



SOUTH AFRICAN AGENCY FOR SCIENCE AND TECHNOLOGY ADVANCEMENT

11th NATURAL SCIENCE OLYMPIAD

GRADES 4 - 6

2022

INSTRUCTIONS

Please read the instructions carefully before answering the questions

This is a multiple choice paper. Please answer all the questions on the answer sheet provided. 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 completely, using an HB pencil.

NB! The answer sheets are marked electronically – do not make any other dots or marks on the answer sheet. Select only one answer for each question or your answer will be discarded. **Ensure that you shade your selection clearly.**

Note that the question numbers 1 to 100 on the answer sheet moves from top to bottom in several columns. Ensure that the number of your selection on the answer sheet corresponds with the number of the question in your examination paper. Should you make a mistake, please erase the incorrect answer completely

The use of **non-programmable** electronic calculators is permitted.

To avoid disqualification - You are required to complete **all** the information requested on the answer sheet. Please complete the information in script, as well as shade the corresponding blocks. If the corresponding blocks are not shaded appropriately, your results will be returned without a name and you will be disqualified. Do not fold the answer sheets.

Three hours are allowed to answer the questions.

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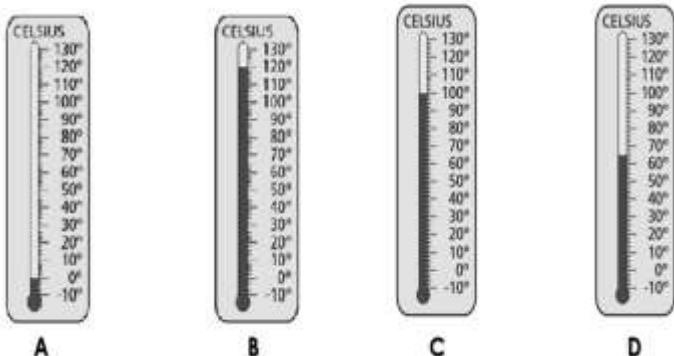
1. This is what the temperature was like for Pretoria, at the same time, over the past few days.

Four-day temperature recordings at 12h00

Day	Temperature (°C)
Tuesday	22
Wednesday	26
Thursday	29
Friday	23

On which day could the air have had the most water vapour at 12h00?

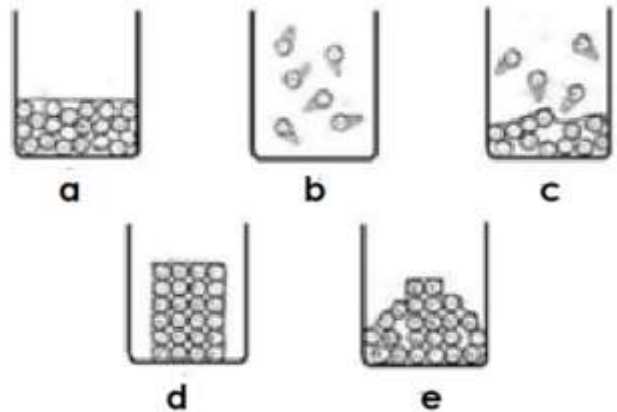
- A. Tuesday
B. Wednesday
C. Thursday
D. Friday
2. The Earth orbits the Sun once ...
- A. Every day
B. Every month
C. Every year
D. This is incorrect – the Sun orbits the Earth every day
3. In an experiment in the class, the teacher boiled 100ml of water in a beaker. Then turned off the heat source and added five ice cubes to the beaker. Which of these thermometers shows what the temperature most likely happened to the temperature after 10 minutes?



4. What is the primary source of energy for life on Earth?

- A. Geothermal heat from inside the Earth.
B. Heat stored in seawater.
C. Atmospheric heat.
D. Solar energy.

5. The 5 beakers represent water in different forms or phases. Select the beakers in the correct order to show what happens when the solid is heated until all the liquid form evaporates and boils away.



- A. a b c d e
B. a d e b c
C. d e a c b
D. d a e c b

6. The Sun, Moon and stars all seem to rise in the East and set in the West about 12 hours later. The best explanation is that...

- A. The Earth rotates from West to East so it seems that these objects move East to West.
B. The Sun's gravity drags the Moon and stars from East to West.
C. The Earth's atmosphere carries the Sun, Moon and stars from East to West.
D. A ball of gas which ignites every morning and goes out every evening.

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7. Thabo's family has a long history of people who developed diabetes. Which lifestyle change should she make to try to prevent becoming diabetic?

- A. watch television and drink water
- B. exercise frequently and watch her diet
- C. play video games and sit on the couch
- D. drink sodas daily and eat fried foods

8. The most important biochemical reaction on Earth is...

- A. Cellular respiration.
- B. Photosynthesis.
- C. The photoelectric effect.
- D. Digestion.

9. Tom wants to build a racetrack that will allow his toy cars to travel fast when force is applied. Which material should he use?

- A. carpet, because friction will be high
- B. gravel, because friction will be high
- C. plastic, because friction will be low
- D. sandpaper, because friction will be low

10. The Sun is a star – but what is a star?

- A. A huge lump of coal burning forever in space
- B. A giant ball of hydrogen gas heated by fusion reactions
- C. A boiling mass of molten lava in space
- D. A ball of gas which ignites every morning and goes out every evening.

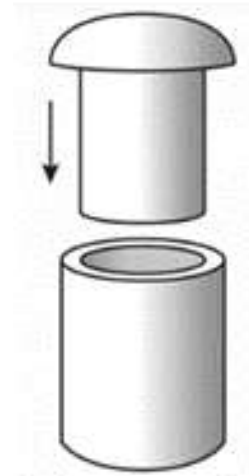
11. A magnet is placed near a pile of steel paper clips. Which will most likely occur?

- A. The magnet will provide a balanced force, causing the paper clips to spin in circles.
- B. The magnet will provide an unbalanced force, keeping the paper clips stationary.
- C. The magnet will provide a balanced force, pushing the paper clips away from it.
- D. The magnet will provide an unbalanced force, pulling the paper clips toward it

12. Too much sugar is not desirable in the diet because...

- A. An excess can cause tooth decay.
- B. The energy you get does not last long.
- C. An excess can lead to diabetes.
- D. All of these are valid problems.

13. You need to fit a metal rod into a hole in a metal cylinder. It fits too tight.



Which would be the best strategy to make the rod fit

- A. Heat the rod and cool the cylinder
- B. Heat both the rod and the cylinder
- C. Cool the rod and the cylinder
- D. Cool the rod and heat the cylinder

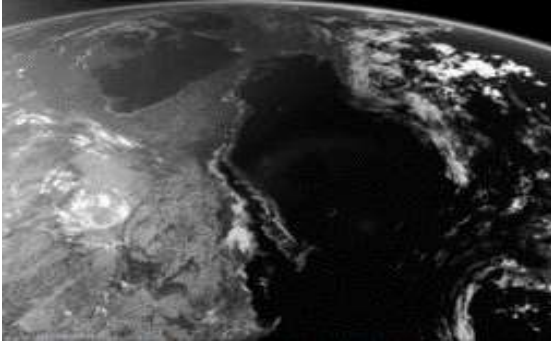
14. Our Solar System contains...

- A. The Sun, 8 major planets, many minor planets, moons, asteroids and comets.
- B. The Earth and the Stars in the sky
- C. Only the 4 rocky planets: Mercury, Venus, Earth and Mars
- D. Only the Sun, the Earth and the Moon.

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15. Due east from Australia is a marine wonder, that can be seen from space. This area has an abundance of marine plant and animal life.

What is this area called?



- A. Great wall of China
- B. Great Barrier Reef
- C. Pacific Coral Reef
- D. Great Austrian Reef

16. Photosynthesis...

- A. Uses green light in sunlight.
- B. Uses all colours in sunlight
- C. Uses ultraviolet energy in sunlight.
- D. Uses red and blue light in sunlight

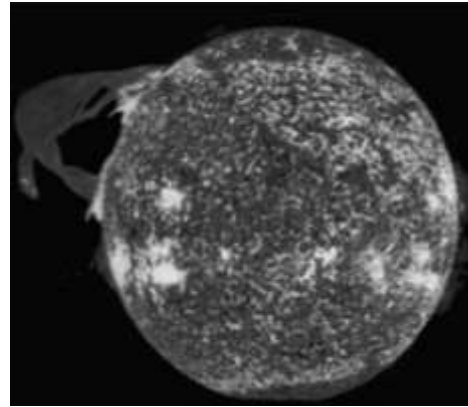
17. A manufacturer is conducting research using a hammock, they want to sell to customers. The manufacturer places different amounts of mass on the hammock and observe what happens to the hammock.



Which feature of the hammock is the manufacturer likely testing?

- A. The force to swing the hammock
- B. The color and style preference of customers
- C. The force required to break the ropes
- D. Damage to the hammock cause by the sun





18. This photograph shows ...



- A. The Sun
- B. Venus
- C. Mars
- D. Jupiter

19. Modern trains rely on magnetism for a fast and smooth ride. Which of the following combinations would assist in the movement of these trains?



- A. 
- B. 
- C. 
- D. 

20. Chemical potential energy is stored in fuels like...

- A. Candle wax.
- B. Petrol
- C. Food like a banana.
- D. All of these are valid energy stores

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21. Which one of the following contributes mostly to pollution of our scarce water resources?

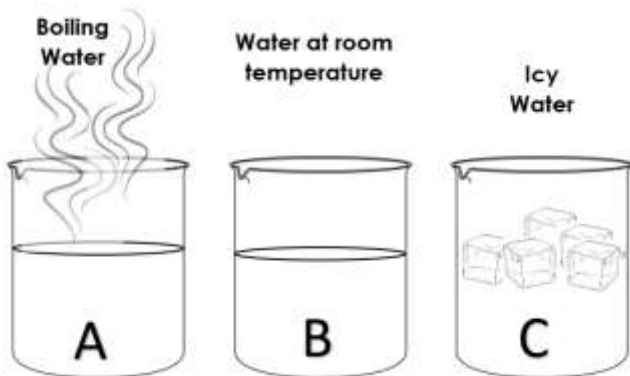
- A. Animals walking through clean water
- B. Humans and their activities
- C. Rocks and sand dumped in rivers
- D. Fish excretions

22. Where does the Moon get the light that it shines down onto the Earth?



- A. The Moon reflects the light of the Sun
- B. The Moon glows softly due to its internal energy
- C. The Moon reflects "earthshine" back down to Earth
- D. Earth pulls energy down from the Moon.

23. In which beaker will the most solute dissolve to form a saturated solution?



- A. A
- B. B
- C. C
- D. All of the above

24. Sound is caused by...

- A. Vibrations of materials.
- B. Air molecules.
- C. Only by musical instruments.
- D. None of these are valid sources.

25. South Africa is one of many countries where limestone solutions crystalize and form columns, stalactites and stalagmites. Where does this normally occur in nature?

- A. Caves
- B. Rivers
- C. Mountains
- D. Savanah

26. At various times different amounts of the Moon may be visible from Earth (as in this photograph showing "Last Quarter").



The changing appearance of the Moon is caused by...

- A. Ocean Tides
- B. The Phases of the Moon
- C. Shadows from clouds floating above the Moon
- D. Shadows from clouds floating above the Earth.

27. Sometimes solids, like ice, change directly into a gas, without turning into a liquid first. What is this process called?

- A. Optimal change
- B. Radical change
- C. Sublimation
- D. Vaporization

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28. A high-pitched sound (like a female singer) ...

- A. Is due to high frequency vibrations.
- B. Is due to low frequency vibrations.
- C. Sounds with a long wavelength.
- D. Sounds with a low energy vibration.

29. Gas is a phase of matter. A characteristic of gas is that it takes the shape of the container in which it is stored. Why is it that gas in a container sounds like liquid when the container is shaken?

- A. Gas is a actually state of liquid
- B. Compressed gas, change to a liquid
- C. Gas expands and form a liquid when the container is too small.
- D. When temperatures drop gas change to a liquid

30. How many astronauts have actually walked on the surface of the Moon?

The first two astronauts who walked on the Moon were the Apollo 11 crew in 1969.

The last two astronauts who walked on the Moon were the Apollo 17 crew in 1972.

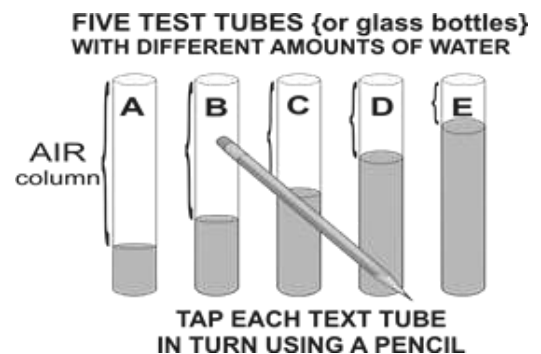
The Apollo 13 mission never landed because there was a problem.

- A. 10
- B. 11
- C. 12
- D. 14

31. Animals that only eat butterflies, beetles, ants, and mosquitoes are called?

- A. Carnivores
- B. Insectivores
- C. Herbivores
- D. Omnivores

32. Which of the test tubes will have the highest pitched sound and which will have the lowest pitched sound when tapped with the pencil?

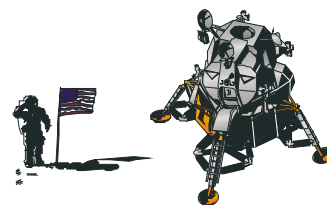


- A. A will be highest and E will be lowest.
- B. A will be lowest and E will be highest.
- C. B will be highest and D will be lowest.
- D. They will all sound the same as C.

33. The Fynbos ecosystem has a huge biodiversity of plants and animals. Here plants produce seeds that can only germinate once they have been scorched by fire. The Protea variants forms part of this Fynbos. Where in South Africa is fynbos mostly found?

- A. Limpopo
- B. Eastern Cape
- C. Free State
- D. Western Cape

34. Why do astronauts have to wear spacesuits when walking around on the Moon?



- A. To protect them from Lunar dust.
- B. To protect them from the Sun's rays.
- C. To keep them cool and provide them with air.
- D. This is not true – they do not need spacesuits at all.

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35. This is Steven. He is not as developed physically as some of his friends of the same age. He lacks Vitamin D resulting in distortion of his bones.

He could be suffering from...



- A. Kwashiorkor
- B. Diabetes
- C. Obesity
- D. Rickets

36. This diagram shows the "Fire Triangle". This helps us to understand that fires can be extinguished by ... (choose the best answer)



- A. Removing the supply of Air and removing the fuel.
 - B. Lowering the temperature and removing the air.
 - C. Removing just the fuel supply.
 - D. Removing any one of these can extinguish a fire.
37. Green plants produce their own food. What do they need to make their own food?
- A. Water, sunlight, Carbon dioxide
 - B. Water, sunlight, oxygen
 - C. Water, minerals, carbon
 - D. Light, water, soil

38. Why did New Horizons, the NASA Space Probe launched in 2006 take nine years to get to Pluto, arriving only in 2015 even though, at an average of 58500 km/h it was the fastest space probe that has ever been launched?

- A. Because it stopped on the way to refuel.
- B. Because it had to take evasive action as it passed through the asteroid belt.
- C. Because it visited all the outer planets on the way.
- D. Because Pluto is very, very far away.

39. When vinegar and bicarb is combined in a beaker the gas formed can be used to extinguish flames. Which gas is formed when these substances are combined?

- A. Oxygen
- B. Carbon Dioxide
- C. Carbon Monoxide
- D. Helium

40. Energy can neither be created nor destroyed, but it can be converted from one form of energy to another. When a taxi is parked with the engine running, most of the chemical energy released when the fuel burned in the engine is not used to move the vehicle. What is most of the chemical energy changed to?

- A. Electric energy for the battery.
- B. It is wasted as heat energy.
- C. Magnetic energy for the generator.
- D. Sound energy for the Sound System.

41. Which one of the following represents examples of vertebrates?

- A. Whale, Snake, Toad, bat, Crocodile
- B. Ostrich, snail, buffalo, gecko, hake
- C. Snake, whale, crocodile, pigeon, snoek
- D. Starfish, Lion, Dove, gecko, snake

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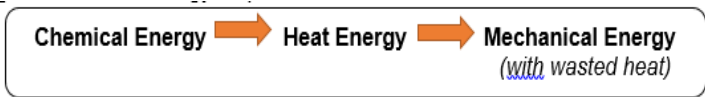
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42. Why do you think that a wild polar bear will never see a wild penguin?
- A. Because polar bears live in the Arctic while Penguins live in the Southern Hemisphere.
 - B. Because penguins are terrified of polar bears and flee as fast as they can.
 - C. Because Polar Bears are mammals and penguins are birds.
 - D. Because Great White Sharks keep them apart.

43. What type of skeleton does a jellyfish have?



- A. Exoskeleton
 - B. Endoskeleton.
 - C. Mess skeleton
 - D. Hydro skeleton
44. This diagram shows an energy sequence:



In which of these cases can this energy sequence explain what is happening?

- A. A flashlight (torch) is ON.
- B. A candle is burning.
- C. Petrol is being used to power a moving taxi.
- D. An electric current is running a refrigerator.

45. The smallest bones in the human body are the
- A. Pinkies
 - B. Wrist bones
 - C. Knee bones
 - D. Incus & stapes

46. What causes day and night?
- A. Sunshine during the day, Moonshine during the night.
 - B. The Sun revolving around the Earth every 24 hours.
 - C. The Earth revolving around the Sun every 24 hours.
 - D. The Earth rotating on its axis every 24 hours.

47. An athlete goes to the gym to get bigger arms. Which muscles is he likely to exercise?
- A. Pectorals
 - B. Gluteus Maximus
 - C. Biceps and Triceps
 - D. Quadriceps

48. Pollution is leading to climate change. What is predicted to be a probable result of climate change for South Africa?

- A. A decrease in rainfall and an increase of desert areas.
- B. An increase in the number of severe earthquakes in the Western Cape.
- C. Awakening of dormant volcanoes in the Karoo.
- D. The thinning of the ozone layer.

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49. On 27 April every year, South Africans celebrate Freedom Day. This day is also known as "National Braai Day". Wood is burned to cook a variety of meat. When the wood is burned, they turn into coals then ash.

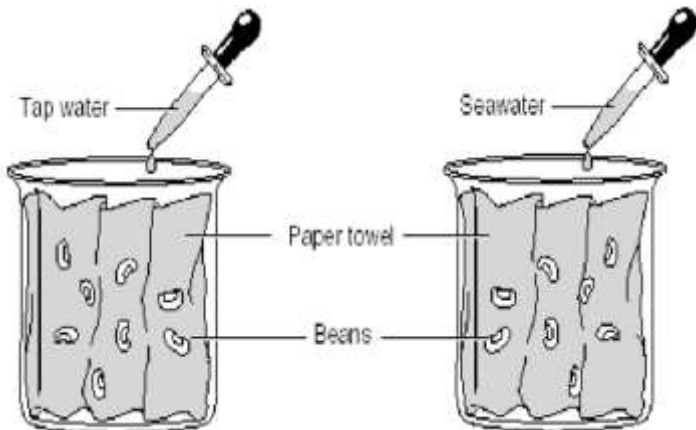
What change is the burning of wood an example of?

- A. Chemical change
- B. Physical change
- C. Both chemical and physical change
- D. None of the above

50. What is the name of the huge radio telescope being built in the Northern Cape?

- A. SALT.
- B. HartRAO.
- C. Lesedi
- D. The Square Kilometre Array.

51. Which one of the questions below, can be answered by the following experiments?



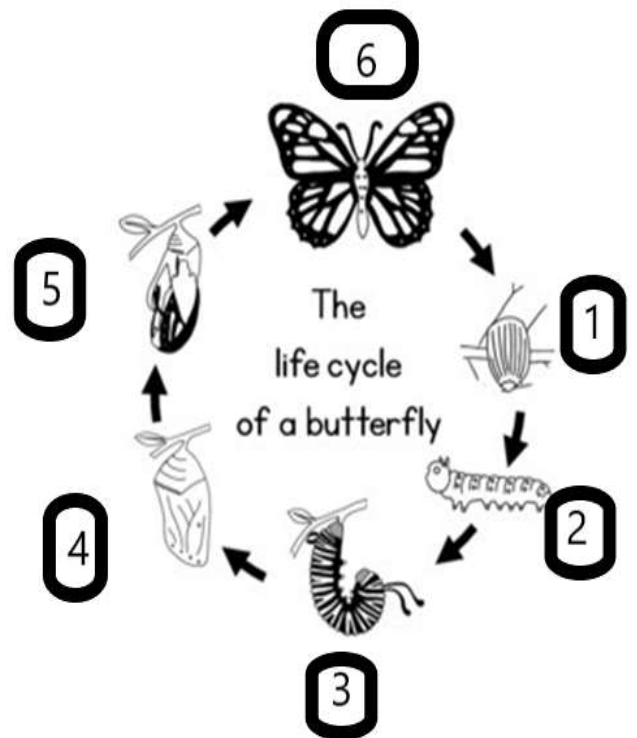
- A. Do beans need light in order to grow?
- B. Can beans grow faster in groups of eight?
- C. Does seawater affect bean growth?
- D. How much water is needed for beans to grow?

52. One of the main causes of acid rain is ...

- A. Nuclear waste leaking from fuel rods from nuclear power stations.
- B. Chemical spills and illegal dumping from chemical factories.
- C. Gases from cars, trucks, factories and power stations burning fossil fuels.
- D. Gases from aerosol spray cans like deodorants, paint and insecticides.

53. During a certain stage of a butterfly lifecycle, the butterfly helps plants to pollinate their flowers. At other stages, it hurts plants by eating its leaves.

At which stage in the butterfly's life cycle does it eat the most plant leaves?

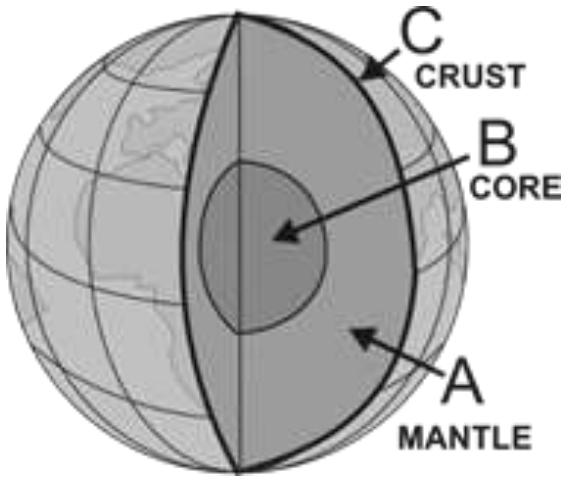


- A. 2
- B. 6
- C. 1
- D. 4

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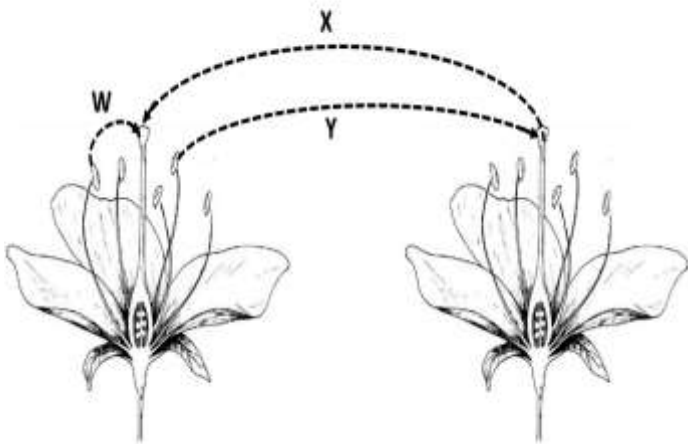
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54. This diagram represents a cross-section through the Earth, showing the three main layers.



Which of the layers is the hottest?

- A. Layer A.
 B. Layer B.
 C. Layer C.
 D. All layers are at the same temperature.
55. The diagram below shows two flowers from the same plant.



Which of the arrow(s) show pollination taking place?

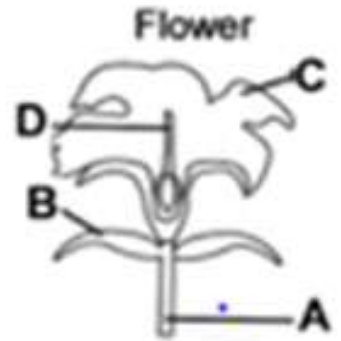
- A. W only
 B. W and Y only
 C. X and Y only
 D. W, X and Y

56. Which of the following is not an example of a fossil fuel?



- A. Petrol.
 B. Coal.
 C. Natural gas.
 D. Wood.

57. Study the pictures on the right and choose what part of the flower marked A to D is similar in function to the tree trunk



- A. A
 B. B
 C. C
 D. D

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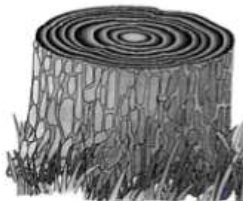
58. Look at this map showing the Atlantic Ocean and the continents on either side of it.



The fact that the Western Coastline of Africa obviously fits onto the Eastern Coastline of South America led Scientists like Alfred Wegener to propose...

- A. the Theory of Continental Drift.
- B. the Theory that the Earth is Expanding.
- C. the Theory that the Earth is Contracting.
- D. the Theory that soil erosion causes opposite coastlines to fit together like pieces of a jig-saw puzzle.

59. A tree has one light ring and one dark ring to make up one year's growth. How many years of growth are shown in



- A. 16
- B. 8
- C. 4
- D. 24

60. The burning of fossil fuel like coal to produce electricity has caused an increase in the amount of ___?___ in the atmosphere.

- A. Oxygen
- B. Carbon dioxide
- C. Nitrogen
- D. Water vapour

61. This is a flowering plant. If all the flowers are removed, the plant will not be able to...



- A. Produce seeds
- B. Grow taller
- C. Make its own food
- D. Absorb nutrients from the soil

62. This photograph of "petrified wood" is clearly showing the 'tree rings' of an ancient tree now fossilised to become stone. This must have happened because...



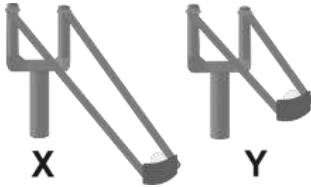
- A. The tree was buried soon after death and the plant cells were filled and replaced by minerals like silica.
- B. This is nonsense – the rock just happens to look like wood.
- C. It is still wood but it has hardened because it is millions of years old.
- D. This so-called evidence is 'fake news' by dishonest scientists.

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63. Which two life processes occur both in humans and plants?

- A. Growing and making food
- B. Germinating and making food
- C. Germinating and reproduction
- D. Growing and reproducing

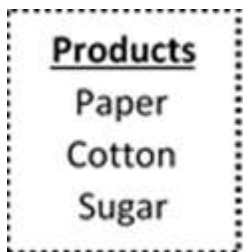
64. The diagram show two catapults X and Y, each loaded with a marble.



The marble is being pulled back by different amounts. Which one of the following statements is true?

- A. X will shoot the marble furthest because the elastic has the least potential energy stored in it.
- B. X will shoot the marble furthest because the elastic has the most potential energy stored in it.
- C. Y will shoot the marble furthest because the elastic has the least potential energy stored in it.
- D. Both catapults will shoot the marble the same distance.

65. The products listed below, comes from the same source. What is the source?



- A. water
- B. plants
- C. animals
- D. rocks

66. This photograph taken in the Karoo shows a “glacial pavement” polished smooth by an ice sheet. The scratches were made by small rocks embedded in the ice and show the direction in which the ice sheet moved.



Which one of the following statements is false?

- A. South Africa was once close to the South Pole.
- B. Continents can move over the mantle.
- C. This is evidence that the Earth is very old.
- D. This so-called evidence is ‘fake news’ by dishonest scientists.

67. Which one of these is not a plant?

A.



B.



C.



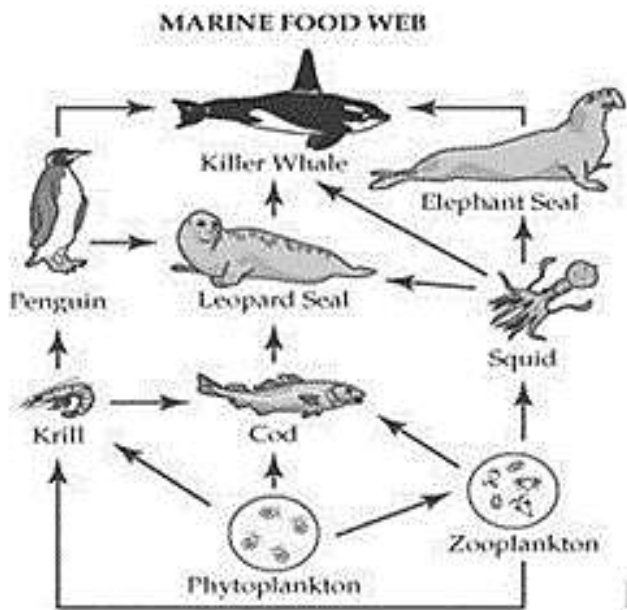
D.



68. The best electrical conductors, in order, are...

- A. copper, lead, gold, silver.
- B. copper, gold, aluminium, lead.
- C. gold, iron, mercury, copper.
- D. silver, copper, gold, aluminium.

69. Plants produce their own food with the help of sunlight. Where in the ocean would the producers flourish?



- A. Ocean floor
- B. Ocean Surface
- C. Ocean Trenches
- D. Below ocean surface

70. Study the marine food web in question 69. What will happen if the apex predator dies out?

- A. Decrease in secondary consumers
- B. Increase in secondary consumers
- C. Increase in producers
- D. Decrease in penguins

71. 66 million years ago many species, including the large dinosaurs, went extinct when ...

- A. Climate change caused by burning fossil fuels made life impossible.
- B. Diseases swept across the Earth because the continents drifted together.
- C. A huge planet struck the Earth forming the Moon.
- D. An asteroid about the size of Table Mountain struck Earth causing a mass extinction

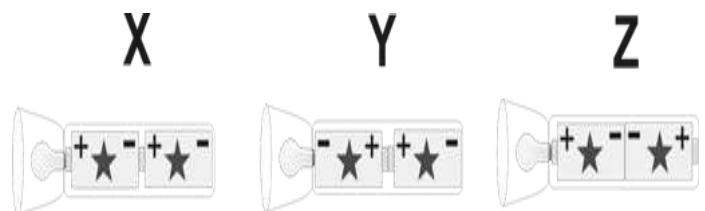
72. Why are there so few hydroelectric power stations in South Africa?

- A. They are expensive and cause severe pollution in our rivers.
- B. South Africa is a dry country, and our water supply is erratic and unreliable.
- C. Our biggest dams are far from our main population centres
- D. You cannot produce hydroelectric power from freshwater sources.

73. Early pre-humans known as Homo erectus were the first to use fire for warmth and for cooking. Evidence was found at Swartkrans near Sterkfontein, dating back 1 million years. The main advantage of cooking meat is that...

- A. Cooked meat makes nutrients more available which helped develop human brains.
- B. Cooked meat tastes better than raw meat.
- C. Cooked meat does not rot as quickly as raw meat.
- D. Other carnivores like sabre toothed cats or hyenas don't like cooked meat.

74. The diagrams show a flashlight and three arrangements of the torch cells. In order to make the flashlight work, the cells need to be inserted as in...



- A. Only as in X.
- B. Only as in Y.
- C. Only as in Z.
- D. X, Y or Z because any arrangement will work.

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75. Sethu has four bottles. She wanted to know which bottle could hold the most water. Sethu determined the mass of each empty bottle. She then measured the mass of each bottle filled with water.

She recorded the following results:

Bottle	Mass of empty Bottle (grams)	Mass of full bottle (grams)
1	100	800
2	100	600
3	500	900
4	700	900

Which bottle held the most water?

- A. 1
- B. 2
- C. 3
- D. 4

76. The 'Cradle of Humankind' near Krugersdorp in Gauteng has many important prehuman fossils of ancestral species including...

- A. An almost complete Australopithecus Prometheus skeleton known as "Little Foot."
- B. The skull of an Australopithecus sediba specimen known as 'Karabo'
- C. The skull of a Homo naledi specimen known as 'Neo' together with 15 skeletons.
- D. All of the above statements are true.

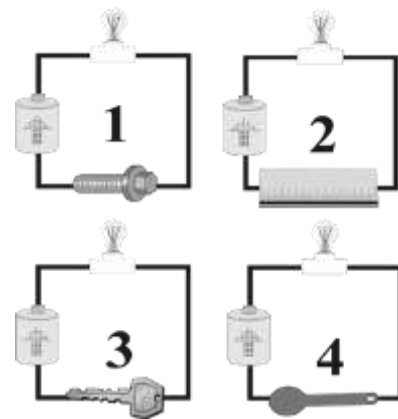
77. The Zulu basket is a rigid bulb-shaped container rendered watertight by the tightness of the coil-weave. Every basket is made by hand, using indigenous raw materials.



What is likely to be stored in these baskets?

- A. Meat
- B. Vegetable
- C. Water & Beer
- D. Fruit

78. The following diagrams show an electrochemical cell and a Lamp connected by wires to items made of various materials.



1 = steel bolt. 2=wooden ruler. 3=brass key.
4=plastic spoon

Which of the lamps will light up?

- A. Only 1.
- B. Only 2 and 3.
- C. Only 2 and 4.
- D. Only 1 and 3.

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79. Below is a picture of a dolos. It was designed by a South African to drastically reduce sea erosion off the East London coast. A dolos can weigh up to 8 tons.



Look at the shape and give a reason why this shape would reduce the power of waves around the coastline.

- A. Looks beautiful
- B. Trap waves and reduce break force of waves
- C. Prevent boats from running ashore
- D. Litter the coastline

80. The Moon is the main factor causing ocean tides on Earth. What causes "Spring tides"?

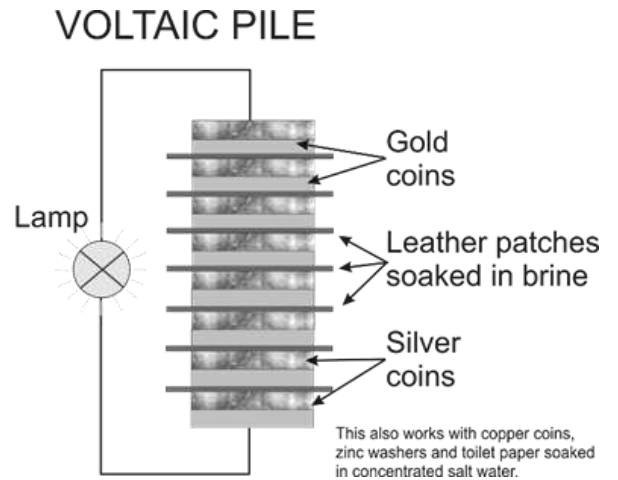
- A. The Moon lines up with Jupiter giving an extra pull of gravity.
- B. The Moon and Sun pull at 90° during First and Last Quarter.
- C. The Moon and Sun work together during Full Moon and again during New Moon.
- D. The Moon has nothing to do with tides – it is too far away.

81. A substance goes through the four changes of state, A, B, C and D. In which of the four processes is there heat gain?



- A. A and D only
- B. B and C only
- C. A and B only
- D. C and D only

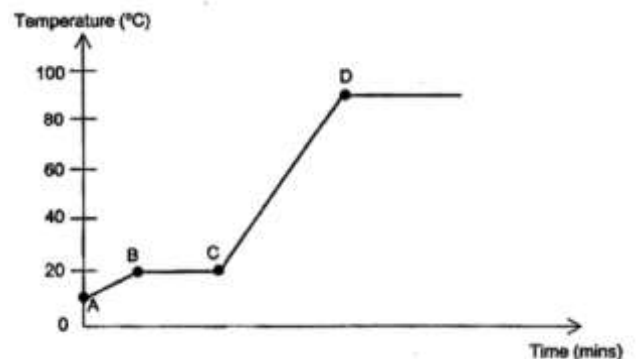
82. This diagram shows a model of the very first "battery" invented in 1779 by an Italian scientist named Alessandro Volta.



It works because ...

- A. It uses two different metals and a liquid electrolyte that can conduct electricity.
- B. It contains gold and silver which are very good conductors.
- C. It has leather patches.
- D. It never actually worked and was a silly idea.

83. Substance X was in its solid state and was heated continuously over a flame. The changes in the temperature of substance X was recorded in the graph below.



At which point did substance X start to boil?

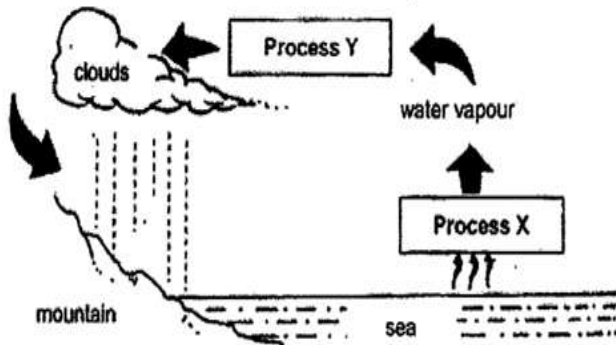
- A. A
- B. B
- C. C
- D. D

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84. The Sun is an example of ...

- A. a comet
- B. an asteroid
- C. a gas giant planet
- D. a star

85. The diagram below represents part of the water cycle.



Which of the following processes correctly represents X and Y?

	PROCESS X	PROCESS Y
A	evaporation	heat gain
B	evaporation	heat loss
C	condensation	heat gain
D	condensation	heat loss

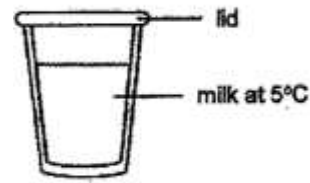
86. This is a “battery” made of six lemons connected in series. It works because it uses metal electrodes made of two different metals (iron & copper). The reading on the voltmeter is 5.3 volts.



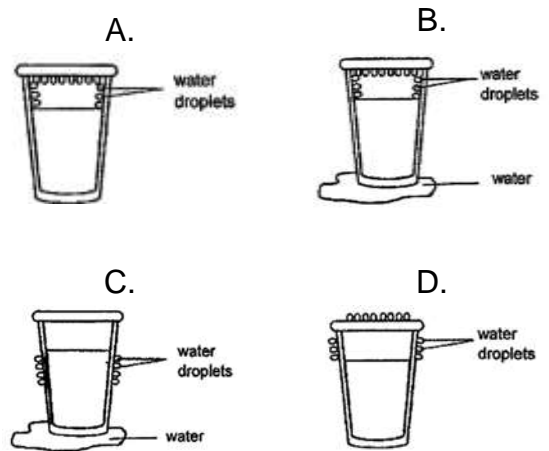
What voltage does each lemon give to this battery?

- A. About 0,9 volts
- B. About 5,3 volts
- C. About 6 volts
- D. This is nonsense – it cannot possibly work at all.

87. Jim placed a glass of cold milk on a table in the kitchen at room temperature.



Which of the following would he observe in the next 20 minutes?

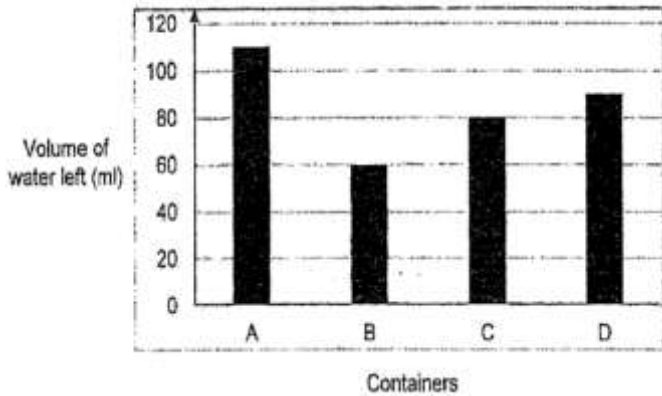


88. Which of the following is an important factor in explaining why the Earth has seasons (spring, summer, autumn, winter)

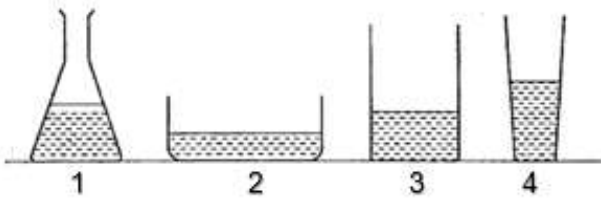
- A. The Earth rotates on its axis once every 24 hours.
- B. The Sun is a hot ball of gas that rotates on its axis once every 25 days.
- C. Magnetic storms on the Sun cause “Sun Spots.”
- D. The Earth’s axis is tilted.

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89. Linda filled four containers A, B, C and D, made of the same material but of different sizes and shapes with 300 ml of water each. She placed the containers out in an open field. After 3 hours, she recorded the volume of the water left in each container in the bar graph below.



Identify containers A, B, C and D below.



- A. 1,2,3,4
- B. 1,4,3,2
- C. 3,4,1,2
- D. 2,4,1,3

90. These three photographs show different power suppliers that all use renewable energy sources

A. Gariep Hydroelectric Power Station



B. Solar panels at a Shopping Centre



C. The Sere' Wind Farm in the Western Cape

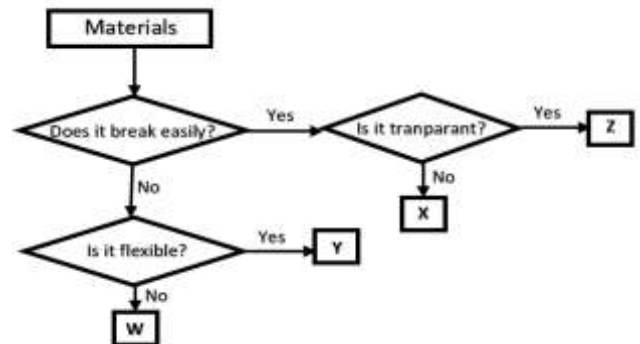


Which one of these Renewable Energy Sources produces direct current?

Which one of these Renewable Energy Sources produces direct current?

- A. Energy source A
- B. Energy source B
- C. Energy source C
- D. They ALL produce direct current.

91. Ryno observe four materials: W, X, Y and Z, and came up with the flowchart below.



Based on the flowchart above, which material W, X, Y and Z is used to make the shopping bag to carry groceries as shown below?



- A. W
- B. X
- C. Y
- D. Z

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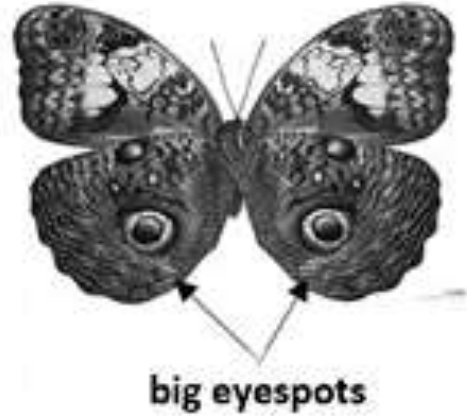
92. Look at the data given in the table below.
Answer the question that follows.

	Average Surface Temperature	Composition of the Atmosphere	Average Distance from the Sun	Days needed to orbit the Sun
Mercury	300°C	None	58 000 000 km	88 days
Venus	470°C	Mostly carbon dioxide	108 000 000 km	225 days
Earth	17°C	78% Nitrogen and 21% oxygen with 0.3% carbon dioxide	150 000 000 km	365 ¼ days

Which of the following reasons best explains why Venus is hotter than Mercury?

- A. Mercury absorbs less sunshine because it lacks an atmosphere.
- B. The large amount of CO₂ in the atmosphere of Venus creates a 'greenhouse effect.'
- C. The longer time Venus uses to orbit the Sun causes it to heat up more.
- D. Mercury has a rocky surface which reflects most of the Sun's heat away.

93. The picture shows an organism with big eyespots on its body as part of adaptation. These big eyespots look like the eyes of a larger animal.



Which of the following is correct about the organisms' adaptation?

	TYPE OF ADAPTATION	PURPOSE
A	Behavioural	Resemble the eyes of a larger animal to frighten away predators
B	Structural	Resemble the eyes of a larger animal to frighten away predators
C	Behavioural	camouflage to blend in with the tree bark to avoid being spotted by predators
D	Structural	camouflage to blend in with the tree bark to avoid being spotted by predators

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94. The photograph below shows an Eskom transformer that has been illegally connected using uninsulated wires – even barbed wire cut from a fence. 22000 volts comes into the transformer, nobody knows the exact voltage being given to the poor consumer receiving this stolen power, risking lives, TV's and homes. Such connections are often made during times when load shedding is active.



Why should this be considered a crime?

- A. It is not a crime – electricity should be free.
 - B. Power comes along a wire – how can that cost anything?
 - C. As long as you are careful nobody gets hurt.
 - D. It is not free if it could cost the life of an innocent child.
95. The prefix “nano” comes from the Greek word meaning dwarf. This condiment has the nanostructure of its lipids and proteins. They are combined into an emulsion as little droplets that are only a few hundred nanometers in size. So it does not taste like eggs, oil or water. It is the interaction of the droplets' nanostructure, achieved through whipping and heating, that contributes to the taste and texture of the condiment.

Which condiment is the text referring to?

- A. Tomato Sauce
- B. Mustard
- C. Mayonnaise
- D. All of the above

96. Where in South Africa are most of our optical telescopes based?
- A. The suburb of observatory in Johannesburg
 - B. Near Sutherland in the Karoo Mountains
 - C. The suburb of observatory in Cape Town.
 - D. At HartRAO north of Krugersdorp.
97. The diagram represents the set-up for a distillation process. Distillation is used to purify and extract/separate components from a mixture.



Which one of the following represents the order of the stages in the distillation process?

- A. heating, condensation, reduction, vaporization
- B. vaporization, solidification, heating, condensation
- C. vaporization, heating, solidification, condensation
- D. heating, vaporization, cooling, condensation

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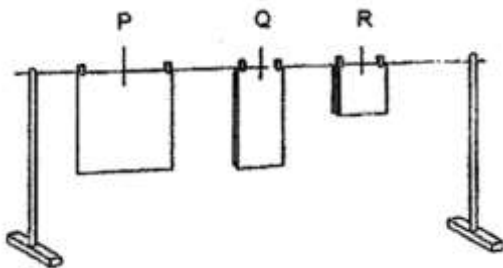
98. The table below show the state of 4 substances E, F, G and H at different temperatures.

Substance	State of substance at ...		
	25°	50°	75°
E	Solid	Solid	Solid
F	Liquid	Liquid	Gas
G	Solid	Liquid	Liquid
H	Liquid	Gas	Gas

Based on the table above, which substance has the lowest boiling point?

- A. E
- B. F
- C. G
- D. H

99. Tercia hung three identical towels `P, Q and R, to dry on a sunny and windy day. The towels were equally wet and had the same mass when she hung it.



Tercia measured the mass of the towels after an hour. Which towel has the lowest mass?

- A. R
- B. P
- C. Q
- D. R and P

100. Students are testing their reaction time by catching a dropped ruler. The distance the ruler fell before being caught between their fingers was recorded on the table below. Use the table to answer the following questions.



Distance Ruler Caught (in centimeters)	Reaction Time (in seconds)
1	0.05
2	0.07
3	0.08
4	0.09
5	0.10
10	0.14
15	0.18
20	0.20
25	0.23
30	0.25

What would your estimate be for the reaction time of a student who caught the ruler at 12cm?

- A. 0.06 seconds
- B. 0.12 seconds
- C. 0.16 seconds
- D. 0.19 seconds

The end

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