

## Appendix B

### Urban Farming in Singapore

#### Synopsis:

In this module, students will learn about urban farming and examine its viability in Singapore.

With the school-based hydroponics system, students will be learning about how to set up a hydroponics system and grow and harvest their own vegetables. Through this, they will learn about, seed germination, factors affecting plant growth such as light, water and nutrients. An additional session on the growing of microgreens will allow students to readily apply what they have learnt to the home setting.

Students will embark on two learning journeys. The first learning journey to Singapore Food Agency which deals with food safety and security in Singapore will give students a broad overview of Singapore's food supply. The second learning journey will give students a glimpse into a commercial urban farm and give students insight into the potential applications of their earlier learning.

The module will culminate in an exhibition in school where students will showcase their learning.

#### Outline

Session	Topics Covered	Learning Experience	Remarks
1	Introduction to Urban Farming	<ul style="list-style-type: none"><li>• Introduction to what urban farming is.</li><li>• Why Urban Farming?</li><li>• Soil vs hydroponics</li><li>• Plant anatomy and growth (include germination differences in plant growth in soil systems vs hydroponics systems)</li><li>• First planting session in the hydroponics system – setup hydroponics system</li></ul>	<p>Classroom session – to prepare notes and slides</p> <p>Hydroponics system – set up prior to the session</p> <p>Seeds and all necessary materials for the hydroponics session</p> <p>Martian Video as a trigger: *If you are stranded on Mars, what would you need to survive?)</p> <p>need solar panels or any other energy source, sunlight, water and oxygen and an enclosure</p>
2	Sustainability of Urban Farming	<p>Sustainability issues related to urban farming</p> <ul style="list-style-type: none"><li>• Carbon footprint</li><li>• Water conservation</li><li>• Labour</li><li>• Food waste</li><li>• Pest management (release of pesticide into environment)</li></ul>	<p>Classroom session – to prepare notes and slides</p> <p>To grow: Basil, Mint, Mustard greens, Kale,</p>

		<ul style="list-style-type: none"> <li>Effect of traditional farming on land (eutrophication due to runoff)</li> <li>Second planting session in the hydroponics system (leafy greens)</li> </ul>	
3	Learning Journey to SFA	<ul style="list-style-type: none"> <li>Learning journey to learn about the agency for all food-related matters in Singapore.</li> <li>As Singapore is primarily reliant on imported food, SFA is required to ensure a safe food supply for our country. Farming is also part of their purview in Singapore to bolster our food supply.</li> </ul>	<p>As the lead agency for food-related matters, SFA's mission is to ensure and secure a supply of safe food for Singapore. SFA works hand-in-hand with the industry and consumers to grow our three "food baskets" – Diversify import sources, Grow local, and Grow overseas, as well as ensure food safety from farm to fork. SFA also partners food businesses to strengthen capabilities, tap on technologies to raise productivity, undertake research to develop new lines of business, and catalyse industry transformation to ensure food security <a href="https://www.sfa.gov.sg/">https://www.sfa.gov.sg/</a></p>
3a	Field Trip  Sky Greens	<ul style="list-style-type: none"> <li>Visit to Sky Greens, the world's first low carbon, hydraulic driven vertical farm.</li> </ul>	<p><a href="https://www.skygreens.com/">https://www.skygreens.com/</a></p> <p>Sky Greens is world's first low carbon, hydraulic driven vertical farm. Using green urban solutions to achieve production of safe, fresh and delicious vegetables, using minimal land, water and energy resources. Sky Greens is the innovation hub of its holding company, Sky Urban Solutions Holding Pte Ltd, where continuous innovation in next generation of urban agriculture solutions take place.</p>
4	Cost of Buying vs Growing	<ul style="list-style-type: none"> <li>Analysis of cost of buying vs growing own vegetables/herbs</li> <li>Points to consider:</li> <li>Setup cost</li> <li>Running cost</li> <li>Water</li> <li>Electricity</li> <li>Nutrient solution</li> <li>Seeds</li> <li>Time</li> <li>Pest management</li> <li>Growing of Microgreens</li> </ul>	<p>Classroom Session</p> <p>Prepare</p> <ul style="list-style-type: none"> <li>interactive activity to get students to compare buying vegetables and growing their own.</li> <li>microgreens introduction slides.</li> <li>microgreens trays and pre-soaked seeds to grow microgreens.</li> </ul>

		<ul style="list-style-type: none"> <li>To compare growth of microgreens using plain water and water enhanced with commercially available growth activators and water enhanced with hydrogen peroxide.</li> </ul>	
6	Showcase of Learning	<p>'Farmer's Market' exhibition to showcase students learning through the 6 weeks.</p> <ol style="list-style-type: none"> <li>1) Process of growing crops</li> <li>2) Key takeaways               <ol style="list-style-type: none"> <li>a. Sustainability of hydroponics</li> <li>b. Cost of buying vs Growing</li> </ol> </li> <li>3) Ideas for uses of the crops</li> </ol>	<p>Sharing with the school community and also giveaways of the harvest and seeds to inspire members of the school community to grow their own food.</p>