Overview of the GED® Science Test

The GED Science Test examines a candidate’s ability to comprehend basic scientific principles and apply them to visual and written text from academic and workplace contexts.

• The test consists of 50 multiple choice questions.

• Candidates have 80 minutes to complete the test.

• Test questions focus on the comprehensive, integrated skills typical of what the candidate must know, understand, and be able to perform in order to be scientifically literate.

• Up to 60% of the questions are presented with visuals.

• Items appear in sets of 2 to 4 questions (25%) or as single questions (75%).

• The content areas targeted by the test questions are:
  - Physical Science (35%)
  - Life Science (45%)
  - Earth and Space Science (20%)

• The GED Science Test also supports the following National Science Education Standards:
  - Unifying Concepts and Processes
  - Science as Inquiry
  - Science and Technology
  - Science in Social and Personal Perspectives
  - History and Nature of Science

• The types of questions include:
  - Comprehension: 20%
  - Application: 20%
  - Analysis: 40%
  - Evaluation: 20%
The content areas of the GED Science Test targeted by the test questions are:

**Physical Science (35%)**
- Structure of atoms
- Structures and properties of matter
- Chemical reactions
- Motions and forces
- Conservation of energy and increase in disorder
- Interactions of energy and matter

**Life Science (45%)**
- The cell
- Molecular basis of heredity
- Biological evolution
- Interdependence of organisms
- Matter, energy, and the organization of living systems
- Behavior of organisms

**Earth and Space Science (20%)**
- Energy in the Earth system
- Geochemical cycles
- Origin and evolution of the Earth System
- Origin and evolution of the universe

**NOTE:** Students do not need to memorize science facts to pass the test. However, having general knowledge about the above science content is very important for a student’s success. Developing related vocabulary is another piece of the necessary foundation for GED success. Having basic science knowledge, coupled with strong reading skills and a developed vocabulary, will help your students to become well-prepared candidates for the GED Test.

The GED Science Test also supports 5 National Science Education Standards.

**Unifying Concepts and Processes** outlines standards that need to be developed over a candidate’s entire education and that transcend disciplinary boundaries. This category establishes guidelines for a candidate’s understanding of the following fundamental concepts:
• Systems, order, and organization
• Evidence, models, and explanations
• Change, constancy, and measurement
• Evolution and equilibrium
• Form and function

Science as Inquiry advances the candidate toward higher-level content knowledge and cognitive skills by helping him or her to develop questioning and reasoning abilities. Specific processes associated with scientific inquiry include:

• Asking questions
• Planning and conducting investigations
• Using appropriate tools and techniques to gather data
• Thinking critically and logically about relationships between evidence and explanations
• Constructing and analyzing alternative explanations
• Communicating scientific arguments

Science and Technology focuses on developing a candidate’s ability to design technology and understand links between science and technology. Specific focuses might include:

• Decision-making abilities in identifying and stating a problem
• Evaluating a solution

Science in Social and Personal Perspectives addresses the scientific foundation a candidate needs to evaluate and make decisions about personal and social issues that may be encountered. Such issues might include:

• Personal and community health
• Population growth
• Natural resources
• Environmental quality
• Natural and human-induced hazards
• Science and technology in local, national, and global challenges

History and Nature of Science addresses a candidate’s understanding of and ability to apply history to science in order to clarify:

• Different aspects of scientific inquiry
• The human aspects of science
• The role that science has played in the development of various cultures
Types of Questions on the GED® Science Test
Critical Thinking Skills

The GED Science Test requires that candidates use higher-level thinking skills. However, students do need basic background in the content areas so that the contexts for the questions are familiar.

Comprehension
Comprehension questions (20 percent) measure the candidate’s understanding of the meaning and intent of text and/or visual material.

Application
Application questions (20 percent) measure the candidate’s ability to use information and ideas in a situation different from that provided by the question stimulus.

Analysis
Analysis questions (40 percent) measure the candidate’s ability to break down information and to explore the candidate’s understanding of the relationship between component ideas.

Evaluation
Evaluation questions (20 percent) measure the candidate’s ability to use provided criteria to make judgments about the validity or accuracy of information.

Further Information about Critical Thinking Skills can be found in the Critical Thinking Skills section of this booklet.

For specific examples of each type of question refer to the Science Locator Test and Answer Key.
GED® Science Test Curriculum

The student will demonstrate and apply reading comprehension and critical thinking skills using Science text and graphic selections.

1. The student will demonstrate a basic understanding and knowledge of major Life Science topics and related vocabulary including the following topics that may be covered on the GED Test:
   - The Cell
   - Heredity and Genetics
   - Biological Evolution
   - Interdependence of Organisms, Ecosystems
   - Matter, Energy, and Organizations of Living Systems
   - Behavior of Organisms

2. The student will demonstrate a basic understanding and knowledge of major Physical Science topics and related vocabulary including the following topics that may be covered on the GED Test:
   - Structure of Atoms
   - Structures and Properties of Matter
   - Chemical Reactions
   - Motion and Forces
   - Conservation of Energy
   - Interactions of Energy and Matter

3. The student will demonstrate a basic understanding and knowledge of major Earth and Space Science topics and related vocabulary including the following topics that may be covered on the GED Test:
   - Structure of the Earth
   - The Changing Earth
   - Weather and Climate
   - Earth’s Resources
   - Origin and Evolution of the Universe

4. The student will apply comprehension skills to science passages and graphics. Comprehension skills include:
   - Restate Information
   - Summarize Ideas
   - Identify Implications
   - Make Inferences
5. The student will apply **application skills** to science passages and graphics. Application skills include:
   • Use information in a new context or situation
   • Identify an illustration of a generalization, principle or strategy

6. The student will apply **analysis skills** to science passages and graphics. Analysis skills include:
   • Distinguish facts from opinions
   • Distinguish conclusions from supporting details
   • Use questioning and reasoning abilities
   • Recognize unstated assumptions
   • Think critically and logically about relationships between evidence and explanations
   • Compare and contrast points of view
   • Make inferences or predictions

7. The student will apply **evaluation skills** to science passages and graphics. Evaluation skills include:
   • Assess whether information is appropriate to substantiate conclusions or generalizations
   • Assess the accuracy of facts presented in a text or graphic
   • Recognize the roles that values, beliefs, and personal convictions play in decision making

**Teaching Recommendations for Science**

- Draw, sketch, label and color code: the cell, solar system, atoms and molecules, body systems, etc.

- For genetics concepts, do problems together on the board. Teach the Pannett Square and use the square to solve problems.

- Be sure to include a unit on DNA.

- Use visuals: posters, pictures, videos, Internet whenever possible.

- Do some short simple classroom experiments to demonstrate major concepts.

- Have students read science passages orally and discuss: Recommended texts – *Wonders of Science Series* by Steck-Vaughn, easy to read and excellent background knowledge.
• Refer to the website howstuffworks.com for background information and knowledge.

• Connect current events to science concepts, e.g. weather, global warming, oil spills, etc.

• Have students become familiar with common elements and those that combine to form common compounds (The Periodic Table).

• Have students work in small groups on “fun” worksheets like matching periodic table element abbreviations to whole words or vocabulary activities. Correct together.

• Familiarize students with basic physics concepts like forces and motion.

• Teach students the states and behavior of matter: solids, liquids, and gases.

• Connect science concepts to students’ lives wherever relevant: smoking issues, nutrition, general health, etc.

• Practice GED-type questions as often as possible after teaching science units starting at a lower level and increasing in difficulty.

• Use vocabulary activities for all important science terms.

• Assign students to bring in newspaper articles based on science issues and share them with the class.

• Have students practice interpreting and evaluating information from charts, tables, graphs and maps frequently. Be sure to include using map keys.
Science Locator Test

A GED Social Studies Locator Test and an answer key are available to print and photocopy (for classroom use) at LiteracyLink.Org

The answer key identifies the critical thinking skill needed to correctly answer each question.

Go to www.LitLink.org

- Click on Teach
- Click on Resources
- Click on Locator Tests
- Choose Tests or Guidelines for answer key

Print free for classroom use.

The Science Locator Test, answer key and student answer form are also included in the hard copy booklet of this curriculum available free from the Bureau of Adult Education.

www.nhadulted.org
Recommended Science Materials

No-Glamour Reading: Content Vocabulary Books I and II
Each book has about 245 reproducible pages written at about a 5th grade level, but full of challenging science and social studies vocabulary and basic concepts.
www.linguisystems.com

190 Ready-To-Use Activities That Make Science Fun George Watson
Lives up to its name. Order from www.Josseybass.com

Just the Facts: Physical Science (titles also include Life Science and Earth and Space Science) These books are designed for grades 4-6 but are appropriate for adults. Be sure to blackout all references to grade level before using with adult students. These types of books are fun and very useful for background knowledge and vocabulary. This company offers many different titles.
www.carsondellosa.com

Steck-Vaughn Wonders of Science
6 titles written on about a Reading Level 4, great for quick background knowledge and oral reading.

Steck-Vaughn Building Strategies Science
Beginning GED books with lots of vocabulary, background information and practice questions, 4 – 6 reading level

Steck-Vaughn Pre-GED Science
Written at about a Reading Level of 8
www.steck-vaughn.com

Top 50 Science Skills for GED Success (Contemporary)
50 targeted lessons that cover the science skill strands on the GED Test. Excellent background information and practice questions.
www.highered.mcgraw-hill.com

Pre-GED Skill Workbooks: Science: Critical Thinking and Graphic Literacy

GED Scoreboost: Thinking Skills: Critical Thinking for Reading, Social Studies, and Science

GED Critical Reading Scoreboost: Graphic Skills for Social Studies and Science

Order from www.newreaderspress.com
Science Websites

- Short articles on 8 body systems with excellent illustrations
- Amazing facts and a quiz is available for each system

www.exploratorium.edu
- An amazing site that explores 100’s of science topics and includes web casts, videos, and pictures
- On-line activities, exhibitions, and links to other “cool” sites
- Teachers have access to on-line tools for teaching and hands-on activities
- Tools for teaching include an extensive digital library of over 10,000 photos and quick time movies

www.hightechscience.org
- Some interesting parts of this site include fun science facts, all about food, and animal facts
- These links are found on the left of the homepage, scroll down

www.howstuffworks.com
- Hundreds of “printer friendly” short articles about a wide variety of science topics and more
- Links to more information on each topic

http://science-education.nih.gov
- National Institutes of Health office of science education for teachers
- Many topics, lesson plans, resources, photos, and more available

www.sciencespot.net
- A very helpful site for teachers looking for fun daily science trivia, word searches, crosswords, and more
- Lessons, links, and more
- Includes a reference desk to find science resources

www.gedscience.com
- Contemporary’s on-line learning center for students and teachers
GED Science Glossary

**activation energy** the energy needed to enable a chemical reaction to take place

**air mass** a body of air with a certain temperature and with a certain moisture content

**air pressure** the weight of the atmosphere

**air resistance** friction caused by air

**alternating current** a current in which the electrons flow first in one direction and then in the opposite

**amino acids** the building blocks of proteins

**amniocentesis** a procedure that is used to examine fetal cells to identify certain types of genetic disorders present in a fetus

**asexual reproduction** a method of reproduction in which an organism is produced from a single cell

**assumption** a belief that something is true without checking its facts

**astronomy** the study of all celestial bodies in the universe

**atmosphere** the blanket of air that surrounds Earth

**atom** the smallest particle of an element that can exist alone

**atomic mass** the sum of the protons and neutrons in the nucleus of an atom

**atomic number** the number of protons in an atom

**axis** the imaginary line running through Earth’s center from the North Pole to the South Pole on which the planet rotates

**axon** a long fiber in a nerve cell through which a nerve impulse is sent

**barometric pressure** see air pressure

**big bang theory** the idea that the universe began with an explosion of a dense, hot, compact mass under extreme pressure

**binary fission** a method of reproduction in which a cell simply divides into two new cells

**biodegradable** organic materials that naturally decompose

**biodiversity** a healthy variety of plant and animal species coexisting in an environment and making the environment more stable

**biogenesis** the principle that living things only come from other living things

**biological clock** an internal control of natural behavioral cycles

**biology** the study of all living things

**black hole** the collapsed leftovers of a supernova

**boiling** the process by which a liquid changes to a gas

**botany** the study of plants

**calorie** a measure of food energy

**camouflage** a coloring pattern that enables an animal to blend into its surroundings and not be seen by predators

**carbohydrate** the main source of food energy

**cartilage** a tough, flexible material that covers bones and joints

**catalyst** a substance that provides a faster mechanism by which a reaction may take place

**cell** the basic unit of life

**cell membrane** the soft, flexible covering that holds a cell together and separates it from other cells

**cell specialization** the process in which the cells of an organism develop in different shapes, structures, and functions

**cell wall** a tough, flexible covering that surrounds the cell membrane of a plant cell
chain reaction a reaction in which nuclei are split apart in a controlled way, resulting in a great quantity of nuclear energy
chemical bonding the process through which atoms are combined
chemical change a change that produces a new substance
chemical equation a shorthand way of describing what happens in a chemical reaction
chemical formula a shorthand way of showing which elements are contained in a molecule
chemical reaction the process in which two or more substances combine to form one or more new substances
chlorophyll the green substance in a plant cell that is used to capture light energy
chromosome a group of genes that carries genetic information for various traits circadian clock a biological clock that controls daily activity
cloning the process of creating a genetically identical replica of an organism
cold-blooded a classification of an organism that cannot control its own internal body
comet a small object made of dust and frozen gas that orbits in a predictable path around the Sun
composting the use of natural biological processes to aid in the decomposition of organic material
compound a group of molecules that each contain the atoms of two or more elements
condensing the process by which a gas becomes a liquid
conductor a material in which electrons can be made to flow
conservation the controlled use and preservation of natural resources
constancy the tendency for things to remain unchanged
contaminants substances that harm the environment
continental drift the movement of continents
contraction a decrease in size of a substance due to its atoms moving closer together, often caused by a decrease in temperature
core the center of Earth
crust the outermost layer of the Earth

crustal plates the exterior layer of Earth’s crust (surface); also called tectonic plates
cytoplasm a jellylike fluid of water, salt, minerals, and many types of organic molecules that are essential to all life processes
dendrite a branching fiber on a nerve cell that receives messages from another nerve cell
digestion the breaking down of food into nutrients that the body’s cells can use
direct current electric current that moves in one direction only
dissolve to become part of a solution
DNA a large, complex molecule formed by chains of chemical compounds

dominant gene one gene in a gene pair that determines the effect of the gene pair
drawing conclusions expressing unstated ideas that are logically connected to given information
ecology the study of the relationship of organisms to their environment
ecosystem a community of populations of organisms and the habitats and natural resources that affect the whole
electric current the flow of electrons in a material
electric force the force that holds electrons in orbit around the nucleus of an atom

electromagnet a strong magnet that is made by coiling a wire around a piece of iron and running an electric current through the wire
electron a particle with a negative electric charge that orbits the nucleus of an atom
hemisphere  the left or right half of the human brain
hormone  a chemical produced within the body that regulates body functions
humidity  the measure of the water vapor in the air
hydrocarbon  a compound composed of only carbon and hydrogen
hydroelectric power  electrical energy formed by the conversion of the energy of flowing water
hypothesis  a reasonable explanation of evidence or a prediction based on evidence
identical twins  two children who form from the same fertilized egg cell
immune system  molecules, cells, and organs that work together to defend the body against pathogens
incineration  the burning of solid
inertia  the natural resistance of matter to change its state of rest or motion
infer  to guess at what is not stated
inference  a point of view that a person arrives at because of what he or she reads, hears, or sees
insulation  material that protects against electric shock
invertebrate  an animal without a backbone or skull
involuntary muscle  a muscle over which a person has limited control
ion  an atom that has either lost or gained an electron
ionic bond  a bond that is formed when an electron in the outermost energy shell of one atom transfers to the outermost shell of a second atom
ionosphere  the region of Earth's atmosphere that reflects radio waves toward the ground
irrelevant information  information that includes any facts that do not directly affect a person's decision
joint  the spot where two or more bones come together
kinetic energy  the energy of motion
kingdom  the most general classification of an organism
landfill  a place where solid wastes are buried
law of chance  a description of the probability of something happening
law of nature  a property of nature that does not change
leaves  the site of food production in a plant
lever  a simple machine in which a small force times a large distance at one end becomes a large force times a small distance at the other end
life cycle  the stages of life that all living things go through: beginning, growth, maturity, decline, and death
ligament  a tough strand of connective tissue
light  the range of electromagnetic wavelengths that humans can visibly detect
light-year  the distance that light travels in one year: about 6 trillion miles
lipid  an energy-storing fat
liquid  a phase of matter in which a substance takes the shape of its container and has a definite volume
lysosome  a special organelle in an animal cell that gets rid of waste materials, protects the cell from foreign invaders, and destroys worn-out or damaged organelles
machine  a device that is designed to make work easier
magnetism  a trait in which an object attracts and repels another object
mantle  the layer of Earth between the crust and the core
mass  the amount of matter an object or particle contains
matter  anything that has weight and takes up space
melting  the process by which a solid turns into a liquid
mesosphere  the layer of Earth’s atmosphere in which air temperature drops with increasing altitude
metamorphosis  the process in which insects and amphibians go through stages of life
meteor  a bright streak of light in the night sky caused by a meteoroid burning up as it enters Earth’s atmosphere
meteorite  a fragment of a meteor that is found on the surface of Earth
meteorology  the study of the atmosphere
migrate  to move from one place to another
milestone  a turning point or point at which everything changes
mitosis  the process of cell
molecule  a combination of two or more atoms
molting  the process through which an organism sheds its exoskeleton
multicellular organism  an organism that consists of more than one cell
muscle  a contracting tissue that is responsible for bone movement
mutation  a change in the genetic information within a cell
natural resources  resources provided by nature that are available to support life
natural selection  the idea that individuals with favorable traits are the most likely members of a species to survive, reproduce, and pass on those traits
nerve impulse  electrical signals that travel to and from nerve cells throughout the body
neuron  a nerve cell that makes up brain
neutron  a particle in the nucleus of an atom that has no electric charge
nonconductor  a material in which electrons cannot be made to flow
nonrenewable resources  resources that cannot be replaced or that take hundreds or thousands of years to replace
nuclear force  the force that holds neutrons and protons together in the nucleus of an atom
nuclear reactor  a device in which controlled chain reactions are carried out
nucleus  an organelle that controls the activities of a cell and stores heredity information
nutrient  a food substance that the body can use for tissue growth and repair, as well as for energy
nutrition  the study of the health value of food
oceanography  the study of Earth’s oceans
opinion  a personal belief that is often based on a person’s own value system
orbit  the path in which a planet travels around the Sun
order  the tendency of properties and behavior to be predictable
organ  a group of different types of tissue that work
organ system  a group of organs that work together
organic  a carbon-containing compound
organic chemistry  the study of carbon
organism  a living thing
ozone  a type of oxygen gas that surrounds Earth and absorbs ultraviolet rays
paleontology  the study of prehistoric animal and plant life through the analysis of fossil remains
Pangaea  the massive supercontinent that split into the seven continents
pathogen  a harmful bacterium, virus, or fungus that invades the human body
phases of matter  the three forms of a substance: solid, liquid, and gas
photosynthesis  the process in which a plant changes sunlight, carbon dioxide, gas and water into glucose
physical change  a change that does not produce a new substance
physical weathering a type of weathering that breaks rocks apart without changing the chemicals within the rocks
planet a celestial body that revolves around the Sun
plate tectonics the theory of the movement of Earth’s crustal plates
pollen a grain that contains the male sex cell of a flowering plant
pollination the process by which flowering plants reproduce
pollution any form of contamination that affects the quality of life
polymer a hydrocarbon that contains a large number of carbon atoms
potential energy stored energy
predator an animal that hunts other animals
prey an animal that is hunted by another animal
prism a triangular piece of glass that breaks light into a spectrum of colors
protein a molecule that is necessary for cell growth and repair and sometimes energy
proton a particle in the nucleus of an atom that has a positive electric charge
radioactivity a property of some types of atoms in which the nuclei are unstable and break apart, releasing particles and radiation
reactants the substances that combine in a chemical reaction
reaction rate the speed at which a chemical reaction takes place
recessive gene a gene that has no effect if a dominant gene is present
recycling the breaking down of trash into its component substances and reusing them in new products
reflection the process in which a wave bounces off a smooth surface
refraction the process in which a wave crosses a boundary and begins to move in a slightly different direction
relevant information information that includes facts that directly affect a person’s opinion
renewable resources resources that can be used and then replaced over a relatively short period of time
respiration the process in which food sugar is broken down and energy and carbon dioxide gas are released
response the reaction of an organism to a stimulus
restate to use different words and phrases to express the same idea
revolution a planet’s complete trip around the Sun
scientific fact a conclusion, based on evidence, that scientists agree on
scientific method a logical way to perform experiments and to draw conclusions that are supported by all available evidence
semiconductor a material in which only a small amount of electric current can be made to flow
skeleton the frame of the human body
social behavior the behavior of animals of the same species as they live together
soil a mixture of tiny rock fragments and organic materials produced by living things
solar cell a device that produces electricity when sunlight strikes
solar energy energy from sunlight
solar system the system comprised of the Sun and the nine planets that revolve around it
solid the phase of matter in which the molecular structure of a substance is nearly rigid
solute the substance that is dissolved in a solution
solution a uniform mixture of substances
solvent the substance in a solution that dissolves the solute
species  a group of organisms that have the same number of chromosomes and display similar traits
spore  a tiny reproductive cell
static electricity  electricity in which electrons are transferred from one object to another
stimulus  something that causes a change in an organism's behavior
stratosphere  the second layer of Earth's atmosphere; contains ozone
summarize  to briefly express a writer's key thought
superconductor  a conductor in which there is no electrical resistance
supernova  a flash of light caused by the explosion of a massive blue star that has become too hot
synapse  the point of contact between two nerve cells
system  an organized group of related objects or components that form a whole
technology  the use of knowledge, materials, and tools to solve human problems and to provide for human needs and wishes
temperature  the measure of heat energy
tendon  a strong, fibrous connective tissue that connects bones and muscles
thermosphere  the outermost layer of Earth's atmosphere in which the temperature rises with altitude
tissue  a collection of similar cells
troposphere  the layer of Earth's atmosphere that is closest to the ground
ultraviolet light  high-energy light from the Sun that is harmful to people
unicellular organism  an organism that consists of a single cell
vertebrate  an animal with a backbone and a skull
vitamin  a chemical that is necessary for proper body growth, body activity, and the prevention of certain diseases
voluntary muscle  a muscle that a person can consciously control
warm-blooded  a classification of animals who can control their own internal body temperature
wavelength  the distance between the highest or lowest points of two adjacent waves
weathering  the breaking down of rock into smaller pieces by natural processes
wheel and axle  a machine, consisting of a rope and axle, in which the force felt by the weight is much more than the force applied to the free end of the rope
work  the process in which an object moves in response to an applied force
zoology  the study of animals

Adapted from Contemporary's GED On-line Learning Center Glossary
www.gedscience.com