

UNIT 1 - ECOLOGY

BOOK SECTIONS

Ch. 1, 2, 3 Intro, 1.5, 1.6, 1.8, 1.9, 1.10, 1.11, 1.12, 2.1, 2.2, 2.5, 2.6, 2.7, 3.7, 4.1, 4.2, 4.5

TERMS TO KNOW

- | | |
|---|---|
| <input type="checkbox"/> Sustainability | <input type="checkbox"/> Pesticide |
| <input type="checkbox"/> Paradigm and Paradigm Shift | <input type="checkbox"/> First Generation Pesticide |
| <input type="checkbox"/> Ecology | <input type="checkbox"/> Second Generation Pesticide |
| <input type="checkbox"/> Ecosystem | <input type="checkbox"/> Insecticide |
| <input type="checkbox"/> Habitat | <input type="checkbox"/> Herbicide |
| <input type="checkbox"/> Abiotic and Biotic Factors | <input type="checkbox"/> Fungicide |
| <input type="checkbox"/> Detritus | <input type="checkbox"/> Bactericide |
| <input type="checkbox"/> Symbiotic Relationship | <input type="checkbox"/> Bioaccumulation/Bioamplification |
| <input type="checkbox"/> Mutualism | <input type="checkbox"/> DDT |
| <input type="checkbox"/> Commensalism | <input type="checkbox"/> Integrated Pest Management |
| <input type="checkbox"/> Parasitism | <input type="checkbox"/> Carbon Cycle |
| <input type="checkbox"/> Parasite | <input type="checkbox"/> Organic and Inorganic Carbon |
| <input type="checkbox"/> Host | <input type="checkbox"/> Nitrogen Cycle |
| <input type="checkbox"/> Parasitoidism | <input type="checkbox"/> Nitrogen, nitrite, nitrate, ammonia |
| <input type="checkbox"/> Predation | <input type="checkbox"/> Nitrogen Fixation |
| <input type="checkbox"/> Trophic structure | <input type="checkbox"/> Nitrogen-fixing Bacteria |
| <input type="checkbox"/> Producer | <input type="checkbox"/> Denitrification |
| <input type="checkbox"/> Autotroph | <input type="checkbox"/> Denitrifying Bacteria |
| <input type="checkbox"/> Consumer | <input type="checkbox"/> Biogeochemical Cycle |
| <input type="checkbox"/> Heterotroph | <input type="checkbox"/> Biochemist |
| <input type="checkbox"/> Herbivore | <input type="checkbox"/> Biosphere |
| <input type="checkbox"/> Carnivore | <input type="checkbox"/> Geosphere |
| <input type="checkbox"/> Omnivore | <input type="checkbox"/> Atmosphere |
| <input type="checkbox"/> Decomposer/Detritivore/Saprobe | <input type="checkbox"/> Hydrosphere |
| <input type="checkbox"/> Food Chain | <input type="checkbox"/> Photosynthesis |
| <input type="checkbox"/> Food Web | <input type="checkbox"/> Cellular Respiration |
| <input type="checkbox"/> Pyramid of Energy | <input type="checkbox"/> Fossil Fuels |
| <input type="checkbox"/> Population | <input type="checkbox"/> Ammonia and Nitrates |
| <input type="checkbox"/> Community | <input type="checkbox"/> Leaching |
| <input type="checkbox"/> Ecotone | <input type="checkbox"/> Oxygen Cycle |
| <input type="checkbox"/> Biodiversity | <input type="checkbox"/> Dissolved Oxygen |
| <input type="checkbox"/> Microecosystem | <input type="checkbox"/> BOD |
| <input type="checkbox"/> Succession | <input type="checkbox"/> Ozone |
| <input type="checkbox"/> Climax Community | <input type="checkbox"/> Troposphere |
| <input type="checkbox"/> Primary Succession | <input type="checkbox"/> Stratosphere |
| <input type="checkbox"/> Secondary Succession | <input type="checkbox"/> Mesosphere |
| <input type="checkbox"/> Albedo Effect | <input type="checkbox"/> Thermosphere/Ionosphere |
| <input type="checkbox"/> Photosynthesis | <input type="checkbox"/> Exosphere |
| <input type="checkbox"/> Cellular Respiration | <input type="checkbox"/> CFCs |
| <input type="checkbox"/> Thermodynamics | <input type="checkbox"/> Organic Halides/Halocarbons |
| <input type="checkbox"/> First Law of Thermodynamics | <input type="checkbox"/> Global Warming |
| <input type="checkbox"/> Second Law of Thermodynamics | <input type="checkbox"/> Greenhouse effect |
| <input type="checkbox"/> Pyramid of Energy | <input type="checkbox"/> Greenhouse Gases - CO ₂ , CH ₄ , NO _x |
| <input type="checkbox"/> Pyramid of Biomass | <input type="checkbox"/> Oligotrophic Lake |
| <input type="checkbox"/> Pyramid of Numbers | <input type="checkbox"/> Eutrophic Lake |
| <input type="checkbox"/> Keystone Species | <input type="checkbox"/> Aquatic Eutrophication |
| <input type="checkbox"/> Ecological Niche | <input type="checkbox"/> Nitrates and Phosphates |
| <input type="checkbox"/> Competition | <input type="checkbox"/> Algal Bloom |
| <input type="checkbox"/> Intraspecific Competition | <input type="checkbox"/> Fertilizer |
| <input type="checkbox"/> Interspecific Competition | <input type="checkbox"/> Range of Tolerance |
| <input type="checkbox"/> Exotic Species | <input type="checkbox"/> Short Term Stress |
| <input type="checkbox"/> Pest | <input type="checkbox"/> Long Term Change |

CONCEPTS TO KNOW

- Explain and give an example of a resource and whether or not it is managed sustainably.
- Explain and give an example of a paradigm shift.
- Recognize and describe biotic and abiotic relationships within ecosystems.
 - Examples include feeding relationships, symbiotic relationships, competition, etc.
- Describe primary and secondary succession.
- Describe the importance of biodiversity in ecosystems.
- Describe bio-accumulation and pesticide use.
- Describe alternatives to pesticides.
- Discuss the issue of pest management and the benefits and challenges of using pesticides.
- Describe/draw carbon cycle.
- Identify organic and inorganic carbon reservoirs.
- Describe/draw nitrogen cycle.
- Describe the cycling process of O, C, H, and N via biological and geological processes.
- Describe biological processes.
- Describe geological processes.
- Describe the human impact on the carbon, nitrogen, and oxygen cycle.
- Describe the function of atmospheric ozone.
- Describe the causes and effects of human impact on ozone depletion.
- List the sources of the 3 primary greenhouse gases.
- Discuss the human influence in enhanced global warming trends.
- Relate human impact to accelerated aquatic eutrophication.
- Discuss the biological needs of organisms in relation to their range of tolerance.
- Give examples of short term stress and long term change in terms of ecosystems.
- Discuss the importance and vulnerability of the Great Lakes (p. 140).
- Compare Lake Superior (oligotrophic) and Lake Erie (eutrophic) (p. 141).



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UNIT 2 - CHEMISTRY

BOOK SECTIONS

- Ch. 5 Intro, 5.1, 5.2, 5.5, 5.6, 5.8, 5.9, 5.11, 6.1, 6.3, 6.4, 6.6, 6.7, 6.10

TERMS TO KNOW

- chemistry, matter, physical/chemical property, atom, element, compound
- group/family, period, metal, nonmetal, metalloid
- WHMIS - Workplace Hazardous Materials Information System
- HHPS - Hazardous Household Product Symbols
- MSDS - Material Safety Data Sheet
- IUPAC - International Union of Pure and Applied Chemists
- electrolyte, nonelectrolyte
- diatomic molecules - HOFBRINCI P S
- ion
- ionic compound
- simple/binary ionic compound
- multivalent ionic compound
- polyatomic ionic compound
- hydrated ionic compound
- molecular compound
- prefixes for molecular (mono, di, tri, tetra, penta, hexa, hepta, octa, nona, deca)
- reactant, product, Law of Conservation of Mass

CONCEPTS TO KNOW

- Recognize the WHMIS and HHPS symbols.
- Know the 9 categories of the MSDS.
- Determine number of protons, neutrons, and electrons in an atom or ion.
 - # p = atomic number
 - # e = # p in an atom, different number for ions
 - # n = mass number - atomic number
- Draw Bohr diagrams for atoms and ions.
- Describe chemical and physical properties of ionic and molecular compounds.
- Name and Write Formulas for:
 - Ionic Compounds (simple, multivalent, polyatomic, hydrates)
 - Molecular Compounds (prefix system and common names)
- Balance chemical equations.
- Identify the type of chemical reaction:
 - Simple Composition
element + element → compound
 - Decomposition
compound → element + element
 - Single Replacement
element + compound → element + compound
 - Double Replacement
compound + compound → compound + compound
 - Hydrocarbon Combustion
hydrocarbon + oxygen → carbon dioxide + water
- Write a balanced chemical equation when you are given:
 - names of all the reactants and products
 - the formulas/names for ONLY the reactants

UNIT 3 - PHYSICS

BOOK SECTIONS

- Ch. 9, 10, 11, Ch. 9 Intro, 9.2, 9.5, 9.6, 9.7, 9.10, Ch. 10 Intro, 10.2, 10.3, 10.4, 10.7, Ch. 11 Intro, 11.1, 11.3, 11.5, 11.7

TERMS TO KNOW

- Significant Digits, Exact Values, Counted Values, Defined Values, Scientific Notation, SI Units, Metric System
- Accuracy, Precision
- Scalar Quantities
 - Distance, Time, Average/Instantaneous/Constant Speed, Acceleration
 - Distance-Time Graph
 - Speed-Time Graph
- Uniform Motion
- Ticker Tape Timer
- Vector Quantity
 - Reference Point, Position, Displacement, Constant/Average/Instantaneous Velocity, Acceleration, Vector Diagram

Distance-Time graph

- REMEMBER labels and titles.
- The slope is equal to the speed.***
 - On a straight line, get slope from the line
 - The slope of a straight line is equal to CONSTANT speed.
 - On a curved line, draw a tangent to the point and find slope of tangent.
 - The slope of a tangent is equal to INSTANTANEOUS speed.
 - On a curved line, draw a line from the first to last point of the graph.
 - The slope of a line drawn from start to finish is equal to the AVERAGE speed.

Speed-Time graph

- REMEMBER labels and titles.
- The slope is equal to the acceleration.***
 - Negative slope - Decreasing Speed
 - Positive slope - Increasing Speed
 - Zero slope - No speed
- The area under the line is equal to the distance.***

CONCEPTS TO KNOW

- Significant Digit Rules
- Scientific Notation Rules
- Converting Between Units (ex: km to m, km/h to m/s, etc.)
- Constant Speed Problems (distance/time)
- Average Speed Problems (total distance/total time)
- Distance-Time Graph Calculations
- Speed-Time Graph Calculations
- Describe the motion of an object from a Distance-Time/Speed-Time graph
- Describe motion from Ticker Tape
- Acceleration Problems (speed/time)
- Final Speed Problems
- Drawing Vectors
- Displacement/Velocity Problems

CONVERSIONS

- 1 km = 1000 m
- 1 h = 60 min or 3600 s
- 1 m/s = 3.6 km/h

FORMULAE

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} \quad \text{SLOPE}$$

$$v_{\text{av}} = \frac{\Delta d}{\Delta t} \quad \text{SPEED}$$

$$\text{Area} = \frac{1}{2} b \times h \text{ for a triangle} \quad \text{AREA UNDER THE LINE}$$

$$\text{Area} = l \times w \text{ for a rectangle}$$

$$v_2 = v_1 + a \times t \quad \text{FINAL SPEED}$$

$$a_{\text{av}} = \frac{\Delta v}{\Delta t} = \quad \text{ACCELERATION}$$

$$v_{\text{av}} = \frac{\Delta d}{\Delta t} \quad \text{VELOCITY}$$

UNIT 4 - WEATHER

BOOK SECTIONS

- Ch. 13, Ch. 14, Chapter 13 Intro, 13.1, 13.2, 13.4, 13.6, 13.8, 13.9, 13.11, 13.13, 14.2

TERMS TO KNOW

- | | |
|---|---|
| <input type="checkbox"/> Weather | <input type="checkbox"/> Aneroid Barometer |
| <input type="checkbox"/> Climate | <input type="checkbox"/> Wind |
| <input type="checkbox"/> Longitude | <input type="checkbox"/> Prevailing Winds |
| <input type="checkbox"/> Latitude | <input type="checkbox"/> Coriolis Effect |
| <input type="checkbox"/> Tropic of Cancer | <input type="checkbox"/> Jet Stream |
| <input type="checkbox"/> Tropic of Capricorn | <input type="checkbox"/> Polar Easterlies |
| <input type="checkbox"/> Arctic Circle | <input type="checkbox"/> Mid-Latitude Westerlies |
| <input type="checkbox"/> Antarctic Circle | <input type="checkbox"/> Northeast trade winds |
| <input type="checkbox"/> Equator | <input type="checkbox"/> Southeast trade winds |
| <input type="checkbox"/> Polar Region | <input type="checkbox"/> Hydrosphere |
| <input type="checkbox"/> Midlatitude Region | <input type="checkbox"/> Water/Hydrologic Cycle |
| <input type="checkbox"/> Tropics | <input type="checkbox"/> Evaporation |
| <input type="checkbox"/> Topography | <input type="checkbox"/> Sublimation |
| <input type="checkbox"/> Radiation | <input type="checkbox"/> Deposition |
| <input type="checkbox"/> Electromagnetic Spectrum | <input type="checkbox"/> Condensation |
| <input type="checkbox"/> Conduction | <input type="checkbox"/> Infiltration/Percolation |
| <input type="checkbox"/> Convection | <input type="checkbox"/> Transpiration |
| <input type="checkbox"/> Advection | <input type="checkbox"/> Precipitation |
| <input type="checkbox"/> Absorption | <input type="checkbox"/> Convection Clouds |
| <input type="checkbox"/> Reflection | <input type="checkbox"/> Front |
| <input type="checkbox"/> Albedo Effect | <input type="checkbox"/> Frontal Clouds |
| <input type="checkbox"/> Heat Sink | <input type="checkbox"/> Orographic Clouds |
| <input type="checkbox"/> Heat Capacity | <input type="checkbox"/> Fog |
| <input type="checkbox"/> Atmosphere | <input type="checkbox"/> Cumulus Clouds |
| <input type="checkbox"/> Altitude.Elevation | <input type="checkbox"/> Stratus Clouds |
| <input type="checkbox"/> Troposphere | <input type="checkbox"/> Alto- |
| <input type="checkbox"/> Tropopause | <input type="checkbox"/> Cirro-/Cirrus |
| <input type="checkbox"/> Stratosphere | <input type="checkbox"/> Nimbus |
| <input type="checkbox"/> Ozone | <input type="checkbox"/> Weather Systems |
| <input type="checkbox"/> Mesosphere | <input type="checkbox"/> Air Mass |
| <input type="checkbox"/> Thermosphere | <input type="checkbox"/> Front |
| <input type="checkbox"/> Ionosphere | <input type="checkbox"/> Warm Front |
| <input type="checkbox"/> Exosphere | <input type="checkbox"/> Cold Front |
| <input type="checkbox"/> Atmospheric Pressure | <input type="checkbox"/> Occluded Front |
| <input type="checkbox"/> Vertical Pressure Gradient | <input type="checkbox"/> Cyclone |
| <input type="checkbox"/> Horizontal Pressure Gradient | <input type="checkbox"/> Cyclogenesis |
| <input type="checkbox"/> Low Pressure Systems | <input type="checkbox"/> Stationary Front |
| <input type="checkbox"/> High Pressure Systems | <input type="checkbox"/> Anticyclone |
| <input type="checkbox"/> Temperature Gradient | |

CONCEPTS TO KNOW

- Main Factors Influencing Global Weather including Solar Energy, Cloud Cover, Earth's Rotation, Jet Streams, Prevailing Winds, Ocean Currents, Land Masses, Hydrosphere
- Types of Energy Transfer
- Layers of Atmosphere
- Importance of Atmosphere for Life
- The Coriolis Effect on Weather
- Pressure and Temperature Gradients
- The Hydrologic Cycle
- Ocean Currents Effect on Weather
- Types of Clouds and Cloud Formation
- Cloud Classification according to Shape, Height, and Rain
- Low Pressure, Stationary Front, and High Pressure Systems