E-mail: Info@saolympiads.co.za website: www.saolympiads.co.za

# Natural Sciences Olympiad
# GRADE 8

**DATE:** 7 AUGUST 2025

**TIME:** 90 MINUTES

**INSTRUCTIONS:**

1. This booklet has 50 multiple-choice questions.
2. Each question is followed by answers marked A, B, C, and D. Only one answer is correct. Choose the correct answer and shade the corresponding circle on the answer sheet.
3. All working details must be done in the space provided.
4. Calculators are permitted.
5. Diagrams are not necessarily drawn to scale.
6. Each question carries one mark.
7. You have 90 minutes for the paper, which works out to an average of 1.8 minutes per question.
8. Read the questions carefully before answering.
9. Visit the website: www.saolympiads.co.za.

ENJOY THE OLYMPIAD.

## Grade 8 NS Olympiad 2024

Various options are provided to answer the following questions. Choose the correct answer and Indicate the correct answer by circling the correct letter on the answer sheet provided. E.g., 1.1.1 – A. (see guide)

1. Why is chlorophyll important for photosynthesis?

   A It stores energy for the plant
   B It absorbs light energy from the sun
   C Break down carbohydrates into glucose.
   D Regulate temperature within plants (1)

2. During a respiration experiment, your group member blows into a test tube filled with clear limewater. We know that humans respirate because …

   A the lime water bubbles in the test tube
   B the lime water smells like milk
   C the lime water turns milky
   D the lime water evaporates (1)

3. Which of the following is an example of a behavioral adaptation?

   A Camouflage to blend into the environment
   B A snake shedding its skin
   C A bat hibernating during the winter
   D A kangaroo's strong hind legs for jumping(1)

4. The Lionfish is an invasive species in the Atlantic Ocean. What is the most likely impact that the Lionfish will have on the ecosystem?

   A The lionfish will become the primary producer in the food chain
   B The lionfish population will remain stable without affecting other species
   C The lionfish will outcompete native species for resources, potentially reducing biodiversity
   D The lionfish will create new habitats for native species to thrive (1)

5. The improvements of medicine has saved millions of lives around the world. However, there is a lot of inaccurate information shared annually. Identify the statement about vaccines that is a common myth.

A Vaccines are rigorously tested for safety and effectiveness before approval
B Vaccines can cause the disease they are designed to prevent
C Vaccines help protect individuals and communities through their immunity
D Vaccines are one of the most effective ways to prevent infectious diseases (1)

6. Give the correct flow of a food chain.

A Algae → Fish → Seal → Shark
B Sun → Algae → Fish → Seal
C Shark → Seal → Fish → Algae
D Sun → Fish → Algae → Shark (1)

7. In South Africa, rhino poaching is a major conservation issue due to the high demand for rhino horns. Which of the following best describes the impact of rhino poaching on savanna ecosystems?

A Increased biodiversity as poachers selectively target older rhinos
B Enhanced stability as poaching reduces competition among grazing species
C Decline in population size leading to ecological imbalance and disrupted grazing patterns
D Improved grassland health due to decreased grazing pressure from fewer rhinos (1)

8. During a trip to your town's local botanical garden you noticed that there are plants with different coloured leaves, such as red or purple. Why do some plants have different coloured leaves?

A Different coloured leaves help plants absorb more sunlight for photosynthesis.
B Different leaf colours help plants protect themselves from too much sunlight or harsh conditions.
C Leaf colour changes are caused by the plant's age, with older plants having darker leaves.
D Plants with different coloured leaves don't need sunlight for photosynthesis. (1)

9. Tuberculosis (TB) spreads through …

A contaminated water
B direct contact with infected blood
C the air when an infected person coughs or sneezes
D insect bites (1)

10. An athlete is running a marathon, and during the race, they start to breath faster. Why is this happening?

A To get rid of excess carbon dioxide and supply more oxygen to their muscles.
B To store oxygen for future energy use.
C To break down glucose into lactic acid.
D To keep their heart rate at a steady pace. (1)

11. Study the following equation.
$C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O$ + Energy

From the above equation, what is regarded as a waste product?

A Oxygen
B Carbon dioxide
C Water
D Energy (1)

12. When washing your hands it is important to use soap. What effect does soap have on harmful microorganisms such as viruses and bacteria?

A Soap traps microorganisms in bubbles, preventing them from escaping
B Soap break down the protein and fat structures of microorganisms
C Soap acts as an antibiotic that directly kills bacteria and viruses
D Soap forms a coating on your skin that makes it harder for microorganisms to attach to a person's skin. (1)

13. Water is made up of hydrogen and oxygen …

A cells
B atoms
C electrons
D protons (1)

14. Which of the following atomic models were first illustrated by Niels Bohr? (1)

| A | B | C | D |
|---|---|---|---|
| | | | |

Study the following diagram and answer question 15 and 16 based on it.

15. What is the total number of electrons in a neutral chlorine atom?

A 17
B 35
C 52
D 18 (1)

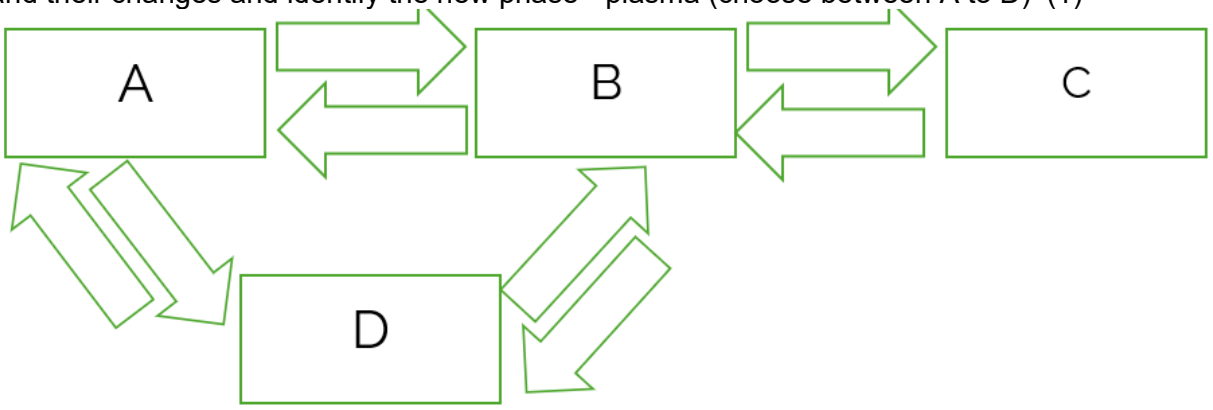
16. What is the total number neutrons in a neutral chlorine atom?

A 17
B 35
C 52
D 18 (1)

17. Which of the following is an example of a mixture? (1)

| A | B | C | D |
|---|---|---|---|
| | | | |
| Milk | Iron nails | Gold bars | Carbon dioxide |

18. A new phase of matter was identified. Use the following flow diagram about the phases and their changes and identify the new phase - plasma (choose between A to D) (1)




19. During a STEM club meeting, your teacher places a balloon in liquid nitrogen. The balloon starts to shrink. What is the best scientific explanation for this?

A The rubber of the balloon contracts in the cold, squeezing the air inside into a smaller space.
B The gas inside the balloon loses energy, causing the particles to move closer together and decreasing the volume of the balloon.
C The liquid nitrogen reacts with the air inside the balloon, making it condense into a liquid.
D The cold temperature forces air out of the balloon, reducing the amount of gas inside. (1)

20. A train moving over train tracks has a very distinct sound and is caused by the gap between train track panels. The gaps are there because …

A They allow the tracks to expand and contract with temperature changes, preventing damage.
B They help the train wheels grip the tracks more effectively, importing traction.
C They reduce friction between the train wheels and the tracks, allowing for smoother travel.
D They are designed to create a warning sound for pedestrians and railway workers. (1)

21. Why does the sky appear blue during the day?

A Blue light is scattered more than other colours because it travels in shorter, smaller waves.
B The Earth's atmosphere reflects sunlight, making the sky appear blue.
C The Sun emits only blue light, which colours the sky.
D Water vapor in the air absorbs blue light and reflects it back to Earth. (1)

22. Ice floats on water because …

A Ice is denser than liquid water, allowing it to stay on the surface.
B The air trapped inside ice makes it lighter than water.
C Ice has a lower density than liquid water due to the arrangement of water molecules in a crystalline structure.
D The surface tension of water holds the ice on top, preventing it from sinking. (1)

23. A block of platinum weighs 3 kg and has a volume of 100 $cm^3$
What is the density of this block of platinum?

A 0,003 $g/cm^3$
B 3 $g/cm^3$
C 30 $g/cm^3$
D 0,03 $g/cm^3$ (1)

24. When air is added to a balloon and its volume increases, which other property of the balloon will also change?

A The pressure of the balloon will increase as more air is added.
B The shape of the balloon will remain the same while the volume increases.
C The weight of the balloon will decrease as the air inside expands
D The temperature of the balloon will rise as its volume increases. (1)

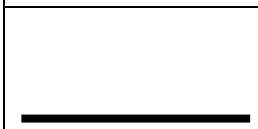
25. Static electricity is:

A the continuous flow of electric charge through a circuit.
B the buildup of electric charge on the surface of an object.
C the movement of electrons through a conductor.
D the energy stored in a battery. (1)

26. Identify the following laboratory equipment.

A Van der Graaf
B Electron microscope
C Telegraph
D Van der Waal – static bulb (1)

27. Which one of the following is an output device? (1)

| A | B | C | D |
|---|---|---|---|
|  | | | |

28. An electrical hairdryer uses which effect of electrical current to dry hair?

A Heating effect.
B Magnetic effect
C Lighting effect
D Chemical effect (1)

29. A colourful mathematical game is painted on the pavement outside a school. Which of the following colours would you avoid most walking on during a hot day?

A Black
B Blue
C Red
D Yellow (1)

30. What is the reason string lights are wired in a parallel circuit rather than a series circuit?

A Parallel connections provide a higher voltage output.
B Parallel connections ensure reliability, so if one bulb fails, the others remain lit.
C Parallel connections simplify circuit design.
D Parallel connections increase the overall resistance of the circuit. (1)

31. The archerfish is known for its ability to accurately spit jets of water at insects above the water's surface. Which scientific principle helps the archerfish adjust its aim?

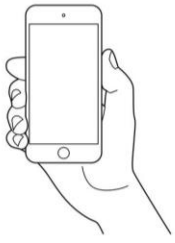
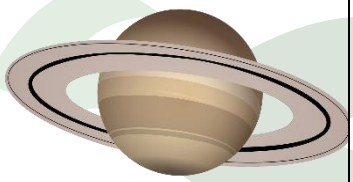
https://www.shutterstock.com/search/archer-fish

A Reflection, because light bounces off the water, making the target appear closer.
B Refraction, because light bends as it moves from air to water, shifting the target's apparent position.
C Diffraction, because water waves spread out and change the position of the insect.
D Absorption, because the water absorbs certain wavelengths of light, making the target easier to see. (1)

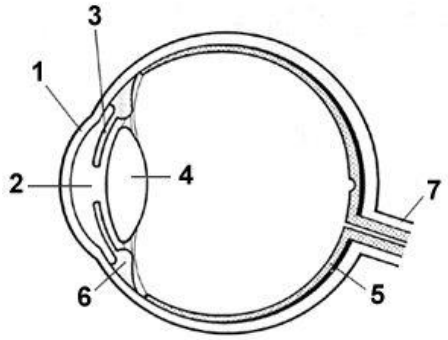
32. Why is a rainbow always seen as a curved arc rather than a complete circle?

A The sun is always too far away to create a full circle.
B The atmosphere scatters the light in all directions.
C The water droplets only refract light in specific directions.
D The ground blocks the bottom part of the rainbow. (1)

33. Which ONE of the following objects is NOT a "luminous" object? (1)

| A | B | C | D |
|---|---|---|---|
|  | | |  |

34. During a cataract operation the lens is removed and replaced with an artificial lens. From the diagram below identify the lens.




https://za.pinterest.com/pin/168322104802444674/

A part labelled 1
B part labelled 2
C part labelled 3
D part labelled 4 (1)

35. Colour-blindness is not very common. Why is colour-blindness more common in boys than girls?

A Colourblindness is a trait passed on by the mother, and boys only need one copy of the gene to be affected, while girls need two copies.
B Colorblindness is caused by a problem with the Y chromosome, so only boys can get it.
C Girls are more likely to be affected because they have two X chromosomes.
D Colorblindness is a condition that only affects people with dark-colored eyes (1)

36. Light year is the measurement of …

A The amount of time it takes for light to travel from the Earth to the Sun.
B The speed of light in kilometres per second.
C The distance that light travels in one year, approximately 9.46 trillion kilometres.
D The age of a star in terms of light years.

37. Which ONE of the following instruments are used to view celestial bodies?

A Microscope
B Telescope
C Electroscope
D Statoscope (1)

38. The mission to Mars is an initiative for humans to create a settlement on Mars within the next few year. Why do humans need special equipment and support to live on Mars?

A Mars has a breathable atmosphere, so humans do not need assistance.
B The weather on Mars is extremely warm, making it comfortable for humans to live there without help.
C Mars has a very thin atmosphere, with little oxygen and extreme temperatures, making it impossible for humans to survive without assistance.
D Mars is close enough to Earth that humans can easily survive there without any special equipment. (1)

39. What causes the Aurora Australis (Southern Lights) to appear in the sky?

A It is caused by the reflection of city lights on the clouds.
B It happens when charged particles from the Sun interact with Earth's magnetic field and atmosphere.
C It is the result of a meteor shower that occurs in the southern hemisphere.
D It happens when the Earth's atmosphere releases stored energy into the sky. (1)

40. Identify the shape of the following galaxy.

https://space-facts.com/galaxies/types/

A Spiral galaxy
B Lenticular galaxy
C Irregular shape galaxy
D Elliptical galaxy (1)

41. Which ONE of the following is the correct description for a meteor:

A A meteor is a small rock that enters Earth's atmosphere and land on the Earth's surface.
B A meteor is a small rock that enters Earth's atmosphere and burns up, creating a streak of light.
C A meteor is a chunk of ice that melts in space and forms a tail.
D A meteor is a small rock that moves space. (1)

42. The James Webb Telescope is a _____ telescope.

A radio
B reflecting
C refracting
D none of the above (1)

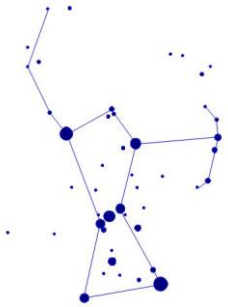
43. In South African mythology, what is the significance of the "Milk of the Moon" in the night sky?

A It represents the moon's reflection on the ocean, believed to be a source of spiritual strength.
B It symbolizes the light of ancestors watching over their descendants during the night.
C It is seen as a pathway where souls of the departed are said to journey towards the afterlife.
D It is thought to mark the boundary between the earthly realm and the divine, where the gods reside. (1)

44. Which of the following is the furthest away from the Sun?

A Pluto
B Oort Cloud
C Proxima Centauri
D Neptune (1)

45. Identify the following constellation:



A Andromeda
B Scorpio
C Sirius
D Orion (1)

46. Which ancient civilization is credited with creating some of the earliest detailed star charts and astronomical observations?

A Ancient Egyptians
B Ancient Greeks
C Ancient Babylonians
D Ancient Mayans (1)

47. The speed of light in a vacuum is approximately 300,000 kilometers per second (km/s). How far will light travel in 5 minutes?

A 90 million kilometres
B 18 million kilometres
C 30 million kilometres
D 15 million kilometres (1)

48. What is the name of the first artificial satellite sent into space?

A Apollo 11
B Sputnik 1
C Hubble Space Telescope
D Voyager 1 (1)

49. What is the primary purpose of the International Space Station (ISS)?

A To observe and track asteroids that may impact Earth
B To provide a space for tourists to visit outer space
C To monitor Earth's weather and climate
D To serve as a laboratory for scientific research in space (1)

50. Which ONE of the following is NOT a way of differentiating a planet from a star in the night sky?

A Planets appear to twinkle, while stars do not.
B Planets move across the sky over several nights, while stars remain in fixed positions.
C Planets usually have a steady, non-twinkling light, while stars tend to twinkle.
D Planets are brighter than stars and are often visible to the naked eye. (1)

**TOTAL MARKS = 50**