

2008 National FFA Floriculture CDE
Problem Solving
Problem One
Answer

In today's society, more and more people think of pesticides in a negative connotation. However, humans have been using these pesticides for centuries, and in the late 1940s, many new kinds of chemicals were discovered that allowed us to significantly increase crops and improve the quality of grains, fruits and vegetables. During the 1960s, we became more aware that pesticide use also carried a significant range of costs to society. Much research and development has occurred in the past 25 to 30 years, and we have seen the widespread use of biological, cultural and physical pest controls combined with judicious pesticide use. The goal is to combine these resources in a way that minimizes economic, health and environmental risks while maximizing effectiveness in a growing number of needs.

As horticulturists, it important for us to understand pesticides and the other options available to us so we can practice good stewardship and defend the responsible use of pesticides to those who wish to take such tools away from us.

After reviewing the following group of questions, select the answer that most closely aligns with the information in the handout before you:

- * What agency is chiefly responsible for regulating pesticides?
- * What famine was responsible for the deaths of one third of a country's population, but can now be controlled by pesticides?
- * This product is not a pesticide.
- * There are four ways of being exposed to a chemical including orally, getting it on your skin and inhaling it. Which method is missing?
- * This is not a symptom of pesticide poisoning as identified on the chart in handout.

A. Texas Department of Agriculture
British Tea Blight
Ethanol
Handshake
Nervousness

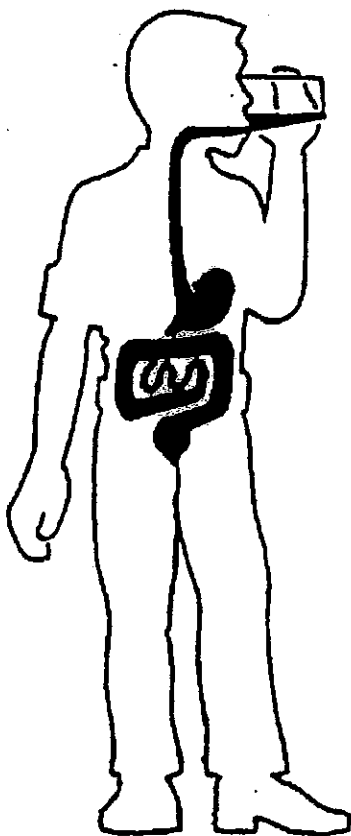
B. Department of Health Services
Ireland's Potato Famine
Diesel
Kissing
Swelling

C. Environmental Protection Agency
Ireland's Potato Famine
Ethanol
Ocular
Fatigue

D. Structural Pest Control Board
Britain's Mad Cow Disease
Dial Soap
Dermal
Stress

YOU CAN BE EXPOSED TO A CHEMICAL:

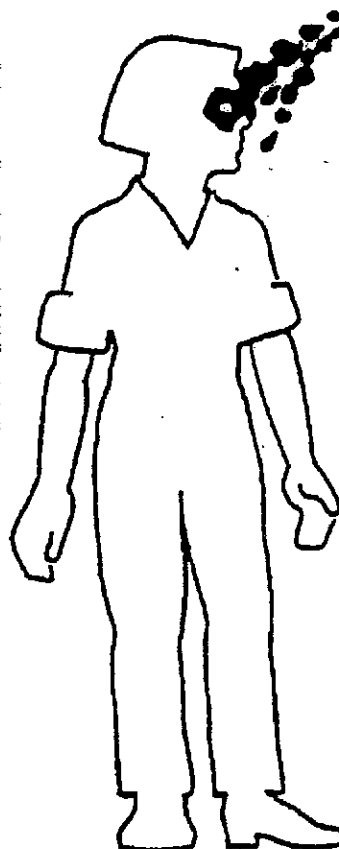
1. Through your mouth.
2. By getting it on your skin.
3. By getting it into your eyes.
4. By inhaling or breathing it into your lungs.



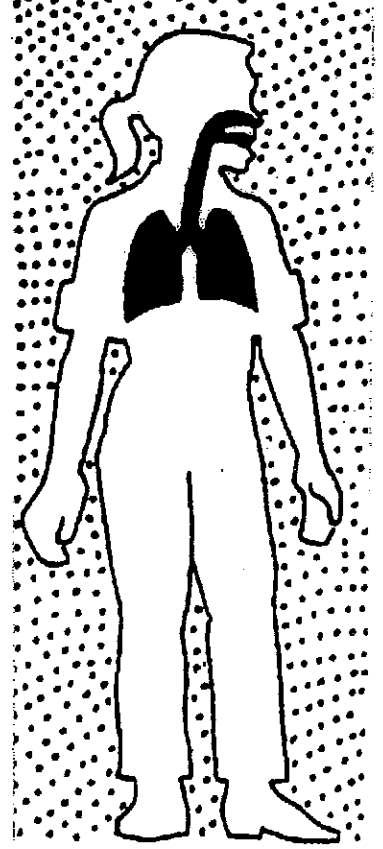
ORAL
(mouth)



DERMAL
(skin)



OCULAR
(eyes)



RESPIRATORY
(lungs)

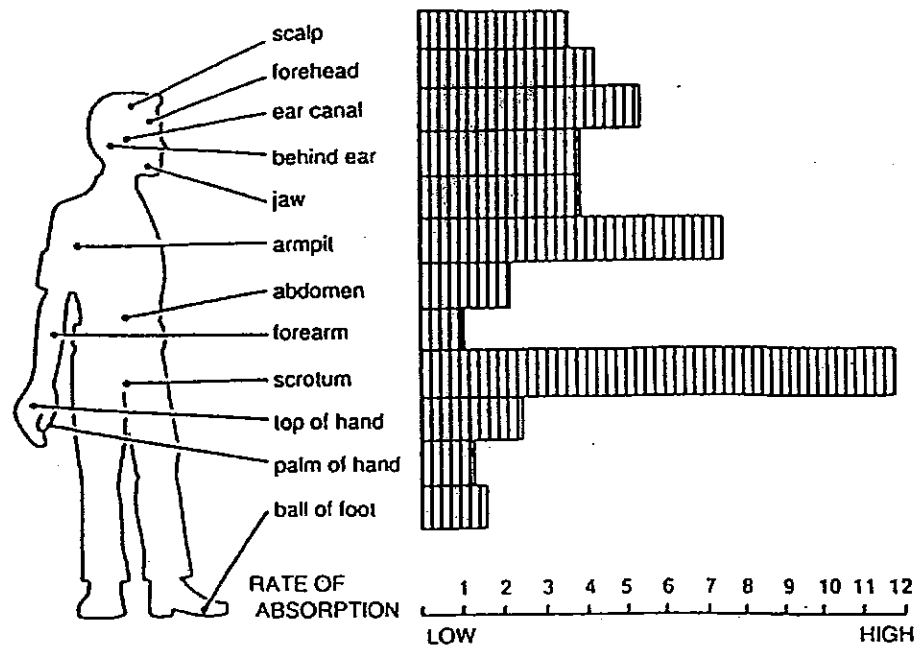


FIGURE 5. Rates of absorption in the human body depend on the pesticide formulation and the exposed areas of the body.
Source: The Safe and Effective Use of Pesticides. 1988. University of California, Publication 3324.

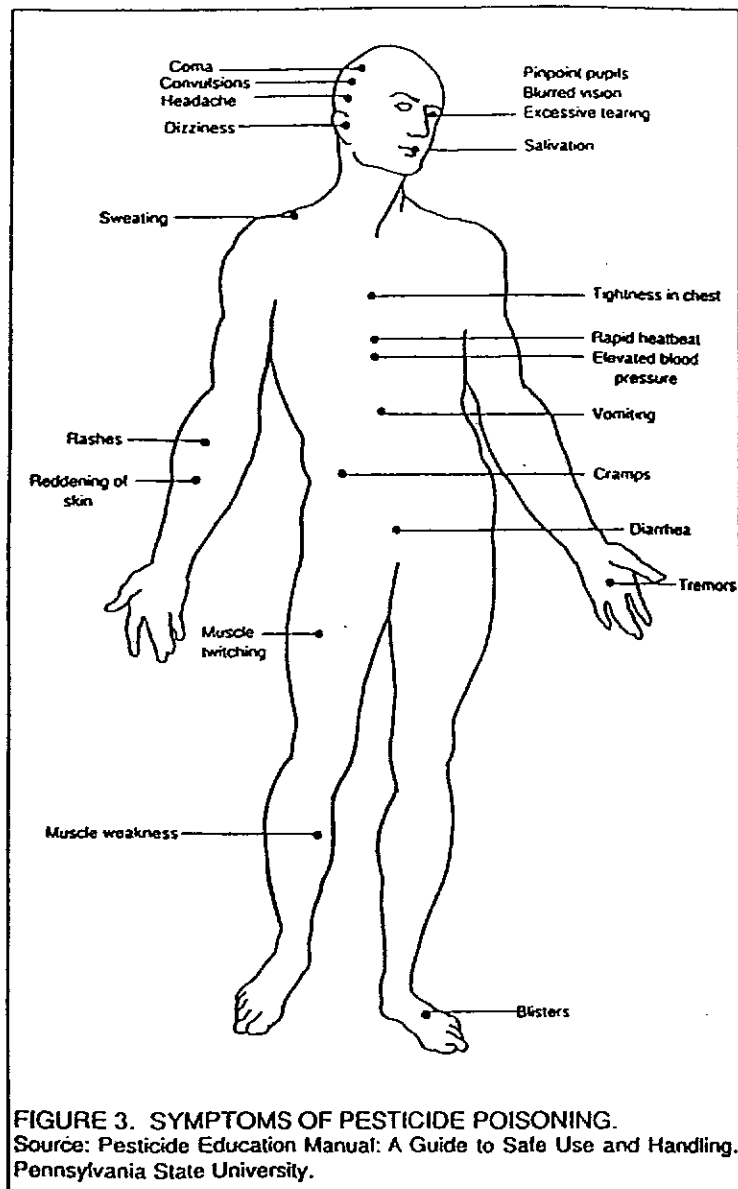


FIGURE 3. SYMPTOMS OF PESTICIDE POISONING.
Source: Pesticide Education Manual: A Guide to Safe Use and Handling.
Pennsylvania State University.



What is a Pesticide?

A pesticide is any substance or mixture of substances intended for preventing, controlling, destroying, repelling, or mitigating any pest. People often think pesticide means insecticide. Actually, pesticide refers to not only insecticides but many other kinds of chemicals. Any living organism that causes damage or economic loss or transmits or produces disease may be the target pest. Pests can be animals (like insects or mice), unwanted plants (weeds), or microorganisms (like plant diseases and viruses). Under United States law, a pesticide is also any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

Many household products are pesticides. Did you know that all of these common products are considered pesticides?

- ✱Cockroach sprays and baits
- ✱Insect repellents for personal use.
- ✱Rat and other rodent poisons.
- ✱Flea and tick sprays, powders, and pet collars.
- ✱Kitchen, laundry, and bath disinfectants and sanitizers.
- ✱Products that kill mold and mildew.
- ✱Some lawn and garden products, such as weed killers.
- ✱Some swimming pool chemicals.

Throughout history, pests have caused problems. Dinosaurs may be extinct but a prehistoric creature of another sort, the cockroach, has been crawling the earth for 350 million years. Diseases transmitted by insects, rodents and bacteria led to epidemics of deadly diseases like bubonic plague and yellow fever. Famines resulted when locusts, molds and other pests destroyed crops. During Ireland's great potato famine 150 years ago, a third of the nation's population died. It was caused by a fungus that pesticides can now control.

Since pesticides are designed to kill or otherwise adversely affect certain living organisms, most pesticides create some risk of harm to humans, animals, or the environment if used improperly. At the same time, pesticides are useful to society because of their ability to kill potential disease-causing organisms and control insects, weeds, and other pests. Biologically-based pesticides, such as pheromones and microbial pesticides, are becoming increasingly popular and often are safer than traditional chemical pesticides.

People have been using chemicals to fight pests since ancient times. In the late 1940s, many new kinds of chemicals were discovered. They helped increase crop yields dramatically and made available plentiful grains and a bountiful variety of inexpensive fruits and vegetables. However, during the 1960s, we became aware that pesticide use had its costs. Concern increased about potential health effects, environmental contamination, and effects on wildlife. Some pests became immune to many pesticides. This all led to stricter pesticide regulation. In the 1980s and 1990s we have seen more widespread use of biological, cultural, and physical pest controls combined with judicious pesticide use. The goal is to combine them in a way that minimizes economic, health, and environmental risks.

All aspects of pesticide sales and use are regulated with the recognition that pests must be controlled, public health and the environment be protected, and reduced-risk pest management strategies be fostered. This strict oversight includes product evaluation and registration, local use enforcement, environmental monitoring, and residue testing of fresh produce.

In the United States, the Office of Pesticide Programs of the Environmental Protection Agency is chiefly responsible for regulating pesticides.

Here are some common kinds of pesticides and their function:

| | |
|--|---|
| Algicides | Control algae in lakes, canals, swimming pools, water tanks, and other sites. |
| Antifouling agents | Kill or repel organisms that attach to underwater surfaces, such as boat bottoms. |
| Antimicrobials | Kill microorganisms (such as bacteria and viruses). |
| Attractants | Attract pests (for example, to lure an insect or rodent to a trap). (However, food is not considered a pesticide when used as an attractant.) |
| Biocides | Kills microorganisms. |
| Disinfectants and Sanitizers | Kill or inactivate disease- producing microorganisms on inanimate objects. |
| Fungicides | Kill fungi (including blights, mildews, molds, and rusts). |
| Fumigants | Produce gas or vapor intended to destroy pests in buildings or soil. |
| Herbicides | Kill weeds and other plants that grow where they are not wanted. |
| Insecticides | Kill insects and other arthropods. |
| Miticides (also called acaricides) | Kill mites that feed on plants and animals. |
| Microbial pesticides | Microorganisms that kill, inhibit, or out compete pests, including insects or other microorganisms. |
| Molluscicides | Kill snails and slugs. |
| Nematicides | Kill nematodes (microscopic, worm-like organisms that feed on plant roots). |
| Ovicides | Kill eggs of insects and mites. |
| Pheromones | Biochemicals used to disrupt the mating behavior of insects. |
| Repellents | Repel pests, including insects (such as mosquitoes) and birds. |
| Rodenticides | Control mice and other rodents. |
| The term pesticide also includes these substances: | |
| Defoliants | Cause leaves or other foliage to drop from a plant, usually to facilitate harvest. |
| Desiccants | Promote drying of living tissues, such as unwanted plant tops. |
| Insect growth regulators | Disrupt the molting, maturity from pupal stage to adult, or other life processes of insects. |
| Plant growth regulators | Substances (excluding fertilizers or other plant nutrients) that alter the expected growth, flowering, or reproduction rate of plants. |

For information on Pesticide Applicator Certification see <http://www-aes.tamu.edu/pat/patinfo.htm>

For the American Association of Pesticide Applicators see <http://aapse.ext.vt.edu/>

See EPA Web Site see <http://www.epa.gov/pesticides/> Learn About Chemicals Around Your House

| Hazard Level Toxicity Level | Toxicity Categories | | | |
|---|---|---|--|---|
| | I Highly Toxic | II Moderately Toxic | III Slightly Toxic | IV Relatively Nontoxic |
| Oral LD ₅₀ * | Up to 50 mg/kg | > 50 - 500 mg/kg | > 500 - 5000 mg/kg | More than 5000 mg/kg |
| Inhalation LC ₅₀ | Up to 0.2 mg/l | > 0.2 - 2.0 mg/l | > 2.0 - 20 mg/l | More than 20 mg/l |
| Dermal LD ₅₀ | Up to 200 mg/kg | > 200 - 2000 mg/kg | > 2000 - 20,000 mg/kg | More than 20,000 mg/kg |
| Eye Effects | Corrosive; corneal opacity not reversible within 7 days. | Corneal opacity reversible within 7 days; irritation persists 7 days. | No corneal opacity; irritation reversible within 7 days. | No irritation. |
| Skin Effects | Corrosive. | Severe irritation at 72 hours. | Moderate irritation at 72 hours. | Mild or slight irritation after 72 hours. |
| SIGNAL word required on label | DANGER (POISON! skull & crossbones)** | WARNING | CAUTION | CAUTION |
| Approximate oral dose that can kill an average person | A few drops to 1 teaspoonful (or a few drops on the skin) | more than 1 teaspoonful to 1 ounce | more than one ounce to 1 pint or 1 pound | more than 1 pint or 1 pound |

* LD₅₀ values are stated as the mg per kg of body weight that could kill 50 % of a test population. [1 mg/kg = one part per million (ppm). 1 ppm can be thought of as 1 inch in 16 miles, or 1 drop in 50 gallons, or 1 second in 12 days, etc.]

LC₅₀ is the concentration in the air in mg per liter (mg/cubic meter or µg per liter) that could kill 50 % of a test population in a defined period of time.

** Not all DANGER are also POISON but if POISON then must have skull and crossbones.

Note: All pesticide labels must include the statement, KEEP OUT OF REACH OF CHILDREN

(Values from Code of Federal Regulations - 40CFR Section 156.10 (h)(1))



POISON EMERGENCY?
Call your poison center right away.

DEVIATIONS FROM THE PESTICIDE LABEL

The use of a pesticide in a manner inconsistent with the label is a violation of FIFRA. The original prohibition of "use of any registered pesticide in a manner inconsistent with its labeling" was modified in 1978 [FIFRA Sec. 2 (ee)] to allow some deviations. Specifically there are four exceptions which allow applicators to vary applications from label instructions.

1. Application of a pesticide at dosages, concentrations, or frequencies less than those specified on the label.
2. Application of a pesticide against a target pest that is not specified on the label - if the crop, animal or site is specified on the label - - unless the label prohibits the use.
3. Use application methods not prohibited by the label instructions. (More recent regulations require that certain types of applications, such as chemigation, be specified on the label.)
4. Use mixtures of pesticides, or pesticides with fertilizers if they are not prohibited by label instructions.

Always
READ and UNDERSTAND
the **LABEL**
before using any
PESTICIDE

No publication is a substitute for the product label. Laws and regulations change constantly - especially on a local or state level. No use recommendation is correct unless it is printed on the *most current* LABEL or LABELING inserts. Also, state law can be more stringent than federal law. Therefore, state and local regulations must be checked *before* using any product.

Follow *ALL* label instructions
and
pesticide can be used safely.

What is a Pest ?

Pests do not exist in nature. *Pests* become pests in the mind of man. In a natural ecosystem good and bad organisms do not exist. All living things can be divided into producers, consumers, and decomposers. Plants (producers) make food from CO₂ in the air, H₂O, chemical elements dissolved in the water, and sunlight. Animals (consumers) eat the food that the plants make. When plants or animals die, microbes, maggots, insects, etc. (decomposers) help to break down the tissues to chemical elements and small compounds like N, P, K, S, and CO₂ and H₂O.

A *pest* becomes a *pest* when it interferes with man and his activities. The word *pest* is a human term and in most languages the equivalent of *pest* refers to evil sent to trouble people (Latin - *pestis*, French - *peste* meaning plague). Ancient religious beliefs held that gods and demons ruled the forces of nature. So, anything that destroyed crops and injured humans must have been sent from the unpredictable realms of the supernatural.

To man, a *pest* is anything that:

- *competes* for food, feed, water or space;
- *injures* humans, animals, crops, structures, possessions;
- *spreads* disease;
- *annoys* humans or domestic animals.

Common *pests* include weeds, insects, mice, rats, fungi, slugs, spiders, nematodes, and bacteria.

What is a pesticide?

A **pesticide** is a chemical used to eliminate a *pest*. There are many different active ingredients registered with at least 30X that number of different labels (one chemical can be packaged and sold under many different labels).

Kinds of pesticides: (% of weight used as active ingredient in the USA)

- Herbicides for weed control (57 %)
- Insecticides for insect control (23 %)
- Fungicides for disease control (12 %)
- Rodenticides for rat and mouse control and all others (8 %)

Where are pesticides used?

- 73 % - Agriculture
- 12 % - Forestry, Industry, Government
- 11 % - Home and Garden

An Integrated Pest Management approach should be used for proper pest management.

Steps in Integrated Pest Management (IPM) include:

1. Identify the pest.
2. Evaluate the damage caused by the pest.
3. Determine if controls are needed.
4. Consider multiple control.
5. Select the best combination of controls.
6. Monitor your decision.

The Texas Department of Agriculture - Pesticide Programs

< http://www.agr.state.tx.us/agr/program_render/0,1987,1848_5319_0_0,00.html?channel=5319 >

Pesticide Applicator Exams: TDA pesticide applicator license exams are offered in Austin the first Tuesday of the month from 8:30-3:30. The Austin office is in the Stephen F. Austin Building at 17th and Congress. Report to the 11th floor reception area. Tests may be taken other days by making an appointment. Always call (512-463-7622) in advance to confirm date and availability.

Dates of testing at other TDA offices are listed below - Applicator Exam Locations - Always call to confirm testing date.

Region 1

West Texas TDA Regional Office
4502 Englewood Ave.
Lubbock, TX 79414
806/799-8555
1st and 3rd Monday
(other days by appointment)

Texas A&M Research and Extension
Center
650 Amarillo Blvd., West
Amarillo, TX 79106
806/358-7285
2nd Thursday

Taylor County Extension Office
1982 Lytle Way
Abilene, Texas 79602
806/799-8555
2nd Monday

Midland County Extension Office
2445 East Business Loop 20
Midland, Texas 79701
806/799-8555
1st Tuesday

El Paso TDA Office
10800 Socorro Road
El Paso, TX 79927
915/859-3942
1st Wednesday

Region 2

North Texas TDA Regional Office
Regal Tech Center
1720 Regal Row, Suite 118
Dallas, TX 75235
214/631-0265
1st Wednesday

Stephenville TDA Office
241 E. McNeill Street
Stephenville, TX 76401
254/965-5097
3rd Wednesday

Tyler TDA Office
3323 S. Southwest Loop 323
Tyler, TX 75701
903/939-3999
2nd Wednesday

Texas Cooperative Extension
Courthouse Annex
600 Scott St., Suite 200
214/631-0265
4th Wednesday of odd months

Region 3

Gulf Coast TDA Regional Office
Elias Ramirez State Office Building
5425 Polk Avenue
Houston, TX 77023
(713) 921-8200
by appointment Monday-Friday

Call (713) 921-8200 for appointments
at the three locations below.

Harris County Extension Service
#2 Abercrombie
Houston, Texas 77084
Last Monday

Texas A&M Research and Extension
Center
2619 Hwy. 21 W.
Bryan, Texas 77803
3rd Wednesday

Texas A&M Research and Extension
Center
1509 Aggie Dr.
Beaumont, Texas 77713
2nd Wednesday of odd months

Region 4

South Central TDA Regional Office
8918 Tesoro Drive, Suite 120
San Antonio, TX 78217
210/820-0288
2nd Monday

Austin TDA Headquarters
1700 N. Congress Ave.
Austin, TX 78701
512/463-7622
1st Tuesday

Texas A&M Research and Extension
Center
1619 Garner Field Road
Uvalde, TX 78802-1849
210/820-0288
2nd Monday of even months

Texas A&M Research and Extension
Center
7887 Hwy. 87 North
San Angelo, TX 76901-9782
210/820-0288
2nd Tuesday

Region 5

Valley TDA Regional Office
900-B E. Expressway 83
San Juan, TX 78589
956/787-8866
1st Tuesday

Corpus Christi TDA Office
5155 Flynn Parkway, Suite 100
Corpus Christi, TX 78411
361/851-2745
1st Tuesday

Texas Cooperative Extension
Agricultural & Environmental Safety
Mary L. Ketchersid,
Ph.D. Weed Science
115 Agronomy Field Lab
2488 - TAMU
College Station, TX 77843-2488
phone: 979-845-6531
FAX: 979-458-2777
<m-ketchersid@tamu.edu>
<<http://agensvafety.tamu.edu/mary/mmary.htm>>

2008 National Floriculture Career Development Event

Problem Two Answer

It is approximately 2:00 PM on a Thursday afternoon. You are in the florist shop working on an order when your supervisor, who is currently treating for whiteflies, calls you on the intercom and ask you to bring his folder with the MSDS information to the greenhouse across the alley from the shop. As you walk out the back door of the shop and start across the alley, you see a bolt of lightning strike a tree between the pole where the breaker box is located and the greenhouse. As the tree falls, it gets tangled in the wiring going into the greenhouse from the breaker box and sparks fly. The tree lands across the frame of the greenhouse. You call out for your supervisor, but do not get a response.

How do you proceed to handle this situation?

A. Open the door of the greenhouse and get your supervisor to safe ground and fresh air. Then refer to the Monsanto MSDS for instructions on how to treat for Roundup poisoning.

B. Call 911 and then immediately go in and take your supervisor to safety. Begin giving him CPR until the paramedics arrive. Then give them the Olympic MSDS related to Marathon.

C. Call 911 and describe the problem including fact that a hazardous material was in use. Tell them supervisor was spraying with Marathon. Have MSDS available when they arrive. While waiting, check area for fallen wires and throw breaker if safe.

D. Call 911 and let them know a hazardous material is involved. With caution, gently turn handle of greenhouse door to make sure it won't shock you. Then go in and determine your supervisor's condition and refer to Monsanto MSDS for correct manner of treatment. As soon as paramedics arrive, let them take charge.

Tips: Answer A is dealing with wrong chemical and disregarding electrical wires.

Answer B is disregarding the potential hazard of electricity and failing to determine real problem.

Answer D sets you up to be electrocuted and uses wrong MSDS.

Answer C addresses electrical danger and potential chemical danger and chemical.

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Floriculture CDE
Problem Solving

Problem Three

Answer

Situation:

Your employer has received a shipment of 24 bundles of standard carnations in assorted colors (25 carnations per bundle) for sale in your shop. The wholesaler billed your employer \$216 for the 24 bundles of carnations. Your employer operates on a 3.5 to 1 markup on all merchandise you sell in your shop. Using the Retailers' Markup Chart, your employer asks you to determine how much to charge your customers for the carnations per dozen and each bloom. How much will you determine to price the carnations per dozen and per bloom?

- A. 18.24 per dozen; \$1.52 per bloom
- B. 18.48 per dozen; \$1.54 per bloom
- C. 20.52 per dozen; \$1.71 per bloom
- D. 19.44 per dozen; \$1.62 per bloom

$$\text{\$216 divide by 24} = \text{\$9.00 divided by 25} = .36$$

$$\text{\$16.20} + \text{\$3.24} = \text{\$19.44 divided by 12} = \text{\$1.62}$$

Retailers Markup Chart *

| You Pay per flower | 100% Markup | 150% Markup | 200% Markup | 250% Markup | 300% Markup | 350% Markup | 400% Markup |
|-----------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| 0.02 | 0.48 | 0.60 | 0.72 | 0.84 | 0.96 | 1.08 | 1.20 |
| 0.03 | 0.72 | 0.90 | 1.08 | 1.26 | 1.44 | 1.62 | 1.80 |
| 0.04 | 0.96 | 1.20 | 1.44 | 1.68 | 1.92 | 2.16 | 2.40 |
| 0.05 | 1.20 | 1.50 | 1.80 | 2.10 | 2.40 | 2.70 | 3.00 |
| 0.06 | 1.44 | 1.80 | 2.16 | 2.52 | 2.88 | 3.24 | 3.60 |
| 0.07 | 1.68 | 2.10 | 2.52 | 2.94 | 3.36 | 3.78 | 4.20 |
| 0.08 | 1.92 | 2.40 | 2.88 | 3.36 | 3.84 | 4.32 | 4.80 |
| 0.09 | 2.16 | 2.70 | 3.24 | 3.78 | 4.32 | 4.86 | 5.40 |
| 0.10 | 2.40 | 3.00 | 3.60 | 4.20 | 4.80 | 5.40 | 6.00 |
| 0.11 | 2.64 | 3.30 | 3.96 | 4.62 | 5.28 | 5.94 | 6.60 |
| 0.12 | 2.88 | 3.60 | 4.32 | 5.04 | 5.76 | 6.48 | 7.20 |
| 0.13 | 3.12 | 3.90 | 4.68 | 5.46 | 6.24 | 7.02 | 7.80 |
| 0.14 | 3.36 | 4.20 | 5.04 | 5.88 | 6.72 | 7.56 | 8.40 |
| 0.15 | 3.60 | 4.50 | 5.40 | 6.30 | 7.20 | 8.10 | 9.00 |
| 0.16 | 3.84 | 4.80 | 5.76 | 6.72 | 7.68 | 8.64 | 9.60 |
| 0.17 | 4.08 | 5.10 | 6.12 | 7.14 | 8.16 | 9.18 | 10.20 |
| 0.18 | 4.32 | 5.40 | 6.48 | 7.56 | 8.64 | 9.72 | 10.80 |
| 0.19 | 4.56 | 5.70 | 6.84 | 7.98 | 9.12 | 10.26 | 11.40 |
| 0.20 | 4.80 | 6.00 | 7.20 | 8.40 | 9.60 | 10.80 | 12.00 |
| 0.21 | 5.04 | 6.30 | 7.56 | 8.82 | 10.08 | 11.34 | 12.60 |
| 0.22 | 5.28 | 6.60 | 7.92 | 9.24 | 10.56 | 11.88 | 13.20 |
| 0.23 | 5.52 | 6.90 | 8.28 | 9.66 | 11.04 | 12.42 | 13.80 |
| 0.24 | 5.76 | 7.20 | 8.64 | 10.08 | 11.52 | 12.96 | 14.40 |
| 0.25 | 6.00 | 7.50 | 9.00 | 10.50 | 12.00 | 13.50 | 15.00 |
| 0.26 | 6.24 | 7.80 | 9.36 | 10.92 | 12.48 | 14.04 | 15.60 |
| 0.27 | 6.48 | 8.10 | 9.72 | 11.34 | 12.96 | 14.58 | 16.20 |
| 0.28 | 6.72 | 8.40 | 10.08 | 11.76 | 13.44 | 15.12 | 16.80 |
| 0.29 | 6.96 | 8.70 | 10.44 | 12.18 | 13.92 | 15.66 | 17.40 |
| 0.30 | 7.20 | 9.00 | 10.80 | 12.60 | 14.40 | 16.20 | 18.00 |

| You Pay per Bunch | 1.00 Markup | 1.50 Markup | 2.00 Markup | 2.50 Markup | 3.00 Markup | 3.50 Markup | 4.00 Markup |
|----------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| 0.50 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 | 2.25 | 2.50 |
| 0.75 | 1.50 | 1.88 | 2.25 | 2.63 | 3.00 | 3.38 | 3.75 |
| 1.00 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 |
| 1.25 | 2.50 | 3.13 | 3.75 | 4.38 | 5.00 | 5.63 | 6.25 |
| 1.50 | 3.00 | 3.75 | 4.50 | 5.25 | 6.00 | 6.75 | 7.50 |
| 1.75 | 3.50 | 4.38 | 5.25 | 6.13 | 7.00 | 7.88 | 8.75 |
| 2.00 | 4.00 | 5.00 | 6.00 | 7.00 | 8.00 | 9.00 | 10.00 |
| 2.25 | 4.50 | 5.63 | 6.75 | 7.88 | 9.00 | 10.13 | 11.25 |
| 2.50 | 5.00 | 6.25 | 7.50 | 8.75 | 10.00 | 11.25 | 12.50 |
| 2.75 | 5.50 | 6.88 | 8.25 | 9.63 | 11.00 | 12.38 | 13.75 |
| 3.00 | 6.00 | 7.50 | 9.00 | 10.50 | 12.00 | 13.50 | 15.00 |
| 4.00 | 8.00 | 10.00 | 12.00 | 14.00 | 16.00 | 18.00 | 20.00 |
| 5.00 | 10.00 | 12.50 | 15.00 | 17.50 | 20.00 | 22.50 | 25.00 |

*Determine the markup you want to charge, and this chart will give you the selling price per dozen (top chart) or per bunch (bottom chart)

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Problem Four

Situation:

You are the production manager in a floral greenhouse operation. You are planning the next crop of 7500 6 inch pots of Chrysanthemums. It has been your experience in the past that Rhizoctonia and Pythium stem and root rots can affect your crop. You plan to try a new biological fungicide called RootShield to control these disorders before they start. In this greenhouse operation you decide RootShield is best applied by mixing thoroughly into the artificial potting medium, before planting, at a rate of 1.0 – 1.5 lbs. per cubic yard of soil mix.

From the table provided, calculate how much soil mix you need to pre-treat with the biological material to grow this crop and the minimum amount of RootShield you will need to order, using the minimum rate of treatment.

A. 20 cubic yards and 20 pounds of RootShield

B. 178 cubic yards and 267 pounds of RootShield

C. 20 cubic yards and 30 pounds of RootShield

D. 25.2 cubic yards and 45 pounds of RootShield

$7500 \text{ (6" pots)} / 14 = 535.71 \text{ cubic feet of soil}$

$535.71 / 27 = 19.84 \text{ cubic yards of soil mix}$ This would be rounded up to 20.

$1.00 \text{ lb. of RootShield} \times 20 \text{ cubic yards} = 20 \text{ pounds of RootShield}$

**Number of Standard Pots that can be filled from 1 Cubic Foot of Artificial
Potting Soil**

| Pot Size (inches) | Number/ cubic foot of mix |
|--------------------------|----------------------------------|
| 2.25 | 296 |
| 2.50 | 176 |
| 3.00 | 120 |
| 4.00 | 44 |
| 5.00 | 24 |
| 6.00 | 14 |
| 7.00 | 9 |
| 8.00 | 5.6 |
| 12.00 | 1.6 |

**2008 National FFA
Floriculture CDE
Problem Five**

Answer Key

Situation:

Your landscape design firm has been hired to design and install a garden in Springfield, New Jersey. The homeowner states that attracting birds, particularly robins, would be desirable because that provides more interest for their housebound niece who lives with them. Using the materials at your place, make appropriate plant recommendations for the shrubs that will provide the perennial borders to this garden room.

Which group below provides appropriate plants for the specified garden?

- A. Coralberry, Fragrant Sumac, Nannyberry, Winterberry
- B. Beauty Bush, Hybrid Weigela, Orange-eyed Butterfly Bush, Siberian Pea Tree
- C. Blue Elder, Snowberry, Red Osier Dogwood, Staghorn Sumac
- D. Amur Honeysuckle, Arrowwood, High-Bush Blueberry, Nannyberry, Sargent Crab Apple**

A selection of flowering shrubs to attract birds

| REGION | SHRUB | FRUIT OR FLOWER | SEASON | BIRDS MOST OFTEN ATTRACTED |
|--|---------------------------|----------------------------|--------------------------|--|
| NORTHEAST Connecticut Delaware Illinois Indiana Iowa Kentucky Maine Maryland Massachusetts Michigan Minnesota Missouri New Hampshire New Jersey New York Ohio Ontario Pennsylvania Quebec Rhode Island Vermont Virginia West Virginia Wisconsin | AMERICAN ELDER | Blue-black berries | Late summer to midfall | BLUEBIRDS, CATBIRDS, FLICKERS, MOCKINGBIRDS, ROSE-BREADED GROSBILLS, WOODPECKERS |
| | AMUR HONEYSUCKLE | Red berries | Fall to midwinter | CARDINALS, CEDAR WAXWINGS, ROBINS, THRASHERS, THRUSHES, TOWHEES, WINTER FINCHES |
| | ARROWWOOD | Blue-black berries | Fall | BLUEBIRDS, CATBIRDS, FLICKERS, ROBINS, THRUSHES |
| | BAYBERRY | Gray berries | Fall to early spring | BLUEBIRDS, CAROLINA WRENS, DOWNY WOODPECKERS, HERMIT THRUSHES, MYRTLE WARBLERS, TREE SWALLOWS |
| | BLACK HAW | Blue-black berries | Fall | CEDAR WAXWINGS, PILEATED WOODPECKERS, SWAINSON'S THRUSHES, YELLOW-BILLED CUCKOOS |
| | HIGH-BUSH BLUEBERRY | Blue-black berries | Midsummer to midfall | BLUEBIRDS, CHICKADEES, HERMIT THRUSHES, ORCHARD ORIOLES, ROBINS, TOWHEES |
| | NANNYBERRY | Black berries | Fall | CATBIRDS, CEDAR WAXWINGS, FLICKERS, HERMIT THRUSHES, ROBINS, ROSE-BREADED GROSBILLS |
| | PINKET-BLOOM AZALEA | Pink or white flowers | Spring | RUBY-THROATED HUMMINGBIRDS |
| | SARGENT CRAB APPLE | White flowers | Spring | RUBY-THROATED HUMMINGBIRDS |
| | | Dark red fruit | Fall | CEDAR WAXWINGS, EVENING AND PINE GROSBILLS, PURPLE FINCHES, ROBINS |
| | SIBERIAN DOGWOOD | Blue-white berries | Fall | CARDINALS, CHATS, FINCHES, FLYCATCHERS, MOCKINGBIRDS, TREE SWALLOWS |
| | TATARIAN HONEYSUCKLE | Pink or red flowers | Late spring | RUBY-THROATED HUMMINGBIRDS, |
| | | Red or yellow berries | Summer | BROWN THRASHERS, CATBIRDS, CEDAR WAXWINGS, PURPLE FINCHES, ROBINS |
| | WINTERBERRY | Red berries | Late summer to midwinter | BLUEBIRDS, BROWN THRASHERS, CARDINALS, CEDAR WAXWINGS |
| SOUTH AND SOUTHEAST Alabama Arkansas Florida Georgia Louisiana Mississippi North Carolina South Carolina Tennessee | AMERICAN ELDER | Blue-black berries | Late summer to midfall | BROWN THRASHERS, CARDINALS, CAROLINA CHICKADEES, CHATS, FLICKERS, INDIGO BUNTINGS, MOCKINGBIRDS, PHOEBES |
| | ARROWWOOD | Blue-black berries | Fall | BROWN THRASHERS, CATBIRDS, PHOEBES, ROBINS, WHITE-EYED VIREOS |
| | BAYBERRY | Gray berries | Fall to early spring | DOWNY WOODPECKERS, HERMIT THRUSHES, MYRTLE WARBLERS, TREE SWALLOWS |
| | BLACK HAW | Blue-black berries | Fall | CAROLINA CHICKADEES, DOWNY AND RED-BELLIED WOODPECKERS, HERMIT THRUSHES, MOCKINGBIRDS |
| | HIGH-BUSH BLUEBERRY | Blue-black berries | Midsummer to midfall | CATBIRDS, CHATS, ORIOLES, PHOEBES, TANAGERS |
| | HYBRID WEIGELA | Pink, red or white flowers | Spring | RUBY-THROATED HUMMINGBIRDS |
| | MANY-FLOWERED COTONEASTER | Red berries | Fall | BLUEBIRDS, CEDAR WAXWINGS, MOCKINGBIRDS, ROBINS |
| | SAPPHIREBERRY | Blue berries | Fall | BLUEBIRDS, CARDINALS, CATBIRDS, MOCKINGBIRDS, SUMMER TANAGERS |
| | SIBERIAN DOGWOOD | Blue-white berries | Fall | BLUEBIRDS, CATBIRDS, CEDAR WAXWINGS, MOCKINGBIRDS, WOOD THRUSHES |
| | SMOOTH SUMAC | Red berries | Fall to early spring | BLUEBIRDS, CAROLINA CHICKADEES, CATBIRDS, DOWNY WOODPECKERS, MOCKINGBIRDS |

(continued on next page)

A selection of flowering shrubs to attract birds (CONTINUED)

| REGION | SHRUB | FRUIT OR FLOWER | SEASON | BIRDS MOST OFTEN ATTRACTED |
|--|----------------------------|-------------------------------------|--------------------------|---|
| NORTH AND SOUTH CENTRAL Kansas Manitoba Nebraska North Dakota Oklahoma South Dakota Texas | BEAUTY BUSH | Pink flowers | Early summer | RUBY-THROATED AND RUFOUS HUMMINGBIRDS |
| | CORALBERRY | Purple-red berries | Fall to midwinter | HERMIT THRUSHES, PURPLE FINCHES, ROBINS, WAXWINGS, WOODPECKERS |
| | FRAGRANT SUMAC | Dark red berries | Summer | BLUEBIRDS, RED-HEADED WOODPECKERS, ROBINS, THRASHERS, YELLOW-SHAFTED FLICKERS |
| | NANNYBERRY | Black berries | Fall | CARDINALS, CATBIRDS, CEDAR WAXWINGS, FLICKERS, HERMIT THRUSHES, ROBINS |
| | ORANGE-EYED BUTTERFLY BUSH | Blue, pink, purple or white flowers | Midsummer to frost | RUBY-THROATED HUMMINGBIRDS |
| | SIBERIAN DOGWOOD | Blue-white berries | Fall | BLUEBIRDS, CARDINALS, CHATS, EVENING GROSBEEKS, THRUSHES, TREE SWALLOWS, WAXWINGS |
| | SIBERIAN PEA TREE | Yellow flowers | Spring | RUBY-THROATED AND RUFOUS HUMMINGBIRDS |
| | WINTERBERRY | Red berries | Late summer to midwinter | BLUEBIRDS, BROWN THRASHERS, CARDINALS, CEDAR WAXWINGS, PURPLE FINCHES, ROBINS |
| WEST AND SOUTHWEST Alberta Arizona Colorado Idaho Montana Nevada New Mexico Saskatchewan Utah Wyoming | AMERICAN ELDER | Blue-black berries | Late summer to midfall | LEWIS'S WOODPECKERS, MAGPIES, MOUNTAIN BLUEBIRDS, SPARROWS, THRUSHES, WARBLING VIREOS |
| | BLACK HAW | Blue-black berries | Fall | HERMIT THRUSHES, ROBINS, TOWNSEND'S SOLITAIRE, VEERIES, WAXWINGS |
| | NANNYBERRY | Black berries | Fall | BLUEBIRDS, BOHEMIAN AND CEDAR WAXWINGS, CATBIRDS, FLICKERS, HERMIT THRUSHES |
| | RED OSIER DOGWOOD | White berries | Summer | BULLOCK'S ORIOLES, CARDINALS, HERMIT THRUSHES, MOCKINGBIRDS, SWAINSON'S THRUSHES |
| | RUNNING SERVICEBERRY | Purple-black berries | Summer | GREEN-TAILED TOWHEES, LEWIS'S WOODPECKERS, MAGPIES, SWAINSON'S THRUSHES, TOWNSEND'S SOLITAIRE |
| | SIBERIAN PEA TREE | Yellow flowers | Spring | BROAD-TAILED HUMMINGBIRDS |
| | SNOWBERRY | White berries | Midsummer to midwinter | EVENING AND PINE GROSBEEKS, MAGPIES, ROBINS, RUFOUS-SIDED TOWHEES |
| | STAGHORN SUMAC | Red berries | Fall to early spring | EVENING GROSBEEKS, HERMIT THRUSHES, MAGPIES, ROBINS, TOWNSEND'S SOLITAIRE |
| | TATARIAN HONEYSUCKLE | Pink or red flowers | Late spring | BROAD-TAILED HUMMINGBIRDS, |
| | | Red or yellow berries | Summer | BOHEMIAN AND CEDAR WAXWINGS, HERMIT AND SWAINSON'S THRUSHES |
| FAR WEST British Columbia California Oregon Washington | BEAUTY BUSH | Pink flowers | Early summer | ANNA'S, BLACK-CHINNED, CALLIOPE AND RUFOUS HUMMINGBIRDS |
| | BLUE ELDER | Blue-black berries | Late summer | BLACK-HEADED GROSBEEKS, CALIFORNIA THRASHERS, PHAINOPEPLAS, STELLER'S JAYS, SWAINSON'S THRUSHES |
| | JAPANESE ROSE | Orange-red fruit | Fall | EVENING GROSBEEKS, ROBINS, THRUSHES, TOWHEES, TOWNSEND'S SOLITAIRE |
| | MAGELLAN FUCHSIA | Red and violet flowers | Early summer to frost | ANNA'S, BLACK-CHINNED, CALLIOPE AND RUFOUS HUMMINGBIRDS |
| | SNOWBERRY | White berries | Midsummer to midwinter | BLACK-HEADED, EVENING AND PINE GROSBEEKS, ROBINS, SPOTTED TOWHEES, VARIED THRUSHES, WREN TITS |

**2008 National FFA
Floriculture CDE
Answer Key**

Problem Six

Situation:

As greenhouse production supervisor for Mid States Nursery, you plan to grow poinsettias in 8 inch standard pots, 3 plants per pot. Available bench space is limited to 20 benches, 10 measuring 4 by 10 feet, and 10 measuring 4 by 15 feet. You decide to use commercial growing media in 4 cubic foot bales at \$18.00 per bale.

Based on the information provided at your station, answer the following:

- 1) How many pots can you produce?
- 2) How many cuttings should you order?
- 3) How many bales of growing media are required?
- 4) What is the total cost of the media?
- 5) What is the per pot cost of the media?

- A.
- 1) 1,000
 - 2) 3,000
 - 3) 17
 - 4) \$ 306
 - 5) \$.31

- B.
- 1) 400
 - 2) 1,200
 - 3) 18
 - 4) \$ 324
 - 5) \$.81

- C.
- 1) 410
 - 2) 1,230
 - 3) 18
 - 4) \$ 350
 - 5) \$.85

- D.
- 1) 1,000
 - 2) 3,000
 - 3) 18
 - 4) \$ 324
 - 5) \$.81

Number of Pots that can be Filled from 1 Cubic Foot of Root Medium

| Pot Size (inches) | Number/ft ³ |
|-------------------------------|------------------------|
| Standard Type | |
| 2 ¹ / ₄ | 296 |
| 2 ¹ / ₂ | 176 |
| 3 | 120 |
| 4 | 44 |
| 5 | 24 |
| 6 | 14 |
| 7 | 9 |
| 8 | 5.6 |
| 12 | 1.6 |
| Azalea Type | |
| 4 | 64 |
| 5 | 32 |
| 6 | 18 |
| 6 ¹ / ₂ | 15 |
| Low Pan | |
| 5 | 40 |
| 6 | 31 |
| 7 | 14 |

**Suggested Final Spacing for Pinched, Multibloom
Poinsettias**

| Pot size (inches) | Number of cuttings per pot | Spacing on center (inches) | Bench area per pot (square feet) |
|----------------------|----------------------------------|----------------------------------|--|
| 8 | 3 | 19 × 19 | 2.5 |
| 7 | 2 | 17 × 17 | 2.0 |
| 6 | 2 | 15 × 15 | 1.5 |
| 6 | 1 | 14 × 14 | 1.3 |
| 5 | 1 | 12 × 12 | 1.0 |
| 4 | 1 | 8 × 9 | 0.5 |

**2008 National FFA
Floriculture CDE
Answer Key**

**Problem Solving Reference
Problem Six**

The correct response is selection B.

An 8 inch pot with 3 cuttings per pot requires a final bench area of 2.5 square feet, and 5.6 standard 8 inch pots can be filled from one cubic foot of root medium per the information at the student's station.

The grower has 10 x 40 and 10 x 60 square feet of bench space, or 1,000 square feet total. 1,000 sq. ft. divided by 2.5 = 400 pots which can be accommodated. At 3 plants per pot, that is 1,200 cuttings from which new plants are started.

One cubic foot of growing media will fill 5.6 standard 8 inch pots, so a 4 cubic foot bale will fill 22.4 pots. 400 pots divided by 22.4 = 17.8 bales or 18 bales required. At \$ 18.00 per bale, the total media cost is \$ 324.00. \$ 324.00 divided by 400 pots = \$.81 per pot.

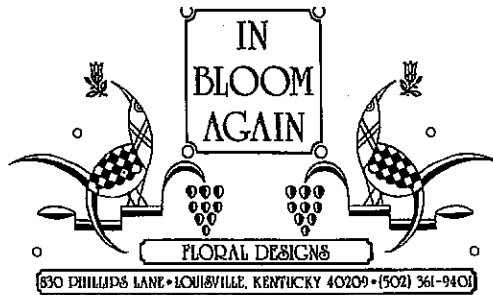
A reference for information provided at student's station is page 321, Introduction to Floriculture, and page 201, Greenhouse Operation and Management.

**2008 National FFA
Floriculture CDE
Problem Solving
Problem Seven
Answer**

Situation:

You are a sales clerk at In Bloom Again. The shop is known for handling an extensive line of gift items as well as the normal floral items. There is currently a 35% discount being offered on all brass and ceramic merchandise. As the door opens, you recognize Harriette Miller, a long time friend and loyal customer of the shop owner. You recognize the box she is carrying because you had sold her a beautiful crystal vase for \$89.00 plus tax about two weeks ago and it was the last one in stock and the box had never been opened. Mrs. Miller tells you that when she opened the box at home, a small piece of glass fell on the floor and she realized the vase had been chipped in shipment from the wholesaler. Since you don't have a replacement vase, Mrs. Miller suggests that you simply deduct the price of the vase from her bill after she finishes shopping. As Mrs. Miller begins to shop she picks up two pairs of brass candle holders that list for \$35.00/pair. She also asks you to help her find a ceramic bird for her niece's birthday. You show her a beautifully painted Robin which list for \$39.50. She decides that while she is at the shop she will get a Thanksgiving wreath priced at \$42.00 and a dozen roses at \$35.00 for the dining room table. As you are writing up the ticket, she asks you what the current sales tax rate is and you reply that it is 8.25%. Before you can finish the ticket, Mrs. Miller mentions to you that she would like to get an extra \$25.00 when she pays with her Debit card so she can stop at the grocery store for a couple of items. What amount did you charge to her card?

- A. \$109.06
- B. \$59.18
- C. \$89.06
- D. \$64.18



No 150950

| | | | |
|--|--|----------------------------|----|
| DELIVER TO <i>Harriette Miller</i> | | DELIVERY DATE | |
| ADDRESS <i>1092 S. Tenth Street</i> | | S | M |
| <i>Louisville, Ky 40209</i> | | T | W |
| | | T | F |
| | | S | |
| WIRE <input type="checkbox"/> IN <input type="checkbox"/> OUT | | ASSOCIATION CODE NUMBER | |
| FLORIST | | CALL TAKEN BY | |
| ADDRESS | | PHONE | |
| 2-Pair Brass Candle Holders | | 45 | 50 |
| 1-Ceramic Bird | | 25 | 68 |
| 1-Thanksgiving Wreath | | 42 | 00 |
| 1 Doz. White Roses | | 35 | 00 |
| | | 148 | 18 |
| | | 12 | 22 |
| OCCASION | | TAX | |
| Sub TOTAL | | 160 | 40 |
| CARD <i>Less Crystal vase 12.00</i> | | 96.34 | |
| <i>Plus \$25.00 cash</i> | | 64.06 | |
| | | 25.00 | |
| | | 89.06 | |
| CHARGE TO | | PHONE | |
| ADDRESS | | | |
| <input type="checkbox"/> CASH <input type="checkbox"/> CHARGE <input type="checkbox"/> C.O.D. <input type="checkbox"/> CREDIT CARD | | | |

Problem 8

Situation:

You have been asked to design a landscape for Mr. Pruitt, whose yard is large and hilly, with rock outcroppings and several existing mature trees. Mr. Pruitt favors a warm monochromatic color scheme of annuals for his beds and borders, all of which receive ample sunlight.

Select an appropriate design from the four at your station, as well as the bedding plant material for each of four areas indicated in the design.

Design A

Area 1 - 'Violet Flame' Salvia

Area 3 - 'Blue Mariner' Petunia and
Ageratum

Area 2 - Purple Zinnias and
'Snowflake' Dianthus

Area 4 - 'Blue Boy' Bachelor
Buttons

Design B

Area 1 - White Ageratum and
'Sunburst' Petunias

Area 3 - Goldenrod and
orange Cosmos

Area 2 - Iris and blue Salvia

Area 4 - 'Redsun' Zinnias and
'Violet Flame' Salvia

Design C

Area 1 - 'Raspberry Rose' Pansies

Area 3 - Orange Cosmos and
Strawberry Dianthus

Area 2 - 'Orange Lady' Marigolds

Area 4 - 'Wizard Mix' Coleus

* Design D

Area 1 - 'Blaze' Verbena

Area 3 - Red Salvia and pink
Snapdragons

Area 2 - 'Pale Pink' Dianthus and
red Nicotiana

Area 4 - 'Red Sun' Zinnias

Problem 8:

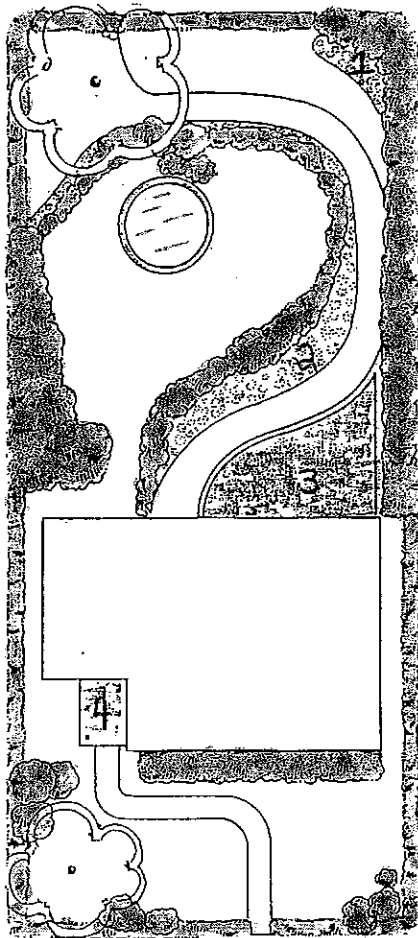
The best response is D. The reference is Color with Annuals, pps 12, 13, 16, and 23.

For a large yard with irregular topography and mature trees, a naturalistic design is best. It would be difficult to convert such a setting into a formal design plan. Designs A and D reflect the naturalistic approach, with curving lines and asymmetrical balance among plant materials. Designs B and C reflect a formal design approach, which would be difficult to utilize.

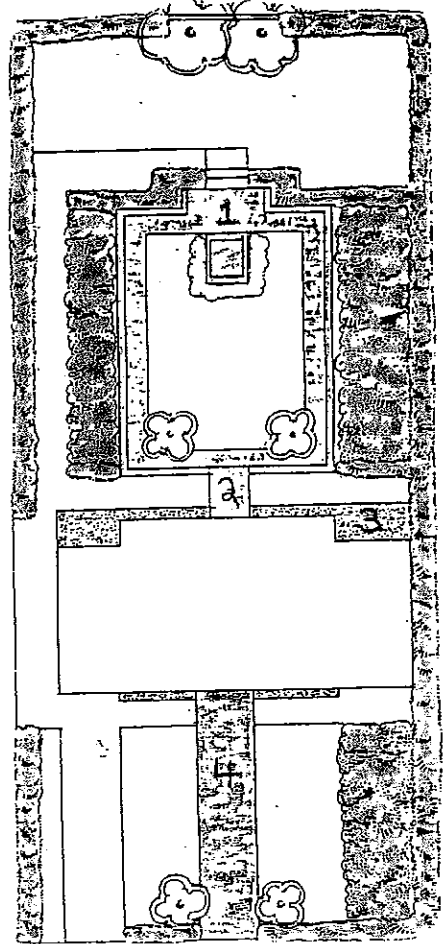
Warm colors include all of the colors on the right side of the color wheel, from yellow to red. A monochromatic color scheme includes the various tints and shades of only one pure color.

Selection A involves cool colors and selection B involves some perennials and is not monochromatic in that it contains white, yellow, orange, red and blue. Selection C uses non monochromatic colors as well, and coleus may be a questionable choice in an extremely sunny environment.

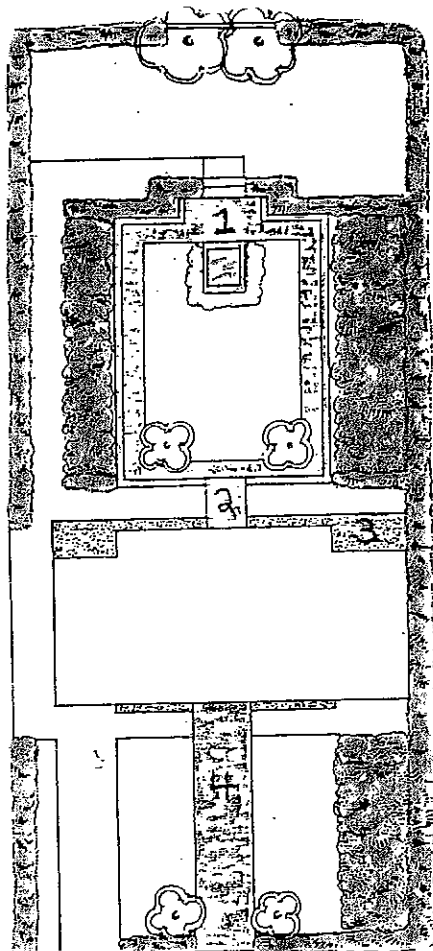
Design A



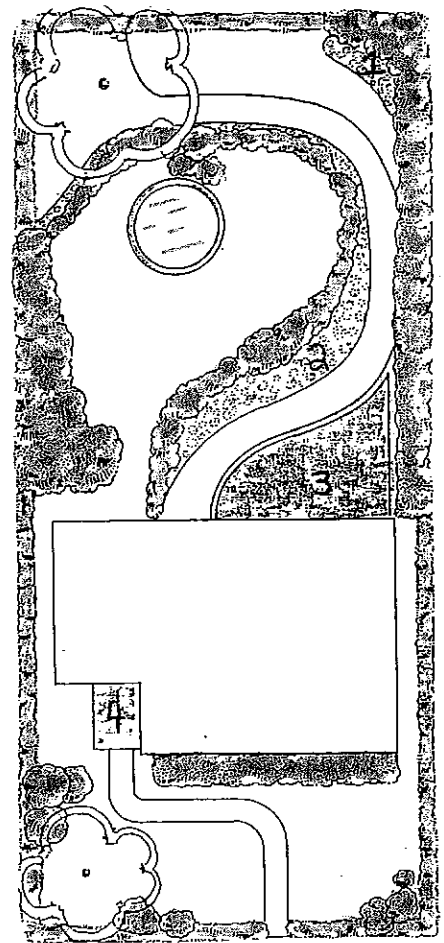
Design B



Design C



Design D



2008 National FFA Floriculture CDE
Problem Nine

The picture on the left shows a series of insects, pests and diseases (labeled A through J) which we commonly find among our flowers and plants. Examine the picture closely and select the list below which matches the insects, pests and diseased in correct order A-J.

INSECTS, PESTS, AND DISEASES



A



B



C



D



E



F



G



H



I



J

A. Beetles, Caterpillars, Mites, Damping off, Whiteflies, Fungus diseases, Aphids, Virus diseases, Thrips, Botrytis blight .

B. Aphids, Thrips, Damping off, Fungus diseases, Mites, Beetles, Botrytis blight, Caterpillars, Virus diseases, Whiteflies.

C. Caterpillars, Aphids, Virus diseases, Whiteflies, Botrytis blight, Damping off, Fungus diseases, Mites, Beetles, Thrips.

D. Aphids, Beetles, Botrytis blight, Caterpillars, Damping off, Fungus diseases, Mites, Thrips, Virus diseases, Whiteflies.

2008 National FFA

Floriculture CDE

Problem Ten

Answer

Situation:

You have decided to grow a spring crop of coleus and large flowered marigold this year. You seeded 1/2 oz of coleus and 1 oz of marigold. Each has an 80% yield of viable seedlings. Both were seeded the first week of January. The temperature of the germination media was maintained at 75 degrees F. It is now one month after seeding.

According to the information provided at your station, how many 18 count flats of coleus and marigolds would you expect to produce and what steps should now be taken?

- A.
 - 1. 2,000 flats of coleus and 500 flats of marigolds will be produced
 - 2. Increase soil temperature to raise coleus germination percent
 - 3. Reseed the marigold crop and raise soil temperature to 85 degrees F.
- B.
 - 1. 5,500 flats of coleus and 110 flats of marigolds will be produced
 - 2. Grow-on the coleus for another four days
 - 3. The marigolds are ready for hardening
- C.
 - 1. **2,444 flats of coleus and 400 flats of marigolds will be produced**
 - 2. **Harden the coleus for about a week**
 - 3. **Transplant the marigolds this week**
- D.
 - 1. 44,000 flats of coleus and 444 flats of marigolds will be produced
 - 2. Prepare to sell the coleus in one month
 - 3. Continue to grow-on the marigolds for several days

Seed Information and Production Schedules for Selected Annuals

| Common name | Scientific name | Approximate seeds per ounce | Germination light requirement ^a | Germination soil temperature (°F) | Germination time (days) |
|-----------------------|---------------------------------------|-----------------------------|--|-----------------------------------|-------------------------|
| African Daisy | <i>Dimorphotheca auratiaca</i> | 10,000 | D | 60-70 | 7-15 |
| Ageratum | <i>Ageratum houstonianum</i> | 200,000 | D or L | 70-80 | 7-10 |
| Alyssum | <i>Lobularia maritima</i> | 90,000 | D or L | 75-79 | 7-15 |
| Amaranthus | <i>Amaranthus tricolor</i> | 45,000 | D or L | 70-75 | 8-10 |
| Aster (China) | <i>Callistephus chinensis</i> | 12,000 | L | 70-80 | 8-10 |
| Baby's breath | <i>Gypsophila elegans</i> | 25,000 | D or L | 70-80 | 10-14 |
| Begonia (fibrous) | <i>Begonia</i> × <i>semperflorens</i> | 2,000,000 | L | 70-75 | 14-21 |
| Begonia (tubercous) | <i>Begonia</i> × <i>tuberhybrida</i> | 2,000,000 | L | 65 | 15-20 |
| Browallia | <i>Browallia speciosa</i> | 125,000 | L | 75 | 7-10 |
| Candytuft | <i>Iberis coronaria</i> | 9,500 | D or L | 70 | 7-14 |
| Celosia (crested) | <i>Celosia cristata</i> | 34,000 | L | 75 | 5-10 |
| Celosia (feathered) | <i>Celosia plumosa</i> | 39,000 | L | 75 | 5-10 |
| Chinese forget-me-not | <i>Cynoglossum amabile</i> | 5,000 | D | 60-70 | 5-10 |
| Clarkia | <i>Clarkia elegans</i> | 90,000 | L | 65-70 | 5-14 |
| Cleome | <i>Cleome spinosa</i> | 12,500 | D or L | 60° (night) 85° (day) | 7-21 |
| Coleus | <i>Coleus</i> × <i>hybridus</i> | 110,000 | L | 65-75 | 10-15 |
| Cornflower | <i>Centaurea cyanus</i> | 7,000 | D | 65-70 | 10-15 |
| Cosmos | <i>Cosmos bipinnatus</i> | 5,000 | L | 70-75 | 5-14 |
| Dahlia | <i>Dahlia</i> × <i>hybrida</i> | 2,800 | D or L | 79-80 | 7-10 |
| Dusty miller | <i>Senecio cineraria</i> | 90,000 | L | 72-75 | 10-15 |
| Forget-me-not | <i>Myosotis aplestris</i> | 44,000 | D | 55 | 10-14 |
| Gaillardia | <i>Gaillardia pulchella</i> | 15,000 | L | 70-80 | 15-20 |
| Garden pinks | <i>Dianthus chinensis</i> | 25,000 | D or L | 70-75 | 5-7 |
| Geranium | <i>Pelargonium</i> × <i>hortorum</i> | 6,200 | L | 70-75 | 5-12 |
| Gomphrena | <i>Gomphrena globosa</i> | 5,000 | D | 70-80 | 14-20 |
| Impatiens | <i>Impatiens wallerana</i> | 52,000 | L | 70-75 | 15-18 |
| Lobelia | <i>Lobelia erinus</i> | 1,000,000 | D or L | 75-80 | 6-20 |
| Marigold (African) | <i>Tagetes erecta</i> | 9,000 | D or L | 75-80 | 5-8 |
| Marigold (French) | <i>Tagetes patula</i> | 9,000 | D or L | 75-80 | 5-8 |
| Morning glory | <i>Ipomoea purpurea</i> | 1,000 | D or L | 80 | 7-14 |
| Moss rose | <i>Portulaca grandiflora</i> | 280,000 | D or L | 75-80 | 7-10 |
| Nasturtium | <i>Tropaeolum major</i> | 175 | D | 65 | 10-15 |
| Nicotiana | <i>Nicotiana alata</i> | 200,000 | L | 70 | 7-14 |
| Pansy | <i>Viola</i> × <i>wittrockiana</i> | 20,000 | D | 63-68 | 7-14 |
| Periwinkle | <i>Catharanthus roseus</i> | 10,000 | D | 75-85 | 10-15 |

Sample of schedules for various commonly grown ornamental plants

| Plant | Seeding Date | Germination (emergence) | | Growing-on | | Hardening | | Transplanting | | Selling Period |
|------------------------|--------------|-------------------------|----------|------------|----------|-----------|----------|---------------|----------|----------------------|
| | | Days | Temp.°F | Days | Temp.°F | Days | Temp.°F | Date | Temp.°F | |
| Ageratum | 1/7 | 6 | 75 to 80 | 10 | 60 to 65 | 10 | 50 to 55 | 2/2 | 60 | April 10 to 20 |
| | 3/31 | 5 | 75 to 80 | 8 | 65 + | 8 | 65 + | 4/21 | 65 + | May 10 to 20 |
| Alyssum | 1/26 | 4 | 75 | 10 | 60 to 65 | 5 | 50 to 55 | 2/18 | 60 to 65 | April 10 to 20 |
| | 3/31 | 4 | 75 | 5 | 65 | 10 | 50 to 55 | 4/19 | 60 | May 10 to 20 |
| Aster | 2/22 | 4 | 75 | 10 | 60 to 65 | — | — | 3/7 | 60 to 65 | April 15 to 20 |
| | 4/1 | 4 | 75 | 10 | 60 to 65 | — | — | 4/15 | 65 | May 10 to 20 |
| Begonia | 12/12 | 21 | 75 to 80 | 21 | 60 | — | — | 1/23 | 60 | April 12 to May 1 |
| Coleus | 1/5 | 8 | 75 to 80 | 20 | 60 to 65 | 7 | 55 to 60 | 2/11 | 62 to 65 | April 10 to 20 |
| | 3/31 | 5 | 75 to 80 | 12 | 65 | — | — | 4/20 | 62 + | May 10 to 20 |
| Dusty Miller | 12/15 | 18 | 75 to 80 | 21 | 60 | — | — | 1/28 | 60 | April 10 to 20 |
| Geranium (seed) | 1/2 | 6 | 75 to 80 | 21 | 60 | — | — | 2/4 | 60 | April 12 to 30 |
| Impatiens | 1/3 | 6 | 80 | 21 | 60 | — | — | 2/4 | 62 | April 12 to 30 |
| Marigold —Dwarfs | 1/5 | 8 | 70 to 75 | 10 | 60 | 12 | 50 to 55 | 2/8 | 60 | April 10 to 20 |
| —Large flowered | 1/5 | 8 | 70 to 75 | 10 | 60 | 12 | 50 to 55 | 2/8 | 60 | April 10 to 20 |
| —Dwarfs | 4/1 | 6 | 70 to 75 | 6 | 60 to 65 | 10 | 60 | 4/23 | 60 | May 10 to 20 |
| Pansy | 10/16 | 10 | 75 | 15 | 55 to 60 | 12 | 45 to 50 | 11/23 | 50 to 55 | March 20 to April 20 |
| | 11/6 | 10 | 75 | 15 | 55 to 60 | 12 | 45 to 50 | 12/15 | 50 to 55 | March 30 to April 25 |
| | 1/14 | 7 | 75 to 78 | 7 | 55 to 60 | 12 to 20 | 50 to 55 | 2/15 to 20 | 58 | April 15 to May 1 |
| Petunia and Snapdragon | 11/20 | 6 | 75 | 10 | 60 | 16 | 45 to 50 | 12/22 | 60 | March 25 to April 5 |
| | 12/3 | 5 | 75 | 7 | 55 to 60 | 16 | 45 to 50 | 1/4 | 60 | April 10 to 20 |
| | 12/12 | 5 | 55 | 7 | 55 to 60 | 16 | 45 to 50 | 1/9 | 60 | April 20 |
| | 1/7 | 5 | 75 | 5 | 55 to 60 | 12 | 45 to 50 | 1/30 | 60 | April 30 to May 5 |
| | 2/25 | 5 | 75 | 5 | 55 to 60 | 12 | 55 to 60 | 3/18 | 60 | May 5 to 12 |
| | 3/15 | 5 | 75 | 5 | 55 to 60 | 12 | 55 to 60 | 4/6 | 60 | May 15 to 18 |
| | 4/1 | 5 | 75 | 5 | 55 to 60 | 12 | 60 | 4/21 | 60 | May 25 |
| | 4/7 | 5 | 75 | 5 | 55 to 60 | 12 | 60 | 4/29 | 60 | May 27 to June 3 |
| Phlox | 12/21 | 12 | 65 | 21 | 55 to 60 | — | — | 2/1 | 55 | April 15 to May 5 |
| Portulaca | 1/24 | 4 | 75 | 14 | 60 to 65 | 12 | 55 to 55 | 2/25 | 60 | April 20 to 30 |
| | 3/31 | 4 | 75 | 8 | — | — | — | 4/14 | 65 | May 10 to 20 |
| Salvia | 1/24 | 6 | 75 to 80 | 6 | 55 to 60 | 6 | 50 to 55 | 2/12 | 60 | April 10 |
| | 3/31 | 6 | 75 to 80 | 8 | 60 to 65 | — | — | 4/14 | 65 | May 10 to 20 |
| Verbena | 12/29 | 7 | 75 | 21 | 55 to 60 | 14 | 55 | 2/1 | 55 to 58 | April 15 to May 1 |
| Vinca | 12/15 | 12 | 75 to 80 | 3 | 55 to 60 | 14 | 55 to 60 | 2/15 | 60 + | May 1 to June 1 |

(Source: *Tips on Growing Bedding Plants*, second edition, Ohio Cooperative Extension Service, The Ohio State University, 1989)