

Practice Worksheet — Grade 11 Science

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Balancing equations

1. Balance the equation for the formation of water by counting atoms: $_\text{H}_2 + \text{O}_2 \rightarrow _\text{H}_2\text{O}$. What coefficient goes in front of H_2O ?

Answer: _____

Defence against infection

2. What is the key difference between a bacterial infection and a viral infection for treatment?
- a) Neither can be treated, so both must simply run their course
 - b) Antibiotics work against viruses but not bacteria
 - c) Both are treated equally well with antibiotics
 - d) Antibiotics work against bacteria but have no effect on viruses
3. Why does taking only part of a prescribed course of antibiotics contribute to antibiotic resistance?
- a) Stopping early makes the remaining tablets weaker over time
 - b) The leftover tablets become contaminated and spread infection
 - c) Antibiotics change the patient's own DNA so their cells resist treatment
 - d) The weakest bacteria die first, so stopping early leaves the hardier ones

Energy efficiency

4. An electric motor is supplied with 800 J of electrical energy and delivers 240 J of useful mechanical energy. What is its percent efficiency?

Answer: _____ (%)

5. A gas furnace takes in 12 000 J of energy from its fuel and delivers 9 600 J of useful heat to the house. What is its percent efficiency?

Answer: _____ (%)

Food webs

6. In a grassland plot near Lethbridge, the producers capture 40 000 kJ of energy over a season. Using the usual estimate that about 10% of the energy at one trophic level passes to the next, how much energy is available to the secondary consumers?

Answer: _____ (kJ)

7. Roughly what proportion of energy passes from one trophic level to the next?

- a) about 50%
- b) about 90%
- c) all of it
- d) about 10%

Kilowatt hours and energy cost

8. For that same motor, supplied with 800 J and delivering 240 J of useful energy, how many joules are wasted, mostly as heat and sound?

Answer: _____ (J)

9. A 1 500 W kettle is used for a total of 4 hours over a week. Using $E = Pt$, how many kilowatt hours of energy does it use?

Answer: _____ (kWh)

Limiting factors and carrying capacity

10. What is ecological succession?

- a) the death of an entire ecosystem all at once
- b) the daily movement of animals through an area
- c) the gradual change in a community's species over time
- d) the migration of birds away at the end of each season

11. Which statements about the cycling of matter are correct? Select all that apply.

- a) matter flows one way and leaves the ecosystem
- b) decomposers return nutrients to the soil
- c) carbon moves between the atmosphere, organisms and the ground
- d) matter is reused rather than created or destroyed

Moles

12. A lab technician takes 250 mL of a 2.0 mol/L cleaning solution and adds water until the total volume is 1.0 L. What is the concentration of the diluted solution?

Answer: _____ (mol/L)

13. A lab technician needs to prepare 500 mL of a salt solution with a concentration of 0.20 mol/L. How many moles of salt must be dissolved to make up that solution?

Answer: _____ (mol)

Momentum impulse

14. What is the momentum of a 60.0 kg runner moving at 4.0 m/s?

Answer: _____ (kg·m/s)

Oxidation and reduction together

15. 0.75 mol of solute is dissolved to make 3.0 L of solution. What is the concentration?

Answer: _____ (mol/L)

Perfectly inelastic collisions

16. A cyclist riding along a river path at 8.0 m/s brakes at a constant 2.0 m/s^2 until coming to a complete stop. How far does the bike travel while braking?

Answer: _____ (m)

Plate tectonics and rock layers

17. A piece of wood buried in a river terrace is tested and found to hold one eighth of the carbon-14 that living wood of the same kind holds. The half-life of carbon-14 is 5730 years. How old is the buried wood?

Answer: _____ (years)

Punnett squares

18. Two parents are each carriers of a recessive condition, with genotypes Aa and Aa. Using a Punnett square, what percentage of their children would be expected to have the condition (genotype aa)?

Answer: _____ (%)

Recognising reaction types

19. A propane barbecue burns fuel according to $\text{C}_3\text{H}_8 + 5\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$. Which type of reaction is this?

- a) Decomposition
- b) Neutralization
- c) Composition
- d) Combustion

Stopping time and force

20. A truck travels 240 km in 3 hours at a steady speed. What is its average speed, in kilometres per hour?

Answer: _____ (km/h)