



Arrest That Pest!

EMERALD ASH BORER in Indiana

An Educator's Guide

Using environmental and civic efficacy to solve the problems presented by invasive species



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Arrest That Pest!

EMERALD ASH BORER in Indiana



Dear Educator,

In the summer of 2002, the Emerald Ash Borer (EAB) was discovered in ash trees in the Detroit and Windsor areas. Since that time this exotic invasive pest has been responsible for the systematic destruction of ash trees throughout Ontario, Canada, and parts of Michigan, Illinois, Indiana, Ohio, Pennsylvania, and Maryland. Any ash tree that is native to North America can be killed within a few years after it has been attacked by EAB. Because of the high rate of mortality associated with this pest, we fear that ash trees as a species in North America may face extinction.

Experts think that the borer traveled from Asia to North America via wooden packing materials and that EAB continues to move primarily by human transport of ash wood products. Adult insects only move short distances on their own, so human activity continues to be the main culprit for spreading this pest. The contribution of people to this serious problem represents an opportunity for educators of young people to engage them in conversations concerning scientific, economic, environmental, and social issues.

Because of continued advances in technology, trade, and travel, it has become increasingly important for all students to recognize themselves as citizens of the world. Our planet continues to shrink as distances become easier to traverse, and our interdependence grows. We must take every opportunity, every “teachable moment,” to reinforce the idea that the choices that we make affect not only members of our local community, but everyone around the globe.

In an effort to meet the challenge that Emerald Ash Borer represents in Indiana, the EAB Education and Outreach Team at Purdue University has created this guide. We hope to motivate young people to take ownership of the environment and understand the ecological and economic impact of this pest.

This curriculum and activity guide will facilitate learning about insects and their place in the ecosystem, generally, and the Emerald Ash Borer and its taxonomy, pathology, and

impact specifically. This guide is founded on the Indiana Academic Standards adopted by the State Board of Education and the most accurate and up-to-date research from scholars and scientists in the fields of entomology, horticulture, and forestry and natural resources.

We use strategies that draw on a variety of subjects (science, social studies, math, and language arts) to foster and support critical thinking and thoughtful decision-making skills about social, economic, and ecological issues. We have included useful classroom materials and activities that provide background information to support classroom instruction.

Through this material, students have the opportunity to learn about the Emerald Ash Borer and explore its impact on the environment in a very real and contemporary context. They will engage in science- and civics-focused conversations. They will come to understand that nothing happens within a vacuum and that there are implications and consequences associated with choice and decision. Our hope is that the information in this guide will help support teachers in their efforts to teach critical thinking skills and analysis to help their students learn to meet challenging problems in a constructive and proactive way.

Best regards,

Melissa Montague Shepson
Emerald Ash Borer Outreach Coordinator
Purdue University



Arrest That Pest! EMERALD ASH BORER in Indiana

***Arrest That Pest!* Program Objectives**

- Improve understanding of the EAB and its potential to destroy all varieties of North American ash trees and provide the key information necessary to slow the artificial spread of this invasive pest.
- Extend knowledge through teachers, students, and families so they are able to recognize the signs and symptoms of EAB, learn ways to slow the spread, and find out who to contact for questions and/or concerns.
- Empower students with the knowledge necessary to make responsible environmental decisions and promote ownership of the community.



Arrest That Pest!

EMERALD ASH BORER in Indiana

Before You Begin

- *Arrest That Pest!* is an easy-to-use program designed to combine science and civic efficacy so that students can extend their knowledge to promote ownership of the environment as they examine the destructive behavior of an invasive species that is harming their community. In addition, *Arrest That Pest!* provides specific opportunities for students to become a part of the solution to the problem.
- The science-based, multidisciplinary lessons in the guide are split over five days and incorporate Indiana standards-based learning models. Lessons can be adjusted to reflect individual teaching styles and available classroom time.
- The unit culminates in a nature walk to conduct surveys to identify local ash trees and survey for signs and symptoms of the borer. In addition, students will design their own campaigns to spread the word about Emerald Ash Borer and the threat it represents, and demonstrate civic efficacy (engaging in the inquiry and debate required to make informed decisions about real social issues then following up with appropriate social or civic action) by enlisting the help of others to help slow the spread on local, state, and regional levels.
- This program can be used to inspire and challenge students to play a pivotal role in slowing the spread of Emerald Ash Borer through the use of cross-curricular, student-friendly lessons, hands on tools, and vocabulary.
 - Scientific information: *Arrest That Pest!* contains information about the biology and signs and symptoms of EAB, characteristics of the ash trees it destroys and information about how to slow the spread to protect ash trees for as long as possible is included for students to learn and share with others.
 - Student friendly activity sheets: Activity sheets are included to help students learn about the beetle, create their own outreach campaigns, and extend their knowledge to others.
 - Hands-on tools for learning and identification: Background information included here scaffolds students understanding of the

problem EAB represents and empowers them to take action to slow the spread.

- Vocabulary words: New words are highlighted in **bold**. Concepts relate to biology, entomology, ecology, communication, civic efficacy, and community service.



Arrest That Pest!

EMERALD ASH BORER in Indiana

Overview of Guidelines for Inquiry-Based Instruction

- All learners bring a wide variety of experiences, knowledge, understanding, interests, and questions to the classroom.
- Learners construct their knowledge by building on or modifying the understanding they already have in place.
- Learners need a variety of educational experiences. Each experience should afford opportunities to ask and answer meaningful, thoughtful questions they have about themselves and their world.



Arrest That Pest! EMERALD ASH BORER in Indiana

***Arrest That Pest!* Indiana Academic Standards Matrix**

Each of the lesson plans contained in the *Arrest That Pest!* curriculum has been correlated to Indiana's Academic Standards. The matrices that follow outline the appropriate standards and indicators for each lesson.

The academic standards listed below are only a portion of the state's comprehensive list for students enrolled in Indiana's schools. For more information on the state's academic standards, click on the following link <http://www.indianastandards.org/>.

English/Language Arts

Standard 1:

READING: Word Recognition, Fluency, and Vocabulary Development

Students use their knowledge of word parts and word relationships, as well as context (the meaning of the text around a word), to determine the meaning of specialized vocabulary and to understand the precise meaning of grade-level-appropriate words.

Lesson Number and Title	Indiana's Academic Standard
Day One: Meet the Borer	<i>Decoding and Word Recognition</i> 5.1.1 Read aloud grade-level-appropriate narrative text (stories) and expository text (information) fluently and accurately and with appropriate timing, changes in voice, and expression. <i>Vocabulary and Concept Development</i> 5.1.2 Use word origins to determine the meaning of unknown words. 5.1.6 Understand unknown words by using word, sentence, and paragraph clues to determine meaning.

Standard 2:

READING: Comprehension and Analysis of Nonfiction and Informational Text

Students read and understand grade-level-appropriate material. At Grade 5, in addition to regular classroom reading, students read a variety of nonfiction, such as biographies, books in many different subject areas, magazines and periodicals, reference and technical materials, and online information.

Day One: Meet the Borer	<i>Structural Features of Informational and Technical Materials</i> 5.2.1 Use the features of informational texts, such as formats, graphics, diagrams, illustrations, charts, maps, and organization, to find information and support understanding. <i>Analysis of Grade-Level-Appropriate Nonfiction and Informational Text</i> 5.2.3 Recognize main ideas presented in texts, identifying and assessing evidence that supports those ideas. 5.2.4 Draw inferences, conclusions, or generalizations about text and support them with textual evidence and prior knowledge. <i>Expository (Informational) Critique</i> 5.2.5 Distinguish among facts, supported inferences, evidence, and opinions in text.
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Standard 3:

READING: Comprehension and Analysis of Literary Text

Students read and respond to grade-level-appropriate historically or culturally significant works of literature, such as the selections in the [Indiana Reading List](#), which illustrate the quality and complexity of the materials to be read by students. At Grade 5, students read a wide variety of fiction, such as classic and contemporary literature, historical fiction, fantasy, science fiction, folklore, mythology, poetry, songs, plays, and other genres.

<p>Day One: Meet the Borer</p>	<p><i>Structural Features of Literature</i> 5.3.2 Identify the main problem or conflict of the plot and explain how it is resolved. <i>Analysis of Grade-Level-Appropriate Literary Text</i> 5.3.2 Identify the main problem or conflict of the plot and explain how it is resolved. 5.3.4 Understand that <i>theme</i> refers to the central idea or meaning of a selection and recognize themes, whether they are implied or stated directly. <i>Literary Criticism</i> 5.3.7 Evaluate the author’s use of various techniques to influence readers’ perspectives.</p>
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Standard 4:
WRITING: Processes and Features
 Students discuss and keep a list of ideas for writing. They use graphic organizers. Students write clear, coherent, and focused essays. Students progress through the stages of the writing process and proofread, edit, and revise writing.

<p>Day One: Meet the Borer</p>	<p><i>Organization and Focus</i> 5.4.1 Discuss ideas for writing, keep a list or notebook of ideas, and use graphic organizers to plan writing. <i>Research Process and Technology</i> 5.4.5 Use note-taking skills when completing research for writing.</p>
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Standard 7:
LISTENING AND SPEAKING: Skills, Strategies, and Applications
 Students deliver focused, coherent presentations that convey ideas clearly and relate to the background and interests of the audience. They evaluate the content of oral communication. Students deliver well-organized formal presentations using traditional speech strategies, including narration, exposition, persuasion, and description. Students use the same Standard English conventions for oral speech that they use in their writing.

<p>Day One: Meet the Borer</p>	<p><i>Comprehension</i> 5.7.1 Ask questions that seek information not already discussed. 5.7.3 Make inferences or draw conclusions based on an oral report. <i>Organization and Delivery of Oral Communication</i></p>
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5.7.4 Select a focus, organizational structure, and point of view for an oral presentation.

5.7.5 Clarify and support spoken ideas with evidence and examples.

Analysis and Evaluation of Oral and Media Communications

5.7.8 Analyze media as sources for information, entertainment, persuasion, interpretation of events, and transmission of culture.

Speaking Applications

5.7.9 Deliver narrative (story) presentations that:

- establish a situation, plot, point of view, and setting with descriptive words and phrases.
- show, rather than tell, the listener what happens.

5.7.10 Deliver informative presentations about an important idea, issue, or event by the following means:

- frame questions to direct the investigation.
- establish a controlling idea or topic.
- develop the topic with simple facts, details, examples, and explanations.

5.7.15 Make descriptive presentations that use concrete sensory details to set forth and support unified impressions of people, places, things, or experiences.

5.7.11 Deliver oral responses to literature that:

- summarize important events and details.
- demonstrate an understanding of several ideas or images communicated by the literary work.
- use examples from the work to support conclusions.

Science

Standard 1:

The Nature of Science and Technology

Students work collaboratively to carry out investigations. They observe and make accurate measurements, increase their use of tools and instruments, record data in journals, and communicate results through chart, graph, written, and verbal forms. Students repeat investigations, explain inconsistencies, and design projects.

Day One: Meet the Borer

The Scientific Enterprise

5.1.3 Explain that doing science involves many different kinds of work and engages men, women, and children of all ages and backgrounds

Technology and Science

5.1.5 Explain that technology extends the ability of people to make positive and/or negative changes in the world.

Standard 4:

The Living Environment

Students learn about an increasing variety of organisms- familiar, exotic, fossil and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environments.

Day One: Meet the Borer

Interdependence of Life and Evolution

5.4.5 Explain how changes in an organism's habitat are sometimes beneficial and sometimes harmful.

Social Studies

Standard 2:

Civics and Government

Students will identify main components and characteristics of the United States government. They will identify and explain key ideas in government from the colonial and founding periods that continue to shape civic and political life.

Day One: Meet the Borer

Roles of Citizens

5.2.9 Demonstrate civic responsibility in group and individual actions, including civic dispositions — such as civility, cooperation, respect, and responsible participation.

5.2.10 Examine ways by which citizens may effectively voice opinions, monitor government, and bring about change in government and the [public agenda](#), including voting and participation in the election process.

	<p>5.2.11 Use a variety of information resources to identify and evaluate contemporary issues that involve civic responsibility, individual rights, and the common good.</p>
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English/Language Arts

Standard 1:

READING: Word Recognition, Fluency, and Vocabulary Development

Students use their knowledge of word parts and word relationships, as well as context (the meaning of the text around a word), to determine the meaning of specialized vocabulary and to understand the precise meaning of grade-level-appropriate words.

Lesson Number and Title	Indiana's Academic Standard
Day Two: Getting to Know the EAB	<i>Decoding and Word Recognition</i> 5.1.1 Read aloud grade-level-appropriate narrative text (stories) and expository text (information) fluently and accurately and with appropriate timing, changes in voice, and expression. <i>Vocabulary and Concept Development</i> 5.1.2 Use word origins to determine the meaning of unknown words. 5.1.6 Understand unknown words by using word, sentence, and paragraph clues to determine meaning.

Standard 2:

READING: Comprehension and Analysis of Nonfiction and Informational Text

Students read and understand grade-level-appropriate material. At Grade 5, in addition to regular classroom reading, students read a variety of nonfiction, such as biographies, books in many different subject areas, magazines and periodicals, reference and technical materials, and online information.

Day Two: Getting to Know the EAB	<i>Structural Features of Informational and Technical Materials</i> 5.2.1 Use the features of informational texts, such as formats, graphics, diagrams, illustrations, charts, maps, and organization, to find information and support understanding. <i>Analysis of Grade-Level-Appropriate Nonfiction and Informational Text</i> 5.2.3 Recognize main ideas presented in texts, identifying and assessing evidence that supports those ideas. 5.2.4 Draw inferences, conclusions, or generalizations about text and support them with textual evidence and prior knowledge. <i>Expository (Informational) Critique</i> 5.2.5 Distinguish among facts, supported inferences, evidence, and opinions in text.
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<p>Standard 3: READING: Comprehension and Analysis of Literary Text Students read and respond to grade-level-appropriate historically or culturally significant works of literature, such as the selections in the Indiana Reading List, which illustrate the quality and complexity of the materials to be read by students. At Grade 5, students read a wide variety of fiction, such as classic and contemporary literature, historical fiction, fantasy, science fiction, folklore, mythology, poetry, songs, plays, and other genres.</p>	
<p>Day Two: Getting to Know the EAB</p>	<p><i>Analysis of Grade-Level-Appropriate Literary Text</i> 5.3.2 Identify the main problem or conflict of the plot and explain how it is resolved.</p>
<p>Standard 4: WRITING: Processes and Features Students discuss and keep a list of ideas for writing. They use graphic organizers. Students write clear, coherent, and focused essays. Students progress through the stages of the writing process and proofread, edit, and revise writing.</p>	
<p>Day Two: Getting to Know the EAB</p>	<p><i>Organization and Focus</i> 5.4.1 Discuss ideas for writing, keep a list or notebook of ideas, and use graphic organizers to plan writing. 5.4.11 Use logical organizational structures for providing information in writing, such as chronological order, cause and effect, similarity and difference, and stating and supporting a hypothesis with data. <i>Research Process and Technology</i> 5.4.5 Use note-taking skills when completing research for writing. 5.4.6 Create simple documents using a computer and employing organizational features, such as passwords, entry and pull-down menus, word searches, the thesaurus, and spell checks. 5.4.7 Use a thesaurus to identify alternative word choices and meanings.</p>
<p>Standard 5: WRITING: Applications (Different Types of Writing and Their Characteristics) At Grade 5, students write narrative (story), expository (informational), persuasive, and descriptive texts (of at least 500 words). Student writing demonstrates a command of Standard English and the research, organizational, and drafting strategies outlined in Standard 4 - Writing Processes and Features. Writing demonstrates an awareness of the audience (intended reader) and purpose for writing.</p>	
<p>Day Two: Getting to Know the EAB</p>	<p>5.5.1 Write narratives that:</p>

- establish a plot, point of view, setting, and conflict.
- show, rather than tell, the events of the story.

5.5.2 Write responses to literature that:

- demonstrate an understanding of a literary work
- support statements with evidence from the text.
- develop interpretations that exhibit careful reading and understanding

5.5.4 Write persuasive letters or compositions that:

- state a clear position in support of a proposal.
- support a position with relevant evidence and effective emotional appeals.
- follow a simple organizational pattern, with the most appealing statements first and the least powerful ones last.
- address reader concerns.

5.5.5 Use varied word choices to make writing interesting.

5.5.6 Write for different purposes and to a specific audience or person, adjusting tone and style as appropriate.

5.5.7 Write summaries that contain the main ideas of the reading selection and the most significant details.

Research Application

5.5.3 Write or deliver a research report that has been developed using a systematic research process (defines the topic, gathers information, determines credibility, reports findings) and that:

	<ul style="list-style-type: none"> • uses information from a variety of sources (books, technology, multimedia) and documents sources (titles and authors). • demonstrates that information that has been gathered has been summarized. • organizes information by categorizing and sequencing.
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Standard 7:

LISTENING AND SPEAKING: Skills, Strategies, and Applications

Students deliver focused, coherent presentations that convey ideas clearly and relate to the background and interests of the audience. They evaluate the content of oral communication. Students deliver well-organized formal presentations using traditional speech strategies, including narration, exposition, persuasion, and description. Students use the same Standard English conventions for oral speech that they use in their writing.

Day Two: Getting to Know the EAB

- Comprehension*
- 5.7.1** Ask questions that seek information not already discussed.
 - 5.7.2** Interpret a speaker’s verbal and nonverbal messages, purposes, and perspectives.
 - 5.7.3** Make inferences or draw conclusions based on an oral report.
 - 5.7.12** Give precise directions and instructions.
- Organization and Delivery of Oral Communication*
- 5.7.4** Select a focus, organizational structure, and point of view for an oral presentation.
 - 5.7.5** Clarify and support spoken ideas with evidence and examples.
 - 5.7.6** Use volume, phrasing, timing, and gestures appropriately to enhance meaning.
 - 5.7.13** Emphasize points in ways that help the listener or viewer follow important ideas and concepts.
- Analysis and Evaluation of Oral and Media Communications*
- 5.7.8** Analyze media as sources for information, entertainment, persuasion, interpretation of events, and transmission

	<p>of culture.</p> <p>5.7.14 Identify claims in different kinds of text (print, image, multimedia) and evaluate evidence used to support these claims.</p> <p><i>Speaking Applications</i></p> <p>5.7.9 Deliver narrative (story) presentations that:</p> <ul style="list-style-type: none"> • establish a situation, plot, point of view, and setting with descriptive words and phrases. • show, rather than tell, the listener what happens. <p>5.7.10 Deliver informative presentations about an important idea, issue, or event by the following means:</p> <ul style="list-style-type: none"> • frame questions to direct the investigation. • establish a controlling idea or topic. • develop the topic with simple facts, details, examples, and explanations. <p>5.7.15 Make descriptive presentations that use concrete sensory details to set forth and support unified impressions of people, places, things, or experiences.</p> <p>5.7.11 Deliver oral responses to literature that:</p> <ul style="list-style-type: none"> • summarize important events and details. • demonstrate an understanding of several ideas or images communicated by the literary work. • use examples from the work to support conclusions.
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Science

Standard 4: The Living Environment
 Students learn about an increasing variety of organisms- familiar, exotic, fossil and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their

environments.	
Day Two: Getting to Know the EAB	<p><i>Interdependence of Life and Evolution</i></p> <p>5.4.4 Explain that in any particular environment, some kinds of plants and animals survive well, some do not survive well, and some cannot survive at all.</p> <p>5.4.5 Explain how changes in an organism’s habitat are sometimes beneficial and sometimes harmful.</p> <p>5.4.7 Explain that living things, such as plants and animals, differ in their characteristics, and that sometimes these differences can give members of these groups (plants and animals) and advantage in surviving and reproducing.</p>
Social Studies	
<p>Standard 2: Civics and Government</p> <p>Students will identify main components and characteristics of the United States government. They will identify and explain key ideas in government from the colonial and founding periods that continue to shape civic and political life.</p>	
Day Two: Getting to Know the EAB	<p>5.2.9 Demonstrate civic responsibility in group and individual actions, including civic dispositions — such as civility, cooperation, respect, and responsible participation.</p> <p>5.2.11 Use a variety of information resources to identify and evaluate contemporary issues that involve civic responsibility, individual rights, and the common good.</p>
<p>Standard 3: Geography</p> <p>Students will describe Earth/sun relationships and the global grid system. They will identify major physical and cultural characteristics of the United States and its regions and name and locate the major physical features of each of the states and major cities of the United States. They will also explain the changing interaction of people with their environment in regions of the United States and show how the United States is related geographically to the rest of the world.</p>	
Day Two: Getting to Know the EAB	<p><i>Places and Regions</i></p> <p>5.3.2 Name and locate states, major cities, major regions, major rivers, and mountain ranges in the United States.</p>

English/Language Arts

Standard 2:

READING: Comprehension and Analysis of Nonfiction and Informational Text

Students read and understand grade-level-appropriate material. At Grade 5, in addition to regular classroom reading, students read a variety of nonfiction, such as biographies, books in many different subject areas, magazines and periodicals, reference and technical materials, and online information.

Lesson Number and Title	Indiana's Academic Standard
Day Three: Identify the Borer	<i>Structural Features of Informational and Technical Materials</i> 5.2.1 Use the features of informational texts, such as formats, graphics, diagrams, illustrations, charts, maps, and organization, to find information and support understanding. 5.2.3 Recognize main ideas presented in texts, identifying and assessing evidence that supports those ideas. 5.2.4 Draw inferences, conclusions, or generalizations about text and support them with textual evidence and prior knowledge. <i>Expository (Informational) Critique</i> 5.2.5 Distinguish among facts, supported inferences, evidence, and opinions in text.

Standard 3:

READING: Comprehension and Analysis of Literary Text

Students read and respond to grade-level-appropriate historically or culturally significant works of literature, such as the selections in the [Indiana Reading List](#), which illustrate the quality and complexity of the materials to be read by students. At Grade 5, students read a wide variety of fiction, such as classic and contemporary literature, historical fiction, fantasy, science fiction, folklore, mythology, poetry, songs, plays, and other genres.

Day Three: Identify the Borer	<i>Literary Criticism</i> 5.3.7 Evaluate the author's use of various techniques to influence readers' perspectives.
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Standard 4:

WRITING: Processes and Features

Students discuss and keep a list of ideas for writing. They use graphic organizers. Students write clear, coherent, and focused essays. Students progress through the stages of the writing process and proofread, edit, and revise writing.

Day Three: Identify the Borer	<i>Organization and Focus</i> 5.4.1 Discuss ideas for writing, keep a list
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	<p>or notebook of ideas, and use graphic organizers to plan writing.</p> <p>5.4.3 Write informational pieces with multiple paragraphs that:</p> <ul style="list-style-type: none"> • present important ideas or events in sequence or in chronological order. • provide details and transitions to link paragraphs. • offer a concluding paragraph that summarizes important ideas and details. <p>5.4.11 Use logical organizational structures for providing information in writing, such as chronological order, cause and effect, similarity and difference, and stating and supporting a hypothesis with data.</p> <p><i>Research Process and Technology</i></p> <p>5.4.5 Use note-taking skills when completing research for writing.</p> <p>5.4.6 Create simple documents using a computer and employing organizational features, such as passwords, entry and pull-down menus, word searches, the thesaurus, and spell checks.</p> <p>5.4.7 Use a thesaurus to identify alternative word choices and meanings.</p> <p><i>Evaluation and Revision</i></p> <p>5.4.8 Review, evaluate, and revise writing for meaning and clarity.</p> <p>5.4.9 Proofread one’s own writing, as well as that of others, using an editing checklist or set of rules, with specific examples of corrections of specific errors.</p> <p>5.4.10 Edit and revise writing to improve meaning and focus through adding, deleting, combining, clarifying, and rearranging words and sentences.</p>
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Standard 5:

WRITING: Applications (Different Types of Writing and Their Characteristics)

At Grade 5, students write narrative (story), expository (informational), persuasive, and descriptive texts (of at least 500 words). Student writing demonstrates a command of Standard English and the research, organizational, and drafting strategies outlined in

Standard 4 - Writing Processes and Features. Writing demonstrates an awareness of the audience (intended reader) and purpose for writing.

Day Three: Identify the Borer

5.5.1 Write narratives that:

- establish a plot, point of view, setting, and conflict.
- show, rather than tell, the events of the story.

5.5.2 Write responses to literature that:

- demonstrate an understanding of a literary work
- support statements with evidence from the text.
- develop interpretations that exhibit careful reading and understanding

5.5.4 Write persuasive letters or compositions that:

- state a clear position in support of a proposal.
- support a position with relevant evidence and effective emotional appeals.
- follow a simple organizational pattern, with the most appealing statements first and the least powerful ones last.
- address reader concerns.

5.5.5 Use varied word choices to make writing interesting.

5.5.6 Write for different purposes and to a specific audience or person, adjusting tone and style as appropriate.

5.5.7 Write summaries that contain the main ideas of the reading selection and the most significant details.

Research Application

	<p>5.5.3 Write or deliver a research report that has been developed using a systematic research process (defines the topic, gathers information, determines credibility, reports findings) and that:</p> <ul style="list-style-type: none"> • uses information from a variety of sources (books, technology, multimedia) and documents sources (titles and authors). • demonstrates that information that has been gathered has been summarized. • organizes information by categorizing and sequencing.
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Standard 6:
WRITING: English Language Conventions
 Students write using Standard English conventions appropriate to this grade level.

<p>Day Three: Identify the Borer</p>	<p><i>Sentence Structure</i></p> <p>5.6.1 Identify and correctly use prepositional phrases (<i>for school</i> or <i>In the beginning</i>), appositives (<i>We played the Cougars, <u>the team from Newport</u></i>), main clauses (words that express a complete thought), and subordinate clauses (clauses attached to the main clause in the sentence).</p> <p>5.6.2 Use transitions (<i>however, therefore, on the other hand</i>) and conjunctions (<i>and, or, but</i>) to connect ideas.</p> <p>5.6.8 Use simple sentences (Dr. Vincent Stone is my dentist.) and compound sentences (His assistant cleans my teeth, and Dr. Stone checks for cavities.) in writing.</p> <p><i>Grammar</i></p> <p>5.6.3 Identify and correctly use appropriate tense (present, past, present participle, past participle) for verbs that are often misused (<i>lie/lay, sit/set, rise/raise</i>).</p> <p>5.6.4 Identify and correctly use modifiers (words or phrases that describe, limit, or qualify another word) and pronouns (<i>he/his, she/her, they/their, it/its</i>).</p> <p><i>Grammar</i></p>
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	<p>5.6.5 Use a colon to separate hours and minutes (<i>12:20 a.m., 3:40 p.m.</i>) and to introduce a list (<i>Do the project in this order: cut, paste, fold.</i>); use quotation marks around the exact words of a speaker and titles of articles, poems, songs, short stories, and chapters in books; use semi-colons and commas for transitions (<i>Time is short; however, we will still get the job done.</i>).</p> <p><i>Capitalization</i></p> <p>5.6.6 Use correct capitalization.</p>
<p>Standard 7: LISTENING AND SPEAKING: Skills, Strategies, and Applications Students deliver focused, coherent presentations that convey ideas clearly and relate to the background and interests of the audience. They evaluate the content of oral communication. Students deliver well-organized formal presentations using traditional speech strategies, including narration, exposition, persuasion, and description. Students use the same Standard English conventions for oral speech that they use in their writing.</p>	
<p>Day Three: Identify the Borer</p>	<p><i>Comprehension</i></p> <p>5.7.2 Interpret a speaker’s verbal and nonverbal messages, purposes, and perspectives.</p> <p>5.7.3 Make inferences or draw conclusions based on an oral report.</p> <p>5.7.12 Give precise directions and instructions.</p> <p><i>Organization and Delivery of Oral Communication</i></p> <p>5.7.4 Select a focus, organizational structure, and point of view for an oral presentation.</p> <p>5.7.5 Clarify and support spoken ideas with evidence and examples.</p> <p>5.7.6 Use volume, phrasing, timing, and gestures appropriately to enhance meaning.</p> <p>5.7.13 Emphasize points in ways that help the listener or viewer follow important ideas and concepts.</p> <p><i>Analysis and Evaluation of Oral and Media Communications</i></p> <p>5.7.7 Identify, analyze, and critique persuasive techniques, including promises, dares, flattery, and generalities; identify faulty reasoning used in oral presentations and media messages.</p>

	<p>5.7.8 Analyze media as sources for information, entertainment, persuasion, interpretation of events, and transmission of culture.</p> <p><i>Speaking Applications</i></p> <p>5.7.10 Deliver informative presentations about an important idea, issue, or event by the following means:</p> <ul style="list-style-type: none"> • frame questions to direct the investigation. • establish a controlling idea or topic. • develop the topic with simple facts, details, examples, and explanations. <p>5.7.15 Make descriptive presentations that use concrete sensory details to set forth and support unified impressions of people, places, things, or experiences.</p> <p>5.7.11 Deliver oral responses to literature that:</p> <ul style="list-style-type: none"> • summarize important events and details. • demonstrate an understanding of several ideas or images communicated by the literary work. • use examples from the work to support conclusions.
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Science

Standard 1: The Nature of Science and Technology
 Students deliver focused, coherent presentations that convey ideas clearly and relate to the background and interests of the audience. They evaluate the content of oral communication. Students deliver well-organized formal presentations using traditional speech strategies, including narration, exposition, persuasion, and description. Students use the same Standard English conventions for oral speech that they use in their writing.

Day Three: Identify the Borer	<p><i>Technology and Science</i></p> <p>5.1.5 Explain that technology extends the ability of people to make positive and/or negative changes in the world.</p>
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Social Studies

Standard 2: Civics and Government

Students will identify main components and characteristics of the United States government. They will identify and explain key ideas in government from the colonial and founding periods that continue to shape civic and political life.

Day Three: Identify the Borer

Roles of Citizens

5.2.9 Demonstrate civic responsibility in group and individual actions, including civic dispositions — such as civility, cooperation, respect, and responsible participation.

5.2.11 Use a variety of [information resources](#) to identify and evaluate contemporary issues that involve civic responsibility, individual rights, and the common good

English/Language Arts

Standard 4: WRITING: Processes and Features

Students discuss and keep a list of ideas for writing. They use graphic organizers. Students write clear, coherent, and focused essays. Students progress through the stages of the writing process and proofread, edit, and revise writing.

Lesson Number and Title	Indiana's State Standard
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Day Four: <i>Arrest That Pest!</i>	5.4.5 Use note-taking skills when completing research for writing.
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Science

Standard 1: The Nature of Science and Technology

Students work collaboratively to carry out investigations. They observe and make accurate measurements, increase their use of tools and instruments, record data in journals, and communicate results through chart, graph, written, and verbal forms. Students repeat investigations, explain inconsistencies, and design projects.

Day Four: <i>Arrest That Pest!</i>	5.1.3 Explain that doing science involves many different kinds of work and engages men, women, and children of all ages and backgrounds
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Standard 2: Scientific Thinking

Students use a variety of skills and techniques when attempting to answer questions and solve problems. Students describe the observations accurately and clearly using numbers, words, sketches, and are able to communicate their thinking to others. They compare, contrast, explain, and justify both information and numerical functions.

Day Four: <i>Arrest That Pest!</i>	5.2.4 Keep a notebook to record observations and be able to distinguish inferences from actual observations.
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English/Language Arts

Standard 1:

READING: Word Recognition, Fluency, and Vocabulary Development

Students use their knowledge of word parts and word relationships, as well as context (the meaning of the text around a word), to determine the meaning of specialized vocabulary and to understand the precise meaning of grade-level-appropriate words.

Lesson Number and Title	Indiana's State Standard
Day Five: Getting the EAB Message Out	<i>Decoding and Word Recognition</i> 5.1.1 Read aloud grade-level-appropriate narrative text (stories) and expository text (information) fluently and accurately and with appropriate timing, changes in voice, and expression. <i>Vocabulary and Concept Development</i> 5.1.6 Understand unknown words by using word, sentence, and paragraph clues to determine meaning.

Standard 2:

READING: Comprehension and Analysis of Nonfiction and Informational Text

Students read and understand grade-level-appropriate material. At Grade 5, in addition to regular classroom reading, students read a variety of nonfiction, such as biographies, books in many different subject areas, magazines and periodicals, reference and technical materials, and online information.

Day Five: Getting the EAB Message Out	<i>Structural Features of Informational and Technical Materials</i> 5.2.1 Use the features of informational texts, such as formats, graphics, diagrams, illustrations, charts, maps, and organization, to find information and support understanding. 5.2.2 Analyze text that is organized in sequential or chronological order. <i>Analysis of Grade-Level-Appropriate Nonfiction and Informational Text</i> 5.2.3 Recognize main ideas presented in texts, identifying and assessing evidence that supports those ideas. 5.2.4 Draw inferences, conclusions, or generalizations about text and support them with textual evidence and prior knowledge. <i>Expository (Informational) Critique</i> 5.2.5 Distinguish among facts, supported inferences, evidence, and opinions in text.
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Standard 3:

READING: Comprehension and Analysis of Literary Text

Students read and respond to grade-level-appropriate historically or culturally significant works of literature, such as the selections in the [Indiana Reading List](#), which illustrate the quality and complexity of the materials to be read by students. At Grade 5, students read a wide variety of fiction, such as classic and contemporary literature, historical fiction, fantasy, science fiction, folklore, mythology, poetry, songs, plays, and other genres.

Day Five: Getting the EAB Message Out

Literary Criticism

5.3.1 Identify and analyze the characteristics of poetry, drama, fiction, and nonfiction and explain the appropriateness of the literary forms chosen by an author for a specific purpose.

Analysis of Grade-Level-Appropriate Literary Text

5.3.7 Evaluate the author’s use of various techniques to influence readers’ perspectives.

5.3.4 Understand that *theme* refers to the central idea or meaning of a selection and recognize themes, whether they are implied or stated directly.

Standard 5:

WRITING: Applications (Different Types of Writing and Their Characteristics)

At Grade 5, students write narrative (story), expository (informational), persuasive, and descriptive texts (of at least 500 words). Student writing demonstrates a command of Standard English and the research, organizational, and drafting strategies outlined in Standard 4 - Writing Processes and Features. Writing demonstrates an awareness of the audience (intended reader) and purpose for writing.

Day Five: Getting the EAB Message Out

5.5.1 Write narratives that:

- show, rather than tell, the events of the story.

5.5.2 Write responses to literature that:

- develop interpretations that exhibit careful reading and understanding.

5.5.4 Write persuasive letters or compositions that:

- state a clear position in support of a proposal.
- support a position with relevant

	<p>evidence and effective emotional appeals.</p> <ul style="list-style-type: none"> • follow a simple organizational pattern, with the most appealing statements first and the least powerful ones last. • address reader concerns. <p>5.5.5 Use varied word choices to make writing interesting.</p> <p>5.5.6 Write for different purposes and to a specific audience or person, adjusting tone and style as appropriate.</p> <p>5.5.7 Write summaries that contain the main ideas of the reading selection and the most significant details.</p> <p><i>Research Application</i></p> <p>5.5.3 Write or deliver a research report that has been developed using a systematic research process (defines the topic, gathers information, determines credibility, reports findings) and that:</p> <ul style="list-style-type: none"> • uses information from a variety of sources (books, technology, multimedia) and documents sources (titles and authors). • demonstrates that information that has been gathered has been summarized. • organizes information by categorizing and sequencing.
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Standard 7:

LISTENING AND SPEAKING: Skills, Strategies, and Applications

Students deliver focused, coherent presentations that convey ideas clearly and relate to the background and interests of the audience. They evaluate the content of oral communication. Students deliver well-organized formal presentations using traditional speech strategies, including narration, exposition, persuasion, and description. Students use the same Standard English conventions for oral speech that they use in their writing.

Day Five: Getting the EAB Message Out	<i>Comprehension</i> 5.7.1 Ask questions that seek information
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not already discussed.

5.7.2 Interpret a speaker's verbal and nonverbal messages, purposes, and perspectives.

5.7.3 Make inferences or draw conclusions based on an oral report.

5.7.12 Give precise directions and instructions.

Organization and Delivery of Oral Communication

5.7.4 Select a focus, organizational structure, and point of view for an oral presentation.

5.7.5 Clarify and support spoken ideas with evidence and examples.

5.7.6 Use volume, phrasing, timing, and gestures appropriately to enhance meaning.

5.7.13 Emphasize points in ways that help the listener or viewer follow important ideas and concepts.

Analysis and Evaluation of Oral and Media Communications

5.7.7 Identify, analyze, and critique persuasive techniques, including promises, dares, flattery, and generalities; identify faulty reasoning used in oral presentations and media messages.

5.7.8 Analyze media as sources for information, entertainment, persuasion, interpretation of events, and transmission of culture.

5.7.14 Identify claims in different kinds of text (print, image, multimedia) and evaluate evidence used to support these claims.

Speaking Applications

5.7.9 Deliver narrative (story) presentations that:

- establish a situation, plot, point of view, and setting with descriptive words and phrases.
- show, rather than tell, the listener what happens.

5.7.10 Deliver informative presentations

	<p>about an important idea, issue, or event by the following means:</p> <ul style="list-style-type: none"> • frame questions to direct the investigation. • establish a controlling idea or topic. • develop the topic with simple facts, details, examples, and explanations. <p>5.7.15 Make descriptive presentations that use concrete sensory details to set forth and support unified impressions of people, places, things, or experiences.</p> <p>5.7.11 Deliver oral responses to literature that:</p> <ul style="list-style-type: none"> • summarize important events and details. • demonstrate an understanding of several ideas or images communicated by the literary work. • use examples from the work to support conclusions.
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Science

Standard 1: The Nature of Science and Technology
 Students work collaboratively to carry out investigations. They observe and make accurate measurements, increase their use of tools and instruments, record data in journals, and communicate results through chart, graph, written, and verbal forms. Students repeat investigations, explain inconsistencies, and design projects.

<p>Day Five: Getting the EAB Message Out</p>	<p><i>The Scientific Enterprise</i></p> <p>5.1.3 Explain that doing science involves many different kinds of work and engages men, women, and children of all ages and backgrounds</p> <p>5.1.6 Explain that technology extends the ability of people to make positive and/or negative changes in the world.</p>
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Standard 4:
The Living Environment
 Students learn about an increasing variety of organisms- familiar, exotic, fossil and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environments.

Day Five: Getting the EAB Message Out	<p><i>Interdependance of Life and Evolution</i></p> <p>5.4.4 Explain that in any particular environment, some kinds of plants and animals survive well, some do not survive well, and some cannot survive at all.</p> <p>5.4.5 Explain how changes in an organism’s habitat are sometimes beneficial and sometimes harmful.</p> <p>5.4.7 Explain that living things, such as plants and animals, differ in their characteristics, and that sometimes these differences can give members of these groups (plants and animals) an advantage in surviving and reproducing.</p>
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Social Studies

Standard 2:
Civics and Government
 Students will identify main components and characteristics of the United States government. They will identify and explain key ideas in government from the colonial and founding periods that continue to shape civic and political life.

Day Five: Getting the EAB Message Out	<p><i>Roles of Citizens</i></p> <p>5.2.9 Demonstrate civic responsibility in group and individual actions, including civic dispositions — such as civility, cooperation, respect, and responsible participation.</p> <p>5.2.11 Use a variety of information resources to identify and evaluate contemporary issues that involve civic responsibility, individual rights, and the common good.</p>
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Arrest That Pest!

EMERALD ASH BORER in Indiana

Day One: Meet the Borer *An Introduction to the Emerald Ash Borer*

Approximate time One class period

Learning Objectives

Students will be able to:

- Identify and discuss the EAB infestation problem
- Identify successful ways to slow the spread
- Propose ways to promote community involvement in the “slow the spread” effort
- Work cooperatively to produce an effective EAB outreach campaign

Preparation

- Download copies of The Emerald Ash Borers in Your Neighborhood.
- Make transparency of a copy of the News Release. (Or create a PowerPoint slide; this will depend upon the technology that is available.)
- Divide the class into campaign teams, 4-6 students per team.
- Make photocopies and/or overhead of Activity Sheet 1: Arrest the Pest! Outreach Campaign Plan, one per student or team.

Materials

- Overhead projector or computer and projector
- Transparencies and overhead pens or chart paper and markers
- Paper
- Pens and pencils for taking notes

Vocabulary

- Infestation
- Invasive
- Canopy
- Vertical splits
- Galleries
- Quarantine
- Vascular system
- Epicormic shoots

- Larva(e)
- Trap tree
- Exit hole
- Regulation
- Nursery

Teaching Tips

- To accommodate a variety of learning styles, it may be helpful to make a copy of the **News Release** for students to read along with you.
- Prior to reading the **News Release** aloud, you may want to conduct a short vocabulary lesson using the glossary provided.

Part One

Introduction

Over the course of the next week, students will be learning about efforts that are being made to slow the spread of a destructive pest from Asia called the “Emerald Ash Borer” (EAB). Students will be introduced to the EAB infestation problem by reading an actual News Release from the Agricultural Communication Department at Purdue University. They will form campaign teams and begin brainstorming ideas for community-outreach campaign projects.

Discussion and Exploration

- Ask the students what they already know about EAB. Have they heard of it? Do they know what it looks like? Have them share and discuss for a few minutes.
- As a kick-off activity, read (or have students read) the **News Release** aloud to the class. Ask students to take notes while you read, making notes about any important points they hear. After the reading, use the following questions to guide a class discussion.
 - What is the problem described in the **News Release**?
 - What is being affected?
 - How can we slow the spread of this pest?
 - What are the signs and symptoms of infestation?
 - What can we do to help?
- Finish the discussion by alluding to **Part Two** of the EAB activity. Ask students: What can you do to help? What about creating a campaign to help spread the word?

Part Two

Teaching Tips

- You will need to guide the students throughout the planning process to ensure that the campaigns are workable (costs are low and materials are readily available) and that messages are appropriate for the target audience.
- Be sure to collect Activity Sheet 1: *Arrest That Pest!* Outreach Campaign Plan at the end of the period, because students will need to use them throughout the unit.

Brainstorming Ideas for an Outreach Campaign Project

Introduction

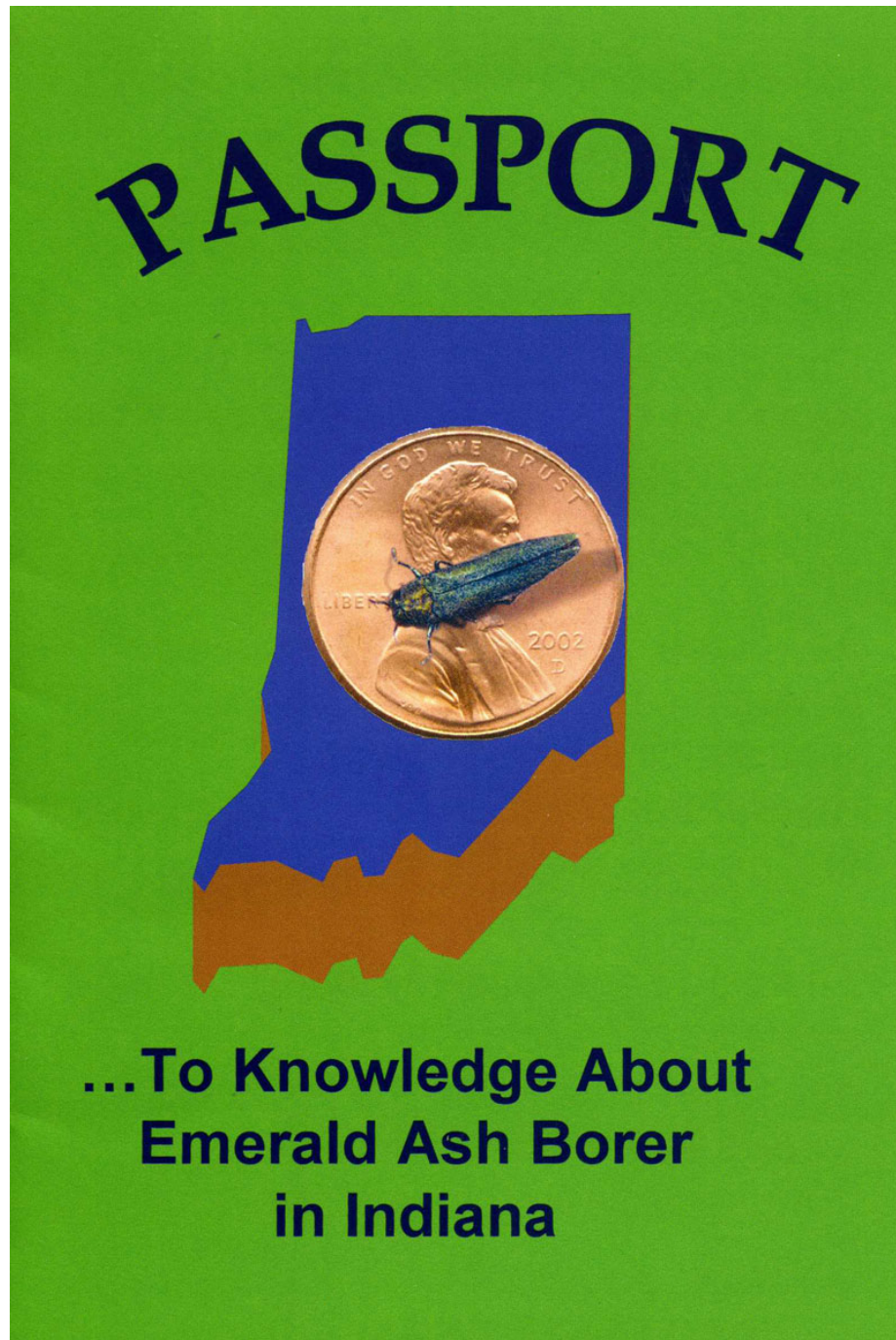
Since the EAB was first discovered in the Detroit/Windsor area in 2002, efforts have been made to slow the spread of the borer by eliminating the “people pathway” (human transport of ash wood). *Students! This is where you come in!* Today we will be working together in teams to develop outreach campaigns to get the community involved in looking for the signs and symptoms of EAB and how to prevent or reduce the spread.

Activity

Kick-Off for the Arrest That Pest! Outreach Campaign

- As a class, brainstorm the different ways in which people get new information. The News Release discussed earlier was one example. What are some others?
- Make a list of the ideas presented by the students. Some examples would be flyers, newspapers, brochures, television or radio, posters, Web sites, and word of mouth.
- Remind the students that they are using science-based research and information to solve a very real problem facing urban and rural communities across Indiana and beyond. They are learning about EAB, and their job is to teach others in the community about this insect and the threat it poses.
- Divide the students into campaign teams of 4 to 6 students to begin planning their community-outreach campaigns. Provide each team with Activity Sheet 1: *Arrest That Pest!* Outreach Campaign Plan.
- Briefly review the directions on Activity Sheet 1 to see if students have any questions. Let them know that you will be moving throughout the room, offering assistance if it is needed.
- Students should begin by determining what they want to say, to whom they want to say it, how they want to say it (theme), and how they want to present it (flyer, poster, Web page, newspaper article, etc.).
- To help students get started, use the following list as idea-starters for campaign titles and headlines. Have students brainstorm other ideas for creating a catchy campaign.

- Wanted Poster: *Wanted Dead or Alive! Indiana's Most Wanted*
- Retro: *Save Trees, Not Borers; Hug a Tree – Not a Borer*
- TV commercials: *Got Ash? Got EAB?*
- Movies: *Nightmare on Ash Trees, I Saw What You Did To My Ash Tree, Dude, Where's My Ash?*



This is a booklet that informs the reader about EAB. The booklet was designed for a workshop that has several checkpoints, at each checkpoint participants have to answer questions correctly. Once they answer the questions correctly you receive a stamp in their passport and are able to move to the next checkpoint.



United States Department of Agriculture
Animal and Plant Health Inspection Service

Program Aid No. 1769

Emerald Ash Borer

The Green Menace



This pamphlet informs the reader on the history of EAB, the signs and symptoms of EAB, and what to do to help prevent the spread of EAB.



This business card tells the reader where to find more information about EAB.

FIREWOOD ALERT

KEEP EXOTIC INSECT PESTS AWAY FROM INDIANA TREES DON'T MOVE FIREWOOD!

Exotic insect pests like the Emerald Ash Borer are major threats to Indiana's trees.

Emerald Ash Borer, a non-native beetle discovered in Michigan, kills ash trees. It can easily be transported to uninfested areas through movement of infested ash firewood.

To help protect Indiana from the Emerald Ash Borer and other exotic insects:

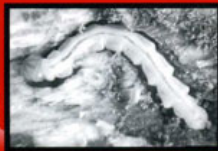
- USE LOCAL SOURCES OF FIREWOOD - DO NOT BRING FIREWOOD FROM HOME.
- IF YOU HAVE ALREADY BROUGHT FIREWOOD FROM HOME,
DO NOT TAKE IT BACK HOME OR LEAVE IT HERE

BURN IT!

EMERALD ASH BORER



ADULT



LARVA



FEEDING TUNNELS



D-SHAPED EXIT HOLES

For more information on the Emerald Ash Borer:

- Contact the Indiana Department of Natural Resources Invasive Species Hotline at 1-866-NO EXOTIC (1-866-663-9684)
- Visit Purdue University's Extension website at: www.entm.purdue.edu/EAB



Purdue University is an equal access/equal opportunity institution. 10/4

This poster explains why transporting firewood from place to place could be harmful to the environment.

EMERALD ASH BORER

A THREAT TO INDIANA ASH TREES

What is it?

- A wood-boring beetle that kills North American ash trees.

When did it get here?

- First detected in the Detroit/Windsor area in 2002.
- Arrived from Asia in wooden shipping material.

What does it do?

- Starves ash trees of nutrients and water by tunneling under bark.

If you think emerald ash borer is in your trees, please call the DNR's toll-free hotline:

- 1-866 NO EXOTIC (1-866-663-9684)

For more information on emerald ash borer in Indiana, visit: www.entm.purdue.edu/EAB

SIGNS OF INFESTATION



ADULT EMERALD ASH BORER



LEAFY SPROUTS AT THE BASE OF THE TREE



D-SHAPED BORER EXIT HOLES



LARVAL FEEDING TUNNELS BENEATH THE TREE'S BARK



DIEBACK OF TOP PART OF TREE



Purdue Extension
Knowledge to Go




This poster highlights important information about EAB such as, where it came from and symptoms of EAB on ash trees.

• WARNING! •

PURDUE UNIVERSITY PURDUE EXTENSION

EMERALD ASH BORER in Indiana



This—and all Indiana ash trees—are threatened by the invasive insect Emerald Ash Borer.

To find out more about this devastating pest, visit: www.entm.purdue.edu/EAB

or call the Indiana DNR toll-free:
1-866-NO EXOTIC



USDA APHIS DNR Indiana Department of Natural Resources

Purdue University is an equal access/equal opportunity institution.

This tree tag can be placed on an ash tree to inform passersby about EAB.

Wrap Up

While the campaign teams are working, remind students to choose a theme that will appeal to their target audience. Explain that in the next few lessons they will be learning more about EAB and will work on incorporating the new information into their campaigns.



Arrest That Pest! **EMERALD ASH BORER** in Indiana

NEWS RELEASE

Writer: Jennifer Stewart

April 26, 2007

Menace on the loose: Emerald Ash Borer flies again in Midwest

WEST LAFAYETTE, Ind. — Millions of ash trees are dead, and after a six-month hiatus, the perpetrator is about to be back on the loose, said an expert from Purdue University.

Each May, the adult Emerald Ash Borer (EAB), an iridescent, green invasive beetle originating from Asia, begins flying again—thus increasing the likelihood of finding new infestations. On its own, EAB will spread only a half mile annually. However, many infestations come as a direct result of firewood, log, and nursery stock movement.

"EAB is an exotic and invasive species that has largely been spread through the movement of firewood," said Jodie Ellis, Purdue Extension EAB specialist. "In order to protect the environment and our natural resources, people must realize that the time to move firewood freely over long distances is over."

The state of Indiana is under a federal quarantine, which means that none of the following may leave the state: ash nursery stock, ash logs or untreated ash lumber with the bark attached, any type of firewood except pine, and any composted or un-composted wood or bark chips that are 1 inch or larger.

In addition to the statewide quarantine, the townships in which EAB is actually found are placed under quarantine regulations, along with their respective counties. "The quarantines are in place to keep EAB from being moved to new areas. If we can't keep the insect under control, all of our ash resources will be lost," said Ellis.

Aside from following all quarantine regulations, and refraining from firewood movement, the general public can help slow the spread of EAB by monitoring area ash trees for EAB activity. "Emerald Ash Borer has many times been detected by citizens who knew

what to look for," Ellis said. "It is a difficult insect to detect, even with our scouts and our trap tree programs. We need millions of eyes out looking for the signs of this pest, so citizens have the opportunity to make a real difference."

Infested trees show signs of dying leaves beginning on the upper one-third of the tree canopy and progressing downward, vertical splits in the bark, D-shaped exit holes measuring approximately one-eighth of an inch wide, S-shaped feeding galleries in the vascular tissue directly under the bark, heavy woodpecker activity on the tree's trunk and branches, "epicormic shoots" or water sprouts growing from the tree trunk, and the presence of worm-like larvae up to 1 inch long under the bark of the tree.

If found, these symptoms should be reported to local Purdue Cooperative Extension educators by calling 1-800-EXT-INFO, or to the Indiana Department of Natural Resources by calling their toll-free invasive species hotline at 1-866-NO EXOTIC.

More information for both citizens and professionals, including a list of replacement trees, identification of ash trees and EAB, biology and life cycles of the insect, quarantine information and more, are available on Purdue's EAB in Indiana Website at www.entm.purdue.edu/EAB.



Arrest That Pest!

EMERALD ASH BORER in Indiana

Arrest That Pest!

Outreach Campaign Plan - Activity Sheet 1

Directions:

Use this Activity Sheet to help you as you plan your campaign. Remember to pick a campaign theme that will be interesting to your target audience.

Team Name:

Team Members:

- 1. Message?** (What you are trying to let people know)
- 2. Target Audience?** (To whom you will give the message)
- 3. Theme?** (A popular movie, song, commercial, etc.)
- 4. Message Presentation?** (Poster, brochure, letter to officials, etc.)
- 5. Materials?** (What will you need to present your message?)
- 6. Plan of action?** (What is your plan of action for presenting your campaign?)



Arrest That Pest!

EMERALD ASH BORER in Indiana

Day Two: Getting to Know the EAB

What Emerald Ash Borer is, What it does, and Why it's a problem

Approximate Time One to two class periods

Learning Objectives

Students will be able to:

- Work cooperatively to identify the main idea and restate the three most important details of their assigned EAB Background Information sections
- Work cooperatively to design an effective outreach campaign

Preparation

- Divide the class into six cooperative learning groups. (There are six EAB Background Information Sections to review and research.)
- Print necessary copies:
 - EAB Background Information - each student will need a copy of the group's assigned section
 - Activity Sheet Two - EAB Research Log, one per student
 - Activity Sheet Three – Arrest That Pest! Outreach Campaign Rubric, one copy per student
- Emerald Ash Borer In Your Neighborhood

Materials

- Scissors
- Copies of EAB Background Information Sections

Vocabulary

- Larva(e)
- Pupa(e)
- Surveyed
- Borer
- Exotic species
- Invasive species
- Regulated

Teacher Tips

- Prior to the activity, it may be helpful to conduct a short vocabulary lesson.
- As students convene in groups to share knowledge from their EAB Research Logs, it is more important that they focus on discussing the questions in depth, rather than how they write. To encourage depth of discussion and to save time, do not require written answers, or have one member act as scribe for the team to record answers.

Part One

Introduction

Remind the students that in order to create a successful campaign, they need to know their topic. During this session, they will be working together in groups to learn all about the EAB, facts such as: what it is, what it does, how it got to North America, and why it's such a problem. Because there is a lot to learn in a relatively short period of time, each group will take one section. Students will become "experts" on their assigned section, and then in a jigsaw grouping activity, they will teach their peers what they have learned.

Activity

- Divide the class into six cooperative learning groups. Assign each group one EAB Background Information section, and pass out the photocopied sections. Provide one EAB Research Log section to each student.
- Have students read their EAB Background Information Sections. Remind them to look for the main idea and three important details. Students should record their answers in the first section of their EAB Research Logs. Allow about 10 minutes for this exercise.
- While the students work, visit each group and have students count off to one to four (cooperative learning group numbers will be dictated by the size of the class), assigning them each a number.
- Once the "experts" are prepared, have the students form new groups: all "1"s together, "2"s together, and so on. With each subject group divided up in this way, each new group will have an "expert" from every section of the EAB Background Information section.
- Have all the "experts" share their newly acquired knowledge with the other members of their new group. This should be a 1 – 2 minute presentation per student.
- For **Part Two**, have the groups discuss the problem further, based on what they learned from the News Release and EAB Background Information section.

Part Two

Introduction

Students should be well on their way to understanding how they can *Arrest That Pest!* They've done the research to learn about the threat of EAB and the problems associated with infestation. They are ready to use their background knowledge to create and develop outreach campaigns that will encourage the community to take an interest too!

Teaching Tips

- At the end of the activity, collect the Campaign Rubrics, and keep them in a place where students can refer to them throughout the project.
- Review and provide feedback to students' Campaign Plans in preparation for the next class.

Activity

- Pass out one *Arrest That Pest!* Outreach Campaign Rubric to each student. Explain that the rubric will be used as both a checklist for the students throughout the project and as a self-assessment tool upon project completion.
- Display the poster, and point out the elements that have been included. Encourage students to refer to the poster throughout the process as a model campaign; it is a great example because it contains all the required components. Remind them however, that their campaign doesn't have to be a poster. It could be prepared using any medium they choose.
- Have students reassemble into their campaign teams. Ask them to scan and discuss the Performance Elements included on the rubric and then brainstorm ideas for each. They should ask themselves the following questions:
 - How can we grab the attention of our audience?
 - How will we illustrate the EAB? Students can draw or download images of the EAB, evidence of EAB, and information about ash trees at <http://www.entm.purdue.edu/EAB/>.
- Ask the teams to make a list of the materials they will need as well as what preparations they need to make in order to create and present the campaign.
- Have the teams complete their *Arrest That Pest!* Outreach Campaign Plans and turn them in for review and approval; they should also turn in the Campaign Rubrics, which will be used at a later time.

Wrap Up

As students complete their Campaign Plans, explain that on Day Three they will be learning how to identify EAB in nature. The teams will then need to decide how to incorporate this new knowledge into their campaigns.



Arrest That Pest!

EMERALD ASH BORER in Indiana

Emerald Ash Borer (EAB) Background Information

Teachers: After determining your cooperative learning groups, photocopy the following pages. Then cut out each section along the dotted line. Make sure each student has a copy of her/his assigned section. Note: Vocabulary words are highlighted in **bold**.

Section One

What is the Emerald Ash Borer?

The **iridescent** adult beetle is dark green in color, 1/2" long and 1/8" wide. When adults flare their wings, you can see their violet **abdomen**. The **larvae** are cream-colored grubs with flat bodies, bell-shaped **segments**, and wide heads.

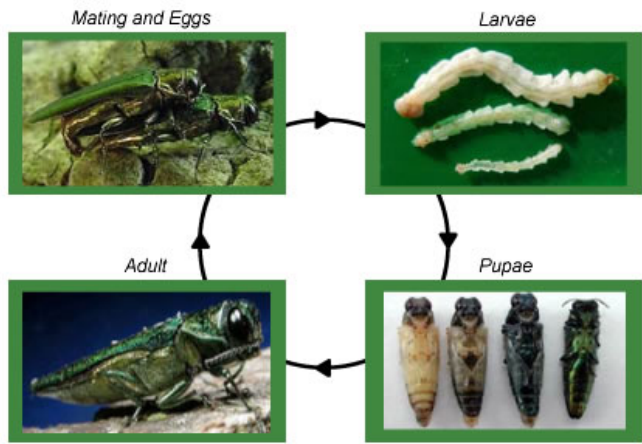
Recent research has shown that in heavily **infested** trees or in trees that are stressed, most EAB have a one year life cycle. In healthy trees that have only a few larvae, most EAB require two years to complete their development.

Adult beetles begin emerging in middle to late May, with peak **emergence** occurring during the month of June. The adult insects are most numerous in late June and early to middle July. Adults feed on the ash tree leaves, and then females begin laying eggs approximately two weeks after they emerge.

The eggs, laid in bark **crevices**, hatch in one to two weeks and the tiny larvae **bore** through the bark. The larvae remain here for several months, usually from late July through October, feeding on the **cambium** or **vascular** tissue that carries water and **nutrients** to the tree.

Most EAB remain in small **chambers** underneath the outer bark over the winter. **Pupation** occurs in the spring, and new generations of adults emerge in May to begin the cycle all over again. <<http://www.entm.purdue.edu/EAB>>

Click on each life stage for details





Arrest That Pest!

EMERALD ASH BORER in Indiana

Emerald Ash Borer (EAB) Background Information

Teachers: After determining your cooperative learning groups, photocopy the following pages. Then cut out each section along the dotted line. Make sure each student has a copy of her/his assigned section. Note: Vocabulary words are highlighted in **bold**.

Section Two

Where did EAB come from, and why is it a problem?

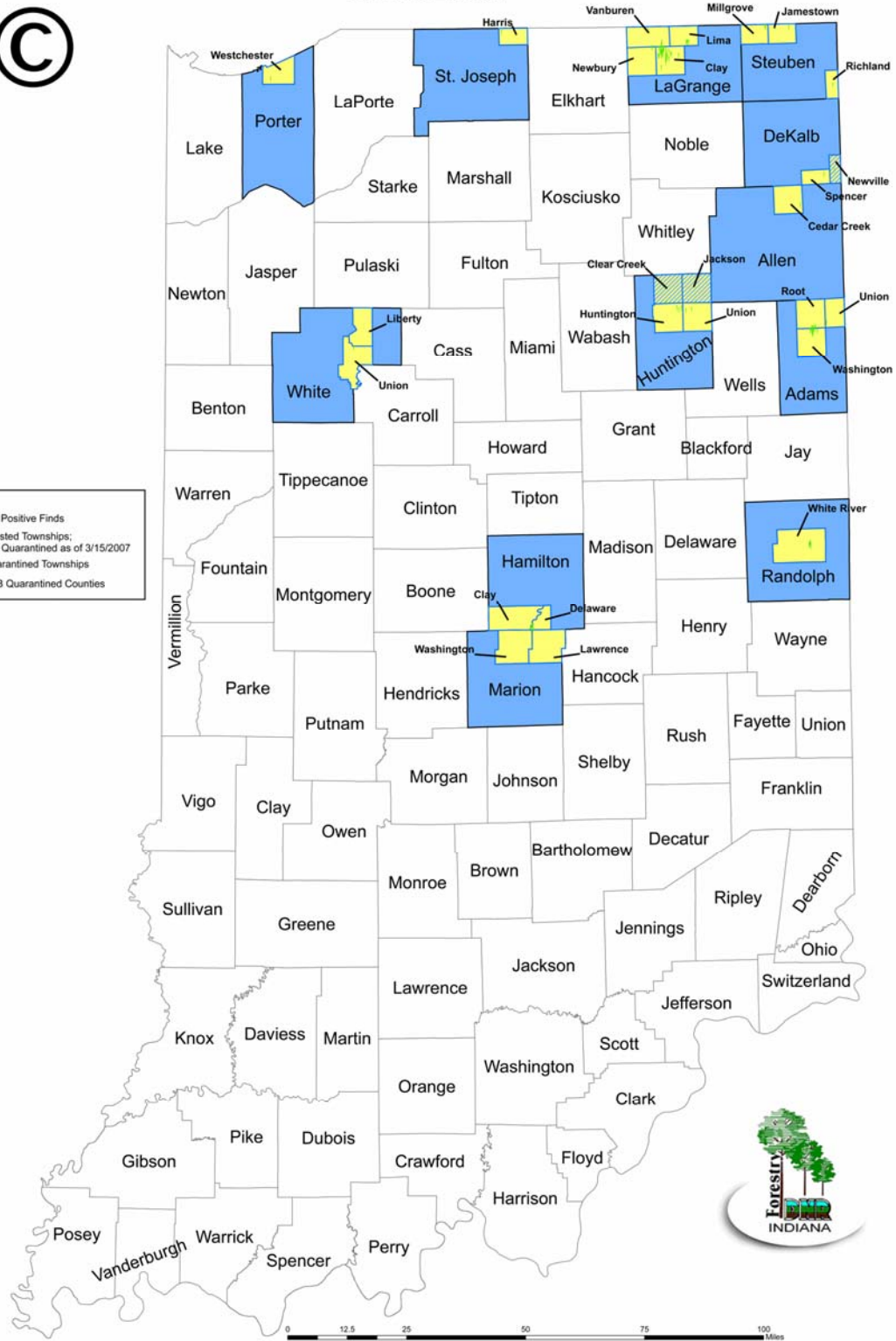
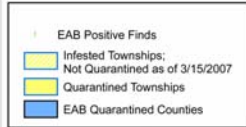
An **exotic species** is one that is not naturally found in an ecosystem. An **invasive species** is a plant, animal, or pathogen that comes from another place and, once established, is likely to cause economic and/or environmental harm. Before June 2002, EAB had never been found in North America.

The natural range of the emerald ash borer (*Agrilus planipennis*) is eastern Russia, northern China, Japan, and Korea. EAB is considered a **secondary pest** if found within its natural range. This means that the borer **co-evolved** with the ash tree so that there are **predators, parasites**, diseases, and environmental conditions that keep the population under control in its native land. It also means that it usually feeds on stressed or dying trees.

But in North America, EAB is considered a **primary pest**. This means that it spreads readily, and beetle populations can increase quickly and destroy thousands of trees in a relatively short time. In other words, EAB attacks all kinds of ash trees, whether they are healthy or stressed, and feeds on them until they die, and there is nothing in place (parasite, disease, or environmental condition) to stop the destruction.

<<http://www.entm.purdue.edu/EAB>>

Indiana Emerald Ash Borer Quarantined Townships and Counties 3/16/2007





Arrest That Pest!

EMERALD ASH BORER in Indiana

Emerald Ash Borer (EAB) Background Information

Teachers: After determining your cooperative learning groups, photocopy the following pages. Then cut out each section along the dotted line. Make sure each student has a copy of her/his assigned section. Note: Vocabulary words are highlighted in **bold**.

Section Three

How did EAB get here, and how is it spread?

Scientists can't say for sure, but they believe that EAB probably "hitchhiked" to this country in **solid wood packing material** in the early 1990s. Solid wood packing material includes wooden crates, **pallets**, and **dunnage** used to stabilize cargo on ships that contain goods imported from Asian countries.

This scenario is possible because the EAB larvae and pupae live inside the wood of ash trees. Some of the larvae and pupae can survive the process of chopping down a tree, cutting it into lumber, and building a crate. They can be shipped, along with the cargo contained in the crate, to other countries.

The beetles emerge from the crate and into trees close by. EAB adults do not fly very fast or very far, usually moving no further than a ½ mile from where they emerge. The primary movement of the borer is through infested ash wood products such as firewood or ash debris that is transported by people.

<<http://www.entm.purdue.edu/EAB>>



Inspecting solid wood packing material in Costa Rica



Cargo ship on the Panama Canal



Arrest That Pest!

EMERALD ASH BORER in Indiana

Emerald Ash Borer (EAB) Background Information

Teachers: After determining your cooperative learning groups, photocopy the following pages. Then cut out each section along the dotted line. Make sure each student has a copy of her/his assigned section. Note: Vocabulary words are highlighted in **bold**.

Section Four

What kind of trees does EAB attack, and how can the trees be identified?

In North America, the beetle has only been found in ash trees. These trees are called a **host species**. When feeding, the beetles **bore**, or chew tunnels, into the wood. The larvae feed on the living tissue of the tree, which prevents the flow of nutrients and water throughout the tree from the roots to the branches and leaves of the tree.

It will attack any size or species of ash in any location – large or small, urban or forest, healthy or stressed; among ash, the borer does not **discriminate** (EAB *does not* attack Mountain Ash because it is not a true ash tree.)

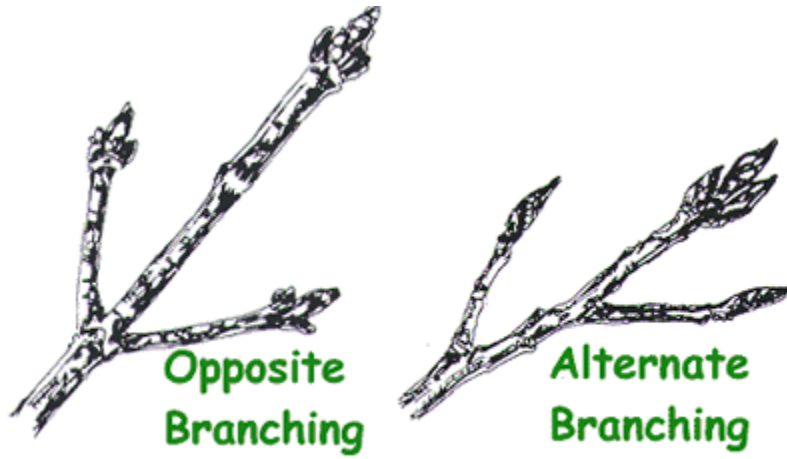
In addition, ash trees have little or no **resistance** to EAB. Scientists have found that EAB adults are more attracted to **stressed** trees and that the larvae develop more rapidly in these trees. Even the healthiest trees have been killed when EAB population densities are high. Up until now, **natural enemies** have had little impact on EAB.

To identify an ash tree, first look at the branch and bud arrangement. Ash trees have branches and buds that are arranged opposite one another. Ash trees have a **pinnately compound** leaf with usually seven or more leaflets. Look for seeds on the trees. Ash trees have prominently winged seeds called **samaras**. The bark of an older ash has a rough, diamond shaped appearance.

<<http://www.entm.purdue.edu/EAB>>



Leaves of an Ash tree





Arrest That Pest!

EMERALD ASH BORER in Indiana

Emerald Ash Borer (EAB) Background Information

Teachers: After determining your cooperative learning groups, photocopy the following pages. Then cut out each section along the dotted line. Make sure each student has a copy of her/his assigned section. Note: Vocabulary words are highlighted in **bold**.

Section Five

Why are trees so important?

Trees are important for a variety of reasons. Trees in **urban**, **suburban**, and **rural** areas improve our quality of life, create a **habitat** for plants and animals, improve the quality of the air we breathe, and reduce storm water runoff and **erosion**. They provide the shade that helps **temper** local climate and conserve energy and serve as natural screens and **buffers**. Trees improve our health and well-being and contribute and promote a sense of community.

If ash trees are infested and die, or have to be destroyed, there is a devastating economic impact on nursery, landscaping, timber, and recreation and tourism industries because of the loss of resources and the jobs associated with those resources. The destruction of ash trees decreases the quality of life for other members of the community. Trees are identified by: leaves, bark, buds, twigs or branches, flowers, and structure. These components are analyzed by shape, size, color, texture, and smell.

<<http://www.entm.purdue.edu/EAB>>



An Ash tree is tagged at a zoo



Arrest That Pest!

EMERALD ASH BORER in Indiana

Emerald Ash Borer (EAB) Background Information

Teachers: After determining your cooperative learning groups, photocopy the following pages. Then cut out each section along the dotted line. Make sure each student has a copy of her/his assigned section. Note: Vocabulary words are highlighted in **bold**.

Section Six

What are the signs and symptoms of an ash tree infested with EAB?




The **canopy** of heavily infested trees will begin to die, usually near the top of the tree and progressing down the trunk. Sometimes ash trees produce **epicormic sprouts** or what are sometimes called “water sprouts” or “witches brooms” on the trunk or large branches where EAB damage is heavy.



Bark may crack over **larval galleries** and result in **vertical splits** through which distinctive “S” shaped galleries can be viewed. As the borer chews out these tunnels, it leaves behind insect **excrement**, or what scientists call **frass**. Adult beetles leave a characteristic “D” shaped exit hole in the bark, roughly 1/8” in diameter when they **emerge** in June.

Woodpeckers often attack larvae, especially during the winter. Woodpecker holes are larger and easier to see than the D-shaped holes left by EAB. Several infestations have been discovered because people noticed woodpecker damage in trees. The distinctive “S” shaped tunnels excavated by feeding larvae destroy the water and nutrient conducting tissues under the bark. The tree literally starves to death in as little as 1 to 3 years.

<<http://www.entm.purdue.edu/EAB>>

Section Six Continued

		
<p>Canopy of tree is dying, sign of EAB infestation Photo by: Dan Herms</p>	<p>Epicormic Sprouts Photo by: Dan Herms</p>	<p>S-shaped larval galleries Photo by: Dan Herms</p>

	
<p>EAB frass Photo by: Dan Herms</p>	<p>D-shaped emergence holes Photo by: Dan Herms</p>



Woodpecker eating EAB



Arrest That Pest!

EMERALD ASH BORER in Indiana

EAB Research Log

Activity Sheet 2

Name:

Section:

Part 1

Directions: Read your assigned section, and then, with your group, identify the main idea and three important details that you will share with your group later.

Main idea:

Important Detail 1:

Important Detail 2:

Important Detail 3:

Part 2

Directions: In your new group, share the main idea and the three most important details you recorded above and then discuss the following questions:

1. What do we know about the emerald ash borer?
2. What is the importance of trees?
3. How are the environment and the economy affected by the loss of trees?
4. What does quarantine mean?
5. How can we slow the spread and reduce the threat?
6. How can we teach others to slow the spread and reduce the threat?



Arrest That Pest!

EMERALD ASH BORER in Indiana

Arrest That Pest!

Outreach Campaign Rubric

Activity Sheet 3

Directions: Use this rubric as a checklist for your outreach campaign. With your team, read the Performance Elements below and the corresponding points possible. Be sure your outreach campaign includes all the elements. After your team has completed the outreach campaign, you will be asked to fill out the points for each element and add up your score. The teacher will use your rubric to grade your performance in the *Arrest That Pest!* unit.

Name:

Performance Element	No Attempt 0	Low Performance 1	Average Performance 3	Exemplary Performance 5	Points Earned
Campaign Planning	Students made no attempt to meet objective.	Students did complete the brainstorming process.	Students completed the brainstorming process, but the plan is not clear and/or attainable.	Students brainstormed a thoughtful, attainable campaign plan.	
How to Identify, Survey, and Report; <i>Arrest That Pest!</i> Website (visual and/or Written)	Students made no attempt to meet objective.	Student campaign is missing more than one of the listed requirements.	Student campaign is missing up to one of the listed requirements; requirements included are clear and understandable.	Student campaign includes listed requirements in a clear and understandable manner.	
Picture of EAB (student-drawn or downloaded)	Students made no attempt to meet objective.	Campaign is missing a clearly visible and accurate image of the EAB.	Campaign includes an image of EAB, but it lacks clarity or accuracy.	Campaign includes a clear and accurate image of EAB.	
Headline (a bold title that capture's the viewer's attention)	Students made no attempt to meet objective.	Campaign is missing a clear and effective tagline.	Campaign includes a tagline, but it is not clear or effective.	Campaign includes a clear and effective tagline.	
Originality and Creativity of Design	Students made no attempt to meet objective.	Campaign design lacks originality and/or creativity.	Campaign design includes some creativity and originality.	Campaign is highly creative and original.	
Teamwork	Students made no attempt to meet objective.	One or two people did all or most of the work; two or more conflicts arose between team members.	Most team members contributed their fair share of the work, and/or up to one conflict arose between team members.	The workload was divided and shared equally by all team members; teams worked without conflict.	
Community Outreach	Students made no attempt to meet objective.	Students attempted to plan and present their campaign but were unsuccessful.	Students planned and presented their campaign to an outside group but lacked a clear objective and/or a handout.	Students planned and presented their campaign to an outside group with a clearly met objective and a handout.	
				Points earned:	
				Points possible:	35



Arrest That Pest!

EMERALD ASH BORER in Indiana

Day Three – Identify the EAB

Learning About the Beetle and Revising Outreach Campaign Plans

Approximate time One class period

Learning Objectives

Students will be able to:

- Identify EAB
- Identify ash (the EAB host tree)
- Identify signs and symptoms of the EAB
- Work cooperatively to revise campaign plans according to teacher feedback

Preparation

- Review the *Arrest That Pest!* Outreach Campaign Plans, and provide feedback to guide students.
- Review students' materials lists for availability; make recommendations for acquisition.
- Have the EAB Insert available to display for Discussion 5.

Materials

- Flip chart paper
- Markers

Vocabulary

- Identify
- Evidence
- Host
- Characteristics

Teaching Tips

- As you work with students, check for their understanding of vocabulary words and any other new words discussed earlier.

Part One

Introduction

In order to be successful in their efforts to *Arrest That Pest!*, students need to know how to locate and identify EAB. Today, they will spend some time reviewing what they know about the EAB and learning how to locate the EAB in nature.

Activity

- Ask the students: How can we identify EAB? Make a list of these characteristics on chart paper. Encourage students to mention all the distinguishing characteristics that they can remember from their research. The students who were “experts” in this area should provide the most examples.
- Next, ask students to remember what kind of tree the EAB uses as a host. Encourage the students to remember any distinguishing characteristics of ash trees.
- Ask the students to describe evidence (signs and symptoms) of EAB infestation of an ash tree. What evidence would someone see when looking for the pest? Make another list on the chart paper.
- Ask students if they can think of any other places that they might find an adult EAB.
- Display or pass out copies of the Emerald Ash Borers in Your Neighborhood. Have the class look at the insert and compare their lists of information with the information found on the flip chart lists. Make changes/additions to the lists as necessary.

Part 2

Arrest That Pest! Outreach Campaign, Making Revisions

Teaching Tips

- The <<http://www.entm.purdue.edu/EAB>> and <www.emeraldashborer.info> Web sites are great places for images and additional information.

Introduction

Now that the students are more familiar with the appearance of the beetle and evidence of infestation, they can begin to think about how to incorporate this knowledge into their outreach campaigns.

Activity

- Ask teams to review teacher feedback on their *Arrest That Pest!* Outreach Campaign Plans and make adjustments to them, if needed.
- Circle the classroom to answer individual group questions and to approve final Campaign Plans.
- Have students spend the rest of the period working on designing their campaigns and creating the necessary materials. If available, allow teams to work on

computers; they can find images to use within their campaigns from the Web sites mentioned previously.

Wrap Up

As the students work on designing their campaigns and creating the materials they need to deliver their messages, explain that on Day 4 they will be learning how to survey for the EAB and how to report a sighting. This knowledge will be an important element to include in their campaigns.



Arrest That Pest!

EMERALD ASH BORER in Indiana

Day Four: *Arrest That Pest!* ***Take a look and make a difference!***

Approximate Time One to two class periods

Learning Objectives

Students will be able to:

- Conduct an EAB survey
- Report findings to <ashdetective@purdue.edu>

Preparation

- Make arrangements for the class outing (permission slips, chaperones, survey location, etc.).
- Print copies of Activity Sheet 4: *Arrest That Pest!* Report Form, one per student
- Print copies of the Family Take-Home Flyer: *Arrest That Pest!*, one copy per student.
- As a follow-up, make extra copies of the Report Form for students to take home.

Materials

- Emerald Ash Borer ID Cards, one per student (These can be downloaded or mailed to you from Purdue.)
- *Arrest That Pest!* Report Form, one per student
- One clipboard per student, if available
- Computer with Internet access (at least one)

Vocabulary

- survey
- data
- sighting

Teaching Tips

- If surveying in one small area, you may want to have students complete all, or most of the Report Form prior to, or when returning from, the outing. This way they can focus primarily on surveying without unnecessary distraction.

Part One

Introduction

Announce to the class that today they will have an opportunity to use their newly acquired knowledge to *Arrest That Pest!*. Kick off the day by working with the class to define the words survey, data, and sighting.

Discussion and Exploration

- Ask the students to remember why they are learning all about EAB. Discuss elicited answers briefly. Remind the students that to help slow the spread they should:
 - Survey for the EAB from late spring through fall. They should survey all ash trees – in the schoolyard, parks, forests, or backyards...anywhere they go!
 - Report all findings. Whenever they do an EAB survey, they should report – whether they see it, or not!
 - Pass their *Arrest That Pest!* skills on to others. Teach their family and friends about EAB and encourage them to survey and report, too!
- Before going out to survey, remind them of the quarantine associated with EAB.
- Pass out one Emerald Ash Borer ID Card to each student, along with a copy of Activity Sheet 4: *Arrest That Pest!* Report Form and a clipboard. Review the directions on the Report Form as a class.

Part Two

Go Beetle Busting!

Introduction As the class prepares to go outside, make sure each student has a pencil or pen, an EAB Report Form, a clipboard or hard surface to write on, and an Emerald Ash Borer ID Card. Then, divide the class into small groups, according to the number of chaperones. Now the class is ready to *Arrest That Pest!*

Teacher Tips

- To ensure a safe and fun outing, it may be helpful to remind the class of the behavior expectations you have for them.

Activity

- Lead the class to an outside location that has ash trees. Walk through the surveying process as a whole-class activity. As you go, point out other types of places where the EAB might be seen.
- If possible, after surveying together as a class, split the class into small groups, and send them to different areas to survey on their own.

- When the students have finished surveying, return to the classroom to discuss what students observed. Fill out the Report Forms together. Ideally the class will submit its reports online at <ashdetective@purdue.edu>. If a computer is available, have the class observe as you model how to complete the online reporting form correctly. Then, have students use the computer to do their own reporting. (Designated computer lab time may be used for this activity.)

Wrap Up

After reporting is done, tell the class that you will have extra Report Forms available; encourage the students to take copies with them and to continue to survey at home, on the way to school, while playing in neighborhood parks, or during visits to other natural areas where ash trees are found. To encourage surveying beyond this lesson, you can assign this as homework. Hand out one Family Take-Home Flyer: *Arrest That Pest!* to each student and encourage them to get their families involved today!



Arrest That Pest!

EMERALD ASH BORER in Indiana

Arrest That Pest!

Emerald Ash Borer Report Form
Activity Sheet 4

Directions: Answer each question. Be sure to write neatly!

School name:

School Zip Code:

Teacher's name:

Date you searched:

Street address of the property you searched:

Did you see EAB or evidence of EAB at this location?
Circle your answer. Yes / No

Email to: <ashdetective@purdue.edu>

Or mail to:

Emerald Ash Borer Program
Department of Entomology
Purdue University
131 Smith Hall
901 West State Street
West Lafayette, IN 47906



Arrest That Pest!

EMERALD ASH BORER in Indiana

Day Five: Getting the EAB Message Out *Complete your outreach campaigns*

Approximate time One to two class periods

Learning Objectives

Students will be able to:

- Work cooperatively to finish designing an effective campaign
- Make oral campaign presentations to the class
- Assess individual student performance

Preparation

Students:

- Finish work necessary for completion of campaigns.

Teacher:

- Display Emerald Ash Borer in Your Neighborhood

Teaching Tips

- Since campaign presentations require a student-made handout, you may want to dedicate one additional period for the campaign teams to complete this; or assign it as homework.

Part One

Arrest That Pest! Campaign Completion

Introduction

Today teams will work to complete their campaigns. Before the students begin, remind them about the importance of including the information they learned about identifying the EAB, and surveying and reporting evidence of this pest. Tell students that they should refer to the Campaign Rubric to be sure they have included each Performance Element.

Activity

- Reassemble students into their campaign teams. Try to give them most of the period to complete their campaigns. As they work, you should circulate among the groups to assist as needed.

- Once students have finished their campaigns, come together as a class to discuss what the next steps should be in implementing their campaigns in the community:
 - Will the class choose one project and implement it as a group?
 - Will each group implement its own project?
 - How will the students extend information about evidence of the EAB and how to slow the spread to protect ash trees?
- As a class, brainstorm the next steps required to present the campaigns to an outside group. Assign tasks to individual students where appropriate. Students who belong to clubs and other organizations could ask for permission to present their campaigns.

Extension Activity

From the Classroom to the Community

Activity

- Each team can plan a short presentation of its campaign for the class. As the other students watch the presentations, they should think about the following Presentation Critique Questions and be prepared to make constructive suggestions about how their campaigns can be improved.
 - Is the presentation appropriate for the target audience?
 - Will it be effective? Why or why not?
 - What about the campaign is good?
 - What can be improved?
 - Are all the Campaign Rubric's requirements met? (Does the campaign address how to survey, identify, and report?)

Assessment

- Encourage students to seek more publicity for their campaigns by approaching local media outlets such as newspapers, radio, and television. Teachers will need students to gain the appropriate permissions and materials needed. You may want to offer extra credit to students who seek out groups and community organizations that will receive a presentation.

Wrap Up

- Upon completion of the project, encourage students to take time to reflect upon what they have done and learned. Have them assess their individual performance on the *Arrest That Pest!* Outreach Campaign Rubric and then turn it in. This may be done as homework or as an in class activity.



Arrest That Pest! EMERALD ASH BORER in Indiana



Support Efforts to *Arrest That Pest!*

Dear Parent or Caregiver,

Your child is currently learning about the invasive Emerald Ash Borer (EAB) at school. In the summer of 2002, the destructive Emerald Ash Borer (EAB) was discovered in ash trees in the Detroit and Windsor areas. Since that time this exotic invasive pest from Asia has been responsible for the systematic destruction of ash trees throughout Ontario, Canada and parts of Michigan, Illinois, Indiana, Ohio, Pennsylvania, and Maryland. Over 20 million ash trees in North America have already been killed, and estimates to remove, dispose of, and plant new trees run into the tens of billions of dollars.

Here in Indiana, there are about 147 million ash trees in the forests and *at least* another 4-5 million in urban areas. Once the borer infests the tree, unless yearly chemical intervention is used, the ash tree dies within one to three years. Because of the high rate of mortality associated with EAB, ash trees as a species in North America may face extinction.

We ask that you join your child in learning about EAB and support her/his efforts to raise awareness about the threat that the beetle poses to ash trees in Indiana. In addition, as your child has learned, it is imperative that we work together to slow the spread of EAB.

Thanks for your support. Your family's participation will help slow the spread of Emerald Ash Borer in Indiana!

***The EAB Educational and Outreach Team at Purdue University
And USDA Animal and Plant Health Inspection Service (APHIS)***

The Emerald Ash Borer (EAB): What You Need to Know

The Emerald Ash Borer (EAB) is a destructive pest that kills ash trees. Here's what you need to know. Please visit our Web site to support your child's *Arrest That Pest!* efforts, and find the answers to these and other questions about EAB:

The Beetle: *How Do You Recognize It?*

The Tree: *How Do You Recognize It?*

The Evidence: *How Do You Recognize It?*

Websites for more information on EAB:

www.entm.purdue.edu/EAB

<http://www.in.gov/dnr/entomolo/pestinfo/ashborer.htm>

Contact Information

For information on the curriculum contact:

Melissa Shepson, 765-494-0997, mshepson@purdue.edu

For more information on EAB

Purdue University Department of Entomology

Exotic Insects Education Coordinator: (765) 494-0822

Purdue Extension: (888) EXT INFO (888-398-4636)

Indiana Department of Natural Resources

Division of Entomology and Plant Pathology: (317) 232-4120

Division of Forestry: (317) 232-4105

Toll-free number for information on invasive species in Indiana:

866-NO EXOTICS (866-663-9684)