



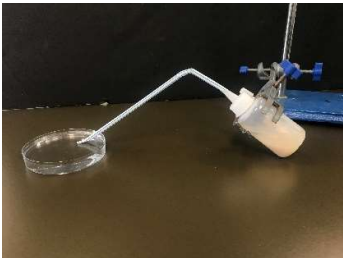
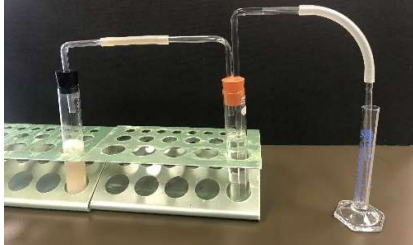


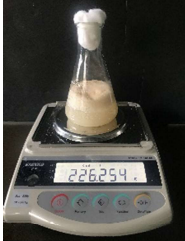



Appendix 3: *A list of possible set-ups*

Table S3. List of possible set-ups and working principles

Possible set-up	Working principles	Example(s)	Similar set-up
<p>A</p> 	<ul style="list-style-type: none"> • The yeast-sugar extract is placed in a syringe • The yeast carries out fermentation in the absence of oxygen • Carbon dioxide is produced • The pressure in the syringe increases/the volume of yeast-sugar extract in the syringe expands • The increased pressure in the syringe pushes the plunger outwards • The change in volume of the mixture in the syringe over time represents the rate of fermentation 	<p>Knabb and Misquith (2006)</p>	
<p>B</p> 	<ul style="list-style-type: none"> • The yeast-sugar extract is placed in a burette • The yeast carries out fermentation in the absence of oxygen • Carbon dioxide is produced • The carbon dioxide rises up and is trapped in the burette • The change in volume of the mixture in the burette over time represents the rate of fermentation 	<p>Collins and Bell (2004); Yurkiewicz, Ostrovsky, and Knickerbocker (1989)</p>	

<p>C</p> 	<ul style="list-style-type: none"> • The yeast-sugar extract is placed in a bottle • The yeast carries out fermentation in the absence of oxygen • Carbon dioxide is produced and is collected over water/forms bubbles under water • The number of bubbles evolved/volume of carbon dioxide displaced over time represents the rate of fermentation 	<p>Chan (2016); Weinberg (2018)</p>	
<p>D</p> 	<ul style="list-style-type: none"> • 0.1 M sodium hydrogencarbonate is added to the yeast-sugar extract such that the resultant mixture is just above the end point of phenolphthalein • The yeast carries out fermentation in the absence of oxygen • Carbon dioxide is produced and dissolves in the yeast-sugar solution, forming carbonic acid • This lowers the pH of the mixture • The pink colour of the mixture fades when the end point of the indicator is reached • The reciprocal of the time required to reach the end point represents the rate of fermentation 	<p>Hong Kong Examinations and Assessment Authority (2009)</p>	

<p>E</p> 	<ul style="list-style-type: none"> • The yeast-sugar extract is placed in capped micro-centrifuge tubes with holes • The yeast carries out fermentation in the absence of oxygen • Carbon dioxide is lost • This decreases the mass of the micro-centrifuge tubes • The change in mass over time represents the rate of fermentation 	<p>Grammer (2012)</p>	
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