3. Temperature

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Pre-class materials

i Read ahead

Before class, you can prepare by reading the following materials:

- 1. Withers chapter 5. Look over the homework, handout, and discussion questions and skim the chapter, reading anything that you need to know.
- 2. [Discussion Questions]
- 3. [Slide Deck] for your reference as we go through the material

Announcements/Reminders

• Monday is Labor Day. No class

Week 3 Discussion Groups

Group	Partner 1	Partner 2	Partner 3
1 2	Justin Adry	Morgan Matthew	Richard Logan B
3	Mayuka	Krystal	Logan M
4 5	Anna Kirsten	Garrett Christina	Sasha Kylie
6	Maisie	Alvin	Jessica

Thought for the day

Physiology is the story of evolution's struggle to maintain an appropriate SA/D ratio in relation to the volume of an animal – Haldane

3. Temperature

Modes of Heat Transfer

- Conduction
- Convection
- Evaporative
- Radiative

Animals also generate heat through **Metabolism**.

https://youtu.be/BHchDrboqEo

 $Flux = C * \nabla (Mass or Energy)$

$$\mathbf{Q} = \mathbf{C} * \mathbf{M} \nabla \mathbf{T}$$

Where: - Flux is the transfer of mass or energy - ∇ is the gradient symbol - Q is heat - C is a material property (resistance or insulation value) - T is temperature

Heat Balance

Metbolic heat production is balanced by all mechanisms for heat exchange:

$$\Delta \mathbf{H}_s = \mathbf{H}_m \pm \mathbf{H}_c \pm \mathbf{H}_r \pm \mathbf{H}_e$$

Where:

 $\Delta H_s = \text{heat of storage}$

 $H_m = \text{heat of metabolism}$

 H_c = heat of conduction and convection

 $H_r = \text{heat of radiation}$

 H_e = heat of evaporation

If an animal is in heat balance, Tb (body temperature) is stable.

If ΔH_s is positive, (Gains > Losses), then Tb increases.

If ΔH_s is negative, (Gains < Losses), then Tb decreases.

Body Temperature

Q10

https://youtu.be/T5O9UvSZ_-g

Iterative Method

https://youtu.be/pEzcZCTYPyE

For Next Time

i Reminders and materials