Pesticide Handling Decisions

- Labeled for use
- Good control
- Safe to handle
- Safe to environment
- Right formulation
Learning Objectives

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

- Explain some consequences of incorrect use of pesticides.
- List factors to consider when you have a choice among different types of formulations.
- Name conditions at the application site that may influence some of the decisions you make about the application.
- Describe adjustments you might need to make in the task itself or in the workplace conditions if heat stress is a concern.

Terms To Know

**Adjuvant** — Chemical added to a pesticide formulation or tank mix to increase its effectiveness or safety.
**Chemical-resistant** — Able to prevent movement of the pesticide through the material during the period of use.
**Concentrates** — Pesticides that have a high percentage of active ingredient.
**Cuticle** — Thin, farty outer surface on the leaves of some plants.
**Decontamination** — Removal of pesticide from surfaces or organisms that are exposed so no further harm or damage can occur.
**Diluent** — Anything used to dilute a pesticide.
**Dilute** — To make less concentrated.
**Drift** — Pesticide movement away from the release site in the air.
**Emulsifier** — Chemical that allows petroleum-based pesticides (EC's) to mix with water.
**Exposure** — Coming into contact with a pesticide; getting a pesticide on a surface or in or on an organism.
**Eyewash dispenser** — Commercially available system for flushing contaminants out of the eyes.
**Fumigant** — Pesticide that is a vapor or gas or that forms a vapor or gas when applied and whose pesticidal action occurs in the gaseous state.
**Heat stress** — Illness that occurs when the body is subjected to more heat than it can cope with.
**Labeling** — The pesticide product label and other accompanying materials that contain directions that pesticide users are legally required to follow.
**Leaching** — The movement of pesticide in water or another liquid downward through soil or another planting medium.
**Liability** — Legal responsibility.
**Non-target** — Any site or organism other than the site or pest at which the pesticide is being directed.
**Offsite** — Outside the area where the pesticide is being released.
**Organic matter** — Materials and debris that originated as living plants or animals.
**Penetrant** — Chemical that helps a pesticide active ingredient to get through a surface and into an object or organism.
**Personal protective equipment (PPE)** — Devices and clothing worn to protect the human body from contact with pesticides or pesticide residues.
**Pesticide handling** — Directly working with pesticides, such as during mixing, loading, transporting, storing, disposing, and applying, or working on pesticide equipment.
**Porous surfaces** — Surfaces that have tiny openings which allow liquid to be absorbed or to pass through.
**Protectant fungicide** — Pesticide applied to prevent the development of some plant diseases caused by fungi.
**Residue** — The part of a pesticide that remains in the environment for a period of time following application or a spill.
**Solvent** — A liquid, such as water, kerosene, xylene, or alcohol, that will dissolve a pesticide (or other substance) to form a solution.
**Systemic pesticide** — Pesticide that is absorbed and circulated by a plant or animal so that the plant or animal is toxic to pests that feed on it.
**Volatile** — Evaporating rapidly; turning easily into a gas or vapor.
Before you do a pesticide handling task, you need to make some important decisions. For any pesticide handling activity, you must decide how to ensure the safety of yourself, others, and the environment. Before you apply a pesticide, you must make several decisions about how to fit the application to your own pest control situation.

**Personal Safety Considerations**

Make safety one of your first concerns every time you handle pesticides or allow someone else to handle them under your supervision. By making a few simple safety decisions, you can prevent many pesticide accidents and reduce the severity of others. Ask yourself these basic safety questions:

**Have I Read the Labeling?**

Always read the applicable sections of the pesticide labeling before you open a pesticide container or begin any pesticide handling activity. Pesticide labeling contains precautions and instructions that you must follow in order to use the product safely and appropriately. It may contain very specific information that concerns the task you plan to do. Be sure you understand everything you need to know about the pesticide product before you are exposed to it.

**How Can I Avoid Exposure to Pesticides?**

The key to personal safety when handling pesticides is to avoid exposure to them. Always keep personal clothing, food, drinks, chewing gum, tobacco products, and other belongings away from where pesticides are stored or handled. They could become contaminated and poison or injure you when you use them.

When you take a break, wash your gloves on the outside, remove your gloves, and wash your hands and face thoroughly. Then you can safely chew gum, eat, drink, or smoke, if you wish.

Avoid getting pesticide on yourself when you use the toilet. The skin in the genital area has been shown to absorb more pesticides than any other skin area. Take the time to wash your hands thoroughly before using the toilet, and be careful not to contaminate yourself from pesticides that may be on the outside of your clothing.

Be aware of other situations where you might be exposed to pesticides on the job. Protect yourself not only during mixing, loading, and application, but also during spill cleanup, repairing or maintaining equipment, and when transporting, storing, or disposing of pesticide containers that are open or have pesticides on their outer surface. Use personal protective equipment when necessary to keep pesticides from getting on your skin and in your mouth, eyes, or lungs.
What Personal Protective Equipment Is Needed?

Decide what personal protective equipment you and the people you supervise will need. You must use what the labeling requires, and you may decide that you need additional equipment. Make sure that the personal protective equipment is clean and in good operating condition.

Be sure that you know how to use the personal protective equipment correctly. Put on and remove the equipment carefully so that you will not come in contact with any pesticides that may be on the outside of it. Do not “cheat” on the personal protective equipment by taking off your gloves to make an equipment adjustment or by pulling your respirator away to scratch your face, wipe off sweat, or take a deep breath while you are still being exposed to the pesticide. Do not wipe your gloves on your clothing; this will contaminate your clothing, and pesticide may move through to your skin.

Is the Equipment Ready and Safe?

Decide what equipment is necessary for your task. Check to make sure that you have all the equipment you need and that it is clean and in good operating condition. Make sure that anyone who will use the equipment knows how to operate it safely and correctly. Do not allow children, livestock or pets, or unauthorized people to touch the equipment. If they are injured or poisoned, you are responsible.

Am I Avoiding the Accidental Spread of Pesticides?

Make it a habit to consider how you and those you supervise may accidentally spread pesticides. You may transfer pesticides to objects, people, and animals when you touch them with gloves that you wore while handling pesticides. When you sit in your car or on a chair while wearing your pesticide-handling outfit, you may leave pesticides behind. If you step into your office or home to answer a telephone call or use the toilet, you may leave pesticides on surfaces there.

Any time you take home or wear home your work clothing, personal protective equipment, or...
other items that are contaminated with pesticides, the pesticides can rub off on carpeting, furniture, and laundry items, and onto pets and people who come into contact with the contaminated materials. When you do not clean up a spill, no matter how small, other people or animals may get pesticide on themselves without knowing they are being exposed. Pesticides that you spread may harm whoever or whatever touches them.

Have I Instructed the Handlers I Supervise?

If you supervise other people who handle pesticides, be sure that they are instructed about the personal and environmental hazards of pesticide use. They should know the ways they may be exposed, how to limit pesticide exposure and reduce the risk of heat stress, and how to respond in an emergency. They also should know how to use the pesticide labeling and other sources of information to learn about the pesticide they are using.

Be sure to provide them with specific instructions about the pesticides they will be handling and about the handling duties they will be performing. It is your legal responsibility to make sure that those you supervise are well informed and that they take all the precautions the pesticide labeling requires.

Am I Prepared for Emergencies?

Before you begin any pesticide handling activity, be sure you are prepared to deal with emergencies such as spills, injuries, and poisonings. Your emergency supplies should include at least:

- Personal decontamination equipment — Keep plenty of clean water, detergent, and paper towels nearby in a protected container to allow for fast decontamination in an emergency. Have an extra over-all-type garment nearby in case clothing becomes soaked or saturated with pesticide and must be removed.
- First aid equipment — Have a well-stocked first aid kit on hand. It should include a plastic eyewash dispenser that has a gentle flushing action.
- Spill cleanup equipment — Keep a spill cleanup kit on hand at all times. The kit should contain not only all the items needed for prompt and complete spill cleanup, but also personal protective equipment to protect you while you are dealing with the spill.
Know who to call in a medical emergency, and be familiar with the signs and symptoms of poisoning caused by the pesticides you handle. In a poisoning emergency, get the person out of the exposure at once, quickly summon medical assistance, and provide first aid.

**Are People and Animals Out of the Area?**

Do not allow anyone but trained and equipped pesticide handlers to be present during any pesticide handling task. You have the legal responsibility to make sure that no one is overexposed to pesticides that you or those you supervise are handling. Always warn workers, supervisors, and any other people who may be near the application site about which sites you plan to treat and how long they must stay out of those sites.

**Pre-Application Decisions**

Take the time to think carefully about every pesticide application before you begin. The decisions you make will determine whether you will be using the pesticide safely and correctly. Making the wrong decisions can cause problems:
- Incorrect use can result in wasted material, failure to control the pest, and damage to the target site (the animal, plant, or place to which you were applying the pesticide).
- Misused pesticides can cause immediate as well as long-term harmful effects to humans, to other living things, to property, and to other parts of the environment.
- Misused pesticides can result in fines as well as legal actions charging you with liability for damages.
- Pesticides are expensive. Using them incorrectly can be costly.

**Choice of Pesticide**

One of the first things you must decide is which pesticide to use. Your knowledge of the situation may allow you to make that decision on your own. When in doubt, ask for help in choosing the safest and most effective pesticide for the job. Your pesticide dealer, the Cooperative Extension Service, your trade association, or other experts may be able to help you choose.

**Choice of Formulation**

The pesticide you have chosen to apply may be available in several formulations. Each type of formulation has different advantages and disadvantages. Decide which one best fits your needs and the special requirements of your application site. When choosing among formulations, consider the following factors:

**Application site**

Some formulations are more likely than others to cause unwanted harm to surfaces, plants, and animals in the application site. Emulsifiable concentrates, for example, tend to pit or stain some surfaces, are easily absorbed through the skin of some animals, and may injure some plants. Dusts and powders are likely to leave a visible residue that may be unacceptable. Fumigant formulations are very likely to injure or kill all plants or animals in the application site.

When pesticides are to be broadcast over large areas, such as in mosquito, biting fly, and forestry pest control, the formulation must be chosen with great care to avoid poisoning nontarget plants and animals in the area.

Typical pesticide labeling statements that alert you to these considerations include:

*Spray droplets will permanently damage automobile paint.*

*Do not apply directly to carpet, as discoloration may occur.*
Repeated applications may cause the appearance of visible spray residues on foliage.

Do not allow spray to contact ferns, hickory, and maples, as injury may result.

Do not apply over areas containing exposed food crops.

Birds feeding on treated areas may be killed. Cover or incorporate granules.

Beekeepers should be warned well in advance to remove hives a safe distance from areas to be treated.

**Equipment**

The type of equipment available and in good working condition may limit your choice of formulation. Check to be sure you have all the equipment you need and that it is in good operating condition before you select a particular pesticide formulation.

**Pesticide movement**

Consider whether runoff is likely to carry the pesticide out of the application site. Granules, pellets, dusts, and other dry formulations that do not require water as a diluent can reduce the risk of runoff.

Consider whether air currents are likely to carry the pesticide away from the application site. If you must apply pesticides when wind or air currents are present, try to choose a formulation or application method that minimizes drift. Avoid dusts, high-pressure sprays, aerosols, and ultra-low-volume formulations. A granular or pellet formulation or a low-pressure spray with coarse droplets would be a good choice. For other types of formulations, consider using an adjuvant designed to reduce drift, such as a foaming agent, thickener, or sticker.

**Personal safety**

Some pesticide formulations are more hazardous to people than others. Emulsifiable concentrates and ultra-low-volume concentrates often contain solvents that are hazardous themselves or that allow the pesticide to pass through the skin more quickly. Fumigants and aerosols are easily inhaled. Whenever you have a choice, select the formulation that is least hazardous to the people (or animals) who will be exposed.

Some adjuvants that you mix with your pesticide may increase your risk of exposure. Penetrants and emulsifiers may allow the pesticide to travel through the skin more quickly than usual. Stickers may increase your exposure by causing the pesticide to stick to personal protective equipment, other clothing, and skin. Spreaders and wetting agents may allow the pesticide to spread out more easily, causing the pesticide to contaminate larger areas of skin or personal protective equipment.

**Target pest**

The type of formulation you select may depend on the pest you are trying to control. Sometimes an entire area must be covered with a pesticide to try to contact each pest. Other pests, however, can be controlled with baits or pesticides placed in a few locations, such as cracks and crevices, at the application site. Fog formulations are useful only for controlling pests present at the time of application. Systemic pesticides are useful for pests that are sucking fluid from or biting into plants or animals.

**Surface characteristics**

Some pesticide formulations are better suited for use on some types of surfaces than on others. Granules, for example, often provide good control on flat surfaces, but are less useful on surfaces where they are likely to slide or blow off. On a porous surface, consider using a wettable powder rather than an emulsifiable concentrate or oil-base pesticide. The wettable powder formulation will leave more pesticide remaining on the surface.

**Cost**

Pesticides that are sold as concentrates to be diluted by the user usually are the least expensive and most convenient to purchase and transport. However, these pesticides often mean more risk during mixing and loading than pesticides that are sold already diluted. It is important that the pesticide application be as economical possible, but other factors listed above may be even more important than cost when choosing the most appropriate pesticide formulation.

**Choice of Application Procedures**

The conditions at the application site will influence some of the decisions you make about the application. Consider factors that affect:

- the effectiveness of the pesticide application,
- the possible effects on you and those under your supervision who are involved in the application, and
- the possible effects on other people and the environment.
Treated spaces
Some fogging and aerosol applications are used in unenclosed areas outdoors. However, most such pesticide applications are applied to an enclosed space. The space may be a building, hold, or silo, or a smaller enclosure, such as a room or vault. Sometimes you must create the enclosed space by using tarpaulins, sheets of plastic, or other chemical-resistant coverings. Consider whether these treated spaces are sealed well enough to prevent the pesticide from escaping too quickly when it is applied. If the enclosed space is not sealed well, consider using a different application method or taking steps to improve the seal. You may need to tighten openings, cover air vents, or fasten the covering more securely at the base.

Soil surfaces
If you are directing a pesticide application at a soil surface, consider the characteristics of the soil at the application site. Organic matter in soils may “tie up” pesticides, limiting their activity. Some pesticide labeling will allow you to use higher rates on soils with high organic matter. Soil texture also affects the way pesticides work. Soils with fine particles (silt and clays) have the most surface area. The labeling may direct you to use higher rates for total coverage. Coarser soils (sands) have less surface area and may allow you to use lower rates.

Typical pesticide labeling statements that alert you to these considerations include:

In soils over 10% organic matter, use highest rate given.

Use the lowest rate for coarser textured (light) soils or soils with lower organic matter. Use a medium rate on medium textured soils or soils containing more than 5% organic matter. Use the highest rate for fine textured (heavy) soils or soils containing more than 10% organic matter.

Plant surfaces
Pesticides tend to bounce or run off narrow, upright leaves. Broad, flat leaves tend to hold the pesticide longer. Foliar sprays may be prevented from entering the leaf by a thick wax and cuticle layer. The waxy surface also tends to cause a spray solution to form droplets and run off the leaves.

A dense layer of leaf hairs may hold the pesticide droplets away from the leaf surface, causing uneven distribution on the surface and allowing less chemical to be absorbed into the plant. However, a thin layer of leaf hairs may allow more even distribution on the surface and may cause the chemical to stay on the leaf surface longer than normal, allowing more chemical to be absorbed into the plant.

Typical pesticide labeling statements that alert you to these considerations include:

Add spreader-sticker when applying to smooth or waxy surfaces.

For best results on emerged weeds, add a surfactant and apply as a directed spray.

In difficult wetting situations, such as mature waxy foliage, use the higher rate.

Other surfaces
Porous surfaces such as wood, concrete, and fabric may absorb pesticides (especially liquid or gas applications) readily. If your objective is to saturate the material with pesticide, porous surfaces are an advantage. However, if the pesticide must remain on the surface to be effective, porous surfaces may require more pesticide to gain effective control. Pesticides may bounce or run off nonporous surfaces, making it difficult to achieve an even coverage.

Applying pesticides so that they remain on upright and slanted surfaces is also difficult. Consider using adjuvants, such as stickers, that help the pesticide cling to the treated surface.

Typical pesticide labeling statements that alert you to these considerations include:

Use the lower rate on nonporous surfaces and the higher rate on porous surfaces.

Activity on porous surfaces may be limited.

The cleanliness of the surface may also affect the effectiveness of a pesticide application. An accumulation of organic matter on the soil surface may absorb many pesticides and reduce the amount available to control the target pest. For applications to surfaces other than soil, excess dust and dirt may prevent some of the pesticide from reaching the surface being treated. Consider removing these materials from the application site before you apply the pesticide.

Typical pesticide labeling statements that alert you to these considerations include:

Remove existing plant material from surface before application.

Application should be made to clean surfaces.

Before application, clean up waste materials, dust, dirt, and all other debris.
Surface moisture

Pesticides often work best with moderate surface moisture. Too much wetness may keep the pesticide from adequately contacting the surface. Dryness may prevent the pesticide from spreading evenly over the surface and contacting the target pest.

A typical pesticide labeling statement that alerts you to this consideration is:

_**Most effective when good surface moisture conditions exist.**_

Temperature, sunlight, and humidity

Temperature may influence the effectiveness of some pesticide applications. **Low temperature** slows down or stops the activity of some pesticides. Low temperature also affects some pests by making them move about less, eat less, or change into another form. These pests may be less susceptible to some pesticide applications. A typical pesticide labeling statement that alerts you to this consideration is:

_Do not apply when temperatures are below 50 °F._

High temperature and direct sunlight will influence the effectiveness of some pesticide applications. They cause some pesticides left exposed on top of surfaces to break down before there is adequate control of the pest. A typical pesticide labeling statement that alerts you to this consideration is:

_Do not apply when temperatures are above 95 °F._

High temperature, especially combined with _low humidity_, increases the likelihood that some pesticides will vaporize. Once in vapor form, pesticides can drift from the original application site and settle onto nontarget areas. When you are applying pesticides that you know or suspect can vaporize easily, consider the temperature conditions at the application site. Typical pesticide labeling statements that alert you to this consideration include:

_At high air or surface temperatures, vapors from this product may injure susceptible plants._

When applied to properly prepared soil, the liquid is converted into a gaseous fumigant.

Do not breathe vapors or fumes.

These statements provide you with an important clue that the pesticide is volatile and that you should take precautions to keep it from vaporizing and moving offsite. When the pesticide is applied as a spray, consider reducing the volatility by decreasing the pressure and increasing the droplet size.

Humidity also influences the effectiveness of some pesticide applications. For example, herbicides often work best when weeds are growing fast — usually in high humidity and optimum temperature. However, these same conditions may make the protected plant more likely to be injured by herbicides. A typical pesticide labeling statement that alerts you to this consideration is:

_Apply when conditions are favorable for weed growth._

Rain or irrigation water

In some pest control situations, you must consider whether rain or other watering will occur during or soon after a pesticide application. Sometimes such watering is helpful. Some pesticides that are applied to porous surfaces, especially soil, must be carried by water into the surface. Thorough watering also is needed to start the pesticide action after the application of some granular pesticides. Some protectant fungicides are designed to be applied to plants during or just before an expected rain or watering.
Typical pesticide labeling statements that alert you to these considerations include:

*Apply just before a light rain or water lightly after application to wash chemical down to soil.*

*Begin applications when dew or rain occur and disease threatens.*

Most pesticide applications, however, should not be made during or just before rain or watering. Rain, irrigation water, or other water that wets the surface soon after a surface application may interfere with pest control by washing off the pesticides or by causing them to leach downwards away from the surface. For outdoor applications, check the forecast and make your own weather observations. For applications to plants, check for an irrigation or watering schedule.

Typical pesticide labeling statements that alert you to these considerations include:

*Application may have to be repeated if rain occurs shortly after application.*

*Following application, and during rainfall events that cause runoff, this chemical may reach surface water bodies including streams, rivers, and reservoirs.*

Avoid wash-off of sprayed foliage within 6 hours of application.

**Air movement**

Air movement from wind or ventilation can greatly alter the effectiveness of a pesticide application. Too much air movement can blow the pesticide off target and result in inadequate control. The amount of air movement that is acceptable depends on the type of formulation and application technique you will be using. As a rule of thumb, the farther from the target surface a pesticide is applied, the less air movement is acceptable.

Typical pesticide labeling statements that alert you to these considerations are:

*Do not apply when weather conditions favor drift from treated areas.*

*Do not apply with aerial equipment when wind speed is greater than 10 mph.*

*Coarse sprays are less likely to drift; therefore, do not use nozzles or nozzle configurations which dispense spray as fine droplets.*

Sometimes you can offset air movement by allowing the air to blow the pesticide towards the area to be protected. You may be able to arrange for the ventilation system to be turned off during indoor applications.

**Scheduling Pesticide Applications**

Each pesticide application involves a different set of conditions. Your responsibility is to assess the conditions and decide when to apply the pesticide and whether to take any special precautions.

Sometimes you have no choice about when to schedule a pesticide application. In those situations, you must be careful to apply the pesticides safely under the existing conditions. If you have a choice about when an application can take place, consider applying during off-hours. Applying pesticides during very early morning hours, in the evening, or even at night — both in outdoor situations and indoors in greenhouses, malls, office buildings, and other nonresidential structures — has several advantages:

- It is less likely that people other than pesticide handlers will be nearby.
Avoid Heat Stress

Several factors work together to cause heat stress. Before you begin a pesticide handling task, think about whether any of these factors are likely to present a problem. Consider what adjustments you may need to make in the task itself or in the workplace conditions, including:

- heat factors — temperature, humidity, air movement, and sunlight,
- workload,
- personal protective equipment,
- water,
- scheduling adjustments.

Heat Factors and Workload

High temperatures, high humidity, and direct sunlight increase the likelihood that heat stress will occur. Air currents provide a cooling effect. Because hard work causes the body to produce heat, you are more likely to develop heat-related illness when you are working on foot than when you are driving a vehicle or flying an aircraft. You are even more likely to become overheated while lifting or carrying heavy containers or equipment.

- Use fans and ventilation systems and provide shade whenever possible to reduce the heat. A work area or vehicle sometimes can be shaded by a tarp or canopy or provided with fans.

- Allow time for adjustment to the heat factors and workload. People who have become used to working in the heat are less likely to be affected by heat stress. To become adjusted to hot work environments, do short periods of light work in the heat for several days in a row; then gradually increase the work period and the workload for the next several days.

- Schedule frequent breaks when the heat stress risk is high.

Personal Protective Equipment

Pesticide handling tasks often require that you wear extra layers of clothing or chemical-resistant suits and other protective equipment. This equipment keeps pesticides from getting on the skin, but it also interferes with the natural body cooling that happens when sweat evaporates from the skin. You can get overheated very quickly when you are wearing personal protective equipment.

- Choose personal protective equipment designed to be as cool as possible or to provide a cooling effect, such as a powered air-purifying respirator or, when appropriate, back-vented coveralls.

- Increase the shade or cooling by use of devices such as awnings, fans, air conditioners, and cooling vests.

Water

Evaporation of sweat from the skin helps to cool the body and maintain a constant core temperature. Under the conditions that may lead to heat stress, the body produces a large amount of sweat. Unless the water that is lost in sweat is replaced, the body can no longer regulate its temperature.
correctly. Under conditions of high temperature, strong air currents, heavy workload, or direct sunlight, a loss of as much as 1 gallon of water per hour is possible.

- Make a special effort to drink plenty of water or "sports drinks" during heat stress conditions. Do not rely on a feeling of thirst to tell you whether your body has enough water. You can lose a dangerous amount of water even before you begin to feel thirsty. You also may stop feeling thirsty long before you drink enough fluids to replace what you have lost.
- Drink plenty of water before and after work.

### Scheduling Adjustments

By taking the above steps, you will prevent most heat stress problems. But you must be ready for times when, regardless of your efforts, you or the handlers you supervise get dangerously hot. When this happens, you must:

- **Adjust work/rest cycles** — Decrease the length of work periods and increase the length of rest periods.
- **Try to schedule tasks requiring the heaviest workload or the most personal protective equipment during the coolest part of the work day.**
- **Stop work** — Under extremely hot conditions when you cannot use cooling devices, you may need to stop work until conditions improve.
Test Your Knowledge

Q. What eight basic safety questions should you ask yourself whenever you or those you supervise will be using pesticides?

A. 1. Have I read the labeling?
2. How can I avoid exposure to pesticides?
3. What personal protective equipment is needed?
4. Is the equipment ready and safe?
5. Am I avoiding the accidental spread of pesticides?
6. Have I instructed the handlers I supervise?
7. Am I prepared for emergencies?
8. Are people and animals out of the area?

Q. List some consequences of the incorrect use of pesticides.

A. 1. Incorrect use can result in wasted material, failure to control the pest, and damage to the target site.
2. Misused pesticides can cause immediate as well as long-term harmful effects to humans, to other living things, to property, and to other parts of the environment.
3. Misused pesticides can result in fines as well as legal actions charging you with liability for damages.
4. Pesticides are expensive. Using them incorrectly can be costly.

Q. Name at least four factors that you should consider when you must choose among different formulations.

A. 1. Whether the formulation will cause unwanted harm to plants, animals, or surfaces in the application site.
2. Application equipment available and best suited for the job.
3. Hazard of drift or runoff (likelihood of air currents or excess water).
4. Risk to applicator, workers, and other people and animals likely to be exposed.

Q. Name four conditions at the application site that may influence some of the decisions you make about the application.

A. Type of space or surface to be treated; surface cleanliness; surface moisture; temperature; humidity; presence of direct sunlight; possibility of rain or watering; air movement.

Q. If heat stress is a concern when you schedule a pesticide application, what five factors might you need to adjust?

A. Heat factors, workload, personal protective equipment, amount of water consumed, and the work schedule.