Applying Stability & Change to the Phenomenon of Coral Reef Bleaching Along Florida's Reef Tract

1.) Describe the system and complete the flowchart.

- Coral reef **ecosystem**, which includes coral organisms, symbiotic algae, ocean water temperature, sunlight, and surrounding environmental conditions.
- A healthy reef represents a stable system with balanced conditions and feedback

2.) Over what timescale does the system change?

- The change in this **system occurs over weeks, months, and years** rather than immediately.
- The rate at which coral loses color increases as stress continues over time.
- Coral reefs may appear stable at first, even as temperatures begin to rise, but repeated heat stress increases the rate of change.

Describe the Connection 1 (Exists? +/- Mechanism?)

+ Within this system, the coral and algae relationship are a key connection that helps maintain stable state (**Equilibrium**).

Component A: Healthy relationship coral, algae and water temperatures.

Willow Brook Primary School. (n.d.). Year 1 coral reef. https://willowbrook.notts.sch.uk/year-1-coral-reef/

Component B: Water Temperature rise 2°F (or 1°C) coral expels algae

National Oceanic and Atmospheric Administration, Atlantic Oceanographic and Meteorological Laboratory. (n.d.). Coral bleaching at Cheeca Rocks. U.S. Department of Commerce. https://www.aoml.noaa.gov/coral-bleaching-cheeca-rocks/

Describe the Connection 2 (Exists? +/- Mechanism?)

-The coral becomes stressed and expels the algae, which is the **mechanism** that leads to bleaching and visible change in the system. Once that relationship breaks down, the system loses energy and stability.

4) Under what conditions is the system stable?

- Within this system, the coral and algae relationship are a key connection that helps maintain stable state (**Equilibrium**).
- The algae live inside the coral and provide energy through photosynthesis, while the coral offers protection and nutrients.
- This connection supports system stability if water temperatures remain within a tolerable range.

3) Under what conditions does the system change?

- When ocean temperatures rise even slightly for extended periods, this connection is disrupted.