Answers.

Fair Experiment, Page 4

i) Distance
ii) Loudness
iii) Volume of the speaker

Forces(Density)

Page 8 Answers

1	**a**	volume = = 20 cm × 10 cm × 6 cm = 1200 cm^3	 [1] [1]
	b	density = mass/volume = 2400 g/1200 cm^3 = 2 g/cm^3	 [1] [1]
	c	The density is higher than that of water.	[1]
2	**a i**	false	[1]
	a ii	true	[1]
	a iii	true	[1]
	a iv	true	[1]
	b i	ice, wood Their densities are lower than that of water.	[1] [1]
	b ii	all of them (even iron!) Their densities are lower than that of mercury.	[1] [1]
3		When the sac fills with oxygen, the overall density of the fish is reduced. If the density is lower than that of the water around it, it will move up.	[1] [1]
5	**a**	Sink in mercury, sink in water.	[1]
	b	Float in mercury, sink in water.	[1]
	c	Float in both.	[1]

Answers from Page 9 to Page 17

1. 50
2. **a**. 9
   b. Copper

3. **a. i)** 3
   ii) She uses identical balls so that it is easier to calculate the average mass
   b. According to the order of blanks 21, 36 , 15, 1.5
   c. 2

4. **a.** By using Balance OR Top Pan balance
   b. i) Volume
   ii) She puts known volume of water in measuring cylinder. She adds cube and measures the volume of displaced water.

5. **a.** Balance or Top Pan Balance
   b. 78.7 grams
   c. 10 cubic centime
   d. 7.87 grams per cubic centimetre

6. B	10. D
7. C	11. D
8. D	12. C
9. B	

Energy Answers for Page 19

1	**a**	temperature	[1]
	b	energy	[1]
	c	more	[1]
2	**a**	The type of material and amount of the material.	[1]
	b	**C**, **A**, **B**	[1]
3	**a**	Metals are good conductors of thermal energy.	[1]
	b	They absorb infrared radiation more quickly than white clothes.	[1]
	c	The hot air expands, becomes less dense, and floats up.	[1]
	d	The feathers trap air and keep the bird warm because air is a good insulator of thermal energy.	[1]
4		created, destroyed, chemical, thermal	[1] each
5	**a**	The one covered with black paper.	[1]
	b	The black paper will absorb the thermal energy from the lamp and the foil will reflect it.	[1]
6	**a**	Thermal energy is conducted through the cup to the table. The temperature of the tea goes down.	[1]
	b	The air above the hot tea and around the sides of the cup gets warmer, expands, and rises. Cooler air flows in to replace it, more energy is transferred to the air from the tea, and that air too gets warmer, expands, and rises, and so on. The temperature of the tea goes down.	[1]
	c	All hot objects emit radiation. The hot cup will radiate thermal energy. The temperature of the tea goes down.	[1]
	d	The lid would reduce the thermal energy transfer by convection.	[1]
7		At least six from: The particles in the metal tray vibrate. The hotter the tray, the more they vibrate. When the tray goes into the oven the metal heats up. The particles on the outside of the tray vibrate more. They pass the vibrations on. The tray reaches the same temperature as the inside of the oven. The tray is in thermal equilibrium. When you take the tray out of the oven it cools down. The energy moves from the thermal store of the tray to the thermal store of the air. The air heats up. The tray reaches the same temperature as the air. The particles in the tray vibrate less.	[6]

Energy Answers for Page 21

8	**a**	Infrared radiation from the Sun heats up the can of soft drink.	[1]
	b	The water that he was pouring on the pot has evaporated. This has cooled the air inside the pot, and that has cooled the can of soft drink.	[1] [1]
	c	The water evaporates so he needs to keep pouring more water to keep cooling the can.	[1]
9	**a**	White surfaces reflect infrared radiation so the houses will absorb less and stay cooler.	[1]
	b	The fire emits infrared radiation, so the camera cannot distinguish between the infrared radiation from the people and the infrared radiation from the fire.	[1] [1]
10	**a**	Energy is transferred by conduction through the inner pane of glass/passed on by vibrations from the hot room. Air inside the gap heats up/conduction occurs very slowly through the air. There is very little convection as there is not much air inside the window. (Very little infrared gets through the glass.) Energy is transferred by conduction through the outer pane of glass/passed on by vibration to the cold air outside.	[1] [1] [1]
	b	The rate of transfer would decrease. There is no air to transfer the energy between the panes. Conduction and convection will not occur/energy would be transferred very slowly by radiation.	[1] [1] [1]
11	**a**	Heating the water creates convection currents and warmer, less dense water rises. The sugar cube dissolves. The convection currents carry the dissolved solid through the water, creating a purple current.	[1] [1] [1]
	b	Any three from: Water is heated by the Bunsen burner. The water molecules move faster. The water expands/becomes less dense. Hot water rises. This is replaced by cold water, forming a convection current.	[3]
	c	e.g. thermals, onshore/offshore breezes	[1]
12	**a**	Particles cannot move past each other so a group of particles cannot rise.	[1]
	b	Heat/thermal energy is transferred to you by radiation.	[1]
	c	Any one from: They can move/travel through a vacuum/space. They both travel at the speed of light. They are both waves.	[1]

Energy Answers from Page 23 to Page 30

1. **a.** 36.7
2. Trapped air is a good insulator
3. Thermal energy lost from surface of skin by **Radiation**
   Thermal energy lost by air movements by **Convection**
   Thermal energy gained from rock by **Conduction**
4. The particles at the surface has more energy than other particles. High energy leave the surface and go into air. This is called evaporation
5. **a.** Conduction

   b. Because different metals have different conduction

6. Heat is transferred through conduction. Particles vibrate and transfer their energy to the nearby particles.
7. **a.** Convection
   b. Conduction
   c. Conductor
   d. Insulator

8. C	12. C
9. D	13. A
10. A	14. D
11. D	

Sound Answers for Page 32 and 33

13.5 Review answers

Student Book answers

1	a	C, E	[1]
	b	A, D	[1]
	c	B, E	[1]
2	a	wave with a bigger amplitude (taller) but same frequency	[1]
	b	wave with a higher frequency (peaks closer together) but same amplitude	[1] [1]
3	a	400	[1]
	b	200	[1]
4	a	20–20 000 Hz	[1]
	b	different	[1]
5		<table><tr><th>Arrow</th><th>Wavelength</th><th>Amplitude</th><th>neither</th></tr><tr><td>A</td><td></td><td>✓</td><td></td></tr><tr><td>B</td><td></td><td></td><td>✓</td></tr><tr><td>C</td><td></td><td>✓</td><td></td></tr><tr><td>D</td><td>✓</td><td></td><td></td></tr><tr><td>E</td><td></td><td></td><td>✓</td></tr><tr><td>f</td><td>✓</td><td></td><td></td></tr></table>	[1] each
6	a	There are 1500 vibrations or waves per second.	[1]
	b	The pitch would be higher.	[1]
7	a	a decibel, the unit of sound intensity	[1]
	b	traffic on the way home	[1]
	c	Two of: reduce the volume, listen for less time, use a loudspeaker instead.	[1] each
8		1 – D 2 – C 3 – A 4 – B	[1] each
9	a	true	[1]
	b	false	[1]
	c	true	[1]
	d	true	[1]

10	a i	The peaks coincide.	[1]
	a ii	The peaks of one are in the same places as the troughs of the other.	[1]
	b	The food would not be evenly cooked. It would be undercooked anywhere destructive interference occurs, and/or overcooked where constructive interference occurs.	[1] [1]
11		The vocal chords vibrate very fast to produce a high sound / vibrate more slowly to produce a low sound. The vocal chords vibrate more to produce a loud sound / vibrate less to produce a quite sound. Pitch is affected by frequency, and loudness is affected by amplitude.	[1] [1] [1]
12	a	Distance from a speaker.	[1]
	b	Loudness of a sound.	[1]
	c	The same note/sound/volume setting.	[1]
	d	Difficult to measure loudness fairly without a sound meter. Echoes or background noise could interfere with the experiment.	[1]

Sound answers from Page 34 to Page 44

1. In the order of blanks.
   Close together, Compression, far apart, Rarefaction

2. In the order of blanks
   Decreases, Decreases, Stays the same, Stays the same

3. In the order of blanks
   E, B, D, C

4. In the order of blanks
   Amplitude, frequency

5. Write C where the particles are close together. Write R where the particles are far apart
6. A high-pitched sound always has a high frequency
7. **a.** Air particles
   b. In the order of blanks
   closer to each other, away from each other

8. **a.** i. 6 complete waves
   b. The amplitude of the wave decreases.

9. **a.** Vibrates

   b. Compression

10.

a. C	b. C	c. D	d. D

11.

a. Second and last box ticked	b. B and C(in the order of blanks)

12. **a**. Particles vibrate and transfer their vibration to nearby particles. The particles do not change their place.
    b. The string vibrates with a bigger amplitude.
    c. The sound heard is loud.
    d. Pitch of sound increases

13. **a.** It vibrates
    b. in the order of blanks
    Frequency, Pitch, Amplitude, Loudness

14. B	17. A
15. C	18. D
16. B	19. C

Electrical Symbols and Circuits Answers from Page 46 to Page 54

1. **a.** A cell or A battery
   Draw symbol of a cell or a battery.
   b. In the order of blanks
   Stop working, the bulbs are in series, keep working, bulbs are in parallel

2. **a.** In the order of blanks
   Series, Ammeter, Current

   b. In the order of blanks
   Parallel, Voltmeter, Voltage

3. **a.** Parallel circuit with closed switch
   b. Ammeter

4. **a.** Length along x-axis, Voltage along y-axis. Complete the graph
   b. Anomalous reading is 30 or 0.35. She must repeat the experiment

5. In the order of blanks
   0.4, 0.4, 0.8

6. a. Parallel
   b. i. Ammeter
   ii. Current
   c. 7.5 A
   d. 7.5 A

7. In the order of Blanks
   Ammeter
   Voltmeter
   Ampere
   Volt

8. In the order of blanks
   0.4 A, 1.8A

9. **a.** Brighter
   b. It would be brighter than before.

10. **a.** Draw the symbol next to Motor symbol
    b. Answer is C

Earth and Beyond answers from Page 46 to Page 65

1. **a.** Polaris and Sirius(Because they are stars)
   b. i. Because the light from the Sun is reflected by Mars
   ii. Because Mars is far from earth.
   c. Because the Earth is moving

2. **a**. In the order of blanks
   Venus
   Neptune
   Sun

   b. In the order of blanks
   Stars
   Because the photograph was taken at different times. Looks like the star is making a trail.
3. **a.** Star
   b. It reflects the sunlight

4. In the order of blanks
   Jupiter
   Uranus
   Neptune

5. **a.** Mercury and Venus
   b. They reflect the sunlight

6. **a.** Stars are not in the same place
   b. Similar to the one in January

7. Planet A Mercury, Planet B Venus
   b. F
   c. Circle 5

8. **a.** Because the earth has moved
   b. circle the option “a different pattern”

9. **a.** Jupiter and Mars
   b. Saturn is closer to the sun so should have less time to orbit the sun

10. **a.** Orbit
    b. 24 Hours
    c. Sun is a source of light
    d. A planet is seen because is reflected by its surface

11. **a.** A and B
    b. A(Mercury), D(Mars), F(Saturn)
    c. The planet that takes the shortest time to orbit the Sun is A

12. **a.** In the order of blanks
    Yes
    No
    No
    No
    Yes

    b. reflected

13. **a. i**. Mercury
    ii. Jupiter

    b. More time than Earth year
    c. It reflects the light from its surface