# Who Took Them? Lab

Name _____

Date _____

Period _____

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**Do Now** This shiny green beetle is the emerald ash borer. It is from Asia. It is about as long as a grain of rice. It was found in Buffalo in 2011. 2 minutes, before you open the lab

**A. Predict: what happened to the ash trees in Buffalo after this beetle came?**

☐ Most of them died ☐ Nothing changed ☐ They grew bigger

**B. How could a beetle from Asia get all the way to Buffalo?**

_____

☐ I can name the six human causes of species loss (HIPPCO).

☐ I can explain how DDT built up in a food chain.

☐ I can explain how habitat fragmentation and invasive species push species toward extinction.

☐ I can build an explanation with a claim, evidence and reasoning.

## Part 1. Break up the forest (Tab 1)

**SEP 4 Analyzing Data · SEP 2 Models · CCC Cause and Effect**

Pick all four plans. Copy each one from **Your plan log**.

**1.** Your plan log. The forest starts with 81 squares.

| Plan | Forest squares | Interior squares | Patches | Ovenbird can nest? |
|---|---|---|---|---|
| **A: no road** | | | | |
| **B: road along the edge** | | | | |
| **C: road through the middle** | | | | |
| **D: two roads cross** | | | | |

**Example.** A patch had 30 interior squares. After a road it has 20. 30 − 20 = 10 lost. 20 lost is 2 times as much as 10. These are not your numbers.

**2.** Plans B and C each cut 9 squares of forest. Interior squares lost, compared with Plan A:

Plan B: 49 − _____ = _____ lost. Plan C: 49 − _____ = _____ lost. Plan C loses

☐ the same ☐ 3 times as much ☐ 9 times as much interior.

**READ FIRST.** In the lab, find the green **Learn It** box and read it. Then answer 3 to 5.

**WORD BANK.** habitat fragmentation · biomagnification · overexploitation

**3.** Breaking a big habitat into small, separated patches is called _____.

**4.** Plans B and C cut the same amount of forest. Plan C is worse for the ovenbird because it makes ☐ more edge ☐ less edge and ☐ more interior ☐ less interior. The ovenbird nests in the ☐ edge ☐ interior.

**5.** Model check. What does each piece stand for? Then name one thing the model leaves out.

| In the lab | Stands for |
|---|---|
| a square | ☐ a block of forest ☐ a bird ☐ a road |
| a hatched square | ☐ deep forest ☐ forest next to an edge ☐ a town |

One thing the model leaves out: ☐ real edges are wider than one square ☐ forests have trees

## Part 2. Up the food chain (Tab 2)

**SEP 5 Mathematics · CCC Scale, Proportion and Quantity**

Tap all five steps. Copy each one from **Your food chain log**. Then use **How many times more?**

**6.** DDT at each step of a New York food chain, in parts per million (ppm).

| Step | Water | Zooplankton | Minnows | Needlefish | Ospreys |
|---|---|---|---|---|---|
| **DDT (ppm)** | | | | | |

**Example.** A heron has 6 ppm. A frog has 2 ppm. 6 ÷ 2 = 3 times more. These are not your numbers.

**7.** How many times more DDT is in an osprey than in a minnow? _____ ÷ _____ = _____ times

**8.** How many times more DDT is in an osprey than in the water? ☐ about 8 ☐ about 8,000 ☐ about 8,000,000 times. In the water, DDT is ☐ too small to matter ☐ small, but it builds up

**READ FIRST.** In the lab, find the green **Learn It** box and read it. Then answer 9 to 11.

**WORD BANK.** bioaccumulation · biomagnification

**9.** Write **bioaccumulation** or **biomagnification** .

DDT builds up inside one minnow's body over its life: _____

DDT gets more concentrated at each step up the food chain: _____

**10.** Cause and effect. Number the steps 1 to 4 to show how DDT hurt ospreys.

_____ eggs crack before they hatch _____ DDT is sprayed and washes into the water _____ ospreys eat many DDT-filled fish _____ shells are thin

**11.** Stability and change. Use the **After the ban** card. Bald eagle pairs in the lower 48 states: _____ in 1963 and _____ in 2007. After the ban, the number of pairs went ☐ up ☐ down. This shows DDT ☐ was a cause ☐ was not a cause of the drop.

## Part 3. Case files (Tab 3)

**SEP 6 Explanations · SEP 7 Argument · CCC Stability and Change**

Open all six files. Copy the two numbers from each file. Leave the last column for after the Learn It box.

**12.** Your case log.

| Case | First number | Second number | HIPPCO cause (Q13) |
|---|---|---|---|
| **1. Wild tigers** | | | |
| **2. Ash trees** | | | |
| **3. Native mussels** | | | |
| **4. Ospreys** | | | |
| **5. Polar bears** | | | |
| **6. Black rhinos** | | | |

**READ FIRST.** In the lab, find the green **Learn It** box and read it. Then answer 13 to 15.

**KEY.** H = habitat loss · I = invasive species · P = population growth · P = pollution · C = climate change · O = overexploitation

**13.** Fill the last column of your case log: H, I, P (population), P (pollution), C or O. Check each one with the letter buttons in the lab.

**14.** The graph shows the first P, population growth. People in 1800: _____ billion. Today: about _____ billion. More people need more ☐ land for homes and farms ☐ sunlight, so there is more ☐ habitat loss ☐ rain.

## Argue it

**SEP 6 Constructing Explanations · SEP 7 Argument from Evidence · CCC Cause and Effect**

**15.** Pick one case file. Build an explanation for why that species declined.

My case: _____

| | |
|---|---|
| **Claim**<br>the human cause | The _____ declined mainly because of _____ (HIPPCO cause). |
| **Evidence**<br>2 numbers or clues | The file shows _____ and _____. |
| **Reasoning**<br>the science that links them | This matters because _____. |

NYSSLS: building toward HS-LS4-5, HS-LS2-7 and HS-ESS3-3 (DCI LS4.C, LS4.D, ESS3.C). Environmental Science, Chapter 7, Lesson 7.2: What Role Do Humans Play in the Loss of Species and Ecosystem Services? (pp. 221-231). SEP = Science and Engineering Practice, CCC = Crosscutting Concept. Data: the student book (Figure 7-14; Woodwell and others, 1967), U.S. Fish and Wildlife Service, NYS DEC, Cornell University.