GED SCIENCE



FULL-LENGTH PRACTICE TESTS

340 ORIGINAL QUESTIONS

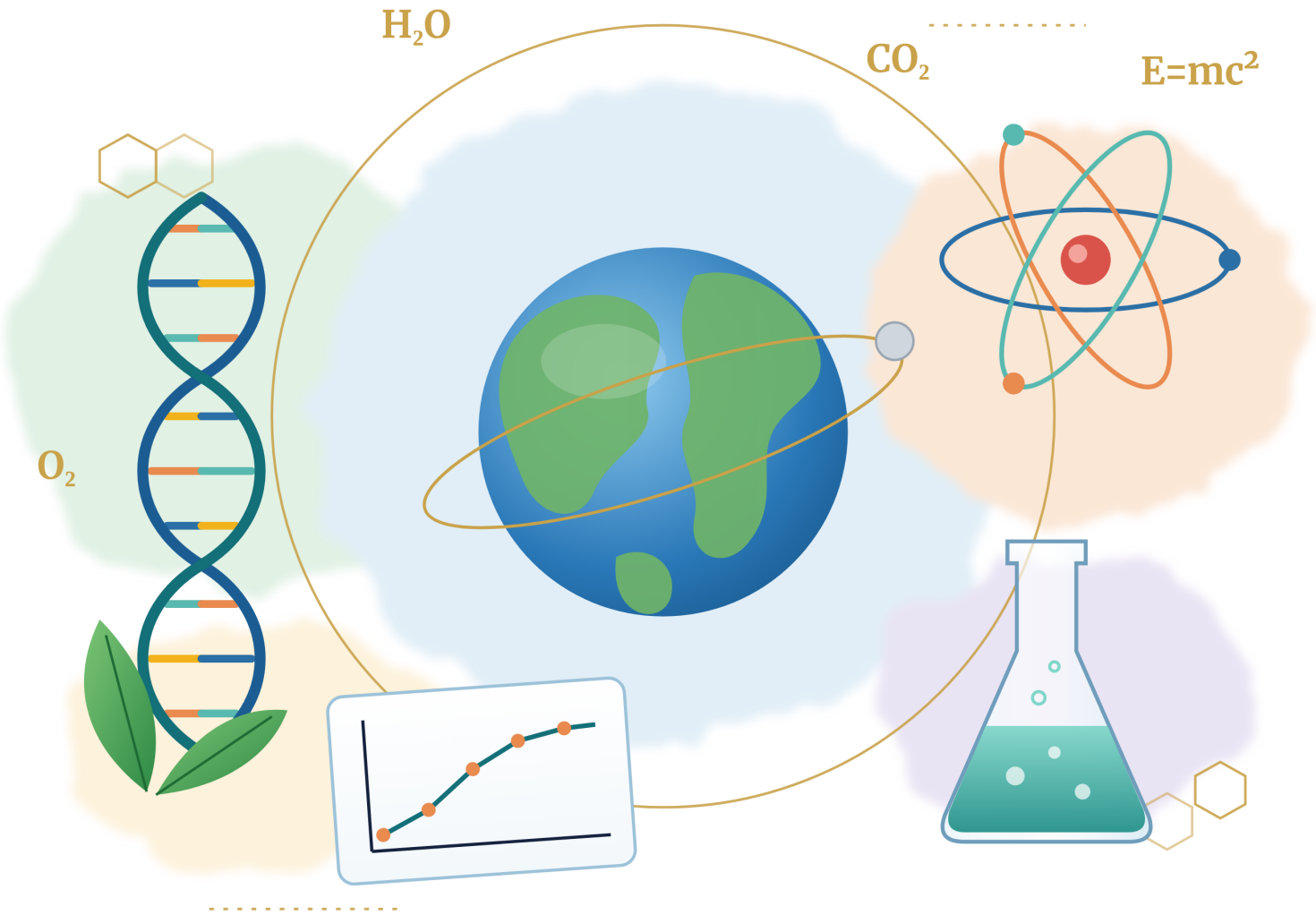
QUICK SCIENCE REVIEW • STEP-BY-STEP EXPLANATIONS

REZA NAZARI

10 FULL-LENGTH GED SCIENCE PRACTICE TESTS

340 Original Questions

Quick Science Review & Step-by-Step Explanations



Reza Nazari

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10 Full-Length GED Science Practice Tests

340 Original Questions with Step-by-Step Explanations and a Quick Science Review

Reza Nazari

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GED Science Quick Review

The ideas, skills, and traps the Science test keeps coming back to

How to use this review. Read it once before Practice Test 1, then use it after each test: for every question you missed, find the card for its topic, reread it, and check the **Watch out** line—most missed questions fall into one of those traps. The review opens with the **Science Practices** that nearly every question uses, then follows the three GED content areas: **Life Science** (about 40%), **Physical Science** (about 40%), and **Earth and Space Science** (about 20%). A **Formulas** sheet closes the review.

1 Science Practices
the reasoning skills behind nearly every question

1.1 Designing an investigation

- **Hypothesis:** a testable prediction ("If . . . , then . . . ").
- **Independent variable:** what the investigator changes on purpose (usually the x-axis).
- **Dependent variable:** what is measured in response (usually the y-axis).
- **Controlled variables:** conditions kept the same while a basic experiment changes one factor.
- **Comparison group:** receives no experimental treatment, a placebo, or the standard condition.
- **Stronger design:** larger samples, repeated trials, random assignment to groups, and blinding.
- **Random assignment** decides by chance which group a participant joins; with good controls, it strengthens a cause-and-effect conclusion. **Random sampling** decides who enters a study; it can make the sample more representative.
- **Confounding variable:** an uncontrolled factor that could explain the result.
- **Reliable** results repeat when the measurement is repeated; **valid** results measure what they claim to. A large sample helps only if it is also **representative** of the group the claim is about.

Watch out: if two factors change together, their separate effects are hard to identify. A planned experiment can test multiple factors systematically.

1.2 Reading tables and graphs

Line graph	change over time or along a continuous variable
Bar graph	comparing separate groups or categories
Circle graph	parts of one whole (percentages)
Scatter plot	relationship between two measured variables
Table	exact values; look down columns and across rows

- Read the title, both axis labels, the units, and the scale *before* the choices.
- **Direct** relationship: both rise together. **Inverse:** one rises as the other falls. **Plateau:** more input no longer changes the result.
- **Interpolating** (between data points) is safer than **extrapolating** (beyond them).

Watch out: a truncated y-axis can visually enlarge differences; it is not automatically misleading if you read the scale.

1.3 Evidence and conclusions

- A good conclusion stays inside the data: the same conditions, range, and population that were tested.
- **Correlation is not causation.** Observational studies generally show that two things go together; randomized, controlled experiments give the strongest direct test of cause and effect.
- One study supports or fails to support a hypothesis; confidence grows through **replication** by other scientists and agreement among different kinds of evidence.
- Not finding an effect in one limited study does not prove that the effect never occurs.
- **Observation** (what was seen or measured) vs. **inference** (an explanation of it).
- **Theory:** a well-tested explanation of many observations. **Law:** a concise description, often an equation, of a relationship observed again and again under stated conditions. A theory does not turn into a law.

Watch out: the best answer is often the most careful one; "always," "proves," and "every" are warning words.

1.4 Numbers in science

Mean	sum ÷ number of values
Median	middle value after sorting; resists outliers
Mode	most frequent value
Range	greatest − least

Rate of change $= \dfrac{\text{change in } y}{\text{change in } x}$ (the slope of a line graph).

Percent change $= \dfrac{\text{new} - \text{old}}{\text{old}} \times 100\%$.

For example, a rise from 20 to 25 is $\dfrac{25-20}{20} \times 100\% = 25\%$.

Probability $= \dfrac{\text{favorable outcomes}}{\text{total outcomes}}$; for independent events, multiply.

Scientific notation: $3.2 \times 10^4 = 32{,}000$; $5 \times 10^{-3} = 0.005$.

Watch out: when groups start at different values, compare the *change* or percent change, not the final numbers.

2 Life Science

about 40% of the test (13–14 of 34 questions in each test in this book)

2.1 Cells

Cell theory: all living things are made of cells; the cell is the basic unit of life; cells come from existing cells.

Nucleus	contains most DNA; helps regulate cell activities
Cell membrane	controls what enters and leaves (selectively permeable)
Mitochondrion	cellular respiration: releases energy from food
Chloroplast	photosynthesis (plants and algae)
Ribosome	builds proteins
Cell wall	rigid support (plants, fungi, bacteria)

Prokaryotes (bacteria) have no nucleus; **eukaryotes** (plants, animals, fungi) do. **Levels of organization:** cell → tissue → organ → organ system → organism.

Watch out: plant cells have a cell membrane too; the wall is an extra layer outside it.

2.2 Moving materials: diffusion and osmosis

- **Diffusion:** particles spread from high to low concentration, with no energy needed (oxygen into cells).
- **Osmosis:** water diffuses across a membrane toward the side with *more* dissolved solute.
- **Active transport:** the cell uses energy to move substances from low to high concentration.

In a solution with more dissolved solute than the cell, water tends to leave; in a solution with less, water tends to enter. Animal cells may swell, while a plant cell's wall limits expansion.

Watch out: in these simplified membrane setups, water crosses the membrane; salt does not.

2.3 Photosynthesis and cellular respiration

Photosynthesis	carbon dioxide + water + light energy → glucose + oxygen (in chloroplasts)
Respiration	glucose + oxygen → carbon dioxide + water + usable energy (ATP) (in mitochondria)

The two processes run in opposite directions and cycle carbon and oxygen through ecosystems. **Limiting factors** for photosynthesis: light, carbon dioxide, temperature, water. **Fermentation** releases a little energy without oxygen.

Watch out: plants carry out respiration all the time, not only at night; photosynthesis needs light.

2.4 Human body systems and homeostasis

Circulatory	heart and blood vessels carry oxygen, nutrients, wastes
Respiratory	lungs exchange oxygen and carbon dioxide
Digestive	breaks food into molecules the body absorbs
Nervous	brain, spinal cord, nerves: fast signals
Endocrine	glands release hormones: slower, longer-lasting signals
Immune	defends against pathogens; vaccines train it
Excretory	kidneys filter blood and form urine
Musculoskeletal	support and movement

Homeostasis keeps conditions near a set point through **negative feedback**: a change triggers a response that pushes the condition back toward that set point (sweating when hot, shivering when cold).

Watch out: negative feedback does not mean "bad"; it means the response opposes the change.

2.5 Health, nutrition, and disease

- **Nutrients:** carbohydrates (quick energy), fats (stored energy), proteins (building and repair), vitamins and minerals, water. Food energy is measured in Calories (kilocalories).
- **Energy balance:** taking in more energy than the body uses is stored, mostly as fat; using more than you take in draws on stores.
- **Pathogens:** bacteria, viruses, fungi, parasites. Antibiotics target bacteria; they do not treat viral infections.
- **Vaccines** expose the immune system to an antigen (or to instructions for making one) without causing the disease, so it responds faster to the real pathogen later.
- **Transmission** can be reduced by measures matched to the route of spread, such as handwashing, clean water, ventilation, or masks when appropriate.

Watch out: bacteria become resistant because resistant survivors multiply, not because a person "gets used to" a drug.

2.6 DNA, genes, and cell division

DNA is a double helix; bases pair A–T and C–G. A **gene** contains instructions for a functional product, often a protein. Proteins help shape traits. A **mutation** is a change in the DNA sequence.

Mitosis	1 cell $\rightarrow$ 2 identical cells with the full chromosome number; growth and repair
Meiosis	1 cell $\rightarrow$ 4 sex cells with half the chromosome number; genetic variety

Human body cells have 46 chromosomes (23 pairs); eggs and sperm have 23.

Watch out: mitosis copies; meiosis halves and shuffles.

2.7 Heredity and Punnett squares

	B	b
B	BB	Bb
b	Bb	bb

Bb $\times$ Bb

Alleles are versions of a gene. A **dominant** allele (B) shows whenever present; a **recessive** allele (b) shows only in bb. Bb $\times$ Bb gives 1 BB : 2 Bb : 1 bb, so $\frac{3}{4}$ show the dominant trait.

- **Genotype** = the alleles (Bb); **phenotype** = the trait you see.
- **Incomplete dominance:** the heterozygote has an intermediate trait (red $\times$ white $\rightarrow$ pink); the alleles themselves do not blend. **Codominance:** both show (AB blood).

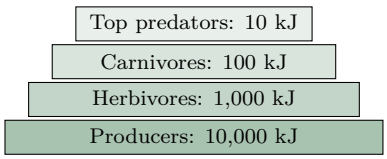
Watch out: each birth is a new, independent chance: a $\frac{1}{4}$ chance stays $\frac{1}{4}$ no matter how many children came before. Dominant does not mean better or more common.

2.8 Evolution and natural selection

- Individuals in a population **vary**, and much variation is inherited.
- More offspring are born than can survive; those with helpful traits survive and reproduce more.
- Over generations, helpful inherited traits become more common: the *population* changes, not the individual.
- **Evidence:** fossils, shared anatomy (homologous structures), DNA similarities, observed changes (antibiotic resistance, peppered moths).

Watch out: organisms do not develop a trait because they need it; the trait must already exist and be inherited.

2.9 Ecosystems: energy and matter



only about 10% of the energy passes to the next level

- **Food chain/web:** arrows point from the food to the eater (the direction energy flows).
- **Producers** make food by photosynthesis; **consumers** eat; **decomposers** recycle matter.
- **Energy flows** one way; at each level much of it is transferred to the surroundings as thermal energy; **matter cycles** (carbon, nitrogen, water).
- **Carrying capacity:** the largest population an area's food, water, and space can support; populations often level off near it.
- Predator and prey numbers rise and fall in linked cycles, with the predator lagging behind.

Watch out: removing one species affects more than its direct predator and prey.

3 Physical Science

about 40% of the test (13–14 of 34 questions in each test in this book)

3.1 Atoms, elements, and the periodic table

Proton	+ charge, in the nucleus; the number of protons identifies the element (atomic number)
Neutron	no charge, in the nucleus; adds mass
Electron	− charge, around the nucleus; involved in bonding

Mass number = protons + neutrons. **Charge** = protons − electrons. **Isotopes:** same element, different numbers of neutrons. **Ions:** atoms that gained electrons (negative) or lost them (positive).

The periodic table lists elements by atomic number; elements in the same **column (group)** have similar properties. Metals are on the left, nonmetals on the upper right.

Watch out: changing the number of electrons or neutrons does not change the element; only protons do.

Scan Me

Read the study summary and table. Then answer Questions 6–7.

Hand Hygiene in Clinics

Researchers studied ten outpatient clinics in five regions. Within each region, they paired two clinics of similar size and patient mix. A coin toss then decided which clinic in each pair would adopt a structured hand-hygiene protocol; the other clinic continued its usual routine. Over six months, trained observers recorded each clinic's rate of healthcare-associated infections per 1,000 patient visits.

The mean infection rates are shown below. Rates rose in both groups during a winter illness surge. Because the protocol was randomly assigned within each pair, the researchers concluded that the hand-hygiene protocol can lower infection rates in outpatient clinics like these.

Region	Protocol clinic	Usual-care clinic
1	3.1	6.0
2	2.8	5.4
3	3.4	6.2
4	2.5	5.0
5	3.0	5.8

6) Which statement best evaluates the researchers' conclusion?

(A) Not supported, because the study can show only an association, not an effect of the protocol.
(B) Supported, because a coin toss assigned the protocol and every protocol clinic had the lower rate.
(C) Not supported, because infection rates rose in both groups during the winter illness surge.
(D) Supported for every kind of facility, including large hospitals, because the gap was so large.

7) *Use the study "Hand Hygiene in Clinics" to answer this question.*

Which additional study would best test whether the conclusion applies more broadly?

(A) Repeat the randomized paired design in larger facilities and other regions for a full year.
(B) Observe only the clinic that had the lowest infection rate for another year.
(C) Repeat the same design in the same ten clinics for another six months.
(D) Introduce the protocol and a new cleaning product at the same time in all clinics.

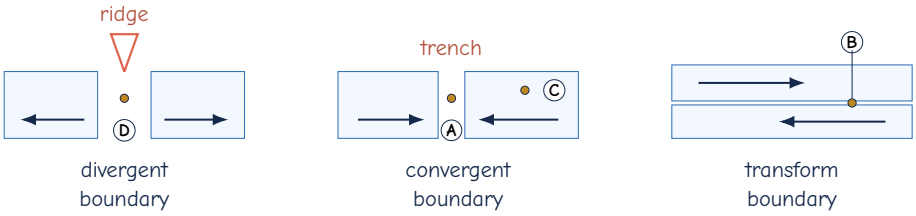
8) An electric motor is supplied with 250 J of electrical energy. It lifts a load, giving the load 75 J of gravitational potential energy. Use efficiency $= \frac{\text{useful output}}{\text{input}} \times 100\%$.
Which statement correctly gives the motor's efficiency and describes the rest of the input energy?

(A) 30%; the other 175 J was destroyed by friction inside the motor
(B) 70%; the other 175 J was mostly transferred to the surroundings as thermal energy
(C) 30%; the other 175 J was mostly transferred to the surroundings as thermal energy
(D) 70%; the other 175 J stayed stored inside the motor as electrical energy

Use the diagram below. Then answer Questions 9–11.

Plate Boundaries

The diagram shows three places where two of Earth's tectonic plates meet. Tectonic plates are pieces of the lithosphere, which is the crust together with the uppermost mantle. The arrows show the direction each plate moves. Points A, B, C, and D mark four locations on the plates.



The arrows show plate motion at each boundary. Point C lies inside a plate, away from any boundary.

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9) At which lettered point on the diagram is new ocean crust most likely forming as melted rock rises and hardens?

(A) Point A
(B) Point B
(C) Point C
(D) Point D

10) *Use the diagram "Plate Boundaries" to answer this question.*

Near one type of boundary, earthquakes occur at greater and greater depths moving away from the boundary, some as deep as about 600 km. At which boundary in the diagram is this pattern most likely, and why?

(A) the divergent boundary, because rising melted rock cracks the plates at great depth
(B) the transform boundary, because the plates grind past each other hundreds of kilometers down
(C) the convergent boundary, because one plate sinks at an angle deep into the mantle
(D) the convergent boundary, because the ridge pulls crust downward to form deep faults

11) *Use the diagram "Plate Boundaries" to answer this question.*

Which question cannot be answered from this diagram alone?

(A) What is the age in years of the rock at the ridge?
(B) Which boundary has plates moving apart?
(C) Which boundary has plates sliding past each other?
(D) Which boundary has plates moving toward each other?

12) A person steps out of a warm house into cold winter air. The body responds with a feedback loop that limits the loss of heat from its core. Put the events in the order they happen. Drag one event into each step. Not every event is used.

Tokens:

1 Skin sensors detect the drop in air temperature
2 Blood vessels in the skin widen to release heat
3 The brain signals blood vessels in the skin to narrow
4 Less warm blood flows close to the skin surface
5 Less thermal energy leaves the body, so the core stays warm

Box A: Step 1 _____

Box B: Step 2 _____

Box C: Step 3 _____

Box D: Step 4 _____