

GED® Tutorials are based on content frameworks for the 2014 GED Test and current specifications and provide students a less stressful and more successful preparation effort as they work to achieve a GED passing score.

GED Tutorials offer targeted instruction, practice and review. Students engage with the content in an interactive, feedback-rich environment as they progress through GED test aligned modules. Students will practice skills essential to the test they're preparing for and build the depth of knowledge, confidence, and higher order skills required to demonstrate mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible to students through focused content, guided analysis, and practice with personalized feedback so students are empowered to increase their Exam Readiness. The Review It offers an engaging and high impact video summary of key concepts and important to grasp connections. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers, linking a student's performance to GED reporting categories and reasoning indicators. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are ready for test day and where they need to continue their review and practice.

This Tutorial is aligned with 2014 assessment content from GED Testing Service and content area assessment targets for Mathematics, Science, Social Studies and RLA sections.

GED® is a registered trademark of the American Council on Education ("ACE").

## 1. NATURE OF SCIENCE

### • WHAT IS SCIENCE?

- **SP.2.b** Identify and refine hypotheses for scientific investigations
- **SP.2.c** Identify the strengths and weaknesses of one or more scientific investigation (i.e. experimental or observational) designs

### • TYPES OF INVESTIGATIONS

- **SP.2.c** Identify the strengths and weaknesses of one or more scientific investigation (i.e. experimental or observational) designs
- **SP.2.b** Identify and refine hypotheses for scientific investigations
- **SP.3.d** Use sampling techniques to answer scientific questions
- **SP.2.a** Identify possible sources of error and alter the design of an investigation to ameliorate that error
- **SP.2.e** Identify and interpret independent and dependent variables in scientific investigations

### • USING MODELS

- **SP.6.a** Express scientific information or findings visually

## 2. MEASUREMENT AND DATA

### • TOOLS AND MEASUREMENT

- **SP.8.b** Use counting and permutations to solve scientific problems
- **SP.7.a** Understand and apply scientific models, theories and processes
- **SP.3.a** Cite specific textual evidence to support a finding or conclusion
- **SP.6.b** Express scientific information or findings numerically or symbolically

- **DISPLAYING AND INTERPRETING DATA**

- **SP.3.b** Reason from data or evidence to a conclusion
- **SP.6.a** Express scientific information or findings visually
- **SP.8.a** Describe a data set statistically

### 3. NATURE OF LIFE

- **FROM ATOMS TO BIOSPHERE**

- **L.d.1** Essential functions of life (e.g. chemical reactions, reproduction, metabolism) and cellular components that assist the functions of life (e.g. cell membranes, enzymes, energy)

- **CHARACTERISTICS OF LIFE**

- **L.c.1** Flow of energy in ecosystems (e.g. energy pyramids), conservation of energy in an ecosystem (e.g. energy lost as heat, energy passed on to other organisms) and sources of energy (e.g. sunlight, producers, lower level consumer)

### 4. THE CHEMISTRY OF LIFE

- **BIOMOLECULES**

- **ENZYMES**

- **L.d.1** Essential functions of life (e.g. chemical reactions, reproduction, metabolism) and cellular components that assist the functions of life (e.g. cell membranes, enzymes, energy)

### 5. CELLS

- **CELL STRUCTURE**

- **L.d.1** Essential functions of life (e.g. chemical reactions, reproduction, metabolism) and cellular components that assist the functions of life (e.g. cell membranes, enzymes, energy)

- **CELL NUTRITION AND TRANSPORT**

- **L.d.1** Essential functions of life (e.g. chemical reactions, reproduction, metabolism) and cellular components that assist the functions of life (e.g. cell membranes, enzymes, energy)

### 6. CELL STRUCTURE

- **PROKARYOTIC AND EUKARYOTIC CELLS**

- **L.d.2** Cell theory (e.g. cells come from cells, cells are the smallest unit of living things), specialized cells and tissues (e.g. muscles, nerve, etc.) and cellular levels of organization (e.g. cells, tissues, organs, systems)
- **L.d.1** Essential functions of life (e.g. chemical reactions, reproduction, metabolism) and cellular components that assist the functions of life (e.g. cell membranes, enzymes, energy)

- **PLANT AND ANIMAL CELLS**

- **L.d.1** Essential functions of life (e.g. chemical reactions, reproduction, metabolism) and cellular components that assist the functions of life (e.g. cell membranes, enzymes, energy)
- **L.d.2** Cell theory (e.g. cells come from cells, cells are the smallest unit of living things), specialized cells and tissues (e.g. muscles, nerve, etc.) and cellular levels of organization (e.g. cells, tissues, organs, systems)

### 7. CELL FUNCTION

- **PASSIVE TRANSPORT**

- **L.d.2** Cell theory (e.g. cells come from cells, cells are the smallest unit of living things), specialized cells and tissues (e.g. muscles, nerve, etc.) and cellular levels of organization (e.g. cells, tissues, organs, systems)

- **L.d.1** Essential functions of life (e.g. chemical reactions, reproduction, metabolism) and cellular components that assist the functions of life (e.g. cell membranes, enzymes, energy)

- **ACTIVE TRANSPORT**

- **L.d.1** Essential functions of life (e.g. chemical reactions, reproduction, metabolism) and cellular components that assist the functions of life (e.g. cell membranes, enzymes, energy)
- **L.d.2** Cell theory (e.g. cells come from cells, cells are the smallest unit of living things), specialized cells and tissues (e.g. muscles, nerve, etc.) and cellular levels of organization (e.g. cells, tissues, organs, systems)

## 8. CELLULAR ENERGETICS

- **PHOTOSYNTHESIS**

- **L.b.1** Energy for life functions (e.g. photosynthesis, respiration, fermentation)

- **CELLULAR RESPIRATION**

- **L.b.1** Energy for life functions (e.g. photosynthesis, respiration, fermentation)

## 9. CELL GROWTH AND REPRODUCTION

- **THE CELL CYCLE**

- **L.d.3** Mitosis, meiosis (e.g. process and purpose)

- **MITOSIS**

- **L.d.3** Mitosis, meiosis (e.g. process and purpose)

## 10. DNA STRUCTURE AND FUNCTION

- **COMPONENTS OF DNA**

- **L.e.1** Central dogma of molecular biology, the mechanism of inheritance (e.g. DNA) and chromosomes (e.g. description, chromosome splitting during Meiosis)

- **THE GENETIC CODE**

- **L.e.1** Central dogma of molecular biology, the mechanism of inheritance (e.g. DNA) and chromosomes (e.g. description, chromosome splitting during Meiosis)

- **DNA REPLICATION**

- **L.e.1** Central dogma of molecular biology, the mechanism of inheritance (e.g. DNA) and chromosomes (e.g. description, chromosome splitting during Meiosis)

## 11. GENE EXPRESSION

- **TRANSCRIPTION**

- **L.e.1** Central dogma of molecular biology, the mechanism of inheritance (e.g. DNA) and chromosomes (e.g. description, chromosome splitting during Meiosis)

- **TRANSLATION**

- **L.e.1** Central dogma of molecular biology, the mechanism of inheritance (e.g. DNA) and chromosomes (e.g. description, chromosome splitting during Meiosis)

## 12. MUTATIONS

- **GENETIC CHANGES IN DNA**

- **L.e.3** *New alleles, assortment of alleles (e.g. mutations, crossing over), environmental altering of traits, and expression of traits (e.g. epigenetics, color-points of Siamese cats)*

- **GENETIC CHANGES IN CHROMOSOMES**

- **L.e.3** *New alleles, assortment of alleles (e.g. mutations, crossing over), environmental altering of traits, and expression of traits (e.g. epigenetics, color-points of Siamese cats)*

## 13. HEREDITY

- **MENDELIAN LAWS OF HEREDITY**

- **L.e.2** *Genotypes, phenotypes and the probability of traits in close relatives (e.g. Punnett squares, pedigree charts)*
- **SP.8.c** *Determine the probability of events*

- **MULTIPLE ALLELES AND ALLELES WITHOUT DOMINANCE**

- **L.e.3** *New alleles, assortment of alleles (e.g. mutations, crossing over), environmental altering of traits, and expression of traits (e.g. epigenetics, color-points of Siamese cats)*

## 14. THE HUMAN BODY

- **ORGANS AND ORGAN SYSTEMS**

- **L.a.1** *Body systems (e.g. muscular, endocrine, nervous systems) and how they work together to perform a function (e.g. muscular and skeletal work to move the body)*

- **HUMAN ORGAN SYSTEMS**

- **L.a.1** *Body systems (e.g. muscular, endocrine, nervous systems) and how they work together to perform a function (e.g. muscular and skeletal work to move the body)*

- **DISEASE AND HUMAN HEALTH**

- **L.a.4** *Transmission of disease and pathogens (e.g. airborne, bloodborne), effects of disease or pathogens on populations (e.g. demographics change, extinction), and disease prevention methods (e.g. vaccination, sanitation)*

## 15. REPRODUCTION

- **MEIOSIS**

- **L.d.3** *Mitosis, meiosis (e.g. process and purpose)*

- **SEXUAL AND ASEXUAL REPRODUCTION**

## 16. EVOLUTION

- **MULTIPLE LINES OF EVIDENCE**

- **L.f.1** *Common ancestry (e.g. evidence) and cladograms (e.g. drawing, creating, interpreting)*

- **THE FOSSIL RECORD**

## 17. MECHANISMS OF EVOLUTION

- **NATURAL SELECTION**

- **L.f.2** *Selection (e.g. natural selection, artificial selection, evidence) and the requirements for selection (e.g. variation in traits, differential survivability)*
- **L.f.3** *Adaptation, selection pressure, and speciation*

- **L.c.3** Carrying capacity, changes in carrying capacity based on changes in populations and environmental effects and limiting resources to necessary for growth

- **EVOLUTION OF SPECIES**

- **L.f.1** Common ancestry (e.g. evidence) and cladograms (e.g. drawing, creating, interpreting)
- **L.f.2** Selection (e.g. natural selection, artificial selection, evidence) and the requirements for selection (e.g. variation in traits, differential survivability)

## 18. CLASSIFICATION

- **TAXONOMY**

- **THE SIX KINGDOMS**

## 19. HOMEOSTASIS

- **HOMEOSTASIS AND DYNAMIC EQUILIBRIUM**

- **L.a.2** Homeostasis, feedback methods that maintain homeostasis (e.g. sweating to maintain internal temperature), and effects of changes in the external environment on living things (e.g. hypothermia, injury)

- **FEEDBACK MECHANISMS IN ANIMALS**

- **L.a.2** Homeostasis, feedback methods that maintain homeostasis (e.g. sweating to maintain internal temperature), and effects of changes in the external environment on living things (e.g. hypothermia, injury)
- **L.a.4** Transmission of disease and pathogens (e.g. airborne, bloodborne), effects of disease or pathogens on populations (e.g. demographics change, extinction), and disease prevention methods (e.g. vaccination, sanitation)

## 20. FUNCTIONS OF ANIMAL SYSTEMS

- **THE IMMUNE AND LYMPHATIC SYSTEMS**

- **L.a.1** Body systems (e.g. muscular, endocrine, nervous systems) and how they work together to perform a function (e.g. muscular and skeletal work to move the body)
- **L.a.4** Transmission of disease and pathogens (e.g. airborne, bloodborne), effects of disease or pathogens on populations (e.g. demographics change, extinction), and disease prevention methods (e.g. vaccination, sanitation)

- **THE NERVOUS SYSTEM**

- **L.a.1** Body systems (e.g. muscular, endocrine, nervous systems) and how they work together to perform a function (e.g. muscular and skeletal work to move the body)
- **L.a.2** Homeostasis, feedback methods that maintain homeostasis (e.g. sweating to maintain internal temperature), and effects of changes in the external environment on living things (e.g. hypothermia, injury)

## 21. FUNCTIONS OF PLANT SYSTEMS

- **PLANT TISSUES**

- **PLANT RESPONSES**

## 22. MATTER AND ENERGY

- **FOOD CHAINS AND WEBS**

- **L.c.2** Flow of matter in ecosystems (e.g. food webs and chains, positions of organisms in the web or chain) and the effects of change in communities or environment on food webs
- **L.c.3** Carrying capacity, changes in carrying capacity based on changes in populations and environmental effects and limiting resources to necessary for growth

- **PYRAMIDS OF ENERGY, NUMBERS, AND BIOMASS**

- **L.c.1** Flow of energy in ecosystems (e.g. energy pyramids), conservation of energy in an ecosystem (e.g. energy lost as heat, energy passed on to other organisms) and sources of energy (e.g. sunlight, producers, lower level consumer)

## 23. CYCLES IN NATURE

- **THE CARBON CYCLE**
- **THE NITROGEN AND PHOSPHORUS CYCLES**

## 24. ECOLOGY

- **INTERACTIONS IN ECOSYSTEMS**
  - **L.a.3** Sources of nutrients (e.g. foods, symbiotic organisms) and concepts in nutrition (e.g. calories, vitamins, minerals)
  - **L.c.4** Symbiosis (e.g. mutualism, parasitism, commensalism) and predator/prey relationships (e.g. changes in one population affecting another population)
  - **SP.3.c** Make a prediction based upon data or evidence
- **SUCCESSION AND ECOSYSTEM STABILITY**
  - **L.c.5** Disruption of ecosystems (e.g. invasive species, flooding, habitat destruction, desertification) and extinction (e.g. causes [human and natural] and effects)
- **NATURAL IMPACTS ON ECOSYSTEMS**
  - **L.c.5** Disruption of ecosystems (e.g. invasive species, flooding, habitat destruction, desertification) and extinction (e.g. causes [human and natural] and effects)

## 25. NATURE OF MATTER

- **WHAT IS MATTER?**
  - **P.c.1** Structure of matter
  - **SP.7.b** Apply formulas from scientific theories
- **ATOMIC STRUCTURE**
  - **P.c.2** Physical and chemical properties, changes of state, and density

## 26. DESCRIBING MATTER

- **THE PERIODIC TABLE**
  - **P.c.2** Physical and chemical properties, changes of state, and density
- **MIXTURES OF MATTER**
  - **P.c.4** Parts in solutions, general rules of solubility (e.g. hotter solvents allow more solute to dissolve), saturation and the differences between weak and strong solutions

## 27. CHANGES IN MATTER

- **PHYSICAL AND CHEMICAL CHANGES**
  - **P.c.2** Physical and chemical properties, changes of state, and density
- **CHANGES OF STATE**
  - **P.c.2** Physical and chemical properties, changes of state, and density
- **CHEMICAL EQUATIONS**

- **P.c.3** Balancing chemical equations and different types of chemical equations, conservation of mass in balanced chemical equations and limiting reactants

## 28. FORCE AND MOTION

### • DESCRIBING FORCES

- **P.b.2** Force, Newton's Laws, gravity, acceleration due to Gravity (e.g. freefall, law of gravitational attraction), mass and weight

### • DESCRIBING MOTION

- **P.b.2** Force, Newton's Laws, gravity, acceleration due to Gravity (e.g. freefall, law of gravitational attraction), mass and weight
- **P.b.1** Speed, velocity, acceleration, momentum, and collisions (e.g. inertia in a car accident, momentum transfer between two objects)

### • EFFECTS OF FORCES

- **P.b.1** Speed, velocity, acceleration, momentum, and collisions (e.g. inertia in a car accident, momentum transfer between two objects)

## 29. NONCONTACT FORCES

### • ELECTROMAGNETIC FORCES

### • GRAVITATIONAL FORCE

- **P.b.2** Force, Newton's Laws, gravity, acceleration due to Gravity (e.g. freefall, law of gravitational attraction), mass and weight

## 30. ENERGY

### • DESCRIBING ENERGY

- **P.a.3** Types of energy (e.g. kinetic, chemical, mechanical) and transformations between types of energy (e.g. chemical energy [sugar] to kinetic energy [motion of a body])

### • ENERGY TRANSFER AND TRANSFORMATION

- **P.a.3** Types of energy (e.g. kinetic, chemical, mechanical) and transformations between types of energy (e.g. chemical energy [sugar] to kinetic energy [motion of a body])
- **P.a.4** Sources of energy (e.g. sun, fossil fuels, nuclear) and the relationships between different sources (e.g. levels of pollutions, amount of energy produced)

## 31. THERMAL ENERGY AND HEAT

### • THERMAL ENERGY AND TEMPERATURE

- **P.a.3** Types of energy (e.g. kinetic, chemical, mechanical) and transformations between types of energy (e.g. chemical energy [sugar] to kinetic energy [motion of a body])
- **P.a.1** Heat, temperature, the flow of heat results in work and the transfer of heat (e.g. conduction, convection)

### • HEAT AND THERMAL ENERGY

- **P.a.1** Heat, temperature, the flow of heat results in work and the transfer of heat (e.g. conduction, convection)
- **P.a.2** Endothermic and exothermic reactions
- **P.a.3** Types of energy (e.g. kinetic, chemical, mechanical) and transformations between types of energy (e.g. chemical energy [sugar] to kinetic energy [motion of a body])
- **P.a.5** Types of waves, parts of waves (e.g. frequency, wavelength), types of electromagnetic radiation, transfer of energy by waves, and the uses and dangers of electromagnetic radiation (e.g. radio transmission, UV light and sunburns)

- **ENERGY TRANSFER AND TECHNOLOGY**

- **P.a.4** Sources of energy (e.g. sun, fossil fuels, nuclear) and the relationships between different sources (e.g. levels of pollutions, amount of energy produced)

## 32. WAVES

- **MECHANICAL WAVES**

- **P.a.5** Types of waves, parts of waves (e.g. frequency, wavelength), types of electromagnetic radiation, transfer of energy by waves, and the uses and dangers of electromagnetic radiation (e.g. radio transmission, UV light and sunburns)

- **ELECTROMAGNETIC WAVES**

- **P.a.5** Types of waves, parts of waves (e.g. frequency, wavelength), types of electromagnetic radiation, transfer of energy by waves, and the uses and dangers of electromagnetic radiation (e.g. radio transmission, UV light and sunburns)

- **INTERACTIONS OF WAVES AND MATTER**

- **P.a.5** Types of waves, parts of waves (e.g. frequency, wavelength), types of electromagnetic radiation, transfer of energy by waves, and the uses and dangers of electromagnetic radiation (e.g. radio transmission, UV light and sunburns)

## 33. PLANET EARTH

- **EARTH'S STRUCTURE AND CYCLES**

- **ES.b.4** Interior structure of the Earth (e.g. core, mantle, crust, tectonic plates) and its effects (e.g. volcanoes, earth quakes, etc.) and major landforms of the Earth (e.g. mountains, ocean basins, continental shelves, etc.)

- **OCEANS**

- **ES.b.2** Characteristics of the oceans (e.g. salt water, currents, coral reefs) and their effects on Earth and organisms

- **THE ATMOSPHERE**

- **ES.b.1** Characteristics of the atmosphere, including its layers, gases and their effects on the Earth and its organisms, including climate change

## 34. WEATHER AND CLIMATE

- **SEVERE WEATHER**

- **ES.a.2** Natural Hazards (e.g. earthquakes, hurricanes, etc.) their effects (e.g. frequency, severity, and short- and long-term effects), and mitigation thereof (e.g. dikes, storm shelters, building practices)

- **CLIMATE**

- **ES.b.1** Characteristics of the atmosphere, including its layers, gases and their effects on the Earth and its organisms, including climate change

## 35. HUMANS AND EARTH'S RESOURCES

- **NATURAL RESOURCES**

- **ES.a.1** Interactions of matter between living and non-living things (e.g. cycles of matter) and the location, uses and dangers of fossil fuels
- **ES.a.3** Extraction and use of natural resources, renewable vs. non-renewable resources and sustainability.

- **IMPACTS OF HUMANS**

- **ES.a.3** Extraction and use of natural resources, renewable vs. non-renewable resources and sustainability.



## 36. OUR CHANGING PLANET

### • WEATHERING AND EROSION

- **ES.b.3** Interactions between Earth's systems (e.g. weathering caused by wind or water on rock, wind caused by high/low pressure and Earth rotation, etc.)
- **ES.a.2** Natural Hazards (e.g. earthquakes, hurricanes, etc.) their effects (e.g. frequency, severity, and short- and long-term effects), and mitigation thereof (e.g. dikes, storm shelters, building practices)

### • GEOLOGIC TIME

- **ES.c.3** The age of the Earth, including radiometrics, fossils, and landforms

### • EARTHQUAKES AND VOLCANOES

- **ES.b.4** Interior structure of the Earth (e.g. core, mantle, crust, tectonic plates) and its effects (e.g. volcanoes, earth quakes, etc.) and major landforms of the Earth (e.g. mountains, ocean basins, continental shelves, etc.)
- **ES.a.2** Natural Hazards (e.g. earthquakes, hurricanes, etc.) their effects (e.g. frequency, severity, and short- and long-term effects), and mitigation thereof (e.g. dikes, storm shelters, building practices)

## 37. THE SOLAR SYSTEM

### • SUN-EARTH-MOON SYSTEM

- **ES.c.2** Sun, planets, and moons (e.g. types of planets, comets, asteroids), the motion of the Earth's motion and the interactions within the Earth's solar system (e.g. tides, eclipses)

### • OUR SOLAR SYSTEM

- **ES.c.1** Structures in the universe (e.g. galaxies, stars, constellations, solar systems), the age and development of the universe, and the age and development of stars (e.g. main sequence, stellar development, deaths of stars [black hole, white dwarf])

## 38. EXPLORING THE UNIVERSE

### • THE UNIVERSE

- **ES.c.1** Structures in the universe (e.g. galaxies, stars, constellations, solar systems), the age and development of the universe, and the age and development of stars (e.g. main sequence, stellar development, deaths of stars [black hole, white dwarf])

### • OUR SUN AND OTHER STARS

- **ES.c.2** Sun, planets, and moons (e.g. types of planets, comets, asteroids), the motion of the Earth's motion and the interactions within the Earth's solar system (e.g. tides, eclipses)