



STEMQUEST GENERAL KNOWLEDGE

50 Questions and Answers

Science · Technology · Engineering · Mathematics

Learn the essentials. Test your knowledge. Explain with confidence.

A free companion to STEMQuest General Knowledge 101 for students ages 8-16.

Free educational edition - 2026

RoboVerse Innovation Academy

How to Use This Book

Try each question before reading the answer. Then explain the idea in your own words, give a real-world example, and write one follow-up question. Use the book for independent study, family learning, classroom warm-ups, team competitions, or STEMQuest review.

Science: Life, Matter, and Earth

Physics: Forces, Energy, and Space

Technology and Digital Systems

Engineering and Design

Mathematics, Data, and STEM Thinking

Five Domains · Ten Questions Each · Fifty Answers

Science: Life, Matter, and Earth

1. What are the basic characteristics of living things?

Answer: Living things are organized, use energy, grow, respond to their environment, maintain internal balance, and reproduce.

2. What is a cell?

Answer: A cell is the smallest structural and functional unit of life. Some organisms have one cell, while others have trillions.

3. What is photosynthesis?

Answer: Photosynthesis is the process by which plants, algae, and some bacteria use sunlight to convert water and carbon dioxide into sugars, releasing oxygen.

4. What is an ecosystem?

Answer: An ecosystem is a community of organisms interacting with each other and with nonliving parts of their environment.

5. Why is biodiversity important?

Answer: Biodiversity supports resilient ecosystems and provides food, medicines, materials, pollination, and other benefits.

6. What is matter?

Answer: Matter is anything that has mass and takes up space.

7. What is an atom?

Answer: An atom is the smallest unit of an element that retains that element's chemical properties.

8. What is the difference between a physical and chemical change?

Answer: A physical change alters form or state without creating a new substance; a chemical change rearranges atoms and forms new substances.

9. Why does ice float on water?

Answer: Frozen water forms an open crystal structure that is less dense than liquid water, so ice floats.

10. What causes seasons on Earth?

Answer: Seasons are caused by Earth's tilted axis as it orbits the Sun, changing the angle and duration of sunlight received.

Physics: Forces, Energy, and Space

11. What is a force?

Answer: A force is a push or pull that can change an object's motion or shape.

12. What is speed?

Answer: Speed is the distance traveled divided by the time taken.

13. What is acceleration?

Answer: Acceleration is the rate at which velocity changes, including changes in speed or direction.

14. What is gravity?

Answer: Gravity is the attraction between objects with mass. It keeps people on Earth and planets in orbit around the Sun.

15. How does friction affect motion?

Answer: Friction opposes motion between surfaces. It can slow objects down but also provides grip for walking, driving, and braking.

16. What is energy?

Answer: Energy is the capacity to cause change or do work.

17. What is the difference between kinetic and potential energy?

Answer: Kinetic energy is energy of motion; potential energy is stored because of position or condition.

18. Can energy be created or destroyed?

Answer: In a closed system, energy is conserved. It can be transferred or transformed but not created or destroyed.

19. How does sound travel?

Answer: Sound travels as vibrations through matter. It cannot travel through a perfect vacuum.

20. Why do planets orbit the Sun?

Answer: A planet's forward motion and the Sun's gravitational pull combine to produce a curved orbital path.

Technology and Digital Systems

21. What is technology?

Answer: Technology is the application of knowledge through tools, processes, and systems that meet human needs or solve problems.

22. What is an algorithm?

Answer: An algorithm is a precise sequence of steps for completing a task or solving a problem.

23. What is binary code?

Answer: Binary code represents information using two states, commonly written as 0 and 1.

24. What is the internet?

Answer: The internet is a global network of connected computer networks that exchange data using shared protocols.

25. What is artificial intelligence?

Answer: Artificial intelligence refers to computer systems that perform tasks associated with human intelligence, such as recognizing patterns, making predictions, or generating content.

26. Why can AI give incorrect answers?

Answer: AI systems learn statistical patterns from data and may lack complete information, reliable reasoning, or an understanding of truth.

27. What is cybersecurity?

Answer: Cybersecurity is the protection of devices, networks, software, and data from unauthorized access, damage, or disruption.

28. What makes a password strong?

Answer: A strong password is long, unique, difficult to guess, and ideally stored in a trusted password manager with multifactor authentication enabled.

29. What is digital citizenship?

Answer: Digital citizenship means using technology safely, responsibly, respectfully, and critically.

30. Why should online information be verified?

Answer: Online content may be incomplete, outdated, biased, manipulated, or false. Verification uses reliable sources and supporting evidence.

Engineering and Design

31. What is engineering?

Answer: Engineering is the use of science, mathematics, creativity, and a design process to develop solutions within constraints.

32. What is the engineering design process?

Answer: A common cycle is: define the problem, research, imagine solutions, plan, create, test, evaluate, and improve.

33. What is a prototype?

Answer: A prototype is an early model built to test an idea and learn how it can be improved.

34. Why is failure useful in engineering?

Answer: A failed test provides evidence about weaknesses, incorrect assumptions, and possible improvements.

35. What is a constraint?

Answer: A constraint is a limit on a design, such as time, cost, size, safety, materials, or environmental impact.

36. What is a simple machine?

Answer: A simple machine changes the size or direction of a force. Examples include levers, pulleys, wheels and axles, inclined planes, wedges, and screws.

37. What is mechanical advantage?

Answer: Mechanical advantage compares the output force of a machine with its input force.

38. Why are real machines not 100 percent efficient?

Answer: Some input energy is transformed into less useful forms such as heat and sound because of friction, deformation, and resistance.

39. What is sustainable design?

Answer: Sustainable design considers environmental, social, and economic impacts across a product or system's life cycle.

40. What makes a design successful?

Answer: A successful design meets defined needs, performs reliably, respects constraints, and is supported by testing and evidence.

Mathematics, Data, and STEM Thinking

41. What is a ratio?

Answer: A ratio compares two quantities by division.

42. What does percent mean?

Answer: Percent means parts per hundred.

43. What is the mean of a dataset?

Answer: The mean is found by adding all values and dividing by the number of values.

44. What is the median?

Answer: The median is the middle value when data is ordered; with an even number of values, it is the mean of the two middle values.

45. What is probability?

Answer: Probability is a number from 0 to 1, or 0 to 100 percent, describing how likely an event is.

46. Why is estimation useful?

Answer: Estimation supports quick decisions and helps check whether an exact answer is reasonable.

47. What is a variable in an investigation?

Answer: A variable is a factor that can change. Fair tests change one independent variable, measure a dependent variable, and control other relevant factors.

48. Does correlation prove causation?

Answer: No. Correlation shows that variables change together, but other factors or chance may explain the relationship.

49. What makes evidence reliable?

Answer: Reliable evidence comes from appropriate methods, careful measurement, sufficient data, repeatable results, and transparent sources.

50. What is the STEMQuest learning cycle?

Answer: Question, Discover, Connect, Challenge, Explain: ask a meaningful question, gather evidence, link STEM ideas, test a solution, and clearly communicate what you know.



KEEP EXPLORING.

Every answer is a doorway to a better question.

Use this companion with the free STEMQuest General Knowledge 101 student book.

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