



# ACE Content Outline

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## INSPECTION AND IDENTIFICATION (45% of Exam Content)

### Inspect for evidence of pests

Knowledge needed to accomplish the skill:

- Tools available for inspection and appropriate uses (e.g., flashlight, moisture meter, flushing agents)
- Probable locations of pests
- Types of evidence of pest presence (e.g., damage caused, egg types, frass)
- Safety precautions (e.g., equipment, personnel)

### Inspect for conditions conducive to pests

Knowledge needed to accomplish the skill:

- Tools available for inspection and appropriate uses (e.g., flashlight, moisture meter, flushing agents)
- Conditions conducive to pests (e.g., site, weather, ambient conditions)
- Safety precautions (e.g., equipment, personnel)

### Identify pests

Knowledge needed to accomplish the skill:

- Taxonomy and classification
- Morphology
- Biology (basic physiology, behavior, habitat, lifecycle, reproduction potential)
- Damage caused

### Document and communicate findings of pest inspection and identification

Knowledge needed to accomplish the skill:

- How to explain pest thresholds and respond to customer expectations
- Use, limitations and types of pest thresholds
- What to document
- How to document
- Where to document
- To whom to communicate findings
- Adherence to ACE Code of Ethics

## **(MONITORING 12% of Exam Content)**

### **Identify and select appropriate monitoring tools**

Knowledge needed to accomplish the skill:

- Monitoring tools available and their uses/limitations and related safety precautions (e.g., flashlight, light traps, pheromone traps)
- Pests that are most commonly monitored (cockroaches, flies, stored product pests, termites, bed bugs)

### **Place monitoring tools properly**

Knowledge needed to accomplish the skill:

- Proper use and placement of tools
- Appropriate combined use of tools

### **Document and communicate findings of monitoring and recommendations**

Knowledge needed to accomplish the skill:

- What to document
- How to document
- Where to document
- To whom to communicate findings and recommendations
- Application of the ACE Code of Ethics

## **SELECTION & IMPLEMENTATION OF CONTROL METHODS (28% of Exam Content)**

### **Choose the appropriate control method(s) for pest management**

Knowledge needed to accomplish the skill:

- Cultural control options available, appropriateness of each, and advantages/limitations of each (e.g., sanitation, temperature, special lighting, habitat modification)
- Biological control options available, appropriateness of each, and advantages/limitations of each (e.g., predators, parasites, pathogens)
- Mechanical control options available, appropriateness of each, and advantages/limitations of each (e.g., traps/glueboards, pest proof design, removal, air curtains, lights)
- Chemical control options available, appropriateness of each, and advantages/limitations of each (e.g., IGRs, Pheromones/Attractants, Pesticides)
- Simple modes of action of commonly used pesticides
- Classifications of commonly used pesticides
- Pesticide resistance
- Pesticide formulations

- Pesticide application techniques
- Appropriateness (or not) of combinations of products
- Following label instructions, including disposal
- Relative effectiveness/efficacy versus risk of various control methods and options within each method
- Importance of selecting least hazardous effective method(s)/option(s)
- How to locate local/state regulations that may differ from product labels

### Select the appropriate tool(s) for use with the pest management method(s) for pest scenarios

Knowledge needed to accomplish the skill:

- Tools available, appropriateness of each, and advantages/limitations of each and related safety precautions (e.g., compressed air sprayer, infrared camera, gas detector, duster)
- Regulations (if any) pertaining to each tool

### Communicate which pesticides are or are not currently allowed for use by the EPA

Knowledge needed to accomplish the skill:

- In which cases certain products are used or not (cyclodienes, Chlorinated hydrocarbons (e.g., DDT, Chlordane, Lindane), Carbamates (e.g. aldicarb, carbofuran, propoxur), Organophosphates (e.g. malathion, chlorpyrifos, diazinon, malathion)
- The reasons why (in general) pesticides are no longer used
- FIFRA's major provisions
- Relationship between state and federal regulations (which takes precedence)
- Role that EPA plays in federal legislation (e.g., FIFRA)

### Follow the label instructions and precautions

Knowledge needed to accomplish the skill:

- Common precautions
- Active ingredients
- Types of formulations
- Proper storage and disposal
- Concentration and mixing procedures
- Restricted use pesticides
- Legal and illegal uses
- Trade names, common names and chemical names
- Toxic dosages
- FIFRA

## **Educate the customer on their role in pest management**

Knowledge needed to accomplish the skill:

- Critical messages to convey
- Appropriate methods for message conveyance
- Behavioral customer modifications

## **Perform selected pest control method(s)**

Knowledge needed to accomplish the skill:

- Appropriate application techniques for each of the pest control methods
- Regulations and restrictions pertaining to application techniques and products
- Application of the ACE Code of Ethics

## **Document and communicate the pest control method(s) applied and tool(s) used for application**

Knowledge needed to accomplish the skill:

- What to document
- How to document
- Where to document
- To whom to communicate
- Application of the ACE Code of Ethics

## **EVALUATION (15% of Exam Content)**

### **Look for reduction in pests**

Knowledge needed to accomplish the skill:

- Monitoring
- Identification
- Communication with customer

### **Analyze pre- and post-treatment effects**

Knowledge needed to accomplish the skill:

- Acceptable thresholds
- Pest resistance
- How to analyze the presence of pests over space and time
- Managing customer expectations
- Interpreting results

## Determine next steps

Knowledge needed to accomplish the skill:

- IPM process
- Methods/options available
- Use of results to affirm/modify pest management methods/options

## Document and communicate evaluation findings

Knowledge needed to accomplish the skill:

- What to document
- How to document (forms to use)
- Where to document
- With whom to communicate
- Regulatory requirements
- Third party audits
- Application of the ACE Code of Ethics

## Pests on the Exam

(Listed in descending order of relative importance **under each header**; thus likeliness of appearing on the exam decreases by order)

### **BITING AND STINGING pests potentially encountered by pest management professionals (PMP).**

- Bed and bat bugs (*Cimex* spp.)
- Yellowjacket wasps (*Vespula*, *Paravespula* and *Dolichovespula maculata* (The bald faced hornet)
- Paper wasps (*Polistes* spp.)
- Mosquitoes (family Culicidae)
- Honey bee, (*Apis mellifera*)
- Black widow spiders (*Latrodectus* spp.)
- Brown recluse spiders (*Loxosceles* spp.)
- Hornet (*Vespa crabro*)
- Cat flea (order Siphonaptera)
- Brown dog tick (*Rhipicephalus sanguineus*)
- American dog tick (*Dermacentor variabilis*)
- Scorpions (class Arachnida: order Scorpiones)
- Wolf spiders (family Lycosidae)
- Bumble bees (*Bombus* spp.)
- Black legged tick (*Ixodes* spp.)

- Solitary bees (Members of the families Apidae, Andrenidae, Megachilidae, Halictidae and Colletidae)
- Flesh flies (family Sarcophagidae)
- Mites (rodent and bird)
- Stable fly (*Stomoxys calcitrans*)
- Black & yellow mud dauber (*Sceliphron* spp.)
- Lone star tick (*Amblyomma americanum*)
- Sac spiders (family Miturgidae; previously Clubionidae) including Cheiracanthium
- Hobo spider and other funnel weaver spiders (family Agelenidae)
- Soft ticks (Argasidae)
- Cicada killer, (*Sphecius speciosus*)
- Ground spiders (family Gnaphosidae)
- Jumping spiders (family Salticidae)
- Organpipe mud dauber (*Trypoxylon* spp.)
- Head louse (*Pediculus humanus capitis*)
- Dust mites (*Dermatophagoides* spp.)
- Body louse (*Pediculus humanus humanus*)
- Crab louse (*Phthirus pubis*)
- Chigger mites (family Trombiculidae)

### **FLIES (ORDER DIPTERA) potentially encountered by pest management professionals (PMP).**

- Small fruit (vinegar, pomace) flies (*Drosophila* spp.)
- House fly (*Musca domestica*) and lesser house fly (*Fannia canicularis*)
- Moth (drain, filter, sewer) flies (family Psychodidae)
- Phorid (humpbacked, scuttle, mausoleum) flies (family Phoridae)
- Fungus gnats (families Mycetophilidae (formerly Fungivoridae) and Sciaridae)
- Blow flies (family Calliphoridae)
- Cluster flies (*Pollenia rudis*)
- Flesh flies (family Sarcophagidae)
- Stable fly (*Stomoxys calcitrans*)
- Horse and deer flies (family Tabanidae)
- Small dung flies (family Sphaeroceridae)
- Crane flies (family Tipulidae)
- Soldier flies (family Stratiomyidae)

## **ANTS (FAMILY FORMICIDAE) potentially encountered by pest management professionals (PMP).**

- Carpenter Ants (*Camponotus* spp.)
- Odorous house ant (*Tapinoma sessile*)
- Red imported fire ant (*Solenopsis invicta*)
- Pavement ant (*Tetramorium caespitum*)
- Pharaoh ant (*Monomorium pharaonis*)
- Argentine ant (*Linepithema humile*)
- Little Black Ant (*Monomorium minimum*)
- Acrobat Ants (*Crematogaster* spp.)
- Crazy ant (*Paratrechina longicornis*)
- Ghost Ant (*Tapinoma melanocephalum*)
- White Footed Ant (*Technomyrmex albipes*)
- Big Headed Ants (*Pheidole* spp.)
- Field Ants (*Formica* spp.)
- Harvester Ants (*Pogonomyrmex* spp.)

## **COCKROACHES (ORDER DICTYOPTERA; ALT. BLATTARIA) potentially encountered by pest management professionals (PMP).**

- German cockroach (*Blattella germanica*)
- Asian cockroach (*Blattella asahinai*)
- American cockroach (*Periplaneta americana*)
- Brownbanded cockroach (*Supella longipalpa*)
- Smokybrown cockroach (*Periplaneta fuliginosa*)
- Oriental cockroach (*Blatta orientalis*)
- Australian cockroach (*Periplaneta australasiae*)
- Woods cockroach (*Parcoblatta* spp.)
- Surinam cockroach (*Pycnoscelus surinamensis*)

## **STORED PRODUCT AND FABRIC PESTS potentially encountered by pest management professionals (PMP).**

- Indian meal moth (*Plodia interpunctella*)
- Cigarette and drugstore beetle (*Lasioderma serricorne* and *Stegobium paniceum*)
- Carpet/domestic beetles (*Anthrenus* and *Attagenus* spp.)
- Clothes moths (family Tineidae)
- Flour beetles (*Tribolium* spp.)
- Sawtoothed and merchant grain beetles (*Oryzaephilus* spp.)
- Warehouse & Cabinet Beetles (*Trogoderma* spp.)

- Psocids (Order Psocoptera)
- Rice Weevil (*Sitophilus oryzae*) and Corn Weevil (*Sitophilus zeamais*)
- Hide and larder beetles (*Dermestes* species)
- Angoumois Grain Moth (*Sitotroga cerealella*)
- Mediterranean Flour Moth (*Anagasta kuehniella*)
- Foreign Grain Beetle (*Ahasverus advena*)
- Plaster Beetles (family Lathridiidae)
- Spider beetles (family Ptinidae)
- Mealworm Beetles (*Tenebrio* spp.)
- Dust mites (*Dermatophagoides farina*)
- Bean Weevil (*Acanthocelides obtectus*)
- Flat Grain Beetle (*Cryptolestes pusillus*)
- Cowpea Weevil (*Callosobruchus maculatus*)
- Red Legged Ham Beetle (*Necrobia rufipes*)
- Cadelle (*Tenebriodes mauritanicus*)

### **WOOD DESTROYING INSECTS potentially encountered by pest management professionals (PMP).**

- Subterranean termites, (*Reticulitermes* and *Coptotermes* spp.)
- Carpenter ants (*Camponotus* spp.)
- Formosan termite, (*Coptotermes formosanus*)
- Carpenter bee (family Xylocopidae)
- Drywood termites (*Kalotermes approximatus*, *Incisitermes* and *Cryptotermes* spp.)
- Lyctid powderpost beetles
- Old house borer, (*Hylotrupes bajulus*)
- Anobiid beetles
- Bostrichid (false powderpost) beetles
- Long horned beetles (Cerambycidae)
- Dampwood termites (*Zootermopsis* and *Neotermes* spp.)
- Metallic wood boring beetles (family Buprestidae)

### **OCCASIONAL INVADERS potentially encountered by pest management professionals (PMP).**

- Silverfish (order Thysanura)
- Springtails (Order Collembola)
- Earwigs (Order Dermaptera)
- Brown marmorated stink bug (*Halymorpha halys*)
- Millipedes (Class Diplopoda)



- Centipedes (class Chilopoda)
- Box elder bug, (*Boisea trivittatus*)
- Sowbugs and pillbugs (class Isopoda)
- House cricket, (*Acheta domesticus*)
- Cellar spiders (family Pholcidae)
- Asian multicolored lady beetle (*Harmonia axyridis*)
- Ground Beetles (family Carabidae)
- Field cricket, (*Gryllus* spp.)
- Clover mite (*Bryobia praetiosa*)
- Firebrat (order Thysanura)
- Comb footed (cobweb) spiders (family Theridiidae)
- Camel (cave) cricket (*Ceuthophilus* spp.)
- Thrips (order Thysanoptera)
- Elm Leaf Beetle (*Pyrrhalta luteola*)
- Aquatic Insects Adults (Trichoptera, Ephemeroptera, Plecoptera)

**COMMON COMMENSAL PESTS (NON-ARTHROPOD) potentially encountered by pest management professionals (PMP).**

- House mouse
- Norway rat
- Roof rat
- Pigeon (rock dove)
- Deer mouse
- English sparrow
- European starling
- Commensal bats (Chiroptera)