Species Interactions Lab: NYSSLS Alignment

Teacher guide for the student worksheet at mrsajdak.com/interactions (two pages, 16 questions). Environmental Science, Chapter 5, Lesson 5.1: How Do Species Interact? Plan-book objective ES.2.5.1. © 2026 Ryan Sajdak. Free to use, share and change under CC BY-NC-SA 4.0 (creativecommons.org/licenses/by-nc-sa/4.0): give credit, do not sell it, share your version the same way.

Objectives

The same two statements are printed at the top of the worksheet, each with a box to tick. They go with plan-book objective ES.2.5.1 and are worded the same as on the lesson worksheet, so students see one wording on both sheets.

I can	Questions
name the five ways species interact, with their signs and an example of each.	1 to 4, 9 to 11, 16
use a model's numbers to explain how predators, prey and competitors change each other's populations.	5 to 8, 12 to 15

Performance expectations: building toward

The lab and worksheet give students evidence for these performance expectations. They are one step on the way, not a full assessment of any one of them.

> **HS-LS2-1**
> *"Use mathematical and/or computational representations to support explanations of biotic and abiotic factors that affect carrying capacity of ecosystems at different scales."* Worksheet link: every run is a computational model. Students see a living (biotic) factor change a population's ceiling: aphids level off at 400 alone, but swing far below that with a predator (Parts 1 and 2).

> **HS-LS2-2**
> *"Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales."* Worksheet link: students compare end counts, compute a percent loss (Q8), and see biodiversity kept or lost in the same tree depending on how food is shared (Part 4).

> **HS-LS2-6**
> *"Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem."* Worksheet link: the predator holds the aphids in check (Q7); adding an invasive parasite (sea lamprey) or competitor (purple loosestrife) resets the numbers (Q4, Q8, Q15); students evaluate a classmate's claim (Q16).

DCI LS2.A: *"Ecosystems have carrying capacities, which are limits to the numbers of organisms and populations they can support. These limits result from such factors as the availability of living and nonliving resources and from such challenges such as predation, competition, and disease."* DCI LS2.C: *"A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions."*

Part by part

Part	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	What students do
1. Take one away Q1 to 4	SEP 3 Planning and carrying out investigations (a controlled comparison: with and without) SEP 4 Analyzing and interpreting data	LS2.A interdependent relationships	Cause and Effect	Run five pairs with both species and with each one removed. Turn the end counts into +, – or 0 for each species, name the interaction, and use behaviour in the habitat to tell predation from parasitism.

2. Boom and crash Q5 to 8	SEP 4 Analyzing and interpreting data SEP 5 Using mathematics and computational thinking	LS2.A carrying capacity; LS2.C	Stability and Change; Patterns	Read peaks and their timing from the predator-prey graph, explain why the predator lags, compare with the carrying capacity, and compute the trout lost to lampreys as a percent.
3. Mystery pairs Q9 to 11	SEP 3 Planning and carrying out investigations SEP 7 Engaging in argument from evidence	LS2.A	Patterns	Identify an unknown interaction from numbers alone, write a claim, evidence and reasoning, then name the limit of that evidence: + and – cannot tell predation from parasitism.
4. Sharing a tree Q12 to 14	SEP 2 Developing and using models SEP 6 Constructing explanations	LS2.A competition; LS2.C	Structure and Function	MacArthur's warblers (textbook Figure 5-2). With the same food everywhere, one warbler out-competes the other two. With the tree split, all three persist: resource partitioning.
Wrap it up Q15 to 16	SEP 2 Developing and using models (predict, then test) SEP 7 Engaging in argument from evidence	LS2.C; ETS link: sea lamprey control	Cause and Effect	Predict what lamprey control does for lake trout and test it. Argue against "every interaction has a winner and a loser" using mutualism and commensalism.

Also in play

- **Links to Chapter 5 days 1 and 2:** the named pairs match the Day 1 pair cards (Pelion garden, sea lamprey, loosestrife at Tifft). The aphid ceiling of 400 is the Day 2 idea of carrying capacity.
- **Misconception:** "every interaction has a winner and a loser" (Day 1). Q16 asks students to take it apart with bumblebees and robins.
- **Nature of models:** the page says each run gives the same numbers because weather, disease and luck are left out. Good for a talk about what a model can and cannot show, alongside Q11.
- **Not covered here:** coevolution and camouflage and mimicry from Lesson 5.1. Pair the lab with the reading for those.

Standards text quoted from the New York State P-12 Science Learning Standards, High School Life Science (NYSED). The answer key is a separate file, kept off the public site.