Fire and Ice

The scenario focuses on surviving in desert and tundra biomes and adaptations for thermoregulation and osmoregulation (water retention).

Readings about **Biomes** can be found in **Chapter 39.**

> If you want to learn more about the **tundra**, read page 799
>
> If you want to learn more about the **desert**, read page 797

Readings about **Thermoregulation and Osmoregulation** are found in **Chapter 33**

- **Thermoregulation**
  - To learn **why** Animals Must Regulate Their Internal Temperature read page 666.
    - If you don't know what is meant by **denaturation**, read page 34
      - We will talk about **proteins** many times and you can read about them starting on page 32, you won't need to know about their composition till later, but denaturation might make more sense if you learn a little about their structure on pp. 32-33
    - If you are not sure what we mean by **metabolism**, you should read "Whole-Body Metabolism: Energy on an Organismal level" on page 71 and the intro paragraph to 4.2 Networks of Chemicals Sustain Life on p. 74
    - If you are not sure what the **Laws of Thermodynamics** are, read pages 72-73
    - If you are not sure what is meant by **homeostasis**, you can find an introductory explanation on pp. 6-7
    - To learn more about how **Water Regulates Temperature**, read page 27
  - If you can't differentiate an **endotherm** from an **ectotherm**, read pp. 666-667
  - If you don't understand what is meant by **poikilotherm** or **homeotherm**, you better check your notes because it is not in the text!
  - If you need to review the **adaptations** that help animals thermoregulate, such as **counter-current exchange**, read p. 667-668
  - A **negative feedback loop** that controls temperature is described on p. 528
- **Osmoregulation (+ diffusion and active transport)**
  - To understand more about **why animals osmoregulate**, read 33.2 Animals Regulate Water Ions in Body Fluids
  - If you want to know more about what the kidney is filtering besides water and ions, read 33.3 **Nitrogenous Wastes Include Ammonia, Urea**, and Uric Acid on page 670
  - If you need more description of **urinary system**, which contains the kidney, read 33.4 The Urinary System Produces, Stores and Eliminates Urine on page 671
  - If you need to review the **parts of a nephron**, read page 672 – 673

- o If you are not sure what the **glomerulus** is, read The Glomerular Capsule Filters Blood on page 674
- o If you are not sure what the **nephron loop** is or what it does, read pp. 674-675, and pay special attention to the diagram on page 674
  - ▪ If you are not sure what is meant by **selectively permeable**, look on page 80.
    - • If you want more information about the **structure of a cell membrane**, read section 3.3 A membrane separates each cell from its surroundings pp. 54-55, but don't worry about the details of lipid bilayers or the various types of protein embedded in them yet.
    - • If you don't know what makes up **a solution (solute, solvent)** read 2.3B Many Substances Dissolve in Water pp. 26-27
    - • If you are not sure what **ions** are, read p. 23
  - ▪ If you are not sure what **passive transport** is or how **diffusion** works or how to distinguish diffusion from **osmosis**, read pp. 80-81
- o If you are not sure what the **collecting duct** is or what it does, read pp. 674-675, and pay special attention to the diagram on page 674
  - ▪ If you are not sure how the collecting duct can become more or less permeable to water, read about **facilitated diffusion** on page 82
  - ▪ If you need an explanation of **active transport**, read page 83
  - ▪ If you want to compare **mechanisms of membrane transport**, look at Table 4.2 on page 82
- o If you need more information about how **hormones** control the kidney function, read p 675 and review the **feedback loop** diagram carefully

Some nice examples that will help you understand how these processes work in real situations (like those you sometimes see on our exams) see:

- o How temperature and concentrated solutions prevent food spoilage in "Why does food get moldy? page 401
- o A great example of **thermoregulatory behavior** is found in "A day in the life of a marine iguana" on page 665.