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## Further guidance

## B6 Brain and mind – Foundation Workbook answers

1	a	<p>Stimulus:</p> <ul style="list-style-type: none"> <li>• light</li> <li>• highest concentration of food</li> <li>• pecked</li> <li>• fast movement</li> <li>• predator</li> </ul> <p>Response:</p> <ul style="list-style-type: none"> <li>• move away from light</li> <li>• move towards the highest concentration of food</li> <li>• withdraws into its burrow</li> <li>• takes off</li> <li>• releases a cloud of ink and moves away quickly</li> </ul>
	b	<ul style="list-style-type: none"> <li>• food/shelter</li> <li>• danger/predators</li> <li>• mate</li> <li>• harmful</li> </ul>
	c	If conditions around the animals change, their simple reflexes may no longer be helpful for survival.
	d	The animal cannot choose to make the action or not make the action. It happens without conscious decision-making.
	e	Missing words: responses, experience, conscious, change, survive
	f	<ul style="list-style-type: none"> <li>• response</li> <li>• stimulus</li> <li>• behaviour</li> <li>• reflex action/response</li> </ul>
2	a	<ul style="list-style-type: none"> <li>• Your pupils get smaller in bright light</li> <li>• Your eyes water on a windy day</li> <li>• A newborn baby grasps at anything put in her hand.</li> <li>• You breathe faster when you run.</li> </ul>

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	<b>c</b>	Simple reflexes of a newborn baby are linked to obtaining food (e.g. sucking) and alerting its parents to potential danger (e.g. startle). These protective reflexes help the baby survive until it develops more complex learned behaviour.													
<b>3</b>	<b>a</b>	Missing words: receptor, effector													
	<b>b</b>	<ul style="list-style-type: none"> <li>e.g. pain/touch/temperature receptors in the skin, light receptors in the eye, sound receptors in the ear, taste receptors in the tongue</li> <li>e.g. receptors that detect change in core body temperature, blood sugar level, blood oxygen levels</li> </ul>													
	<b>c</b>	Missing words, for example: skin, touch, ear/eye, sound/light													
	<b>d</b>	Missing words: <ul style="list-style-type: none"> <li>secreting, hormones</li> <li>contract, move</li> </ul>													
<b>4</b>	<b>a</b>	Correctly labelled diagram (see textbook page 155)													
	<b>b</b>	Labels clockwise from top left: nucleus, cell membrane, axon, fatty sheath, cytoplasm													
	<b>c</b>	Missing words: electrical, axon, insulates, speed													
	<b>d</b>	Missing words: (top) receptors, sensory, (bottom) effectors, motor													

## Further guidance

	<b>e</b>	Completed flow diagram: <div style="text-align: center;"> <span style="border: 1px solid black; padding: 2px;">You pick up a hot plate</span> → <span style="border: 1px solid black; padding: 2px;">pain receptors in the skin</span> → <span style="border: 1px solid black; padding: 2px;">CNS</span>  <span style="border: 1px solid black; padding: 2px;">You drop the plate</span> ← <span style="border: 1px solid black; padding: 2px;">muscles in the arm</span> ← </div>
	<b>f</b>	<ul style="list-style-type: none"> <li>• hot plate</li> <li>• pain receptors in the skin</li> <li>• CNS</li> <li>• nerves in hand and arm</li> <li>• muscles</li> <li>• dropping the plate</li> </ul>
<b>5</b>	<b>a</b>	Missing words: axon, electrical
	<b>b</b>	Missing words: touch, synapse, activates, chemical
	<b>c</b>	The two synapses within the spinal cord correctly labelled.
<b>6</b>	<b>a</b>	<ul style="list-style-type: none"> <li>• caffeine – a stimulant present in tea, coffee and some soft drinks</li> <li>• curare – a poison that blocks transmission of nerve impulses (causing paralysis)</li> <li>• drug – a medicine or other chemical that causes effects in the body</li> <li>• Ecstasy – a drug that has mood-enhancing effects</li> <li>• morphine – a painkiller used as a medicine</li> <li>• painkiller – a chemical that reduces the sensation of pain</li> <li>• stimulant – a chemical that increases nervous activity</li> <li>• toxin – a poison that causes dangerous effects in the body</li> </ul>
	<b>b</b>	(Note: this question will be replaced at the next reprint of the Workbook.)
<b>7</b>	<b>a</b>	Missing word: billions
	<b>b</b>	Consciousness – being aware of yourself and your surroundings
	<b>c</b>	<ul style="list-style-type: none"> <li>• Cerebral cortex coloured</li> <li>• Missing words: cerebral cortex, large, processes, humans</li> </ul>
	<b>d</b>	Damaged brain regions (top to bottom): A, C, B
	<b>e</b>	You can stimulate an area of the brain's surface and observe the body's reaction, e.g. movement.
	<b>f</b>	It is non-invasive (do not have to open up the skull).
<b>8</b>	<b>a</b>	The woodlice move to darker places, which are likely to offer more shelter, protection and moisture, thus improving the woodlice's chances of survival.
	<b>b</b>	If conditions around the animals change, their simple reflexes may no longer be helpful for survival.
	<b>c</b>	For example, a lion cub learns hunting tactics from its mother.
	<b>d</b>	This will increase the lion cub's chances of survival - it will catch more food.

## Further guidance

9	a	<ul style="list-style-type: none"> <li>Adapting – adjusting to new conditions</li> <li>Learning – knowledge or skills gained from experience</li> <li>Neuron pathways – strong links between points along connecting neurons</li> <li>Repetition – doing the same thing more than once.</li> </ul>												
	b	1, 5, 4, 2, 3												
	c	It strengthens the connections between neurons in a pathway, making the response easier each time the action is repeated.												
10	a	Missing words: experience, complex, behaviour, adapting												
	b	With a large cerebral cortex, a human can make many different neuron pathways, so have many potential ways of responding to different situations. This increases their ability to learn new responses as necessary for survival.												
	c	The harder it is to make new pathways in the cortex, the more difficult it is for adults to make the new connections to enable them to learn a new language.												
	d	By repetition, through exposure to the language, and by using the new language												
11	a	Underlined: storage of information, retrieval of information												
	b	Missing word: verbal												
	c	<table border="1"> <thead> <tr> <th>Memory type</th> <th>How long does it last?</th> <th>How much can be stored?</th> <th>An example</th> </tr> </thead> <tbody> <tr> <td>short-term</td> <td>about 30 seconds</td> <td>not much - e.g. a few words in a sentence or a list</td> <td>remembering that this row is about short-term memory</td> </tr> <tr> <td>long-term</td> <td>up to a lifetime</td> <td>no limit</td> <td>remembering the date of your birthday</td> </tr> </tbody> </table>	Memory type	How long does it last?	How much can be stored?	An example	short-term	about 30 seconds	not much - e.g. a few words in a sentence or a list	remembering that this row is about short-term memory	long-term	up to a lifetime	no limit	remembering the date of your birthday
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	d	People with short-term memory loss (e.g. through accident or disease such as Alzheimer's) can still remember things from their long-term memory store.												
12	a	Repetition strengthens the connections between neurons in a pathway.												
	b	Repetition moves information from the short-term memory to long-term memory store.												
	c	For example, an actor reads the lines of a play over and over again, trying to understand them and make associations that help him remember the order of the words and lines. Rehearsing chunks of lines reinforces the learning and moves the information from short-term memory to long-term memory stores.												
	d	For example, mnemonics: Every Good Boy Deserves Football helps you remember that the lines on a staff of music are in the order EGBDF.												

## Further guidance

## B6 Brain and mind – Higher Workbook answers

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Further guidance

	<b>f</b>	<p>Completed flow diagram:</p> <pre>                     [nerve impulse from brain]                       ↓     [you pick up a very hot plate] → [pain receptors in skin] →   [central nervous system - spinal cord]     [you hold on to the plate...] ← [muscles in the arm] ←                 </pre>
<b>5</b>	<b>a</b>	Correct order: 5, 4, 1, 3, 2
	<b>b</b>	<p>A – receptors drawn on the ends of bottom neuron, with curved indents into which the round shapes of the chemicals will fit</p> <p>B – square-shaped molecules drawn in the synapses; arrows going down the page to show direction of impulse</p>
<b>6</b>	<b>a</b>	<ul style="list-style-type: none"> <li>• caffeine – a stimulant present in tea, coffee and some soft drinks</li> <li>• curare – a poison that blocks transmission of nerve impulses (causing paralysis)</li> <li>• drug – a medicine or other chemical that causes effects in the body</li> <li>• Ecstasy – a drug that has mood-enhancing effects</li> <li>• morphine – a painkiller used as a medicine</li> <li>• painkiller – a chemical that reduces the sensation of pain</li> <li>• stimulant – a chemical that increases nervous activity</li> <li>• toxin – a poison that causes dangerous effects in the body</li> </ul>
	<b>b</b>	(Note: this question will be replaced at the next reprint of the Workbook.)
	<b>c</b>	Drug A
	<b>d</b>	It would block the receptors at the end of the neuron, so the transmitter chemical could not bind.
	<b>e</b>	<p><b>i</b> Maintain higher concentration of serotonin.</p> <p><b>ii</b> Serotonin binds with receptors more frequently.</p> <p><b>iii</b> More impulses are triggered in the second neuron.</p>
	<b>f</b>	Missing word: increase
<b>7</b>	<b>a</b>	Missing word: billions
	<b>b</b>	Consciousness – being aware of yourself and your surroundings
	<b>c</b>	<ul style="list-style-type: none"> <li>• Cerebral cortex coloured</li> <li>• Missing words: cerebral cortex, large, processes, humans</li> </ul>
	<b>d</b>	Damaged brain regions (top to bottom): A, C, B
	<b>e</b>	You can stimulate an area of the brain’s surface and observe the body’s reaction, e.g. movement.
	<b>f</b>	It is non-invasive (do not have to open up the skull).

Further guidance

8	a	<p>i Food</p> <p>ii Salivation</p> <p>iii Bell</p> <p>iv The dog salivated when it heard a bell.</p>												
	b	Missing words: reflex, conditioned												
9	c	<p>i Caterpillars</p> <p>ii Bright colours (on caterpillars' surface)</p> <p>iii Caterpillars</p> <p>iv Animals that feed on flying insects will learn that wasps sting, so will avoid catching insects that look like wasps (e.g. hoverflies) in case they might get stung.</p>												
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## Further guidance

12	a	Repetition strengthens the connections between neurons in a pathway.
	b	Repetition moves information from the short-term memory to long-term memory store.
	c	Student's attempted answer
	d	Student's attempted answer
	e	More nerve impulses follow the same nerve pathway, strengthening the connections between neurons. This makes the response to the same stimulus easier/faster next time it occurs.
	f	For example, mnemonics: Every Good Boy Deserves Football helps you remember that the lines on a stave of music are in the order EGBDF.