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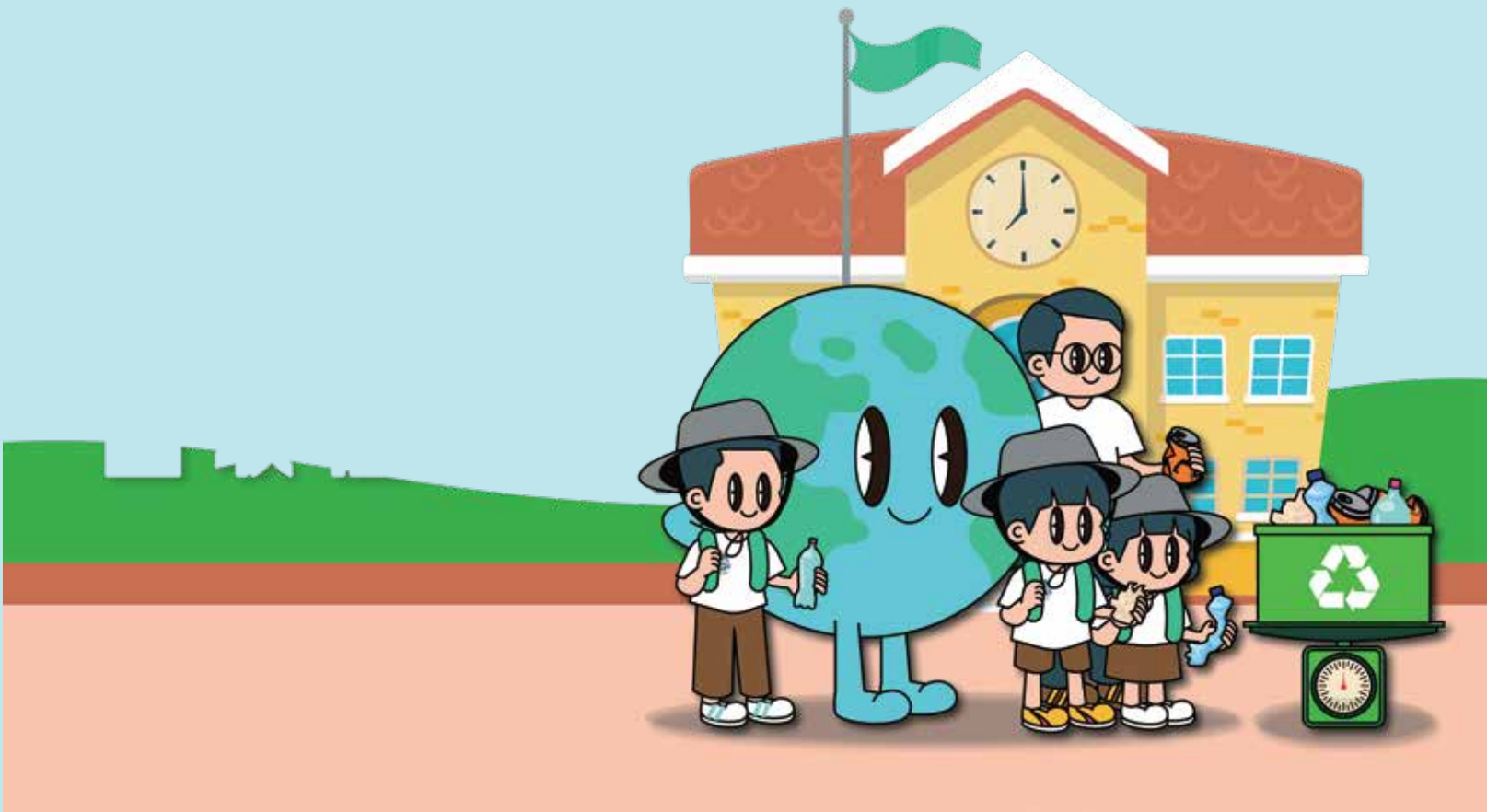
SGREEN

Recycle at School

Teaching Resources for Secondary School



SGREEN
Recycle at School

Content

SGREEN Background Information

Environmental education has been promoted among schools for many years. Many schools have set up recycling bins on campus to cultivate the habit of recycling waste in students. According to the most updated data from the Environmental Protection Department, Hong Kong's waste recycling rate is around 31%. What is the meaning to school? In view of the "Municipal Solid Waste Charging Scheme" which will be officially launched next year, how should schools prepare for it?

To get ready for "Municipal Solid Waste Charging Scheme", Ocean Park Conservation Alliance has been established to create recycling database in school through the implementation of SGREEN activities to formulate long-term waste reduction and recycling plans to cultivate recycling habits. Schools can also experience the management of waste recycling supply chain to ensure the process is effective and smooth.

For students, the habit of recycling can be cultivated through SGREEN activities, and thus actions of waste recycling, waste reduction and reuse in school can be encouraged.

Introduction of SGREEN Toolkit

The SGREEN toolkit is designed to support teachers in organising recycling-related educational activities and to help teachers promote the concept of recycling in schools. It is hoped that through different teaching activities and school-wide extended activities, recycling awareness in the school will be aroused, thereby formulating recycling goods and directions through an established recycling database.

Introduction of SGREEN Suggested Activity

To incorporate SGREEN throughout the school year, different activities are suggested to implement into lessons or activities day. Through a series of activities, students can acquire environmental recycling relaated knowledge faster and environmental recycling habit in school. In addition, recycling data can be created through various types of activities. With the database schools can foresee recycling trends, and thus set school recycling goals and conservation directions. Concepts of environmental recycling could even be integrated into various school subjects and promoted to the community.

Seahorse Rangers are encourage to promote and assist teachers in coordinating the suggested activities and encourage teachers and students across the school to participate in SGREEN.

Main Learning Objective:

- Collaborate with different stakeholders to promote recycling habits
- Increase the usage of recyclables by upcycling creatively
- Determine recycling goals through recyclables data collection

Objectives of Suggested Activities

Goals

Through the theme teaching activity, students are able to:

1. Acquire an in-depth understanding of garbage classification and types of recycling materials.
2. By understanding the current social and global recycling situation, reflect on and formulate appropriate recycling programs for schools to implement
3. Learn the operation mode and recycling methods of local environmental protection organisations and evaluate the efficiency and feasibility of school's recycle programs
4. Use STEAM to promote environmental recycling information to all teachers and students in the school, and all sectors of the society

Preparation

1. Ask students to pay attention to recyclable materials in school
2. Ask students to learn the overall recycling situation in today's society and around the world
3. Collect information on environmental protection organisations that recycle materials in Hong Kong (including operations and recycling methods)

Introduction activity

1. Arouse students' reflection through current events (the impact of garbage on the natural environment and ecology, such as stranded green sea turtles and cetaceans)
2. Make the students understand the concepts of recycling materials and upcycling through PowerPoint and short videos

Relevant concepts	Music	Visual Arts	General studies	Mathematics

Suggested Classroom Activities

Part 1：Explore recyclables on campus and the ways of recycling

Main learning objective:
Enhancing knowledge about recyclables (refer to supplementary powerpoint slide 10–17)

1. Explore and gather data on potential recyclables on campus
2. Explore the supply chain of recyclables
    a. Upcycling
    b. Become raw material in a circular economy
    c. Donate to other organisation

Example

Suitable for:
Biology or Chemistry

1. Make an introduction using recyclables on campus.
   Question: What are the recyclables at school?
   Follow–up questions:
    a. What are the other possible recyclables, apart from those existing on campus?
    b. Where will the recyclables go, after being put in the recycling bins?

2. Invite students to debate on the following recycling–related topics.
   Suggested topics:
    a. Relations between plastic wastes and micro–plastics and their affection to different parties
    b. Recycling and product life cycle
    c. Recycling and waste reduction at the source

3. Understand the supply chain of recyclables.
    a. Recyclables are put in recycling bins
    b. Recycling companies collect the recyclables
    c. Recyclables are broken down and the impurities are removed
    d. Recyclables are made into raw materials or upcycled into new products

Example (cont.)

4. Explore ways to upcycle recyclables by experiential learning.
   Biology class – Fermented into fertiliser
   Chemistry class – Make handmade soap, for example using coffee grounds to make soup

5. Extended activity: Invite students to observe the usage of recycling bins and trash bins during recesses, lunchtime and afterschool before the next lesson.

Part 2：Integrate information and formulate on-campus recycling plans

Main learning objective: Understand the recycling situation on campus (please refer to supplementary powerpoint slide 20–23)

1. Research and discuss the location of recycling bins on campus
2. Determine on-campus recycling targets based on research data of recyclables
3. Integrate recycling data and information to promote recycling programme to all teachers and students

Suitable for: Mathematics

Example

1. Observation sharing.
   a. Invite students to share their observations of recycling bins and trash bins

2. Teachers may guide students to reflect on the recycling practices of students and teachers.
   Discover for interesting topics for scientific researches.
   a. Steps of a scientific research:
      observation → hypothesis → experiment → analysis → conclusion
   b. Suggested topics for scientific researches:
      i. Correlation between the usage of recycling bins and their locations
      ii. Ways to increase the usage of recycling bins
      iii. Correlation between recycling and reducing waste at source

3. Formulate hypothesis.

Example (cont.)

4. Experiment: Conduct experiment on interesting topics based on on-site inspection and analysis.

a. Calculate the usage of recycling bins and rubbish bins on campus

b. Divide students in groups to observe the usage of recycling bins and trash bins in school during recess, lunch and after school periods

Waste disposal status

Amount of recyclables in the recycling bin			Number of students: _____
Quantity	Plastic bottles:	Used paper:	Aluminium cans:

Amount of recyclables in the rubbish bin			Number of students: _____
Quantity	Plastic bottles:	Used paper:	Aluminium cans:

c. Multiply the above data by the number of days to calculate the monthly recycling amount and garbage amount

Average monthly recycling amount	(Total amount of recyclalbes in recycling bin in a day * no. of bins) * no. of weekdays
Average monthly garbage amount	(Total amount of recyclalbes in rubbish bin in a day * no. of bins) * no. of weekdays

d. Through calculation, find out the average monthly recycling amount and average monthly garbage amount throughout the year

e. Find out the recycling and garbage ratio (recycling: garbage)

f. Repeat on-site inspection and analysis can be made if needed

5. Analysis and conclusion: Teachers can lead students for data analysis and conclusion making.

a. Data analysis: The usage data of recycling bins and rubbish bins, types of users, users experience etc.

b. Conclusion: Make suggestion based on research topics

Part 3 : Study the operation and recycling methods of designated environmental protection organisations

Main learning objective:
Explore new feasibilities for recycling materials on campus (please refer to supplementary powerpoint slide 20–23)

1. Study the operations and recycling methods of environmental protection organisation, and understand the recycling process and related regulations
2. Integrate information and formulate a detailed recycling plan, including the storage location of recyclable materials, recycling procedures, recycling frequency and recycling precautions
3. Explore disposal ways of recyclable materials, such as upcycling, using raw materials to make other items, or donating to other organisations

Suitable for:
Visual Arts, General Studies or Language

Example

1. Through the first two parts of the activity, students have learnt the ways to handle recyclables and the recycling situation on campus. Teachers can lead students for investigation on the operations and recycling methods of environmental protection organisations, in order to understand the recycling process in Hong Kong.
    a. Choose one of the recyclables from the first part of the activity
    b. Study the operations and recycling methods of environmental protection organisations
        Suggested research field:
            Upcycling organisations
            Closed loop supply chain organisations

2. Develop in–depth understanding of an environmental protection organisation through project–based learning.
    a. Data research: online research, interviews
    b. On–site investigations

3. Invite students to discuss whether it is feasible to promote recycling on such recyclable on campus.

Example (cont.)

Research Example:

1. Choose a certain type of recyclable: Coffee grounds.

2. Evaluate the daily production of coffee grounds in a coffee shop or the staff room.

3. Research on coffee grounds recycling organisations.

4. Integrate information and formulate recycling plans.
    a. Provide plastic buckets as coffee grounds storage containers
    b. Store only coffee grounds in the container
    c. Recycle coffee grounds every 3 days to prevent them from becoming mouldy
    d. Before recycling, place coffee grounds evenly on a plate and place them in the microwave for approximately one minute to dry the moisture in the coffee grounds

5. Explore ways to upcycle recyclable materials.
    a. Fermented into fertiliser
    b. Make handmade soap

6. Explore various recycling methods: Organise a theme-based event day – Coffee grounds upcycling day.
    a. Make handmade soap from coffee grounds

Suggested Extended Activities

Relevant concepts	Visual Arts	Chemistry

Part 1 : Use recycled materials on fashion or large-scale props to invite whole-school participation

1. Communicate with the Students' union or relevant student groups to encourage the school in using recycled materials as raw materials for event props
    a. Fashion show
    b. Large event day (e.g. Athletic Meet, Swimming Gala)
2. Integrate the required materials and formulate a recycling plan

Example

Fashion show

1. Consult the Student Union/Visual Arts teacher on using recycled materials as raw materials for the fashion show.
2. Research on the used clothing recycling process and categories.
    a. Clean clothes (new or used)
    b. Shoes
    c. Handbags
    d. Backpacks
    e. Accessories (e.g. scarves)
3. Categorise used clothing according to:
    a. Pattern
    b. Fabric
4. Pass the sorted fabrics to the Student Union/Visual Arts teacher.

Part 2：Integrate into the community by collaberating with non-profit organisations

Through researching on microplastic pollution, reflect and promote the importance of reducing the plastics use.

1. Communicate with the Students' Union or relevant student groups to discuss possible collaberation with non-profit environmental protection organisations
2. Engage in the community with conservation concepts to promote and educate recycling habits and knowledge as part of the "Community Service" duties in "Other Learning Experiences"

Example

1. Cooperate with non-profit environmental protection organisations to organise beach clean-up activities.

2. Collect and analyse microplastics on beaches.

3. Organise joint sharing sessions with non-profit organisations.
    a. Discuss the impact of microplastics pollution on the environment

Part 3：Incorporate STEAM elements

Promote environmental protection to teachers, students and all sectors of the society, encourage participation from various stakeholders.

1. Create environmentally friendly enzyme cleaners or fertilisers and share the work with the public on school open days
2. Develop online tutorials on making environmentally friendly enzyme cleaners or fertilisers, and invite teachers, students and the public to make them together

Example

STEAM elements:
S — Fermentation process and principle
T — Environmental enzyme online teaching materials production (including PPT and videos)
A — Design environmentally friendly enzyme teaching materials
M — Calculate ingredient ratios

1. Create fruit skin eco enzyme cleaner.
    a. Prepare apporximately 300 grams of fruit skin and about 100 grams of brown sugar
    b. Prepare a 2–liter plastic bucket and 1 liter of boiling water
    c. Put the fruit skin and brown sugar into the bucket
    d. Place it in a sealed plastic bottle to ferment for three months
    e. After the fruit skin ferments, it becomes eco enzyme cleaner
    f. Put the eco enzyme cleaner into small bottles and share them with the community on open days or put them at the school gate

2. Create food waste compost.
    a. Use a plastic bucket to collect food waste (uncooked fruits and vegetables, vegetable leaves, fruit skin, egg shells, coffee grounds, etc.)
    b. Prepare a plastic bucket and drill several small holes in the bottom to allow the liquid produced after fermentation flowing out
    c. Collect fallen leaves and weeds and place them on the bottom layer
    d. Put the prepared materials into the bucket alternately
    e. Cover with a layer of soil and compact lightly
    f. Prepare another bucket to collect the flowing liquid and put it into small bottles
    g. Share them with the community on open days or put them at the school gate

Roles of Seahorse Rangers

On–campus communication	Communicate with the Students' Union or relevant student groups to explore possibilities
Off–campus communication	Promote on–campus conservation activities and assist teachers to organise such activities

參考連結

Upcycling coffee grounds

https://www.eco-greenergy.com/pages/zgcc-cg-profit-usage

Arts Education Curriculum Documents

https://www.edb.gov.hk/tc/curriculum-development/kla/arts-edu/curriculum-docs/index.html

Conservation related topics

Plastic particles

https://www.greenpeace.org/taiwan/update/13518/%E4%BB%80%E9%BA%BC%E6%98%AF%E5%A1%91%E8%86%A0%E5%BE%AE%E7%B2%92%EF%BC%9F%E4%BD%A0%E6%88%91%E7%9A%84%E6%8E%92%E9%81%BA%E7%89%A9%E4%B8%AD%E5%8F%AF%E8%83%BD%E9%83%BD%E6%9C%89%E5%AE%83%EF%BC%81/

Product Lifecycle

https://www.youtube.com/watch?v=Ryr_OZvKRel&t=167scurriculum-docs/index.html

Plastic reduction at source

https://www.greenpeace.org/taiwan/update/12393/%E5%9B%9E%E6%94%B6%E4%B8%8D%E8%83%BD%E8%A7%A3%E6%B1%BA%E5%A1%91%E8%86%A0%E5%95%8F%E9%A1%8C%EF%BC%81%E4%BC%81%E6%A5%AD%E3%80%81%E6%94%BF%E5%BA%9C%E3%80%81%E5%80%8B%E4%BA%BA%E5%8F%AF%E4%BB%A5%E5%81%9A/

References for environmental protection projects in cooperation with non-profit organisations

Environment and Conservation Fund Project List

https://eeca.ecc.org.hk/tc/application/projects.html

Make a Peel Cleanser

https://www.hk01.com/親子/38009/diy水果清潔劑-善用果皮廚餘-野人教你自製環保酵素#media_id=192325

https://www.hk01.com/親子/532009/媽媽好幫手-碌柚變身不傷手天然清潔劑-趕絕螞蟻-甲由#media_id=5408186

Make food waste compost

https://www.youtube.com/watch?v=rWCB0KIpI7I

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Supplementary powerpoint

Teaching resources

Poster