


## Key concept (age 11-14)

### BCL3.2: Cellular respiration


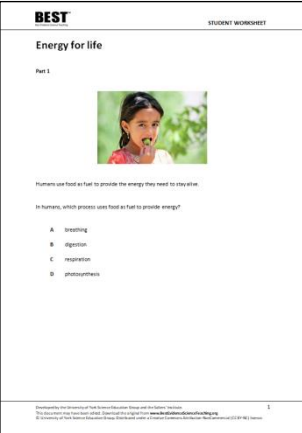
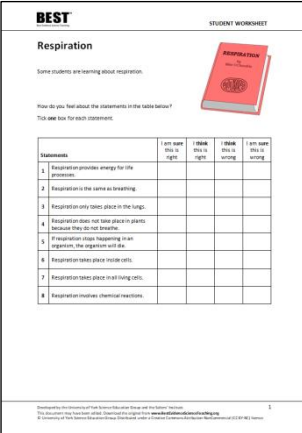
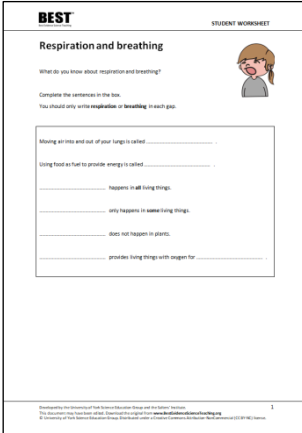
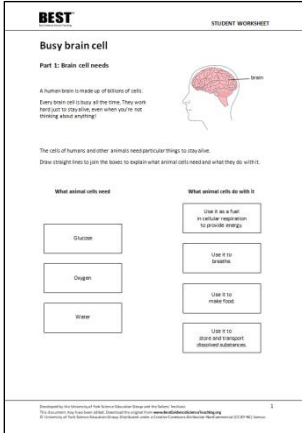
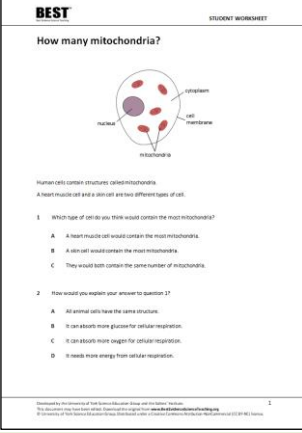
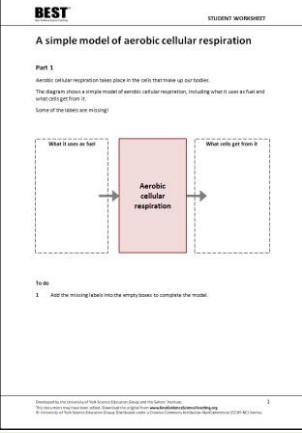
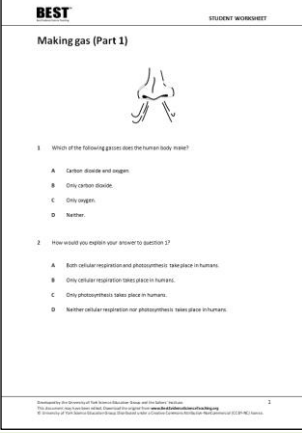
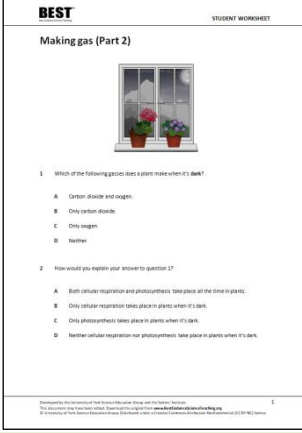
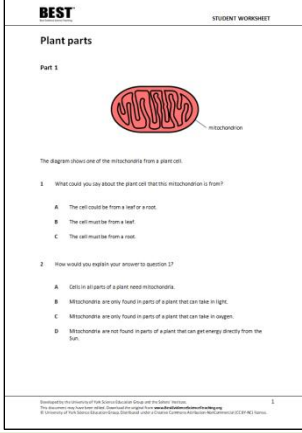
#### Progression toolkit: Cellular respiration

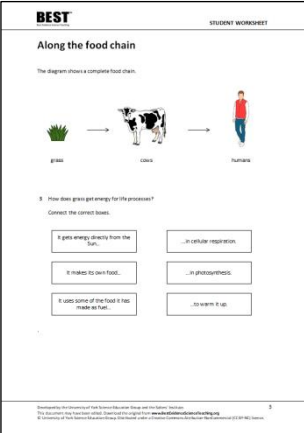


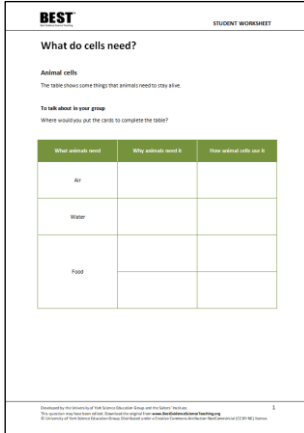
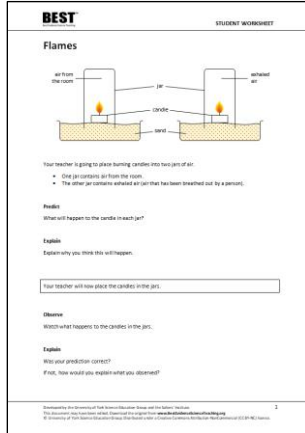
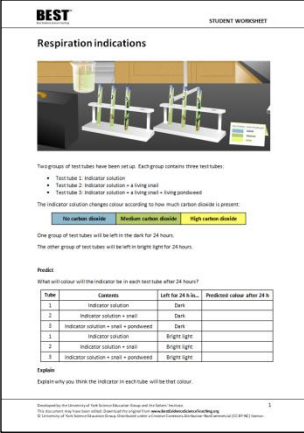
<b>Learning focus</b>	Energy for life processes is provided by a chemical process called cellular respiration inside all living cells, which uses glucose (from food) as fuel.					
<b>As students' conceptual understanding progresses they can:</b>						
<b>P</b>	Recall that all living organisms need energy for life processes, which is provided by cellular respiration.	Distinguish between cellular respiration and breathing, including the nature of the processes and where they take place.	Link living animals' and plants' need for oxygen and the presence of mitochondria in their cells to aerobic respiration.	Describe aerobic cellular respiration using a simple model of the process, including what it uses as fuel (glucose plus oxygen) and what it makes as waste products (carbon dioxide and water).	Apply understanding of photosynthesis and cellular respiration to explain when and why they take place in plants.	Recognise that biomass is transferred through food chains, and energy for life processes is made available when some of this biomass is used as fuel for cellular respiration.
<b>Diagnostic questions</b>	Animal life and plant life	Respiration	Busy brain cell	A simple model of aerobic cellular respiration	Making gas, Part 2	Along the food chain
	Energy for life	Respiration and breathing	How many mitochondria?	Making gas (Part 1)	Plant parts	
<b>Response activities</b>	Ball of energy	Deep breath		Flames		
			What do cells need?	Respiration indications		

Key:

**P** Prior understanding from earlier stages of learning

**B** Bridge to later stages of learning

<p style="text-align: center;"><b>Animal life and plant life</b></p> 	<p style="text-align: center;"><b>Energy for life</b></p> 	<p style="text-align: center;"><b>Respiration</b></p> 	<p style="text-align: center;"><b>Respiration and breathing</b></p> 	<p style="text-align: center;"><b>Busy brain cell</b></p> 
Confidence grid	Simple multiple choice	Confidence grid	Focused cloze	Linking ideas; two-tier multiple choice
<p style="text-align: center;"><b>How many mitochondria?</b></p> 	<p style="text-align: center;"><b>A simple model of aerobic cellular respiration</b></p> 	<p style="text-align: center;"><b>Making gas (Part 1)</b></p> 	<p style="text-align: center;"><b>Making gas, Part 2</b></p> 	<p style="text-align: center;"><b>Plant parts</b></p> 
Two-tier multiple choice	Modelling, linking ideas	Two-tier multiple choice	Two-tier multiple choice	Two-tier multiple choice; linking ideas

<p style="text-align: center;"><b>Along the food chain</b></p>  <p style="text-align: center;">Simple multiple choice; linking ideas</p>	<p style="text-align: center;"><b>Ball of energy</b></p>  <p style="text-align: center;">Challenge to thinking</p>	<p style="text-align: center;"><b>Deep breath</b></p>  <p style="text-align: center;">Concept map, discussion</p>	<p style="text-align: center;"><b>What do cells need?</b></p>  <p style="text-align: center;">Discussion, card-sort</p>	<p style="text-align: center;"><b>Flames</b></p>  <p style="text-align: center;">Practical PEOE (predict-explain-observe-explain)</p>
<p style="text-align: center;"><b>Respiration indications</b></p>  <p style="text-align: center;">Practical PEOE (predict-explain-observe-explain)</p>				