under road traffic legislation.

There are several types of Personal Protective Equipment (PPE) to wear to protect different parts of the body:

Gloves: To protect the hands. It is best to wear long-sleeve gloves.

Boots: To protect the feet. It is best to wear heavy-duty rubber.

Overalls: To protect the legs, arms, and body. It is best to wear heavy-weave cotton or specialist coveralls.

Apron: To protect the front of the body. It is best to wear aprons made of PVC, rubber, or polyethylene (liquids cannot get through).

Hat: To protect the head and forehead. Be aware that the ears and sometimes the forehead are not protected. You can wrap a cloth around your head to protect those parts as well.

Hood: To protect the neck and ears.

Goggles: To protect the eyes.

Face shield: To protect the eyes and face. It is cooler to wear than goggles.

Mask: To protect the nose and mouth. Not recommended for spraying.

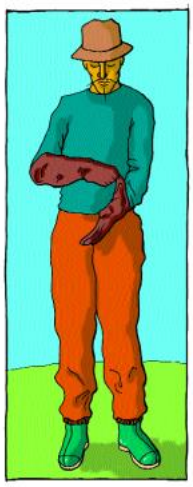
Respirator: To protect the nose and mouth.

When to wear what?

Always check the label to learn the appropriate PPE to wear in certain situations. The more toxic a product, the more protective clothing is required.

How to wear Personal Protective Equipment?

Boots: Wear trousers **over** the boots to avoid spillage into the boots.



Gloves should be long and worn **over** the sleeves. If only short (wrist length) gloves are available they should be under the (elasticated) sleeve.
Remove gloves by making them inside out to ensure that your bare skin is not touching the outside of the gloves.

Order of putting on PPE

Start with overalls or an apron; then put on the mask, goggles, hat, boots, and finally gloves.

Why wear Personal Protective Equipment?

It is important to protect yourself when working with agri-inputs, because they can enter the body in several ways.

Inputs can **enter the body** in the following ways:

- **Dermal**: Via the skin -when skin and eyes are not protected-, or when pesticides soak through clothing.
- **Inhalation**: by breathing, especially in closed spaces.
- **Ingestion**: by swallowing, when eating, drinking, or smoking with contaminated hands.

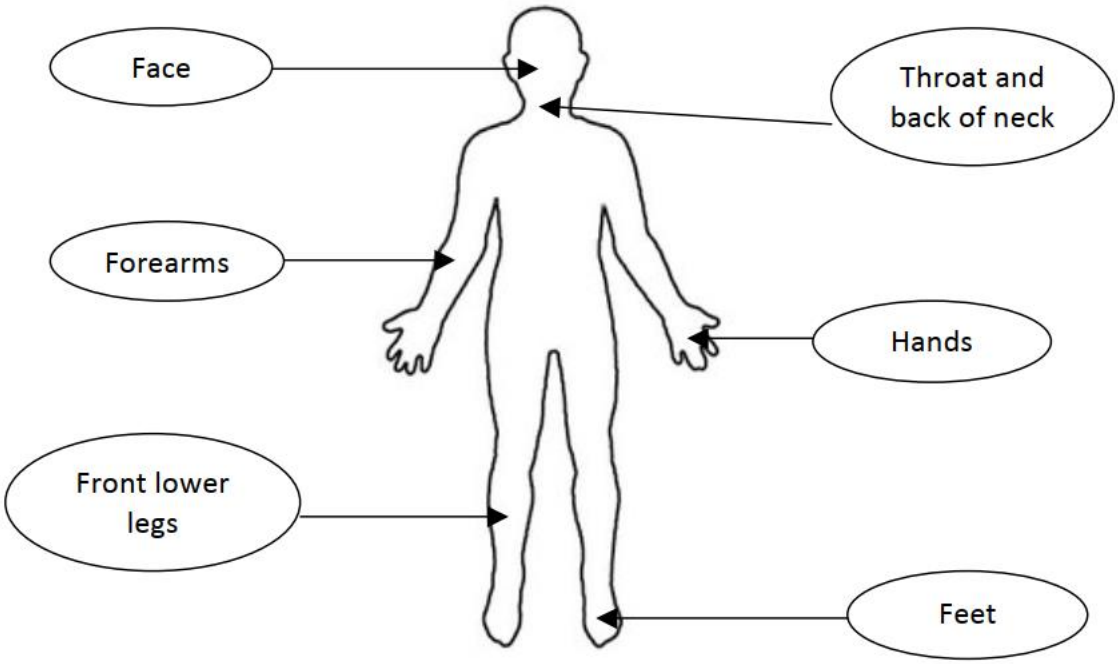
Each part of the body has its own **absorption rate**, which determines how much of the input in contact with the skin will enter the body. The following parts have the following absorption rates:

- Extremely high: scrotum
- Very high: ear canal, forehead, scalp
- High: Abdomen, ball of feet, palm of the hand, forearm

High risk areas – Where most of contact with pesticides takes place:

Care of protective clothing

- **Inspect** before use:
  - Gloves, coverall, boots and apron for tears
  - Straps of face shield, masks and respirators
- **Clean** properly after use:
  - Clean separately from other clothes
  - Wear gloves when cleaning protective equipment
- **Store** properly:
  - Do not store it where you store your agrochemicals: fumes and leakages can damage your equipment.
  - Away from children and areas where people move
- **Replace respirator cartridges** on a regular basis:
  - Check expiry date
  - Replace every 3 months or if you get any chemical smell during use



What do the Regulations require?

The main requirement of the PPE at Work Regulations is that personal protective equipment is to be supplied and used at work wherever there are risks to health and safety that cannot be adequately controlled in other ways.

The Regulations also require that PPE:

- is properly assessed before use to ensure it is suitable.
- is maintained and stored properly.
- is provided with instructions on how to use it safely; and
- is used correctly by employees.

Assessing suitable PPE

Consider the following when assessing whether PPE is suitable:

- Is it appropriate for the risks involved and the conditions at the place where exposure to the risk may occur? For example, eye protection designed for providing protection against agricultural pesticides will not offer adequate face protection for someone using an angle grinder to cut steel or stone.
- Does it prevent or adequately control the risks involved without increasing the overall level of risk?
- Can it be adjusted to fit the wearer correctly?
- Has the state of health of those who will be wearing it been taken into account?
- What are the needs of the job and the demands it places on the wearer? For example, the length of time the PPE needs to be worn, the physical effort required to do the job and the requirements for visibility and communication.
- If more than one item of PPE is being worn, are they compatible? For example, does a particular type of respirator make it difficult to get eye protection to fit properly?

Maintenance

Make sure equipment is:

- well, looked after and properly stored when it is not being used, for example in a dry, clean cupboard, or in the case of smaller items, such as eye protection, in a box or case;
- kept clean and in good repair - follow the manufacturer's maintenance schedule (including recommended replacement periods and shelf lives). Simple maintenance can be carried out by the trained wearer, but more intricate repairs should only be done by specialists.
- Make sure suitable replacement PPE is always readily available.

Self-Check – 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

1. Define PPE in your own context? (3pts)
2. Why do you assess suitability of PPE? (5pts)
3. What must you consider when assessing PPE? (4 point)
4. What could you do if you can't maintain equipment's? (3 points)
5. What would happen if there is where PPE? (5 points)

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

4.4 Monitoring procedures and skills applied by employees.

Monitoring is an information gathering and record keeping activity that is the basis of any successful IPM program. Monitoring utilizes a variety of techniques ranging from casual observation to statistically valid quantitative sampling, to measure pest damage, track populations of both beneficial and pest organisms and provide assessment of the site and surroundings.

Careful, concise records are necessary to determine when specific control tactics are to be implemented to keep pest levels below the injury level. This information is further utilized to measure the effectiveness of specific tactics, to pinpoint A hot spots and used in subsequent years for planning and timing of control activities.

Monitoring includes inspecting areas for pest evidence, entry points, food, water and harborage sites, **and estimating pest population levels**. This can be achieved using sticky traps, physically observing pests or evidence of pests such as droppings, nests, or shed skins (exoskeletons).

Knowledge, Skills and Abilities

Knowledge of: the practice of managing pests using biological, cultural, mechanical, physical and chemical controls with emphasis on the least toxic approach; proper usage, application and dilutions of chemical pesticides used in the control of invertebrates/vertebrates, pathogens, vegetation management and aquatic pest control; the use and care of various equipment peculiar to pest management techniques; hazards, precautions, use, handling and storage of pesticides, including safety procedures during operation of various equipment.

Ability to: manage effectively the work of subordinates and/or provide guidance to city staff, contractors, tenants, and the general public using pest control methods; provide training where needed to maintain an acute awareness of safety hazards and maintain a safe working environment; communicate in writing with city staff, private structural contractors, government agencies and the general public; record and report activities

and maintain records, usage and recommendations using general computer skills; effectively communicate with city staff, private contractors, government agencies and the general public to facilitate the effectiveness of daily pest control operations communicate with city staff, private contractors, government agencies and the general public to facilitate the effectiveness of daily pest control operations.

Monitoring or surveillance and forecasting of pests are vital components of Integrated Pest Management. Pest monitoring or surveillance forms an integral part of any and all control
measures applied to crop and that no pesticide should be applied without sufficient justification
which can be obtained only through monitoring or surveillance.

Objectives of pest monitoring programme

- To know the existing and new pest species.
- To assess the level of pest population and damage during different growth stage of crop.
- To study the influence of seasonal weather parameters on the pests.
- To determine the behavior of minor pests in attaining major pest status.
- To assess the natural enemies of pests and their influence.
- To assess the behavior of pests under changing cropping pattern and new varieties.
- To fix up hot spot, endemic and epidemic areas of the pests.
- To forewarn the farmers for making the timely decisions of control measures.

Self-Check – 4	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test i: Give short answer

1. What are the general pest management objectives and monitoring?
2. _____is an information gathering and record keeping activity that is the basis of any successful IPM program?

Information Sheet 5- Providing Feedback, advice and coaching.

5.1. Providing Feedback, advice, and coaching.

Feedback is often about giving people an account of their behavior or actions as it relates to a certain criterion. In a communities and disability services context, feedback and advice form an important part of client service work, usually in the form of information, opinions, observations, and suggestions offered by:

- the client in relation to the way their case is being managed
- the support worker and other people involved with the client about their progress.

Feedback may be provided formally or informally by:

- the client
- Significant others (family members, careers, other workers, professionals, etc.)
- service providers
- your observations/experiences as the support worker
- your supervisor and/or co-workers.

A formal feedback process may be necessary where support workers are responsible for monitoring specific activities of the client's action or case plan. An informal process may be to discuss issues with the client and provide advice. When giving feedback you need to consider the following guidelines:

- Be flexible about when and how feedback is given.
- Be creative about the most effective ways to provide feedback.
- Be prepared to listen and consider the ideas, opinions and problems raised by the other person.
- Ask direct questions to clearly identify any problems or issues.
- Show that you respect and value the individual contributions of the other person.
- Provide feedback in such a way that people feel involved and believe contact with you is worthwhile.

- Practice good communication skills such as active listening, using appropriate language, explaining meanings, and asking questions.
- Ask the other person for suggestions on ways to overcome any issues/problems you or they have with the action plan.

Self-Check – 5	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: give short answer

1. What would happen to an employee if he doesn't have the required skill? (4pts)

2. What general abilities must an employee have? (5pts)

3. What does it mean formal and informal feedback? (3pts)

4. What must you consider when giving feedback? (5pts)

5. What is the importance of feedback? (3pts)

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

LG#59	LO#5- Coordinate contingency management activities

Instruction sheet
This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics: • Initiating first aid procedures and coordinated • Notifying relevant authorities and arrangements • Rescheduling activities This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, **upon completion of this learning guide, you will be able to**: • Initiate first aid procedures and coordinated • Notify relevant authorities and arrangements • Reschedule activities
Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6.If you earned a satisfactory evaluation proceed to “Operation sheets
7.Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8.If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet 1. Initiating and coordinating first aid procedures

1.1. First aid procedures

1 Before administering care to an ill or injured person, check the scene and the person. Size up the scene and form an initial impression. ...

3 If the Person Appears Unresponsive: Shout to get the person's attention, using the person's name if it is known. ...

4 If the person is breathing

Contingency planning for pest incursions includes many different activities, both scientific (e.g. pest diagnostics and biology) and administrative (e.g. authorization and funding). The activities fall within a spectrum of pre-border, border, and post-border quarantine systems:

- identification of pest threats
- quarantine and offshore activities
- surveillance
- diagnostics
- biology, ecology, and control
- identifying roles and responsibilities
- legislative authority
- funding and compensation
- Increased preparedness and response planning

Objective

The purpose of these emergency procedures is to ensure that any form of emergency that interrupts normal and safe working conditions in the plant can be dealt with quickly in a systematic manner. Operational procedures are spelt out to enable a coordinated plan of action to be carried out to control the emergency situation and restore it back to normal.

Scope

- Control and or extinguish the fires.
- Contain leakage and spills in the event of a chemical incident.
- Effect the rescue and treatment of casualties.
- Safeguard human lives and
- Minimize damage to property and the environment.

Responsibility

This procedure is the responsibility of the manager

Procedures

The following describes the process and condition for Emergency Response Procedure

Types of Emergencies

The following are some of the most common situations that may lead to an EMERGENCY in the plant:

- Outbreak of fire or occurrence of fire
- Occurrence of serious accident and
- Damage to materials and plant which endangers the safety of personnel

First Aid Procedure

- Gassing
  - ✓ Remove patient to fresh air, lay down and rest
  - ✓ Remove patient to fresh air, lay down and rest
  - ✓ Keep patient warm and
  - ✓ Call doctor at once or transport to doctor or hospital

- Eyes
  - ✓ Hold eyes open and wash continuously with water for at least 15 minute an
  - ✓ Transport to doctor or hospital
- Skin
  - ✓ Immediately wash affected area with water to prevent frostbite and
  - ✓ Transport to doctor or hospital
- Emergency Control Points
  - ✓ Emergency Mustering Area
  - ✓ The Emergency Mustering Area will be the open area beside of reception lobby.
- First Aid Post
  - ✓ Emergency Control Post the First Aid Post will be set up in front of the reception Counter
  - ✓ Emergency Control Post

The Emergency Post will be set up at the Reception Area.

- ✓ Evacuation
- ✓ If the fire or gas leak is serious and may spread and get out of control, evacuation may be declared by the
- ✓ Site Commander. The evacuation route to be taken by plant personnel is by way of the nearest Emergency Gate.
- ✓ The SC and ASC shall ensure that all plant Personnel are safety evacuated to the Emergency Mustering Area.

Evacuation Procedures

The order to evacuate shall only be given by the Site Commander.

When the order to evacuate is given by the Site Commander, the Assistant Site Commander shall immediately announce it over the loud hailer.

The normal format of the Evacuation announcement is:

"Attention all employees. There is a major gas leak (or fire) at (location). Please remain calm. All employees except those involved in emergency services shall leave their work places immediately. Proceed to assemble at (location)"

The announcement should state clearly the location of gas leak or fire and the point of assembly.

In normal situation, the evacuation shall be at the Emergency Mustering Area beside of reception lobby.

Senior employees (predesignated) shall oversee the orderly movement of people during the evacuation.

The senior employees would gather the Clock-in cards of all employees and the bin containing the contractor visitor pass. A roll call of all persons in the plant office will be performed. She would report to the Assistant Site employee, visitor, or contractor.

The following Emergency Control Points are to be set up to coordinate the emergency operations as follows:

At the Emergency Mustering Area, employees should queue up orderly, according to their work sections. He shall liase with the Site Commander on the likely whereabouts of any missing

Self-Check 1	Written Test

Name: _____ Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

---

1. What is first aid procedure? (3pts)
2. What would you do if a person in hails chemical gas? (3pts)
3. What are the procedures for evacuation? (3 point)
4. Where should the first aid post be put? (3 points)
5. What are the most common emergencies? (3 points)

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

Information Sheet 2. • Notifying and making arrangement of relevant authorities.

5.2. Notifying relevant authorities and arrangements

Workplace injury is a major cause of concern for all involved in occupational health and safety.

The factors which cause workplace accidents and occupational illnesses are called hazards. The need for systematic management of OHS hazards and their attendant risks applies to all organizations and all activities and functions within an organization.

It is important to distinguish between hazard, risk and exposure when undertaking risk management.

Hazard is the potential for harm, or adverse effect on an employee's health. Anything which may cause injury or ill health to anyone at or near a workplace is a hazard.

Workplace injuries are identifiable events, for example, cuts, bruises, crushed feet and hands, broken bones, amputations.

They are commonly referred to as acute trauma and are caused through

- slips, trips, and falls
- falling objects
- being struck by an object
- accidents with machinery.

Self-Check 2	Written Test

Name: _____ Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

---

1. What is hazard? (5pts)
2. What are the procedures for workplace injury? (5 point)
3. Briefly describe the difference between Hazard and Risk? [5%]

Note: Satisfactory rating - 15 points Unsatisfactory - below 15 points

You can ask you teacher for the copy of the correct answers.

Information Sheet-3	Rescheduling activities that are not carried out

5.3. Rescheduling activities that are not carried out

Generally, you can reschedule pick, invoke, and staff activities if they are in the running, waiting, ready, or claimed state. Also, you can repair an activity that stopped because the timeout expression cannot be evaluated.

To reschedule an activity, you must be a system administrator or an administrator of the activity.

To reschedule an activity, complete the following steps

Procedure

- Select the activity you want to reschedule
- Specify a date and time to reschedule the activity. Alternatively, you can specify that the activity is never rescheduled or that it is immediately rescheduled.

Self-Check 3	Written Test

Name: _____
Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

---

1. Why notifies authorities? (3pts)
2. Why schedule activities? (3pts)
3. What are the procedures to reschedule activities? (3 point)
4. In what conditions must you reschedule activities? (3 points)

Operation sheet 1– IPM steps

Anyone concerned with reducing pest problems while regarding the health and safety of humans and animals should consider these simple steps:

Steps:

Step 1: Sample for Pests (Inspect and Monitor): Is there a real problem?

Step 2: Proper Identification: Is it really the pest you think it is?

Step 3: Learn the Pest Biology: Will it be a long-term problem or will it be gone next week?

Step 4: Determine an Action Threshold: Do you need to act?

Step 5: Choose Tactics: What's the best treatment?

Step 6: Evaluate: How did it work?

Lap Test	Demonstration

Name…… ID……..

Date……..

Time started: _____ Time finished: _____

Instructions: Check the effectiveness of pest control measures.

LG #60	LO#6- Report progress

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Receiving and assessing reports and records
- Compiling and documenting reports and records

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, **upon completion of this learning guide, you will be able to**:

- Receive and assess reports and records
- Compile and document reports and records

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
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6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet-1	Receiving and assessing reports and records

Introduction

Plant, pests, and natural enemies are biotic factors which relate in feeding series in food chain. Therefore, the population dynamic of each one will depend on their hosts or prey in the surrounding. In normal surrounding the population of plants, pests and natural enemies will increase or reduce synchronize together and be in a constant equilibrium. But in unmoral climatic conditions and surroundings the amount in increase or reduction of these three factors might not be synchronized e.g. pests increase due to abundance of plants but natural enemies decline. This situation causes imbalance between pests and natural enemies and pest outbreaks might occur. Therefore, growers have to monitor pests, natural enemies, and damaged plant parts regularly in order to make correct decision for pest control and can find out appropriate control measures to the situation.

6.1. Receiving and Assessing Reports and Records

Monitoring Inspection, monitoring, and pest identification are key components IPM. sample IPM inspection report form.

Implementation of an IPM program should start with a “walk through” or initial inspection of the facilities to evaluate pest management needs of all premises. This includes identifying problem areas and equipment and determining whether structural features or management practices contribute to pest infestations. Interviews with key building occupants (front office staff, custodians, cafeteria managers, some teachers, and other staff) can also yield critical information for planning the IPM program.

Monitoring: is a series of routine and ongoing inspections to look for pests and evidence of pest presence and conditions that may encourage infestation. Information from these inspections is always carefully recorded on appropriate data sheets, maps of the school grounds, and/or floor plans of buildings.

Monitoring combines communication with building occupants, visual inspection, and trapping to discover the presence of pests, entry points into buildings, and places where pests are finding food, water, and harborage or resting sites. Monitoring will also determine pest population levels to see whether action levels have been reached. In addition, monitoring provides quantitative information on the effectiveness of pest control or actions taken and whether there is a need for further action if pest populations occur at unacceptable levels after remedial action has been taken.

Pest managers use inspection and monitoring to become familiar with the workings of the site and to anticipate conditions that may trigger pest problems so that they can be prevented or eliminated before they become serious. The information collected by monitoring becomes the basis for informed and intelligent pest management decisions appropriate for a particular situation as outlined in the school system's IPM program

6.2. Why monitor?

Monitoring provides data on which to base decisions about whether action is necessary.

Monitoring can:

- Show if the pest population is increasing or decreasing. Inspection of problem sites on different occasions will help determine whether a pest situation warrants action.
- Detect pests early before they become a problem.
- Provide information needed for discussions with clientele about progress in meeting pest management objectives.
- Without monitoring records, complaints or pest observations by occupants are the only source of information to direct pest control activities.
- Monitoring helps to determine what kinds of actions are needed, where action is needed, and when it is needed.

Monitoring will:

- Show where pest-proofing, sanitation, and/or other preventative measures are most needed.

- Pinpoint pest infestations and “hot-spots” and facilitate targeting of pesticide treatments.
- Help to time and target treatments to the most vulnerable stage in the pest life cycle.
- Facilitate the planning of treatments to avoid interference with school activities and, if necessary, provide sufficient time for notification.
- Did the action reduce the number of pests to acceptable levels?
- How long did the effect last?
- Is additional action needed?
- Were there undesirable side effects?
- Does the action plan need to be adjusted?

6.3. **What should be monitored**?

Monitoring sites involves the regular observation and recording of:

- The condition of the crop site inside and out (structural deterioration, ways that allow pests to enter, conditions that provide pest harborage).
- The level of sanitation inside and out (waste disposal procedures, level of cleanliness, and conditions that supply food to pests).
- Pest damage and the number and location of pests or pest signs (rodent droppings, ants foraging, cockroaches caught in traps, etc.).
- Human behaviors that affect pests (working conditions that make it impossible to close doors or screens, food storage and handling procedures that provide food for pests, etc.).
- Management activities and their effects on the pest population (caulking, cleaning, setting out traps, treating pests.

Self-Check 1	Written Test

Name: _____
Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

---

1. What is the importance of record? (3pts)
2. What is the importance of monitoring? (3pts)
3. Is there a common reporting format? Why? (3pts)
4. What are the common things that you must keep in a record? (3pts)
5. Why does IPM plan need to be put in the report? (3pts)

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

Information Sheet-2	Compiling and documenting reports and records

6.1. Compiling and documenting reports and records

- **Records**

The success of any IPM program depends heavily on a good record-keeping system and accurate records. The size of the school and number of buildings will help determine how many logbooks should be maintained. Logbooks can be established for each building or other facility as determined by the IPM contact person. Placing logbooks in central locations such as the main office, teacher's workroom, or cafeteria should make them accessible to school occupants and limit the amount of time that it takes the pest manager to check them regularly. (See Part Five for a sample Pest-Sighting Log.)

6.2. Why keeps records?

Using a pest-sighting log and keeping good records on pest management activities will:

- Allow schools to determine if the IPM program objectives are being met.
- Lead to efficient decision-making and procurement of pest control supplies if pest control is done by maintenance personnel.
- Show changes in the site environment (availability of resources for the pest), physical changes (exclusion and repairs), pest population changes (size and structure), or changes in the amount of damage or loss.
- Provide an ongoing record that may allow anticipation and planning for control of seasonal pests or tracking of recurring pest problems.
- Preserve important information when employees leave or retire and make it easy to pass this information from one employee to another.
- Safeguard against litigation.

Arrange of documentation relevant to pest management and containing safety symbol and terminology needs to be read and understood includes

- Chemical level
- Equipment instruction/manuals
- Manufacturer instruction
- Material safety data sheet
- Plans /pest management and equipment maintenance, company business plan/
- Regulations, legislation and code of practices /including OHS and environmental/
- Work order and schedule
- Work place and organizational policies ,procedures
- Pest activity/inspection report
- Pest management system problem/action report
- Service log books
- Site management report and site visit report

Self-Check 2	Written Test

Name: _____
Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

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4. What is the importance of record? (3pts)
5. What is the importance of monitoring? (3pts)
6. Is there a common reporting format? Why? (3pts)
7. What are the common things that you must keep in a record? (3pts)
8. Why does IPM plan need to be put in the report? (3pts)

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

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