



TOO HOT? TOO  
COLD? GET it  
JUST RIGHT

# LEARNING OBJECTIVES

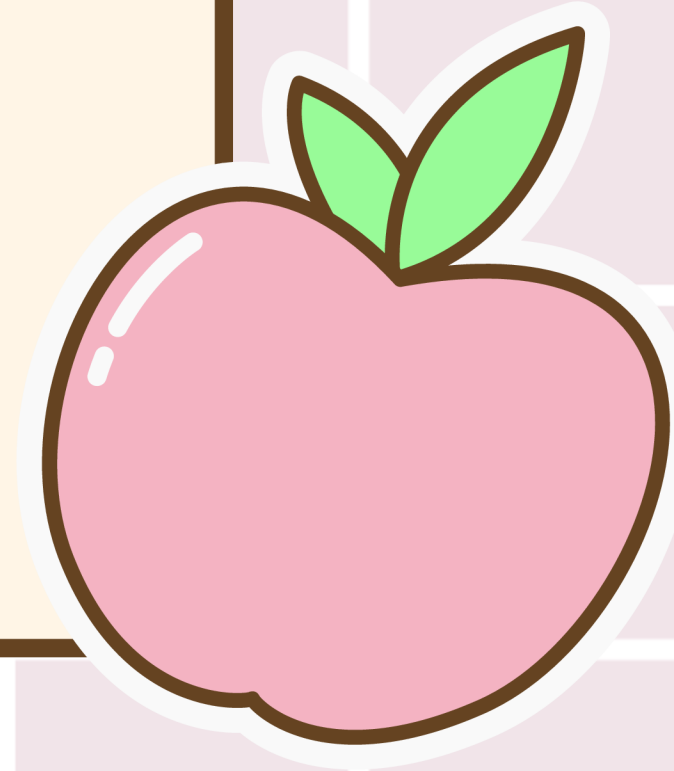
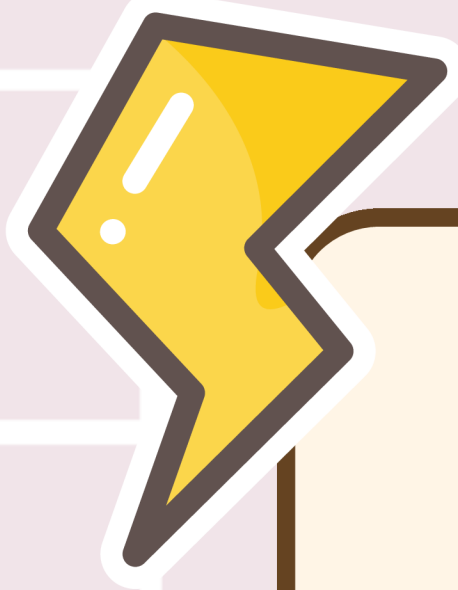
By the end of this module, students should be able to:

1. Understand the importance of water temperature in crab aquaculture.
2. Identify the optimum temperature range for *Portunus trituberculatus*.
3. Recognize the effects of temperature fluctuations on crab health and growth.
4. Learn how temperature sensors function and how to apply them in the field.




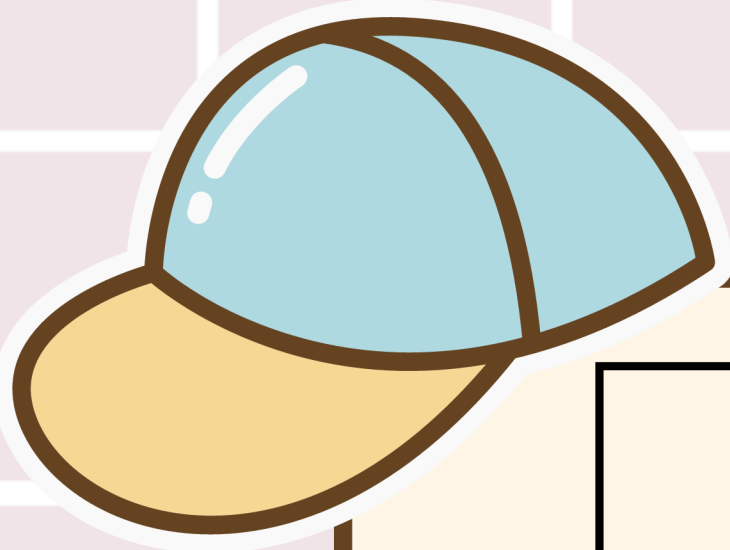
# WHY TEMPERATURE MATTERS IN AQUACULTURE

- Water temperature affects the metabolism, immune system, molting cycle, and oxygen levels in water.
- Crabs are ectothermic – meaning their body temperature and physiological processes depend on environmental temperatures.



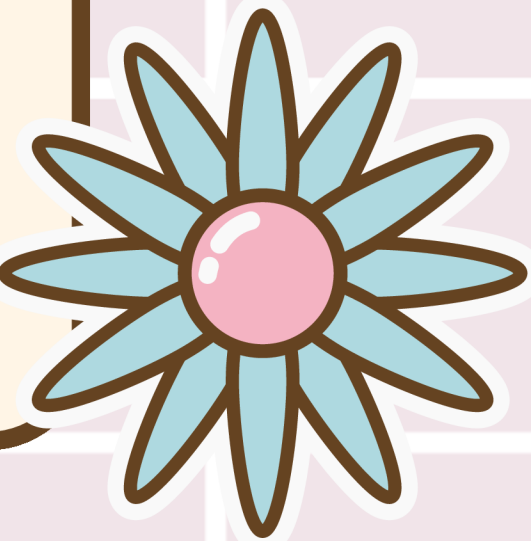
# OPTIMUM TEMPERATURE RANGE FOR SWIMMING CRABS



- Ideal range: 24°C – 30°C
- Below 20°C: Slow growth, reduced activity
- Above 32°C: Heat stress, reduced oxygen availability, potential mortality



# EFFECTS OF TEMPERATURE FLUCTUATION ON CRABS

Temperature Issue	Effects
Sudden drop in temperature	Stress, suppressed immune response, poor feeding
Excessive heat	Oxygen depletion, increased ammonia toxicity, heat shock
Long-term suboptimal range	Poor growth performance, delayed molting, high disease susceptibility





# TEMPERATURE SENSORS: HOW THEY WORK

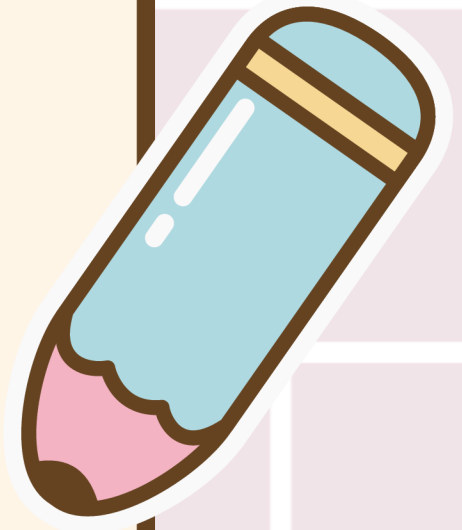
## Types of sensors:

- Digital temperature probes (e.g., DS18B20)
- Thermocouples
- Infrared temperature sensors (less common in aquaculture)

## How they work:

- Detect temperature changes via electrical resistance or thermal voltage
- Provide real-time readings for water temperature monitoring systems

Often integrated with IoT systems for remote access and automated alerts

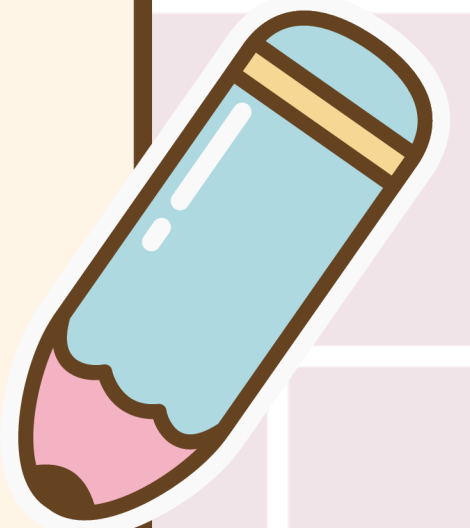




# USING TEMPERATURE DATA TO MAKE DECISIONS



- Automated feeder adjustments based on temperature
- Early warning system for potential heat or cold stress events
- Helps plan water exchange and aeration operations
- Critical during transportation, acclimation, and larval rearing



THANK  
YOU

