British Science Week 2015

Schools Quiz

Answer sheet

Registered Charity Number: 212479 and SC039236

Level 1 suggested for ages 5 to 8

Round 1: Inventions and discoveries (Level 1)

1. What medicine that comes from a mould, did the Scottish biologist Alexander Fleming discover in 1928?

a) Penicillin (antibiotics).

2. What did the Italian astronomer Galileo Galilei use to see mountains and craters on the Moon in 1609?

Telescope.

3. When was the first moving TV picture sent by the Scottish inventor John Logie Baird?

b. 1890.

4. Thomas Edison invented the first electric light bulb in 1879. How many years ago was this?

136.

5. On the 12 April 1981 NASA launched the first of a fleet of re-usable space craft called...

a) The shuttle.

Round 2: Physics and space (Level 1)

1. Which force keeps your feet on the ground and brings you back down when you jump up?

   Gravity.

2. Name three types of energy

   Any three from: kinetic, electric, light, heat, sound, elastic (potential), gravitational (potential), nuclear, chemical (potential).

3. Which **two** of the following are **not** planets:

   (b) Pluto, and (e) The Sun.

4. Which is the coldest planet in the Solar System? *Bonus question: why is it the coldest?*

   Neptune, because it's the planet furthest from the Sun. Pluto is incorrect as it's no longer classified as a planet.

5. If a car moves at three metres every second how far will it have moved in ten seconds? *Bonus question: how far will it have moved in one minute?*

   30 metres (3m x 10s); Bonus 180m (3m x 60s).

6. How many seasons are there on Earth and what are they called? *Bonus question: why are there seasons on Earth?*

   Four; spring, summer, autumn and winter. *Bonus: because the earth is tilted on its axis.*

Round 3: Engineering (Level 1)

1. Name one property of metal that makes it good for making cars.

   Any one from: strong, malleable or it can be shaped, cheap.

2. Name one material that is good at conducting heat.

   Metal(s), or any named metal.

3. What shapes are these?: Write the number first then the correct letter, for example 2B

   1B, 2C, 3A.

4. Which of these materials: wood, plastic, glass, metal, water, rock, would you choose to make a:

   a) Table: wood, metal or plastic.

   b) Window: glass, accept wood, plastic or metal if they mean the window frame.

   c) Waterproof coat: plastic.

5. The force needed to break three materials was tested and the results collected:

C is the strongest. Bonus three times stronger or four (N).

Round 4: Materials (Level 1)

1. Name one substance that is a poor conductor of electricity.

   Wood, plastic, rubber or any other insulator.

2. What instrument do we use to measure the temperature of something? *Bonus question: at what temperature does water freeze?*

   Thermometer, 0°C.

3. What is the hot liquid rock inside a volcano called? *Bonus question: what is the same hot liquid rock called when it erupts out of a volcano?*

   Magma; *Bonus question: lava.*

4. What is a fossil?

   The remains of an organism (animal or plant) that lived millions of years ago.

5. Rocks and stones on a beach that have fallen off cliffs often look round and smooth. How did they become rounded and smooth?

   Waves and tides rubbed them together smoothing and polishing them over a long time/many years.

6. How can you turn a solid into a liquid? Bonus question: can you give a common example of this?

   Heat it up until it melts; Bonus question: ice to water/ ice cream to 'cream'/ rock to lava or magma.

Round 5: Biology (Level 1)

1. What happens to a deciduous tree in winter?

   They lose their leaves.

2. Name a common carnivore and herbivore.

   Any sensible answers.

3. Name two things plants need to grow.

   Water, light, carbon dioxide, (accept soil).

4. This animal is covered in scales; it has gills, and fins and lives in water all the time. Which group of animals does this belong to?

   Fish.

1. A plant grows 3cm taller every two days. How tall is it after eight days? *Bonus: How tall is it after 2 weeks*?

   12cm ((8÷2)x3=12): Bonus; 21cm (14÷2)x3=21).

5. Name two adaptations that help polar bears to survive in the freezing cold of the Arctic.

   Thick (hollow) fur, thick layer of fat under skin, black skin, large feet to help it walk on ice/snow and swim, white for camouflage, hairy ears.

Round 6: Science in the news (Level 1)

1. The space probe Rosetta landed a probe on what last year?

   b) A comet.

2. What is the British engineer James Dyson famous for inventing?

   (Cyclone) vacuum cleaner.

3. Virgin Galactic will be the first craft to take passengers where?

   Into space.

4. In which continent was there a deadly virus outbreak last year? *Bonus question: what is the name of the virus?*

   Africa; *Bonus question: Ebola.*

5. At 9:45am on 20 March 2015 there will be a partial solar eclipse in the UK. What happens during a solar eclipse?

   The Moon passes in front of the Sun blocking out the light and casting a shadow on the Earth. If you are within the shadow you see the eclipse.

6. In May 2014 the remains of a very large animal were dug up in Argentina. The thigh bone (the big bone at the top of your leg) was the height of an adult. What do you think they had found?

   A type of dinosaur (it was a new species called titanosaur - an enormous herbivore dating from the late Cretaceous period and member of the sauropod family).

Level 2, suggested for ages 8 - 13

Round 1: Inventions and discoveries (Level 2)

1. In December 1903 the Wright brothers from America were the first people to successfully do what?

   a) Fly a powered aircraft.

2. In 1867 Alfred Nobel from Sweden, after who the Nobel Prizes are named, invented which material that made mining safer (and warfare more dangerous!)?

   Dynamite

3. Which of these was invented first:

   a) The electric vacuum cleaner (1901, Hubert Booth);

   b) The telephone (1876, Alexander Graham Bell);

   c) The refrigerator (1850, James Harrison);

   d) Motion pictures (1899, Thomas Edison)?

4. In 1946 Dr. Percy LeBaron Spencer found a chocolate bar melted in his pocket while testing radar. In 1956 he invented a special oven to cook food using radio waves. What do we call this type of oven?

   Microwave oven.

5. While out walking George de Mestral noticed that the hooks on burrs (burdock seeds) made them stick to his clothing. In 1948 he used this idea to develop which common hook and loop fastening material.

   Velcro.

Round 2: Physics and space (Level 2)

1. Alessandro Voltaire after who the volt is named, invented which one of the following?

   b. Battery.

2. When sunlight passes into raindrops it is split up into the colours of the rainbow and reflected. What are the seven colours of the rainbow? *Bonus mark if they are in the correct order.*

   Red, orange, yellow, green, blue, indigo, violet (in order).

3. What is the standard unit for measuring force?

   Newton (N).

4. On the 19 July 2013 Mohammed Farah ran 1,500 metres in three minutes 29 seconds. What was his average speed in metres per second (m/s)? *Formula: average speed (m/s) = distance (m) ÷ time (s)*

   7.18m/s (1500/ (3 x 60 + 29)).

5. Conduction and convection transfers heat energy through solids and fluids (gasses and liquids). How is heat energy transferred from the Sun to Earth?

   Radiation.

6. The Sun feels warmer in summer because: choose the correct letter?

   b. The Earth is tilted on its axis.

Round 3: Engineering (Level 2)

1. Wood floats on water but metal sinks. Why do large metal ships float?

   Something floats if it is less dense than the liquid it is put into. Because the average density of a ship is less than the density of water it displaces (pushes out the way of the hull) it floats. This is because a ship is mostly full of air. A solid block of metal is very dense compared to the water around it so it sinks.

2. Why does sewage need to be treated before it is pumped into rivers and the sea?

   Because sewage contains harmful microbes that will contaminate fresh water supplies leading to the outbreak of water borne diseases.

3. How can you make a single sheet of paper strong enough to balance a mug of water along one edge of the paper?

   Roll it into a tube, hold it upright and balance the mug on one end. The edge is rolled up into a circle now that you can easily balance the mug on.

4. What form of energy is used in a hydroelectric dam to produce electricity?

   Gravitational potential energy.

5. Carbon fibre is used to make things like bicycles, racing cars, aircraft. What properties make it good for these applications?

   Very light, very strong.

6. Name the supersonic car that will travel at over 1,000mph across the Hakskeen Pan in South Africa next year (that's three football pitches end to end every second!).

   Bloodhound SSC (super-sonic car).

Round 4: Chemistry (Level 2)

1. If a material is said to be a good conductor what does this mean?

   It allows heat and/or electrical energy to pass/flow through it easily.

2. Name the following elements from their symbol: H, O, Na and Fe

Hydrogen, oxygen, sodium and iron.

3. Which one of the following chemical equations shows a reversible reaction:

   (b) $2NO_2 \rightleftharpoons 2NO + O_2$ it's the only one with reversible arrows.

4. What is molten rock inside a volcano called? What is it called when it erupts out of the volcano? *Bonus question: name one type of rock that is made when molten rock cools and solidifies*?

   Inside=Magma, outside= *lava. Bonus: granite, basalt, pumice, gabbro.*

5. Adding baking powder (sodium hydrogen carbonate) to a sponge cake mixture makes it rise when heated? Which gas is made in the reaction that makes the cake rise? *Bonus question: what type of chemical reaction is this?*

   Carbon dioxide: Bonus question: thermal decomposition.

6. Black ink is a mixture of different coloured inks in solution. What process can be used to separate these different coloured inks?

   Chromatography.

Round 5: Biology (Level 2)

1. In 1859 the English naturalist Charles Darwin proposed which theory about how living things adapt to their environment?

Evolution (by natural selection).

2. What is the name given to the chemical reactions used by plants to make their own food and which requires light energy. *Bonus question: write the word equation for this reaction.*

Photosynthesis; Bonus question: carbon dioxide + water $\xrightarrow{Light}$ *sugar (glucose) + oxygen.*

3. Describe two adaptations of polar bears that allow them to survive in the freezing conditions of the Arctic?

Thick (hollow) fur, thick layer of fat under skin, black skin, large feet to help it walk on ice/snow and swim, white for camouflage, hairy ears.

4. A healthy diet requires a balance of seven nutrients. Name three of these? *Bonus question: state why each of them is required by the body*

Any three from: carbohydrates (energy); fat (energy and insulation); protein (growth and repair); minerals e.g. calcium (bones, teeth) iron (blood); vitamins (e.g. healthy immune system); water (hydration), fibre (healthy digestion).

5. Animals and many plants reproduce by sexual reproduction that requires two parents (a male and a female). Some organisms only require one parent to make new offspring. What is this type of reproduction called?

Asexual reproduction (cloning/ binary fission).

6. Why do some animals hibernate in the winter?

So that they can survive winter when there is little food available.

Round 6: Science in the news (Level 2)

1. What was the name of the spacecraft that delivered the probe Philae to comet 67P in November 2014? *(Bonus mark: in which year was the spacecraft launched?)*

   Rosetta, 2004.

2. In January 2015 a group of research scientists in Boston, Massachusetts in the USA used soil to discover a new example of a class of drugs which kill bacteria. Which class of medical drugs did this belong to?

   Antibiotic (Bonus mark if named: Teixobactin).

3. In 2014 a study of hippos very surprisingly found some were adding what to their usually vegetarian diet?

   Dead hippos (and other dead animals).

4. In November 2014 disaster and tragedy struck Richard Branson's quest to make commercial space travel a reality. What was the name of the spacecraft that exploded and crashed?

   Virgin Galactic.

5. This find in Argentina last year would have weighed about 77 tonnes, been 40m (130ft) long and 20m (65ft) tall when alive. What was it?

   A new species of dinosaur named titanosaur - an enormous herbivore dating from the late Cretaceous period and member of the sauropod family.

6. Which object in the Solar System will be photographed up close for the first time ever in July 2015 by NASA's New Horizon space probe?

   Pluto.