

Endler's guppies

60 minutes • D4.1.8 • Chapter 6 • The dry lab

Interpreting data from a controlled experiment on sexual and natural selection, and planning one of your own

BY THE END, STUDENTS CAN

- ☐ Interpret data from Endler's guppy experiments, and explain how controlling the predator separates sexual from natural selection D4.1.8

TIMING

0-6	6 min	Do now: predict the ponds	
6-18	12 min	The experiment	
18-28	10 min	Reading the data	
28-53	25 min	The dry lab	
53-60	7 min	Plenary: what does it model?	
	60 min	One lesson	

STARTER

- 6 min** **Do now: predict the ponds**
- On a mini whiteboard, sketch a graph of the males' mean spots against generations for three ponds: no predator, a weak predator and a dangerous one. No numbers. Hold them up. Keep them for the end of the lesson.

ON THE BOARD, FROM THE GUIDE

Open the guide on the projector at each chapter (the links work in this PDF). Every figure plays from its own buttons, and the lesson's slides have the same figures, step by step, in the order of this plan.

06 Two pressures, tested

CHAPTER 06 IN THE SLIDES

Step through the figure (4 steps, the arrow keys on a projector). Stop on each caption and ask what changed before you go on.

- In the wild, males in streams with **fierce predators** are duller than males in streams with few.
- Endler set up **three ponds** with the same starting guppies: no predator, a weak predator and a dangerous one.
- He changed **one thing**, the predator, measured the males' spots, and kept everything else the same.
- After the generations: more colour with no or a weak predator, **less colour** with the dangerous one.

Predict box: In the pond with the dangerous predator, males end up with fewer spots. What is the best explanation? Hands up or mini whiteboards first.

Answer A: Males that show a lot of colour are caught more often, so duller males leave more offspring

THE LESSON

12 min **The experiment**

Chapter 6's figure. Students name the independent variable (the predator), the dependent variable (spots on the males), and what is kept the same, before step 3 shows it. Ask: why is the pond with no predator needed, and why start with the same fish in each?

10

min

Reading the data

The four questions in [chapter 6](#) ("Reading data like this"): the start, the direction, the separation and the control. Apply them to the class's whiteboards first, then to a real graph from [the dry lab](#).

25

min

The dry lab

[The dry lab](#), in pairs. Run the no-predator pond (A), the strong predator pond (C) and the control (D) three times each, then change the strength of mate choice. Students record every run and bring the class's results together on the board. Point out the IA coach under the bench: the structure of a good investigation is variables, repeats and uncertainty.

ACTIVITIES

DRY LAB

Endler's guppy ponds

[The dry lab](#) above, with the tasks and questions under it. It works on a phone as well as a laptop, and the results table downloads as a CSV for the class's pooled graph. The IA coach under the bench takes students through variables, repeats and uncertainty.

Needs: one device per pair.

PLENARY

7

min

Plenary: what does it model?

Back to the whiteboards. What did the experiment model, and what did it leave out? (Real streams have many other pressures; ponds are small.) Link to the nature of science: experiments control one factor to test a cause.

WHAT STUDENTS GET WRONG

Individual guppies lose their spots. The change is in the population across generations.

STRETCH AND SUPPORT

Support: give the captions of each figure as a cut-up storyboard to put in order, and use the key terms (tap the dotted words) as a glossary.

Support: give a writing frame for the plenary: "The experiment modelled... It left out..."

Stretch: what extra control pond or measurement would show whether spots are heritable, and not just something the ponds caused?

IN THE GUIDE

- 6** [Two pressures, tested](#)
- Lab** [Dry lab: Endler's guppy ponds](#)
- All** [The whole guide, with the figures that play](#)
- PPTX** [This lesson's slides, in the order of this plan](#)

PRACTISE AND REVISE

BUILD FOR YOUR CLASS

- [Tarsia puzzle, dominoes and picture reveal](#) on D4.1, built from its key terms and ready to print
- A [pub quiz](#) with rounds on D4.1, to present or run with no projector
- An [escape room built from the question bank](#) on D4.1

ALREADY ON THE SITE FOR D4.1

- Lesson: [Hardy-Weinberg & Chi-Squared](#)
- Quiz: [Natural Selection \(HL\)](#)
- Quiz: [Natural Selection](#)
- Revision map: [D4.1 Natural selection](#), to fill in
- Exam questions: [D4.1 in the exam maker](#), a paper with its markscheme

CARD SETS ON SPLYCR

- Open a set to host it as a class game, or make a copy to edit.
- [D4.1 Natural Selection](#)

How this was made. The course structure, the activities and the teaching choices come from my own classroom, my presentations and my years of teaching IB and AP Biology. I use Claude, an AI, to help write and build the interactive guides, lesson plans, slides and practice questions, and to draw the diagrams and code the interactives. I direct the work and review it against the IB and AP specifications before it goes live.

EXAM PRACTICE

Check yourself

Set it for homework: a fresh paper of exam-bank questions on D4.1 at standard level each time, marked as students go and saved to their Exam practice when they are signed in.

biologybybradford.com/exam-maker/sit?topics=D4.1&level=SL&paper=quiz&marks=15&src=ep

