Teacher guidelines – activity on:
Green technology

Generic green skills

Cognitive competencies:

- Innovation skills to identify opportunities and create new strategies to respond to green challenges
- Systems and risk analysis, skills to assess, interpret and understand both the need for change and the measures required

Interpersonal competencies:

- Communication and negotiation skills to discuss conflicting interests in complex contexts

Technological competencies:

- Management systems (waste, energy, water)

Learning objective

Students are expected to:

1. Identify green technologies used on campus
2. Identify issues that can be solved with the use of green technology
3. Suggest a green technology for any one of the identified issues

Format

Small group work

Role of teacher

Facilitator

Resources needed

A3 paper, pens, colored pencils, student worksheet, concept information sheet

Time required

2 hours

Assessment

The assessment will be based on:

1. Students' group work reflected in a worksheet and sharing group observations regarding the use of green technology on campus
2. Students' group presentations focused on innovative ideas for using green technology/ies to solve a problem

Suggested teaching and learning sequences

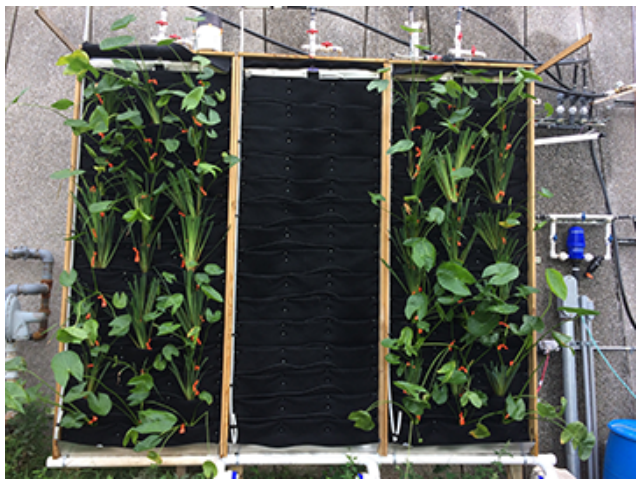
Part 1: Small group learning on campus (60 mins)

1. In the classroom, show students some pictures of green technology to inspire their thinking (you can use the PowerPoint presentation that is a part of this pack).

a. **Transparent solar spray transforms windows into watts**

b. **Energy saving escalator**

c. **thermoGreenWall™ (tGW)**



Green walls are essentially vertical gardens on the exterior of a wall. They passively regulate a building's cooling and heating needs, filter air and provide habitat. Green walls are also aesthetically pleasing.

Unlike standard green walls, the new technology, tGW, actively rejects heat, providing an alternative technology to wet cooling towers that provide heat rejection needs for district chilled water production, building cooling, and power generation.

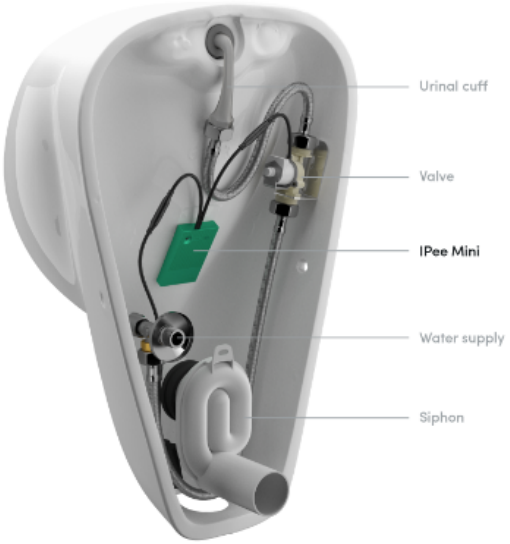
Find more at
https://sustainability.yale.edu/news/green-wall-technology-has-first-trial-run-campus

d. **Sideways-growing trees**

The trees are planted in pots clamped to the facades of buildings. The pots rotate and the movement 'tricks' the trees into growing sideways.

Because they are constantly revolving, sideways trees are exposed to more sunlight than regular trees, so they are bushier. In fact, they have about double the biomass of regular trees. This means that they can filter more pollutants from the air, fix more carbon and produce more oxygen. They also have a cooling effect. A building facade with greenery on is about twice as cool as a concrete surface.

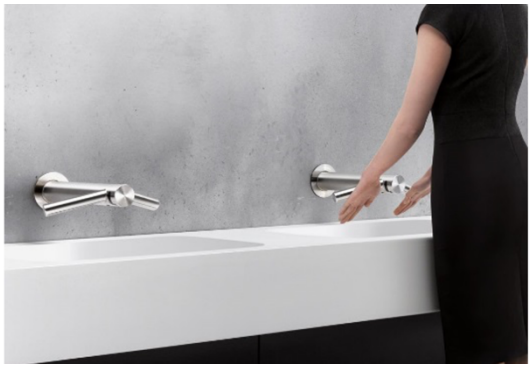
e. **Smart toilet**



One of the most irritatingly wasteful inventions of modern times has to be the auto-flush toilet. They never seem to flush at the right time – sometimes before you enter the toilet cubicle, sometimes before you've finished your business. According to one study in the United States, when auto-flush toilets replaced manual commodes, water use increased by 54 percent.

Enter the IPee, an intelligent toilet sensor that flushes only when it needs to, and with an appropriate amount of water. Find more at: https://www.eco-business.com/news/from-breathing-walls-to-rain-harvesting-canopies-the-coolest-tech-at-singapore-green-building-week/

f. **The Dyson Airblade Tap**



After washing your hands you can dry them with the same tap. As you don't need a separate hand dryer, you avoid waste water dripping on the floor, so less resources are needed for cleaning, and you save on wall and floor space as well as materials needed for manufacturing.

2. Divide students into groups of 4-5 people and take them outside to explore some areas on campus (e.g. canteen, study areas, outside seating areas). Let students identify and discuss the green technologies used on campus and think about the advantages of using them and evaluate how technologies work. Remind students to fill out the worksheet.

3. Facilitate students to identify environmental issues on campus, such as waste in the canteen or printing room, the use of air-conditioners and computers, limited green zone, lack of natured ventilation, etc. Remind them to fill out the worksheets.

4. Invite students to share their responses and answers in class.

5. If you want students to evaluate issues at a workplace after introducing several green technologies through the PowerPoint, set the tasks based on students' worksheets and ask them to work on the tasks during industry placement. Ask students to bring their worksheets back to class for discussion and presentation.

Part 2: Small group work in class (60 minutes)

1. Ask students to pick one identified environmental issue on campus, or at the workplace, and explore it in groups. Suggest that different groups focus on different issues.

2. Guide students to reflect on their previous learning or work experience to identify the causes and effects the issue has, and evaluate identified environmental issues from different perspectives.

3. Guide students to brainstorm a green technology to address the environmental issue.

4. Ask students to sketch a poster in groups.

5. Presentation: students are required to explain how the proposed green technology will work and help to solve the issue.

Suggested answers/examples of activities

Part 1: Small group learning on campus (60 minutes)

Green technology on campus	**Goals of using the green technology**	**How do they work?**
LED monitors	Energy efficiency	The light will only turn on when it senses movement

Part 2: Small group work in class (60 minutes)

Environmental issue: Food waste management	
Cause and effect	***Green technology***
Serving of oversized portions that people cannot finish. This will result in environment pollution and a waste of resources. (Students can also draw a mind map to link different concepts related to this issue).	1. Convert food waste into clean energy 2. Smart tech, which can provide suggestions for the purchase of food 3. Varity of food portions

Reference:

Green wall technology has first trial run on campus | Yale Sustainability. (2017). Retrieved from https://sustainability.yale.edu/news/green-wall-technology-has-first-trial-run-campus

Ho, C., & Hicks, R. (2018). From breathing walls to rain-harvesting canopies: The coolest tech at Singapore Green Building Week. Retrieved from https://www.eco-business.com/news/from-breathing-walls-to-rain-harvesting-canopies-the-coolest-tech-at-singapore-green-building-week/

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