UNINTENDED CONSEQUENCES

TEACHER GUIDE

LAUNCH

PLANNING

Here's a suggested schedule for this kit! The activities should be completed in order, but you can choose when the lessons take place over time.

ACTIVITY INFORMATION	SECTION	TIME REQUIRED	DAY/ LESSON
ACTIVITY 1: BEFORE AND AFTER See drastic ecosystem changes before your eyes! **Time required: 30 min**	☐ Small Changes, Big Results	30 minutes	Day 1
ACTIVITY 2: ECOSYSTEM INVADERS Is there a difference between invasive and non-native? What about endangered and vulnerable? Find out! **Time required: 2 h**	☐ Happy as a Hogweed	60 minutes	Day 2
	☐ Asian Lady Beetles	60 minutes	Day 3
ACTIVITY 4: CLIMBING UP, UP, UP Recreation is fun and an opportunity to spend time in nature. But, how does nature take it? **Time required: 3 h 15 min**	☐ Can Plants Take It? (Setup)	30 minutes	Day 4
ACTIVITY 3: ANSWERS THROUGH MATH Dive into the mathematics behind population studies. **Time required: 3 h 15**	☐ Carrying Capac ☐ Bio		Day 5

activity 1

BEFORE AND AFTER

We know that studying for a test can lead to a better grade, or that touching a hot stove will cause pain. These consequences happen quickly after the action, but many consequences take years to show their full effects. In this activity, your student will see a series of pictures and answer associated questions about action and consequence.

DO SMALL CHANGES MATTER?

CONTENT

- Students will look at four sets of before and after photos – mangroves, bouldering, Giant hogweed, and Asian lady beetles.
- Students will learn about how each of the photos is related to similar world issues.
- The vocabulary term human impact is defined.

Question: Do plants play a role in coastal ecosystem home destruction? Explain.
Answer: Answers will vary.
How to Help:
• Plants do play a role in coastal ecosystems. Students will learn more about this in Activity 5.
• The four in-text questions are intended to get your student to engage with each set of pictures individually.
• There are no required responses as the answers will come about later in this kit.

Question: Could bouldering lead to fewer plants? Explain.
Answer: Answers will vary.
How to Help: *Bouldering leads to fewer plants as a result of compaction and magnesium carbonate introduction. Students will learn more on this topic in Activity 4.*

Question: How might a flower and burns on human skin be related?
Answer: Answers will vary.
How to Help: *Many plants produce toxins that can burn human skin. This will be discussed in detail in Activity 2.*

Question: Are bugs a good thing for plants and the environment? Explain.
Answer: Answers will vary.
How to Help: *Bugs are a part of the environment so they have a role so long as they are in the correct ecosystem. Students will learn about this more in Activity 2.*

THINK ABOUT IT!

Question 1: Which, if any, of the events in the "After" photos do you think are human-caused? Explain.
Answer: Answers will vary.
How to Help: *All the "After" photo events are human-caused through human interactions in "Before" photos. How humans are related will be explained to your student throughout the kit.*

Question 2: How are all the situations in the "After" photos related?
Answer: Students may say that the "After" photos are all negative. While this isn't wrong, each of the "After" photos is related to human influence on natural processes.

b. What is the approximate carrying capacity for the species? Explain.
Answer: 20 individuals
How to Help: *After a large spike and decrease, the population overs around 20, with 21 individuals being too many and 19 being too few.*

c. Explain what happened in year 15.
Answer: The number of births raised above carrying capacity.
How to Help: *Students can also say there were more births than deaths.*

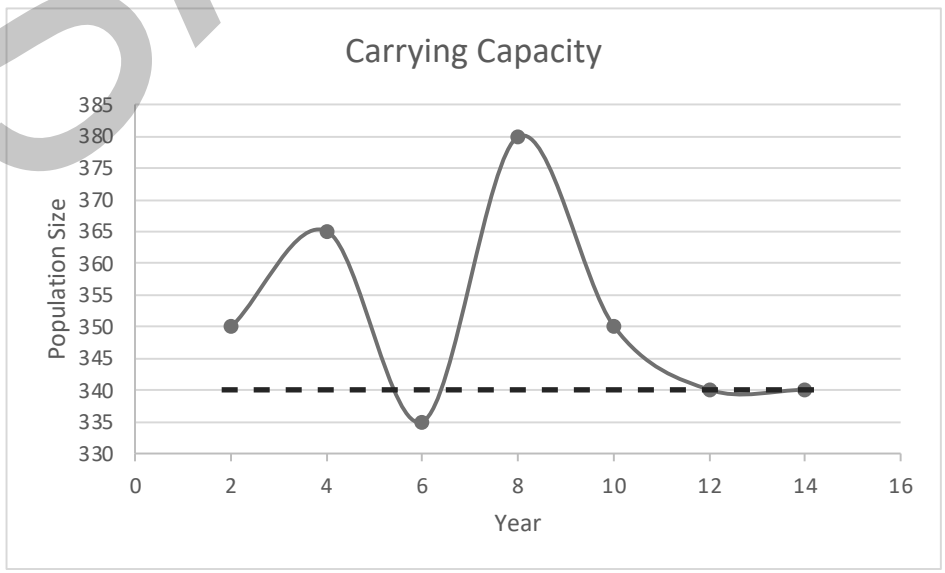
Question 2:

Year	Births	Deaths	Population Size
2			350
4	105	90	
6	87	117	
8	145	100	
10	90	120	
12	80	90	
14	85	85	

a. Calculate the population size for each year. Note: Population size is the previous year's population plus births and minus deaths.

Year	Births	Deaths	Population Size
2			350
4	105	90	365
6	87	117	335
8	145	100	380
10	90	120	350
12	80	90	340
14	85	85	340

b. Graph the carrying capacity data. Note: The lines connecting your point on the graph should be curved. The carrying capacity should be shown as a dotted line.



LAUNCH

SCIENCE UNLOCKED

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Kit	SU-UNCONS
Instructions	IN-UNCONST
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