

WICKED PLANTS

A BOOK OF BOTANICAL ATROCITIES

FREE
BOOK STUDY RESOURCES

**FOR WICKED
PLANTS**

by Amy Stewart



**READING
SCIENCE**

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Thank You! I am an educator, just like you, and I sincerely appreciate the trust you have put in me and my work through your use of this resource.. I hope my work makes your work a little easier.

Wicked Plants was written for adults, but many teachers who have read it have requested teaching resources for it. The book is engaging, entertaining, and interesting for students. It does, however, contain some references to illegal and/or hallucinogenic plants. The information on those plants is presented factually in the book, in a way that discourages use for illegal or dangerous purposes. These teaching resources were created to do the same. Teachers are encouraged to read the book prior to purchasing copies for use with students, to follow applicable school district procedures for book approval, and to use appropriate discretion in selection of sections for use by students.

Contents

Notes For The Teacher -----	5
Introduction -----	6
Vocabulary Dominos (Deadly Nightshade) -----	7-8
Crossword Puzzle (Deadly Nightshade) -----	9-10
Too HOT for School? (Habanero Pepper) -----	11-13
Pepper Thermometer (Habanero Pepper) -----	14-15
Word Study (Jimson Weed - Datura) -----	16-17
Color-by-Number (Jimson Weed - Datura) -----	18-21
Task Cards (Henbane) -----	21-16
Word Search and Comprehension Worksheet (Mandrake) -----	27-30
Deadly Web Graphic Organizer (Tobacco) -----	31-32
Tobacco and Symbiosis (Tobacco) -----	33-34
Common Core Standards Matrices -----	35-38

Notes For The Teacher

These resources will be of no use without the book *Wicked Plants*. Without reading the sections of the book associated with the activities, students will be unable to complete the work.

One of the best things about *Wicked Plants* is that each plant has its own brief section in the book. The sections are short and stand alone. It's not necessary for students to read the entire book from cover to cover or in a specific order. Each section can be used alone or in combination with others, which is great for differentiated small group work! In these resources it is assumed that students will have read all of the sections listed below.

Page numbers refer to the hardback edition published in 2009 ISBN-13: 978-1-56512-683-1.

Common Name	Scientific Name	Page Numbers
Deadly Nightshade	<i>Atropa belladonna</i>	31-33
Habanero Chile	<i>Capsicum chinense</i>	51-53
Henbane	<i>Hyoscyamus niger</i>	55-56
Jimson Weed	<i>Datura stramonium</i>	67-69
Mandrake	<i>Mandragora officinarum</i>	105-107
Tobacco	<i>Nicotiana tabacum</i>	183-185

Introduction

A WICKED FAMILY

Of all the Wicked Families in the plant kingdom, the Solanaceae family is a contender for Most Wicked. We have a love-hate relationship with the family Solanaceae. The family includes tobacco, which has caused much suffering and killed millions of us. But it also includes plants that have become nearly essential to us. Potatoes, peppers, and tomatoes - what would our cultures be like without them? Human history is intertwined with the tendrils of the Solanaceae. These learning resources explore our relationship with some notoriously wicked members of the Solanaceae family.



Image Source: Précis de Toxicologie clinique & médico-légale, 2e édition, Baillière & fils, 1907 (Public Domain)

Vocabulary Dominos Teacher's Guide

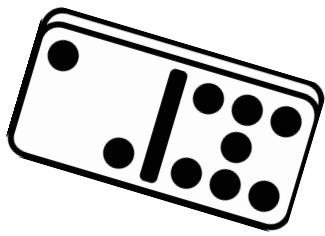
Good readers can infer meaning of vocabulary from context. Nonfiction is a more authentic way to learn how to do that than reading from a textbook. Vocabulary Dominoes is a simple, low-prep, and very effective strategy for learning new vocabulary in context, but to students, it feels like a game! It's hard to beat that combination!

My favorite way to use the vocabulary dominos is with pairs of students, because that use supports academic conversations. However, you can use vocabulary dominos as an individual activity, or for the "ragged time" between your faster and slower readers completing the reading of the text. It's also great to keep on hand as a general vocabulary review activity when you have a few extra minutes in class.

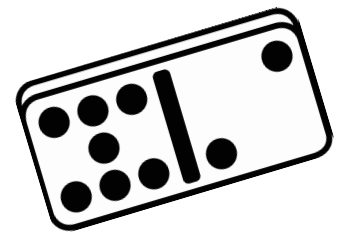
These vocabulary dominos can be used as an activity after students have already had instruction on the vocabulary. But they're even better if used the first time students have been exposed to the vocabulary. If students "play" the game while reading the text, they have to determine the meaning of the word from context clues in order to be able to match the vocabulary word with its meaning.

Cut and laminate sets of cards. To prevent cards from different sets being mixed up, print each set on a different color of card stock. Store the card sets in quart-sized zip-close bags. To make distribution and collection quick and easy, put a piece of duct tape around the bottom edge of the baggie, punch holes in it, and store the baggies in a three ring binder.

Distribute the cut and laminated card sets to students and have them arrange the dominos as they encounter the words so that the vocabulary word on the end of one card touches the simplified meaning on the end of another card. To add another fun element to the activity, repeat the activity and have teams of students compete to be the first to accurately finish completing the domino chain. Or let individual students try to beat their own best time in completing the chain.



- Vocabulary Dominos -
Atropa belladonna (Deadly Nightshade)



START

carnivorous

meat-eating

Cholera

an infectious bacterial disease

pustules

a fluid or pus-filled bump on the skin

terse

psychosis

short abrupt statement

delusion

mental confusion or loss of contact with reality

edible

an illogical or irrational belief

able to be eaten

mnemonic

a pattern to help with remembering

herbaceous

soft-stemmed plants (not shrubs or trees)

perennial

living or lasting many years

tubular

in the form of a hollow tube

potent

having great strength or power

tincture

alluring

a liquid containing plant extracts

Very attractive or desirable

END

Name _____

Class _____

Across

- 4. an illogical or irrational belief
- 5. in the shape of a hollow tube
- 7. short or abrupt
- 8. able to be eaten
- 9. a liquid that contains plant extracts
- 11. meat-eating
- 13. a fluid or pus-filled bump on the skin
- 14. a pattern to help with remembering something.

Down

- 1. soft-stemmed plants (not trees or shrubs)
- 2. loss of contact with reality
- 3. having great strength or power
- 6. living or lasting many years
- 10. an infectious bacterial disease
- 12. very attractive or desirable

1

2

3

4

5

6

7

8

9

10

11

12

13

14

Vocabulary Crossword
Deadly Nightshade
Atropa belladonna

Across

- 4. an illogical or irrational belief
- 5. in the shape of a hollow tube
- 7. a short or abrupt statement
- 8. able to be eaten
- 9. a liquid that contains plant extracts
- 11. meat-eating
- 13. a fluid or pus-filled bump on the skin
- 14. a pattern to help with remembering something.

Down

- 1. soft-stemmed plants (not trees or shrubs)
- 2. loss of contact with reality
- 3. having great strength or power
- 6. living or lasting many years
- 10. an infectious bacterial disease
- 12. very attractive or desirable

						1		2	3									
						H		P	P									
4	D	E	L	U	S	I	O	N										
						R		Y		T								
						B		C		E								
																	6	
5	T	U	B	U	L	A	R		H	N							P	
						C			O		7	T	E	R	S	E		
8	E	D	I	B	L	E			S									
						O					10						R	
							9	T	I	N	C	T	U	R	E			
	11	C	A	R	N	I	V	O	R	O	U	S		S		H		N
						L												
13	P	U	S	T	U	L	E											
14	M	N	E	M	O	N	I	C										
							N											
							G											

Vocabulary Crossword **KEY**
Deadly Nightshade
Atropa belladonna

Too HOT For School? Think-Draw-Write Teacher's Guide

Think-Draw-Write is a strategy for activating both the right and left hemispheres of the brain. The focus is on students writing a short statement which draws from the information in the text as well as the story.

Prep: Print the story and the graphic organizer double-sided on regular copy paper.

Procedure: Have students read the section from *Wicked Plants* about Habanero Chiles. Then provide students the story about the student, Nick Lien, who received a two-day after-school suspension for bringing Ghost Peppers to school. Have students write in the graphic organizer a statement supporting each of the position statements., and draw a unique icon or symbol to represent the issue.

This is a great short writing activity on a real world topic that will be engaging to secondary students, and it also encourages and allows creativity in the design of the icon to represent the issue.

Too HOT For School?

In May 2015, Nick Lien, a sixteen year-old student, received after-school suspension for two days for bringing to school an envelope containing dried ghost peppers. Ghost peppers are a variety of Habanero chili pepper similar to the "Dorset Naga" described in *Wicked Plants*.

At lunch, Nick and his friends were talking about the peppers. Three of his friends asked to try a piece of the dried pepper. After eating small pieces of pepper, two of the students immediately rushed to the school nurse's office in extreme pain. The third dashed off to find some milk to drink.

School district superintendent Roberta Gerold defended the after-school suspension, saying "You can't bring things to school that could hurt other students. There needs to be consequences when you put another student in danger."

Nick's mother was red-hot mad about the suspension because she thought Nick was being punished for bringing food to school. The family frequently eats foods made with ghost peppers. Nick claimed he brought the dried pepper pieces to school to sprinkle on his sandwich at lunch.

In a graphic organizer on the back side of this page, write a brief statement supporting the principal's position, and another statement supporting Nick's mother's position. Use evidence from the text to support each position.

For more information about the suspension, you might wish to review the New York Post newspaper article and the CBS News broadcast of the story found at:

<http://nypost.com/2015/05/27/student-gets-detention-for-giving-ghost-pepper-to-classmates/>

Think Draw Write

Name _____ Class _____

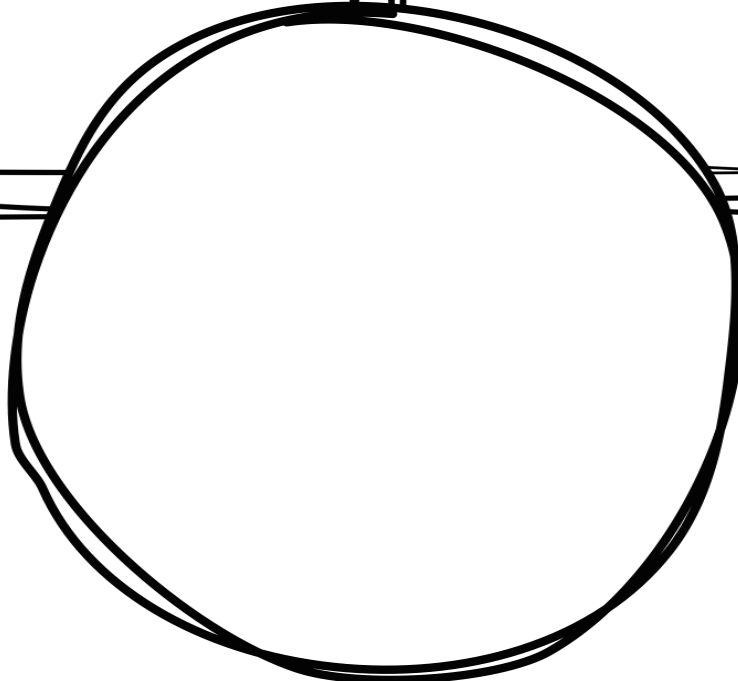
In the circle draw a representation of the issue. In the bottom boxes write statements supporting each of the positions in the top boxes. Remember to support each statement with information from the reading.

Position: The suspension of the student for bringing ghost peppers to school was reasonable.

Position: The suspension of the student for bringing ghost peppers to school was unreasonable.

Statement in support of this position:

Statement in support of this position:



Pepper Thermometer Teacher's Guide

The pepper thermometer is deceptively simple in appearance but not in results. It can be used as a 'hook' for a number of different lessons. The opportunities come from the differences in how students design the scale and color the pepper. There's not a 'right' way to create the pepper thermometer. There will be disagreement between students about it. Below are some suggestions for ways to use the activity to lead in to discussions and additional lessons.

In English/Language Arts and History - Use the differences in student design and coloring to introduce a lesson about "relative" words. For example, "warm" is a relative word. It's meaning depends on comparison between two or more things. If air is 80°F, people might call it warm. But if the water in a shower is 80°, it wouldn't be called warm! The coloring of the pepper can show students that relative terms like 'warm' mean different things to different people. It can lead to a discussion about the risks (or intent) of using relative language in writing or speaking. Or use the activity to introduce a lesson on connotative and denotative meanings of words (like 'hot').

In Science - Use the differences in student coloring as a lead-in to discussion of the accuracy (or inaccuracy) of the Scoville Heat Unit scale. Discuss how the scale was developed, and the inherent weakness of scales which are based on different people's perception of the same thing, rather than on an objective measurable standard. Discuss other scales like the Enhanced Fujita scale or Richter scale and how the intervals on those scales are determined. Or use the pepper thermometer activity to lead into a lesson on the development of the metric system and the objective standards on which it is based.

In Math - Modify the pepper activity by requiring students to convert the SHU units to scientific notation. Discuss whether or not students created the scale to have equal intervals, and what makes it difficult to create a scale with equal intervals from data expressed in ranges.

Name _____

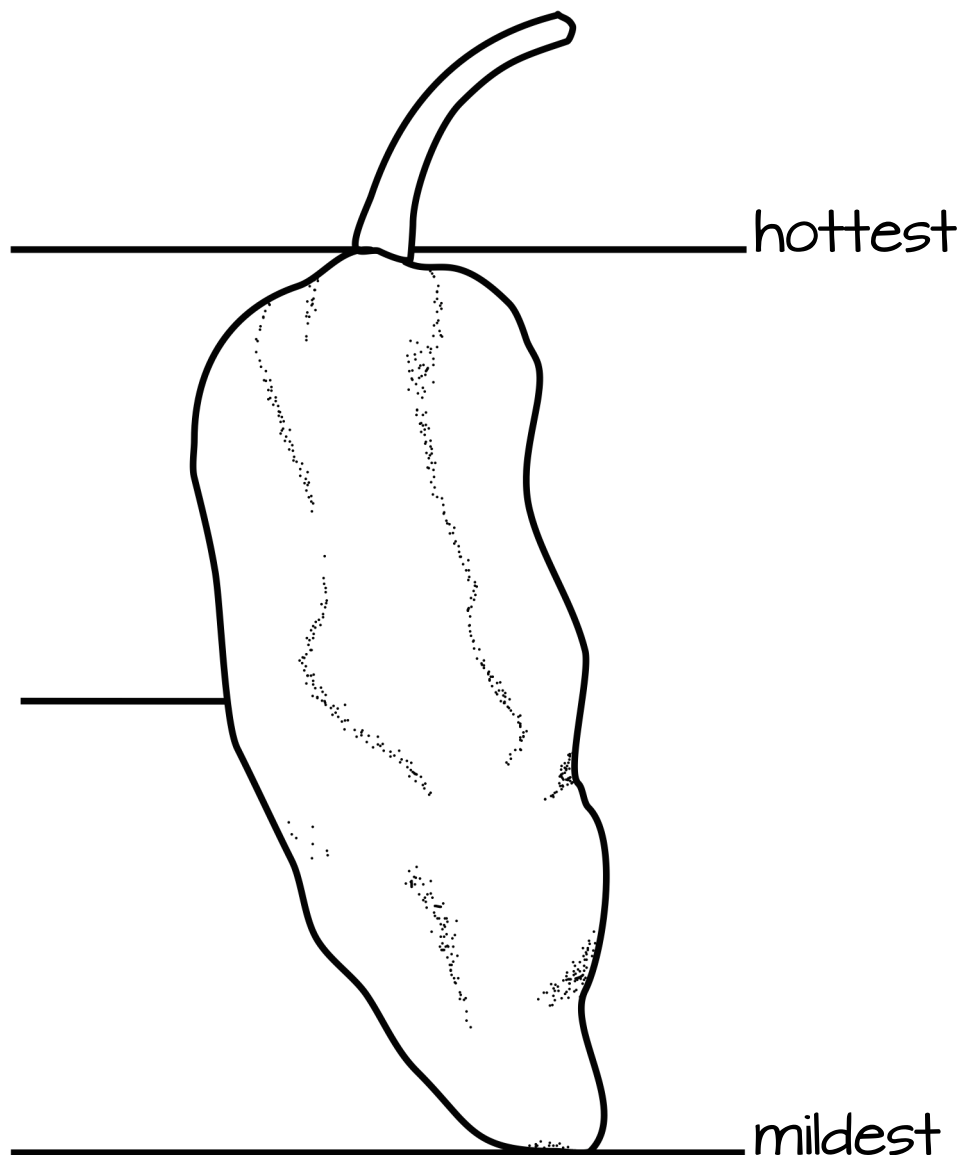
Class _____

PEPPER THERMOMETER

Use the drawing to create a thermometer showing the Scoville Heat Units for each of the peppers you have read about in *Wicked Plants*, including the pepper spray used by police.

Divide the scale accurately to show the correct amount of difference between the numbers on your scale.

Color the pepper to show the gradual change in temperature from mild to hot.



Word Study Teacher's Guide

Word Study assignments are for in depth vocabulary study. A great deal of the success of Word Studies lies with choosing the right word. The Word Study in this resource is intended for use with the section about Jimson Weed (*Datura* sp.) in the book *Wicked Plants*, where students will find a description of the "striking" flower of the plant.

Prep: Make copies of the Word Study sheet for students. Provide dictionaries or access to the internet for reference.

In this activity, students are asked to look at the word "strike". They use the word to learn about the influence of German on the English language. They learn about phrasal verbs in English. They learn to consider nuances of meaning with a rank-ordering task. They explore 'strike' as one of the few English words that is its own antonym. They learn that some words can be different parts of speech depending on how they are used in a sentence.

There's another Word Study task in the free resources for *Wicked Bugs* that you can download from www.amystewart.com Use one or both of them as models for your own Word Study guides for any vocabulary word you wish students to spend some time with. Word Study tasks are a fabulous short way to introduce students to etymology, and spark an interest in the study of the English language with all of its quirks and interesting history. They're great for bell work or for an emergency lesson plan.

Name _____

WORD STUDY

Class _____

Choose one sentence from the reading passage in which the study word is used. Write it below:

The definition that makes most sense for the word as it is used in this reading is:

What part of speech is the word as used in that sentence?

strike
(striking)

This word did not come from Latin or Greek. What language (other than English) did it come from?

Many words, including "strike" and the past tense "struck" can form phrasal verbs. A phrasal verb is a phrase containing the verb with an adverb or a preposition. For example:

"He will strike up a conversation with her."

Write a sentence using "strike" or "struck" as a phrasal verb.

Find two other words that could be used in place of the word in the sentence you copied. Write them (and the study word) on the "number line" to show their strength in comparison with the study word.

weaker

stronger

The word "strike" is its own antonym. How or when does the word strike mean the opposite of 'hit'?

"Jimson Weed" Color-by-Number Teacher's Guide

As children, many of us were introduced to art with color-by-number painting. We never outgrow the pleasure that comes from coloring, painting, or drawing. But most older students don't get much opportunity to do that in an academic setting. That's a shame. Color-by-number tasks are a fabulous alternative to worksheets. They are much more engaging! The coloring part of the task causes students to check their work if they can tell that the color they are about to use in the drawing doesn't make sense. No worksheet will cause students to reflect on their own answers and make corrections as well as color-by-number tasks will do! Color-by-number tasks also make scoring/marking student work so easy because mistakes in the coloring are very obvious!

Prep: Make copies of the questions and coloring page. Double-sided copies are fine as long as students are using crayons or colored pencils (not markers or paints) to complete the drawing. Use the color key with a document camera to show students the way the flower is supposed to look when finished. Or hang it up for students to self-check their work.

Question	Answer Choice: A	Answer Choice: B	Answer Choice: C
<p>1. Which of these did the settlers consider the best reason to settle on Jamestown Island?</p> <p>a. There were no local Indian tribes living on the island.</p> <p>b. They planned to build large ships.</p> <p>c. They liked the view.</p>	Color grass green	Color dark violet	Color white (or leave uncolored)
<p>2. What is the best explanation for Datura-related deaths of early settlers on Jamestown Island?</p> <p>a. The settlers were committing suicide.</p> <p>b. The settlers were murdered.</p> <p>c. The settlers' deaths were accidental.</p>	Color chocolate brown	Color white (or leave uncolored)	Color dark green
<p>3. The name Jimson Weed</p> <p>a. comes from the name of the person who discovered Datura.</p> <p>b. is the common (not scientific) name for Datura</p> <p>c. is the name of a plant related to Datura, but not Datura.</p>	Color dark violet	Color pale violet	Color chocolate brown
<p>4. The name "Thorn Apple" is also given to Datura, probably</p> <p>a. because the fruit is shaped like an apple.</p> <p>b. because the poison in it causes sharp pain.</p> <p>c. because it's covered with sharp thorns.</p>	Color pale violet	Color pale gray-blue	Color pink
<p>5. The most reasonable inference about the British soldiers poisoned by Datura is that they</p> <p>a. didn't think the settlers were to blame</p> <p>b. didn't wonder why they had no memory of 11 days</p> <p>c. suspected the settlers but were afraid to do anything about it</p>	Color denim blue	Color white (or leave uncolored)	Color chocolate brown
<p>6. The involvement of the settlers in the poisoning of British soldiers might be questioned by historians because</p> <p>a. there was nothing to be gained from just making the soldiers sick</p> <p>b. they had eleven days to finish killing the soldiers but didn't</p> <p>c. both a and b</p>	Color white (or leave uncolored)	Color pale violet	Color chocolate brown
<p>7. Physical responses to Datura poisoning do NOT include which of the following?</p> <p>a. coma</p> <p>b. sleepiness</p> <p>c. seizures</p>	Color pale gray	Color dark violet	Color denim blue
<p>8. People might choose to plant Datura in gardens because</p> <p>a. the flowers are beautiful</p> <p>b. the fruit is attractive</p> <p>c. the leaves turn red in fall</p>	Color pale gray blue	Color pink	Color pale violet

Name _____

Class _____

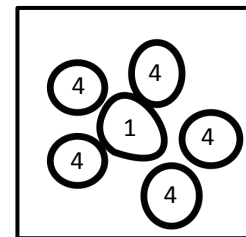
"JIMSON WEED"

Answer the questions on the back side of this paper.

Record your answers choices (A, B, C) on the lines below.

Color the picture to the left according to instructions for the answer you chose.

- | | |
|----------|----------|
| 1. _____ | 5. _____ |
| 2. _____ | 6. _____ |
| 3. _____ | 7. _____ |
| 4. _____ | 8. _____ |



Color the center of the flower using this key.

Name _____

Class _____

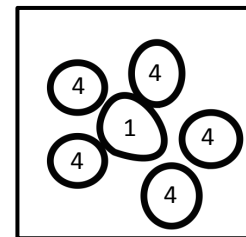
"JIMSON WEED" KEY

Answer the questions on the back side of this paper.

Record your answers choices (A, B, C) on the lines below.

Color the picture to the left according to instructions for the answer you chose.

- | | |
|-----------------|-----------------|
| 1. <u> A </u> | 5. <u> A </u> |
| 2. <u> C </u> | 6. <u> C </u> |
| 3. <u> B </u> | 7. <u> B </u> |
| 4. <u> C </u> | 8. <u> A </u> |



Color the center of the flower using this key.



Henbane Task Cards

Teacher's Guide

Task cards are a great strategy to accompany reading! They can be used with individual students, pairs, or small groups. They provide options for movement around the room. They encourage academic discussion. They can be used in a timed activity, or for extra credit, or as a way to keep students engaged in productive learning while waiting for others to finish a task so that the class can move on as a group.

Prep: Make copies sufficient for your intended use with pairs or small groups. Cut the printed sheets into individual cards. Laminate them for greater durability.

The least complex way to use task is to make copies for pairs of students to share. The students can either be allowed to work together with each card, recording their answers on their answer sheets, or they can be instructed to work individually, sharing the cards and skipping around on their answer sheets as needed until they've both answered the questions on all cards.

For small groups, the cards can just be laid in the center of the table with students sharing them, or you can assign a group 'reader' to read each card and instruct students to discuss the answer as a group before recording the answer on their own individual answer sheets.

For a "quick finishers" activity, store the cards and laminated answer sheets in a convenient location in the room and let students use them individually as needed. Plastic bins make convenient storage for task cards, but the cards can also be hole-punched and fastened with a binder ring and then hung on hooks or fastened into a 3-ring binder.

With a small set of task cards (as in this resource) the best way to use them is with pairs or individual students. Large sets can be fastened to classroom walls or laid on individual desks with students rotating on signal to complete each task card. A great variety of task card sets can be found on www.teacherspayteachers.com for many grades and subjects.

The henbane "witches' flying potion" was administered

- a. in a drink
- b. in a salve or lotion
- c. in smoke

1

Children in which country played with henbane and died?

- a. Germany
- b. Greece
- c. Turkey

2

Henbane is a weed that is native to:

- a. The Middle East
- b. Europe, Africa, and the Mediterranean
- c. North America

3

Henbane is particularly well known for its

- a. terrible odor
- b. prickly leaves
- c. ugly yellow flowers

4

Visitors to Alnwick Poison Garden on hot days are warned to avoid

- a. touching henbane leaves
- b. smelling henbane flowers
- c. getting anywhere near the plant

5

In 1516, Germany's Bavarian Purity Law made it illegal to

- a. put henbane in beer
- b. put yeast in beer
- c. use anything but barley, hops, and water in beer

6

"Soporific sponges" were used until the 19th century for surgery. Based on its use in the reading, the meaning of 'soporific' is probably related to

- a. pain control
- b. causing unconsciousness
- c. antiseptics/germ killing

7

The name "henbane" means

- a. hen killer
- b. hen flower
- c. hen skull

8

Henbane Task Cards Student Answer Sheet

Name _____ Class _____

1. _____

Record your
answers from each
task card on this
answer card.

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

Henbane Task Cards Student Answer Sheet

Name _____ Class _____

1. _____

Record your
answers from each
task card on this
answer card.

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

Henbane Task Cards

Answer **KEY**

Name _____ Class _____

1. **B**

2. **C**

3. **B**

4. **A**

5. **C**

6. **C**

7. **B**

8. **A**

Record your answers from each task card on this answer card.

Note To the Teacher

Print the student answer cards on card stock (heavy paper). Cut them in half along the dotted line. If you laminate them and provide dry-erase fine-tip markers to students, then you'll only need to print and laminate a class set of the cards and will be able to re-use them over and over for years.

Name _____

Class _____

MANDRAKE - WORD SEARCH

T	H	E	R	O	S	E	H	M	S	I
S	H	A	K	E	S	P	E	A	R	E
H	N	T	H	Y	L	I	A	N	H	G
R	O	S	E	T	T	E	R	D	A	A
I	P	R	O	M	A	N	T	R	N	H
E	S	O	A	N	D	C	B	A	N	T
K	H	O	E	E	K	F	E	G	I	R
S	S	T	S	H	A	R	A	O	B	A
P	O	T	I	O	N	I	T	R	A	C
L	L	F	A	D	E	A	X	A	L	Y
Z	D	E	T	A	C	R	U	F	I	B

Directions:

Answer the fill-in-the-blank questions on the reverse side of this page.

Find the answer words in the word search puzzle.

When you have found all of the answer words, copy the letters that remain (letters that were not part of any answer). Write them in the blanks to form a hidden message.

Name _____

Class _____

MANDRAKE - WORD SEARCH

T	H	E	R	O	S	E	H	M	S	I
S	H	A	K	E	S	P	E	A	R	E
H	N	T	H	Y	L	I	A	N	H	G
R	O	S	E	T	T	E	R	D	A	A
I	P	R	O	M	A	N	T	R	N	H
E	S	O	A	N	D	C	B	A	N	T
K	H	O	E	E	K	F	E	G	I	R
S	S	T	S	H	A	R	A	O	B	A
P	O	T	I	O	N	I	T	R	A	C
L	L	F	A	D	E	A	X	A	L	Y
Z	D	E	T	A	C	R	U	F	I	B

Directions:

Answer the fill-in-the-blank questions on the reverse side of this page.

Find the answer words in the word search puzzle.

When you have found all of the answer words, copy the letters that remain (letters that were not part of any answer). Write them on the blank lines below the questions, to find a hidden message.

Name _____

Class _____

MANDRAKE - WORD SEARCH

Directions:

Answer the fill-in-the-blank questions on this page

Then find the answer words in the word search puzzle.

When you have found all of the answer words, copy the letters that remain (that were not part of any answer) to fill in the blanks of the hidden message at the bottom of the page:

1. According to legend, mandrake _____ when it is pulled from the ground
2. The part of the mandrake used for potions is the _____
3. _____ wrote Romeo and Juliet, a play in which a mandrake potion plays an important role.
4. In the play, a _____ gives Juliet the potion.
5. Mandrake is a little plant, with a foot-tall _____ of leaves.
6. In the _____ civilization, it was believed that mandrake would cure demonic possession.
7. Juliet drank a _____ to fake her own death.
8. Mandrake often looks like a human with legs created by a _____ (split) root.
9. General _____ drugged enemy warriors with mandrake.
10. He tempted them with a feast including _____, a wine made with mandrake.
11. His tactic won him the city of _____.
12. One effect of mandrake is to make a person's _____ very irregular, which might cause what Juliet was promised.

The promise: _____

Name _____
Class _____

MANDRAKE WORD SEARCH KEY

Directions:

Answer the fill-in-the-blank questions on this page

Then find the answer words in the word search puzzle.

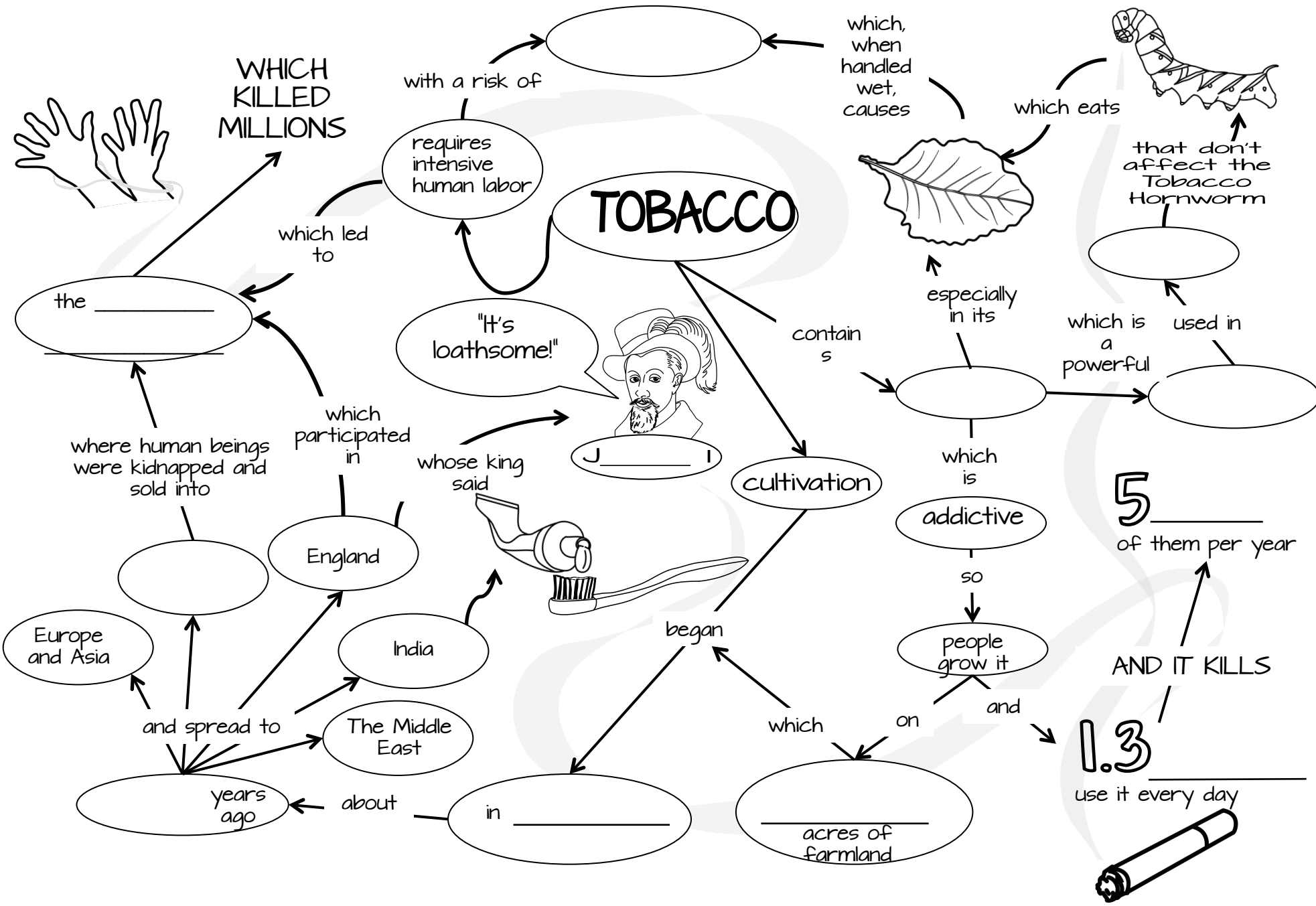
When you have found all of the answer words, copy the letters that remain (that were not part of any answer) to fill in the blanks of the hidden message at the bottom of the page:

1. According to legend, mandrake **shrieks** when it is pulled from the ground
2. The part of the mandrake used for potions is the **root**.
3. **Shakespeare** wrote Romeo and Juliet, a play in which a mandrake potion plays an important role.
4. In the play, a **friar** gives Juliet the potion.
5. Mandrake is a little plant, with a foot-tall **rosette** of leaves.
6. In the **Roman** civilization, it was believed that mandrake would cure demonic possession.
7. Juliet drank a **potion** to fake her own death.
8. Mandrake often looks like a human with legs created by a **bifurcated** (split) root.
9. General **Hannibal** drugged enemy warriors with mandrake.
10. He tempted them with a feast including **mandragora**, a wine made with mandrake.
11. His tactic won him the city of **Carthage**.
12. One effect of mandrake is to make a person's **heartbeat** very irregular, which might cause what Juliet was promised.

The promise: "**The roses in thy lips and cheeks shall fade.**"

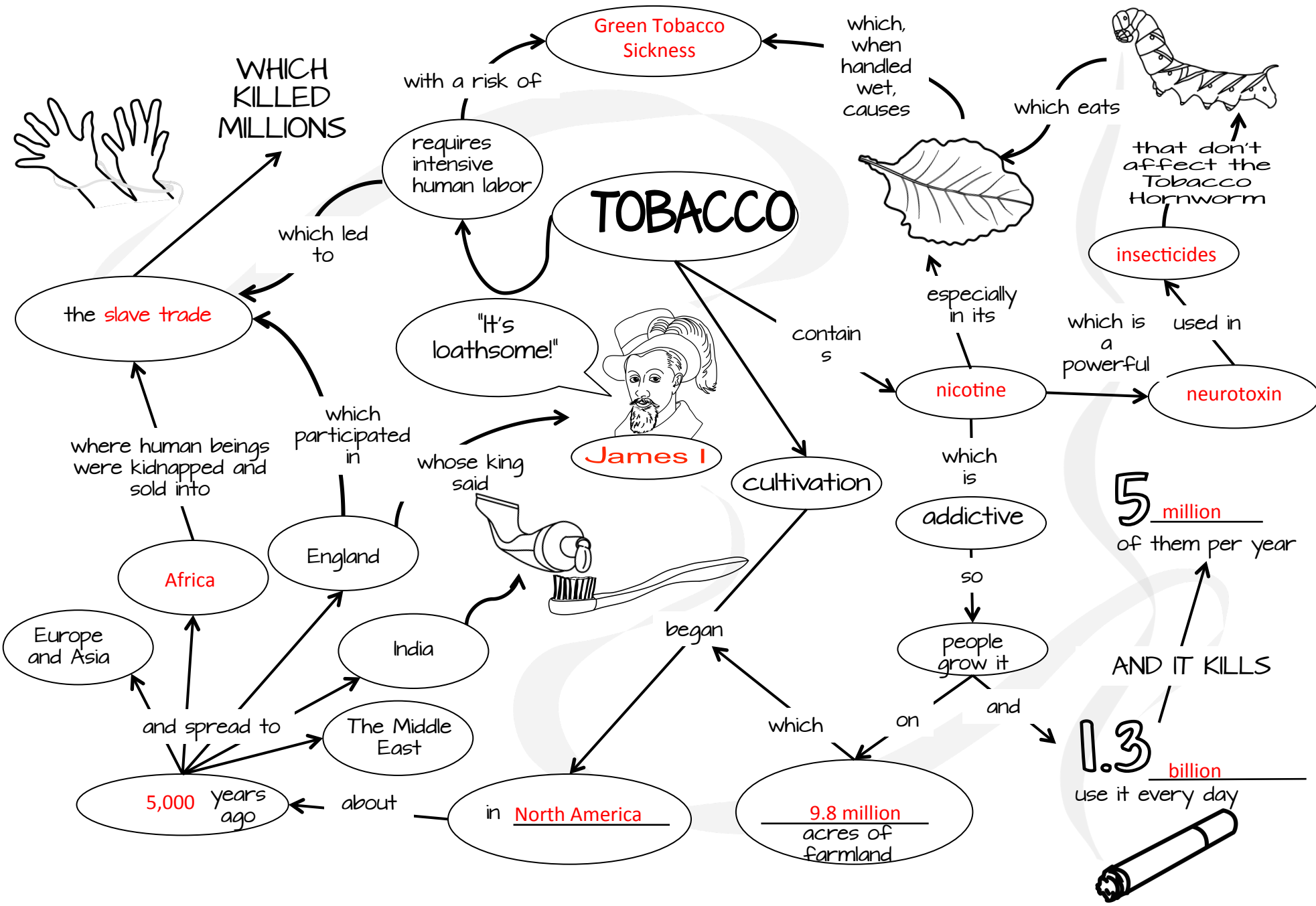
Name _____
Class _____

A Deadly Web



Name _____
Class _____

A Deadly Web - KEY



Name _____
Class _____

Tobacco and Symbiosis

Symbiosis is a relationship between two or more living things, which benefits at least one of them. There are three kinds of symbiosis. One is called mutualism. In mutualism both living things benefit from the relationship. In commensalism, one of the living things benefits and the other is unaffected. In parasitism one of the living things is benefited and the other is damaged.

1. Would you consider the relationship between humans and tobacco to be any type of symbiosis? If so which type? If you think it is not any type of symbiosis, explain why. Use evidence from the book to support your answer.

As explained in the book, nicotine is used in insecticides. One insect, the tobacco hornworm, which eats tobacco, is not harmed by insecticides containing nicotine. As a matter of fact, the tobacco hornworm actually uses nicotine to protect itself. It releases nicotine through its skin, which repels many predators like bad breath repels people.

2. What kind of symbiotic relationship exists between the hornworm and the tobacco? Defend your answer.

When a tobacco plant is under attack by hornworms, it releases chemicals which combine with chemicals in the saliva of the hornworm to create a new chemical which attracts hornworm predators.

3. Is there a symbiotic relationship between the predatory insects and the tobacco plant? If so, what type? If not, what is it about the relationship that makes it not an example of symbiosis?

Name _____
Class _____

Tobacco and Symbiosis

Symbiosis is a relationship between two or more living things, which is beneficial to at least one of them. There are three kinds of symbiosis. One is called mutualism. In mutualism both living things benefit from the relationship. In commensalism, one of the living things benefits and the other is unaffected. In parasitism one of the living things is benefited and the other is damaged. If either organism cannot live without the other, it's called "obligate" symbiosis. If the relationship is not obligate, it's called "facultative" symbiosis.

1. Would you consider the relationship between humans and tobacco to be any type of symbiosis? If so which type? If you think it is not any type of symbiosis, explain why. Use evidence from the book to support your answer.

There is more than one possible answer. Some students may consider it parasitism because people are harmed by tobacco but tobacco is cultivated (benefited) by people. Some students may not consider it symbiosis at all because tobacco can grow without people and many people don't use tobacco at all. Some students may consider it symbiotic because people benefit economically from the relationship. In that case, they may describe it as mutualistic. But it should be pointed out to them that symbiosis is related to physical survival, not to economics. In a strictly scientific sense, the relationship is not an obligate symbiotic relationship because neither people nor tobacco require the relationship for survival and both live without the other.

As explained in the book, nicotine is used in insecticides. One insect, the tobacco hornworm, which eats tobacco, is not harmed by insecticides containing nicotine. As a matter of fact, the tobacco hornworm actually uses nicotine to protect itself. It releases nicotine through its skin, which repels many predators like bad breath repels people.

2. What kind of symbiotic relationship exists between the hornworm and the tobacco? Defend your answer.

Students should describe the relationship as parasitic. Explanations will vary.

When a tobacco plant is under attack by hornworms, it releases chemicals which combine with chemicals in the saliva of the hornworm to create a new chemical which attracts hornworm predators.

3. Is there a symbiotic relationship between the predatory insects and the tobacco plant? If so, what type? If not, what is it about the relationship that makes it not an example of symbiosis?
The tobacco plant does not require the predatory insects for survival and they do not require it. The relationship is beneficial to both, but not essential to either. It would be considered a facultative mutualistic relationship.

ELA Common Core Standard	Word Study (Jimson Weed)	Crossword (Belladonna)	Think-Draw-Write (Peppers)	Vocabulary Dominos (Belladonna)	Pepper Thermometer (Peppers)	Color by Number (Datura)	Task Cards (Henbane)	Word Search (Mandrake)	Web Notes (Tobacco)	Inferences Worksheet (Tobacco)
Language Standards										
CCSSELA-LITERACY. L.8.1 A	X									
CCSS ELA-LITERACY L8.2C		X						X		
CCSS ELA-LITERACY. L8.3			X		X					
CCSS.ELA-LITERACY. L.8.4.A L.9-10.4.A	X	X		X		X	X	X	X	
CCSS.ELA-LITERACY. L.8 4B L.9-10.4B	X									
CCSS.ELA-LITERACY. L.9-10.4C	X			X						
CCSS.ELA-LITERACY. L.9-10.4D	X			DEPEN DING ON USE						
CCSS.ELA-LITERACY. L9-10.5.B	X									
CCSS.ELA-LITERACY L8.6	X	X		X		X	X	X		

ELA Common Core Standard	Word Study (Jimson Weed)	Crossword (Belladonna)	Think-Draw-Write (Peppers)	Vocabulary Dominos (Belladonna)	Pepper Thermometer (Peppers)	Color by Number (Datura)	Task Cards (Henbane)	Word Search (Mandrake)	Web Notes (Tobacco)	Inferences Worksheet (Tobacco)
Science and Technical Subjects Standards										
CCSS ELA-LITERACY RST.6-8.1 RST.9-10.1	X		X		X					
CCSS.ELA-LITERACY RST.6-8.4 RST.9-10.4	X	X		X						
CCSS.ELA-LITERACY RST.6-8.5 RST.9-10.5									X	
CCSS ELA-LITERACY RST.9-10.7					X					
CCSS ELA-LITERACY RST. 6-8.8					X	X				X
CCSS ELA-LITERACY RST.6-8.9 RST.9-10.9						X	X	X	X	X
CCSS ELA-LITERACY RST.6-8.10 RST.9-10.10				X		X	X	X	X	X

ELA Common Core Standard	Word Study (Jimson Weed)	Crossword (Belladonna)	Think-Draw-Write (Peppers)	Vocabulary Dominos (Belladonna)	Pepper Thermometer (Peppers)	Color by Number (Datura)	Task Cards (Henbane)	Word Search (Mandrake)	Web Notes (Tobacco)	Inferences Worksheet (Tobacco)
Reading Informational Text Standards										
CCSS.ELA-LITERACY RI.8.1 RI.9-10.1	X	X	X	X		X	X			
CCSS.ELA-LITERACY RI.8.3	X								X	
CCSS.ELA-LITERACY RI.8.4 RI.9-10.4	X	X		X			X	X		
CCSS.ELA-LITERACY RI.8.10-10 RI.9-10-10	X	X	X	X	X	X	X	X	X	X
Writing Standards										
CCSS ELA-LITERACY WHST.6-8-1 WHST.9-10.1			X							

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WICKED BUGS
by Amy Stewart

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BOOK STUDY RESOURCES
WICKED PLANTS
by Amy Stewart
READING SCIENCE

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