

3. Temperature

Marguerite Butler

2023-09-06

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

💡 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)

$Q = C * M \nabla T$

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

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

$$\Delta H_s = H_m \pm H_c \pm H_r \pm H_e$$

Where:

ΔH_s = heat of storage

H_m = heat of metabolism

H_c = heat of conduction and convection

H_r = heat of radiation

H_e = heat of evaporation

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

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

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

Body Temperature

Q10

https://youtu.be/T5O9UvSZ_-g

Iterative Method

<https://youtu.be/pEzcZCTYPyE>

For Next Time

 Reminders and materials