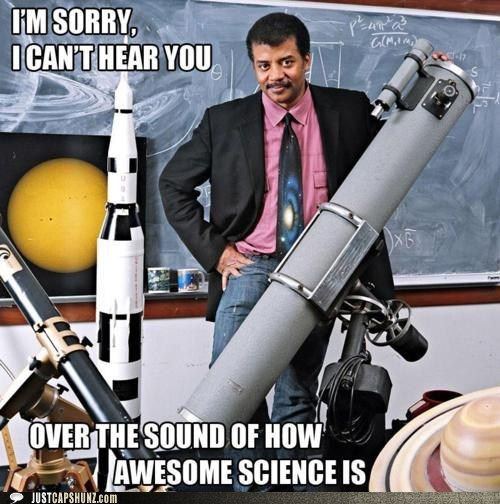
Swan Christian College

Year 10 Science

Some examination revision



Chemical Science

1. When an atom loses an electron:

a a positive ion is formed

b a negative ion is formed

c the atomic number is changed

d the mass number is changed

Explain your answer

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. The elements sodium, lithium, potassium and caesium all form ions with a charge of:

a 1+

b 2+

c 3+

d 1+ and 2+

To what group of the periodic table do these elements belong? Explain why they form ions of this charge?

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1. An unknown substance (X) was found to combine with chlorine to form an ionic compound of XCl3. How many **valence electrons** does element X have?

A 1

b 2

c 3

d 4

What are valence electrons?

1. Hypothetical element X, which has 2 electrons in its outermost shell, is reacted with element Y, which has 7 valence electrons. Which of the following statements is INCORRECT?

A The ions formed are X2+ and Y–.

b The compound has the formula XY2.

C Element X donates electrons to element Y.

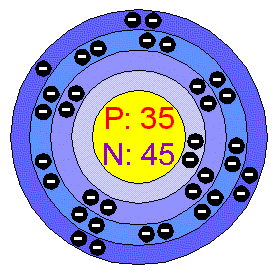
d The compound formed is covalent.

Explain why the statement is incorrect.

1. Complete the table below, which shows the structure of a number of atoms. Use your periodic table as required.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Name of element |  | Atomic number | Mass number | Number of protons | Number of neutrons | Number of electrons | Electron configuration |
| Neon |  |  | 21 |  |  |  | 2 8 |
|  |  |  | 31 |  | 16 |  |  |
|  |  |  |  |  |  | 19 |  |

1. Name the following compounds:
   1. CuS\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Al(OH)3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. NaF \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. SO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Write the formula of the following substances:
3. Magnesium iodide\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Silver nitrate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Carbon tetrachloride\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Iron \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. A student draws the diagram below to represent the electron configuration of a neutral atom.



**a** What is the name of the element?

**b** Write the electron configuration for the element

**c** To what group of the periodic table does the element belong? Explain how you made your decision.

**d**  If this atom was to form an ion what would be its charge? Why?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**The next two questions are based on the following table, which summarizes the properties of four different substances numbered I, II, III and IV.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Substance | Melting Point (oC) | Electrical Conductivity in Solids | Electrical Conductivity in Molten State | Hardness and Malleability |
| I | -7 | Non-Conductor | Non-  Conductor | Soft |
| II | 1083 | Good Conductor | Good Conductor | Hard and Malleable |
| III | 801 | Non-Conductor | Conducts electricity | Hard and brittle |
| IV | 3550 | Non-Conductor | Non-Conductor | Hard and brittle |

1. Which substance would be classified as ionic?

a) I b) II

c) III d) IV

1. Which substance would be classified as a covalent network solid?

a) I b) II

c) III d) IV

1. Give the name of the following, and state the type of bonding (metallic, covalent network, covalent molecular or ionic) that is present.

|  |  |  |
| --- | --- | --- |
| **SUBSTANCE** | **NAME** | **BONDING TYPE** |
| Ca |  |  |
| SiO2 |  |  |
| CaO |  |  |
| NH3 |  |  |
| NH4Cl |  |  |

1. Give the electron configuration for –

Carbon \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Argon \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sodium \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Oxide ion \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Draw electron dot diagrams for the following –
2. oxygen gas (O2)

b. magnesium chloride (MgCl2)

c. carbon tetrachloride (CCl4)

1. carbon dioxide (CO2)

### Complete the following table by giving the correct chemical formula for the named molecules.

|  |  |  |  |
| --- | --- | --- | --- |
| Barium phosphate |  | Sodium oxide |  |
| Potassium sulfide |  | Silver sulfate |  |
| Ammonium carbonate |  | Magnesium nitrate |  |
| Tin II hydroxide |  | Zinc phosphate |  |
| Sodium sulfide |  | Potassium sulfate |  |
| Silver carbonate |  | Ammonium hydrogen carbonate |  |
| Sodium fluoride |  | Tin IV chloride |  |
| Silver bromide |  | Ammonium iodide |  |
| Magnesium sulfate |  | Calcium carbonate |  |
| Zinc hydrogen carbonate |  | Barium hydrogen sulfate |  |
| Iron II nitrate |  | Cobalt hydroxide |  |
| Potassium bromide |  | Silver iodide |  |
| Magnesium carbonate |  | Calcium hydrogen carbonate |  |
| Zinc hydrogen sulfate |  | Barium nitrate |  |
| Copper II phosphate |  | Iron III hydroxide |  |
| Sodium bromide |  | Potassium iodide |  |
| Silver oxide |  | Ammonium sulfide |  |
| Calcium hydrogen sulfate |  | Zinc nitrate |  |
| Sodium hydroxide |  | Iron II phosphate |  |
| Sodium sulfite |  | Potassium oxide |  |
| Silver sulfide |  | Ammonium sulfate |  |
| Calcium nitrate |  | Zinc hydroxide |  |
| Sodium ethanoate |  | Potassium permanganate |  |
| Iron III hydrogen carbonate |  | Copper I fluoride |  |
| Aluminium sulfide |  | Manganese bromide |  |
| Iron III oxide |  | Lead II sulfate |  |

1. Complete the following table that gives the name of some common acids and their formulas. The first has been done for you.

|  |  |
| --- | --- |
| Name of acid | Formula |
| Hydrochloric acid | HCl |
| Sulfuric acid |  |
|  | HNO3 |
| Phosphoric acid |  |
| Carbonic acid |  |
|  | CH3COOH |

1. Complete these general word equations for chemical reactions:

Acid + Reactive Metal → \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_

Acid + Metal Oxide → \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_

Acid + Metal Hydroxide → \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_

Acid + Carbonate → \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_

Acid + Hydrogencarbonate → \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_

Acid + Base → \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_

Metal + Oxygen → \_\_\_\_\_\_\_\_\_\_\_\_

Non-metal + Oxygen → \_\_\_\_\_\_\_\_\_\_\_\_

[K, Na, or Ca] + water → \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_

[Al, Zn, Fe, Ni, Sn, or Pb] + steam → \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_

[Cu, Hg, Ag, Pt, or Au] + water/steam → \_\_\_\_\_\_\_\_\_\_\_\_

1. Identify the following substances by choosing a name from the box. Write the correct name next to the substance.

Metal hydroxide Non-metal oxide Metal Oxide

Metal carbonate Metal hydrogencarbonate Metal ion

Metal Salt

Al2O3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ni \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Fe(OH)3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Zn(CO3) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

KHCO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

CaCl2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mg2+\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Convert the following word equations to symbol form and then balance them. Write your balanced equation underneath the word equation
2. calcium + water calcium hydroxide + hydrogen gas

\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_

1. zinc metal + nitric acid zinc nitrate + hydrogen gas

\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_

1. lead + silver ions lead II ions + silver

\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_

1. Write the word equations below as chemical equations and balance:
   1. Zinc and lead (II) nitrate react to form zinc nitrate and lead.
   2. Aluminum bromide and chlorine gas react to form aluminum chloride and bromine gas.
   3. Sodium phosphate and calcium chloride react to form calcium phosphate and sodium chloride.
   4. Potassium metal and chlorine gas combine to form potassium chloride.
   5. Aluminum and hydrochloric acid react to form aluminum chloride and hydrogen gas.
   6. Calcium hydroxide and phosphoric acid react to form calcium phosphate and water.
   7. Copper and sulfuric acid react to form copper (II) sulfate and water and sulfur dioxide.
   8. Hydrogen gas and nitrogen monoxide react to form water and nitrogen gas.
2. Using the Activity Series of Metals, fill in the table below, to ***show what solid will form*** (if any) if the metals are put in solutions of tin chloride and copper iodide. If you think nothing will happen, write “no reaction”.

|  |  |  |
| --- | --- | --- |
| **METALS**: | **in tin chloride solution** | **in copper iodide solution** |
| Aluminium |  |  |
| Tin |  |  |
| Silver |  |  |

1. Write balanced equations for the following reactions. [6 marks]

|  |
| --- |
| Sodium + cold water  \_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_ |
| zinc + dilute sulfuric acid  \_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_ |
| Aluminium + superheated steam  \_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_ |

1. Balance the equations below:
2. \_\_\_\_ CH4 + \_\_\_\_ O2 🡪 \_\_\_\_ CO2 + \_\_\_\_ H2O
3. \_\_\_\_ C3H8 + \_\_\_\_ O2 🡪 \_\_\_\_ CO2 + \_\_\_\_ H2O
4. \_\_\_\_ FeCl3 + \_\_\_\_ NaOH 🡪 \_\_\_\_ Fe(OH)3 + \_\_\_\_NaCl
5. \_\_\_\_ Na + \_\_\_\_ H2O 🡪 \_\_\_\_ NaOH + ­­­\_\_\_\_H2
6. \_\_\_\_ Ag2O 🡪 \_\_\_\_ Ag + \_\_\_\_O2
7. \_\_\_\_ CO2 + \_\_\_\_ H2O 🡪 \_\_\_\_ C6H12O6 + \_\_\_\_O2
8. \_\_\_\_ K + \_\_\_\_ MgBr2 🡪 \_\_\_\_ KBr + \_\_\_\_ Mg
9. \_\_\_\_ H2O + \_\_\_\_ O2 🡪 \_\_\_\_ H2O2
10. \_\_\_\_ NaBr + \_\_\_\_ CaF2 🡪 \_\_\_\_ NaF + \_\_\_\_ CaBr2
11. \_\_\_\_ H2SO4 + \_\_\_\_ NaNO2 🡪 \_\_\_\_ HNO2 + \_\_\_\_ Na2SO­4
12. Main reactions involving acidic substances

*For the following reactions, (1) complete the word equation; (2) complete and balance the chemical equation provided.*

1. Acid + Metal Hydroxide 🡪 \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_

\_\_H2SO4(aq) +\_\_ Fe(OH)2(aq) 🡪 \_\_\_\_\_\_\_\_+ \_\_\_\_\_\_\_\_\_

1. Non-Metal Oxide + Metal Hydroxide 🡪 \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_

\_\_CO2(g) + \_\_Ba(OH)2(aq) 🡪 \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_

1. Acid + Metal Oxide 🡪 \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_

\_\_HNO3(aq) + \_\_Al2O3(s) 🡪 \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_

1. Acid + Metal Carbonate 🡪 \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_

\_\_HCl(aq) + \_\_CaCO3(s) 🡪 \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_

1. Acid + Hydrogencarbonate 🡪 \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_

\_\_H2SO4(aq) + \_\_KHCO3(aq) 🡪 \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_

1. *Write the* ***NET IONIC*** *equations below as chemical equations and balance:*
   1. Aluminum and hydrochloric acid react to form aluminum chloride and hydrogen gas.
   2. Calcium hydroxide and phosphoric acid react to form calcium phosphate and water.
   3. Copper and sulfuric acid react to form copper (II) sulfate and water and sulfur dioxide.
   4. Hydrogen gas and nitrogen monoxide react to form water and nitrogen gas.
2. The solutions below are **mixed**. For each of the mixtures, predict whether or not a chemical reaction will occur. Where a reaction occurs, indicate both the **molecular equation** and **net ionic equation.** If a reaction does not occur, write ‘no reaction’.

**a** **silver nitrate and potassium chloride**

Molecular equation:

Net ionic equation:

**b** **sulphuric acid and Sodium metal**

Molecular equation:

Net ionic equation:

**c** **sodium nitrate and potassium chloride**

Molecular equation:

Net ionic equation:

**Reactions producing precipitates**

1. *Use the solubility rules to determine if the following ionic solids are soluble in water.*
2. CuCO3
3. MgCl2
4. Zn(OH)2
5. Ca3(PO4)2
6. *Write ionic equations for each of the following precipitate forming reactions. If no precipitate forms, write ‘No Reaction’.*
7. \_\_NiCl2(aq) + \_\_Na2S(aq) 🡪
8. \_\_Al2(SO4)3(aq)  + \_\_Ba(OH)2(aq)  🡪

**Displacement Reactions**

1. A student was given a shiny grey metal and asked to identify what element it is composed of. The metal was placed in different solutions to see if it would react. It was found that it reacted with copper(II) sulfate solution but not with zinc nitrate solution.
2. Which metal (or metals) could the rod be made of?
3. What other test could be done to determine the identity of the metal?

**Data and Tables**

Activity Series

|  |
| --- |
| K  Na  Ca |
| Al  Zn  Fe  Ni  Sn  Pb |
| Cu  Hg  Ag  Pt  Au |

Biology

1. Observe the following population of teddy bears.





2. Will natural selection be able to act on this population? Why or why not?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. After several millions of years, the following mutant arose in the teddy bear population.



This mutant found it could eat more food types than the normal type teddy. For example, it could chew up vegetables and hard biscuits whereas the normal type teddy was stuck eating soft foods like cake and marshmallows. However, the mutant was also much more susceptible to tooth decay and cavities.

4. In what type of situation would the mutant teddy be at a *disadvantage*, resulting in it’s genes not being passed on, and it’s type dying out?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Describe a situation where the mutant type teddy would be at an *advantage*. Name the selective pressure in this situation.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. The environmental factor that causes a change in a population is said to be imposing

a) artificial selection

b) selection pressure

c) sexual selection

d) evolution

7. Explain what *sexual selection* is.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. How might sexual selection help the survival of a species?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

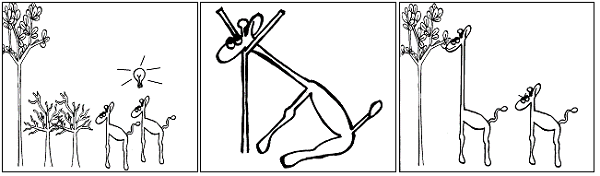
9. Name some types of variation that can be found in a cat population.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. Give the genetic definition of natural selection

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11. The following diagram illustrates a theory of evolution that was proposed before Darwin proposed his theory.



**DIES!**

Eg. Giraffes stretch their necks in order to reach the higher trees. When the smaller trees dies out, the giraffe with the longer (stretched) neck survives, and passes the long neck onto its’ offspring.

Explain what is wrong with this theory, in light of our current understanding of genetics.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12. In the example of the peppered moths;

a) What moth types existed before the tree colours changed?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) What moth types existed after the tree colours changed?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) Was any new genetic information added to the moth population?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d) What actually *did* change in the moth population?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e) If there had only been light coloured moths in the population, what would have happened to the moth population?

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13. a) What was the pesticide resistance in some insects due to?

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b) What happens every time the farmer sprays with the same pesticide?

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c) What is the selective agent in this case?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d) This is an example of

i) artificial selection

ii) natural selection

iii) sexual selection

iv) environmental pressure

14. The name for the genetic makeup of an organism is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The name for the characteristics of an organism is it’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15. a) Is it correct to say that bacteria ‘become’ resistant to antibiotics?\_\_\_\_\_\_\_\_\_\_

If not, why not? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) How do bacteria reproduce, and how fast does this occur?

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c) What will you need to do if you are infected with bacteria that are resistant to the antibiotic you are using?

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d) How is antibiotic resistance beneficial to the bacteria?

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e) If a population of bacteria becomes resistant to an antibiotic (over several generations), can you say evolution has occurred? Why or why not?

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16.

a) What are the two main sources of genetic variation?

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b) Prior to the use of antibiotics, humans still had some defence against bacterial infection. What was/is it? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) Name some factors that have contributed to the increase in the number of antibiotic resistant bacteria

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d) Name an alternative to antibiotics that has been used to greatly reduce the incidence of bacterial infection. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



e) How could bacteria that have never been exposed to antibiotics, contain antibiotic resistant genes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_