



Competition and grazers

Lesson plan: competition for space on reefs, the role of herbivores, the Jamaica phase shift and its limits, and a grazer simulation game



Ages	14 to 18 (grades 9 to 12)
Time	60 to 75 minutes
Group	Pairs
Where	Any classroom. No internet needed.
You need	The slides, one board and record sheet per pair, a dice, counters or pencils

What students learn

- How corals and algae compete for space.
- How herbivores keep algae in check.
- What a phase shift is, using the Jamaica case, and why such shifts are less common than once feared.
- How a simple model can show the effect of grazing, and what it leaves out.

Before the lesson

1. Print one **grazer game** sheet per pair.
2. Each pair needs a dice and counters, or can use pencil marks.

The lesson

- 1 **Competition 8 minutes, slides 1 and 2.**
- 2 **Grazers and Jamaica 15 minutes, slides 3 to 5.** Tell the Jamaica story in order: overfishing, hurricane, urchin die-off.
- 3 **Grazer game 30 minutes, slide 6.** Pairs play both versions and graph.
- 4 **Wrap up 10 minutes, slide 7.** Link to parrotfish fishing and reserves.

Answers and what to listen for

What to expect: with 2 grazers, algae usually overtakes coral within a few rounds. With 8 grazers, coral holds or gains ground. The model leaves out coral growth rates, disturbance, recruitment and fish behaviour, which is a good discussion point.

Making it easier or harder

- **Older groups:** change one rule, such as a hurricane round that turns 20 coral squares to bare, and predict the outcome.
- **Link:** the Reef data lab shows more algae and less coral where enforcement is weak.

Curriculum links

- **Biology:** interdependence, competition, trophic interactions.
- **Maths:** modelling, graphs.
- **IB and GCSE:** ecosystems and human impact.

The teacher reading has the science behind every slide, with links to the sources.

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