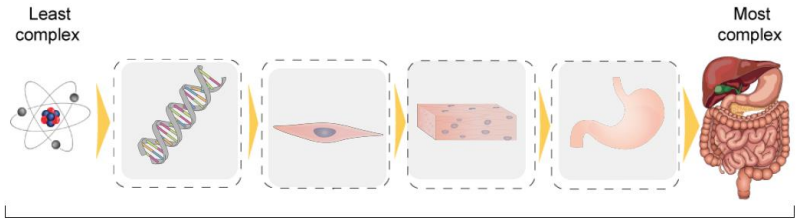
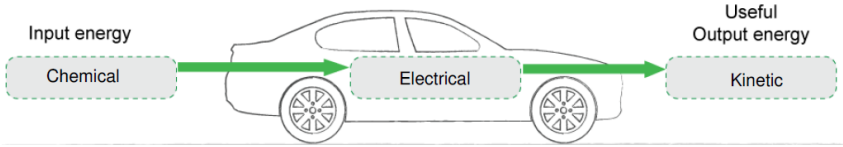
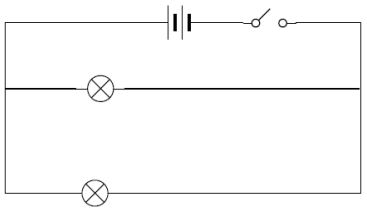
Question		Answers	Notes	Total	Criterion
1	a	Group – Elements arranged in vertical columns that show similar chemical properties Period – Elements arranged in horizontal rows that show different chemical and physical properties All correct		**1**	A
	b	2,8,3 ***or*** $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^1$		**1**	A
	c	***Aircraft:*** lightweight ***or*** strong ***Soda can:*** resistant to corrosion ***or*** lightweight ***or*** malleable	*Do **not** accept lightweight for both aircraft and soda cans*	**2**	D
	d	Neutralization ***or*** acid – base ***or*** double displacement		**1**	A
	e	$Al(OH)_3 + 3\ HCl \longrightarrow AlCl_3 + 3\ H_2O$ Correct reactants Correct products Correct balancing	*State symbols not required* *Award 1 mark for a correct word equation*	**3**	A
2	a	 Two consecutive images All correct		**2**	A
	b	***Tissue:*** a group of (similar) cells that work together to perform the same function ***Organ:*** A group of tissues ***or*** cells that work together to perform different functions		**2**	A

	c	***Energy:*** Glucose ***or*** carbohydrate ***or*** lipid ***or*** fats ***Growth:*** Protein	*Do **not** accept meat or vegetables as these are not nutrients* *Ignore incorrect additional answers for each part*	**2**	A
	d	(large) intestine		**1**	A
	e	***Any three points from the list [max 3]*** • cells or most of the body are composed of water • water is needed for transport in the body • chemical reactions occur in a water-based environment • water is needed for temperature regulation • water is needed to replace water lost by sweat • water is needed as part of the digestion process	*WTTE*	**3**	A
	f	***Any reasonable precaution related to water borne cholera, for example [max 1]*** • cook food – to kill any bacteria that may be present • do not consume tap water – as bacteria may be present • wash hands because the bacterium is spread in close contact • do not share utensils ***Any reasonable, correctly linked justification [max 1]***		**2**	A
3	a	The length of the arrows is equal ***or*** The forces are balanced ***or*** The arrows would not be of equal length if the car was accelerating ***or*** There would be unbalanced forces if the car was accelerating (hence) the car moves at a constant speed or it is not accelerating	*Award no marks if the candidate refers to missing vertical forces only*	**2**	A
	b	 Chemical Electrical Kinetic		**3**	A

	c	 A circuit with two bulbs in parallel Switch in the correct place		**2**	A
	d	***Any two from the following list [max 2]*** • if one bulb breaks, the other is unaffected • bulbs will work independently • bulbs in parallel are brighter than bulbs in series or bulbs in parallel work at normal brightness.		**2**	A

4	a	Range/(horizontal) distance is given as dependent variable is given ***Any reasonable RQ linking range with only one independent variable, for example*** • how does the range / (horizontal) distance depend on the <u>speed</u> the javelin is thrown • how does the range / (horizontal) distance depend on the <u>angle</u> the javelin is thrown		**2**	B
	b	***Any two control variables, for example [max 2]*** • angle ***or*** throwing speed • mass ***or*** length ***or*** material of the javelin • weather conditions • height of the athlete	*Check for contradiction with part (a)*	**2**	B
	c	***Two reasons relating to validity, for example [max 2]*** • similar shape (and so valid) • similar motion (and so valid) • different mass (and so invalid) • fins (and so invalid)	*WTTE*	**2**	C

	d	***Any reasonable suggestion, for example [max 1]*** • convenience • no special equipment • safety		**1**	C
	e	Table with two columns ***and*** at least five rows Headings of angle ***and*** range Units included in table headings Lowest angle of 21º Highest angle of 45º Data collected across the full range Data in increasing or decreasing order		**7**	B C
	f	0.8 (kg)		**1**	C
	g	½ mv^2 seen or implied 193.6 194 J	*Award 2 marks if 193.6 only is seen* *Award 3 marks if 194 only is seen* *Award this mark separately*	**4**	C

5	a	Any title correctly linking angle and horizontal distance		**1**	C
	b	40 m		**2**	C
	c	Max range is at an angle of 45±1º Below 45º ***or*** below the maximum as the angle increases, the range increases Above 45º ***or*** below the maximum as the angle increases, the range decreases	*Do **not** award the second and third marking points unless there is a reference to the maximum*	**3**	C
	d	C		**1**	C

<table>
<tr><td rowspan="3">6</td><td>a</td><td>Respiration or catabolism</td><td>Do not accept metabolism</td><td>1</td><td>A</td></tr>
<tr><td>b</td><td>(energy lost =) 34 %

Useful energy output = 66 (%)</td><td>seen or implied</td><td>2</td><td>C</td></tr>
<tr><td>c</td><td>IV: draw length

DV: (horizontal) distance / range

Any reasonable two CV, for example [max 2]:
• angle of release
• weather conditions
• same bow
• same arrow</td><td></td><td>4</td><td>B</td></tr>
<tr><td>6</td><td>d</td><td colspan="3">
<table>
<tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th></tr>
<tr><td>Hypothesis</td><td>simple prediction</td><td>testable prediction linked to draw length and distance with no explanation</td><td>testable hyp correctly linked to draw length and distance and simple explanation referring to energy</td><td>testable hyp correctly linked to draw length and distance and complete explanation linking stored energy and kinetic energy</td></tr>
<tr><td>Manipulation of IV / sufficient data</td><td>ref to different increments or trials</td><td>at least five increments or three trials</td><td>at least five increments and three trials</td><td>at least five increments, three trials and calculates mean</td></tr>
<tr><td>Equipment</td><td>protractor to measure release angle or equipment to ensure angle of release is constant</td><td></td><td></td><td></td></tr>
<tr><td>Method</td><td>attempt at method but may be not relevant</td><td>attempt at method, insufficient detail and not likely to give relevant data</td><td>method described, could be followed, will produce relevant data</td><td>complete method fully explained and could be replicated</td></tr>
<tr><td>Safety</td><td>a safety precaution is mentioned</td><td></td><td></td><td></td></tr>
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</td><td>14</td><td>B</td></tr>
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	e	***Any two reasonable extensions, for example [max 2]*** • mass of arrow • elasticity of bow string • material of bow • sex of archer		**2**	C
7	a	Nucleus ***or*** cytoplasm ***or*** plasma membrane ***or*** cell membrane		**1**	A
	b	*Daughter cells are identical to parent cells* *Used in growth and repair* *Used to create normal body cells* *One parent cell creates two daughter cells* Two correct All correct	*ignore relative position*	**2**	D
	c	***Any three from the list below*** • protection from infection • temperature reduction through sweating • temperature regulation from vasodilation or vasoconstriction • sensation	*WTTE*	**3**	D
	d	Stage 1 Skin stem cells are obtained from skin Stage 2 Stem cells are placed on a Petri dish to multiply Stage 3 Skin stem cells are placed into solution Stage 4 Skin stem cells are sprayed onto damaged skin	*Award 2 marks for two correct consecutive stages regardless of position*	**4**	D

<table>
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<td>7</td>
<td>e</td>
<td>
<table>
<tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th></tr>
<tr><td>Biology</td><td>an incomplete general statement</td><td>a specific strength or limitation about one type of stem cells</td><td>a specific strength or limitation about both types of stem cells</td><td>a specific strength or limitation about both types of stem cells and a further statement</td></tr>
<tr><td>Ethics</td><td>a statement of an ethical issue</td><td>a description of an ethical issue or a statement of two ethical issues</td><td>a description of an ethical issue and a statement of a further ethical issue</td><td></td></tr>
<tr><td>Economic</td><td>a statement of an economic issue</td><td>a description of an economic issue or a statement of two economic issues</td><td>a description of an economic issue and a statement of a further economic issue</td><td></td></tr>
<tr><td>Conclusions</td><td>a concluding statement linked to an issue discussed</td><td>a concluding statement referring to two issues discussed</td><td></td><td></td></tr>
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</td>
<td>12</td>
<td>D</td>
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