

支持單位：



教育暨青年局
Direcção dos Serviços de
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民政總署
INSTITUTO PARA OS
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環境保護局
DIRECÇÃO DOS SERVIÇOS DE PROTECÇÃO AMBIENTAL



能源發展辦公室
Gabinete para o Desenvolvimento
do Sector Energético



兒童環保行動  Envirokids Program

第三階段行動記錄 Third Stage Workbook

主辦單位：



澳門生產力暨科技轉移中心

為服務而發展 為發展而服務
We serve to develop We develop to serve

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 再造紙 RECYCLE PAPER



環境與我們

我們人類現時耗用地球資源的情況已達地球所能給予的120%。到了2050年我們便需要兩個地球，但地球只有一個！由於地球復原的速度未能趕及，自然環境面臨崩潰。從今天起，就讓我們每一個人加強與環境關係的認識，並透過減少、再用和循環再造的三大原則，善用地球資源避免浪費。

齊來動腦筋



1. 列出三種有助保護澳門環境的行為

項目	保護環境的行為	原因
1	在學校自製天然肥料	好好利用廢物
2	在學校建立社區園圃	植物可美化環境
3		

2. 列出三種會損害澳門環境的行為

項目	損害環境的行為	原因
1	把可再用或循環再造的廢物丟棄	焚化中心需要耗用大量能源去處理垃圾、堆填區很快會飽和
2	到處興建水泥建築物	人類和動物可享用的綠化空間越來越少
3		

我們可做些甚麼？

我們可以在學校實行一些環保項目，簡單來說如自製天然肥料或建立社區園圃、進行有機耕種，已經有助我們學習如何保護我們的環境了。

小提示



你要相信自己能改善環境。



行動

你可以參與環保活動，例如社區園圃、自製天然肥料和廢物再用等。

小提示



按照我們提供的活動例子去實踐環保。





怎樣才能保護環境？

你和你的同學可以在老師的指導下組成四至六人的小組，挑選一個你們感興趣的環保項目，然後擬定行動計劃，為環保盡一分力。

注意：團隊的發展階段
團隊的發展可分為四個階段：

- ➔ **形成期：**
團隊成員共同定義團隊成員各自的角色與工作內容。
- ➔ **風暴期：**
團隊成員由於要合作、溝通和協調，遭遇到困難與阻力。
- ➔ **基準期：**
團隊成員逐漸了解各自的工作責任，接受團隊所定出來的規則，互相提出有建設性的意見，以友善、信任及分享的態度來解決問題，令小組工作得更順暢。
- ➔ **執行完成期：**
團隊成員逐漸地根據工作目標，以合作方式去進行並完成。

小提示



進行了我們的活動例子後，你就會明白如何為環保盡一分力。

如何去進行一項環保活動？

我們可以用「PDCA」循環去進行一項環保活動：

步驟一：計劃 (PLAN)

在這個階段，我們要知道的是需要做甚麼、如何做、由誰來做和何時做。

步驟二：執行 (DO)
我們把計劃付諸實行。

步驟三：檢查 (CHECK)
我們檢查一下所做的是否和計劃相符。

步驟四：總結及改善 (ACT)
在這個階段，我們進行總結，看看學習了些甚麼和如何才能做得更好。



環保活動例子A — 社區園圃



步驟一：計劃 (PLAN)

我們要知道需要做甚麼、如何做、由誰來做和何時做。

1. 我們要準備活動所需的材料及工具：
 - 花盆或一小塊土地
 - 泥土
 - 花或蔬菜的種子
 - 澆水工具
 - 園藝工具
 - 園藝手套
 - 堆肥
 - 選擇作為園圃的地方



2. 我們需要進行甚麼工作？如何去？

工作/次序	活動內容	負責人	日期/時間
1	提供所需材料及工具，並向學生解釋	老師	第一天
2	選擇一個適合作為園圃的地方，並向學生解釋	老師	第一天
3	把泥土放入花盆	指定的組員	第二天
4	選擇花或蔬菜的種子	指定的組員	第二天
5	播種，並覆上泥土(如需要)	指定的組員	第二天
6	澆水	指定的組員	每天
7	除去雜草(如需要)	指定的組員	每天
8	記錄種子發芽、植物開花、蔬果收成的時間	指定的組員	每天
9	施肥(如需要)	指定的組員	需要時

環保活動例子A — 社區園圃



步驟二：執行 (DO)

按照以上表格列出的活動計劃去進行。

注意：老師需要向學生解釋工作內容及進行方法。

步驟三：檢查 (CHECK)

根據活動計劃檢查已進行的工作，確定沒有任何遺漏。

步驟四：總結及改善 (ACT)

讓我們總結一下，看看學習了些甚麼，例如：

1. 植物需要水、陽光和肥料(有養分的泥土)和適當的護養。
2. 昆蟲會吃掉蔬菜，而雀鳥會吃掉果實(例如蕃茄)。
3. 蜜蜂和蝴蝶會吸取花蜜，並傳播花粉。

注意：老師需要和學生一同討論，總結經驗。



環保活動例子B — 自製天然肥料

自製天然肥料



步驟一：計劃 (PLAN)

我們要知道需要做甚麼、如何做、由誰來做和何時做。

1. 我們要準備活動所需的材料及工具：

容器(透明膠樽)

泥土

蚯蚓

枯萎的植物

園藝工具

園藝手套

針(將膠樽打洞)

保鮮紙

橡筋



2. 我們需要進行甚麼工作？如何去做？

工作/次序	活動內容	負責人	日期/時間
1	提供所需材料及工具，並向學生解釋	老師	第一天
2	把泥土放入容器	指定的組員	第二天
3	把蚯蚓放入容器	指定的組員	第二天
4	把枯葉放在泥土上	指定的組員	第二天
5	用保鮮紙封蓋著容器口，並用橡筋固定	指定的組員	第二天
6	把容器放在指定的地方	指定的組員	第二天
7	每天往容器加適量的水	指定的組員	每天
8	觀察蚯蚓需要多少天才能把枯葉分解	指定的組員	每天
9	觀察泥土上是否覆蓋著一層肥料	指定的組員	每天

自製天然肥料

環保活動例子B — 自製天然肥料

步驟二：執行 (DO)

按照以上表格列出的活動計劃去進行。

注意：老師需要向學生解釋工作內容及進行方法。

步驟三：檢查 (CHECK)

根據活動計劃檢查已進行的工作，確定沒有任何遺漏。

步驟四：總結及改善 (ACT)

讓我們總結一下，看看學習了些甚麼，例如：

1. 枯萎的植物可以被自然分解。
2. 除了蚯蚓之外，還有其他昆蟲可以有同樣的作用。

注意：老師需要和學生一同討論，總結經驗。



自製天然肥料

環保活動例子C — 將膠樽製成容器，
供環保活動例子A/B使用



步驟一：計劃 (PLAN)

我們要知道需要做甚麼、如何做、由誰來做和何時做。

1. 我們要準備活動所需的材料及工具：
剪刀
膠樽
針(將膠樽打洞)
箱頭筆
2. 我們需要進行甚麼工作？如何去做？

工作/次序	活動內容	負責人	日期/時間
1	提供所需材料及工具，並向學生解釋	老師	第一天
2	了解環保活動例子A/B需要甚麼樣的容器	指定的組員	第二天
3	用箱頭筆在膠樽上勾劃出所需容器的形狀	指定的組員	第三天
4	剪裁膠樽 (注意：為防止意外，一定要在老師看管下才可進行)	指定的組員	第三天
5	把容器交給環保活動例子A/B的團隊成員	指定的組員	第四天
6	檢討容器是否適合使用	所有組員	第五天



環保活動例子C — 將膠樽製成容器，
供環保活動例子A/B使用

廢物
再用

步驟二：執行 (DO)
按照以上表格列出的活動計劃去進行。

注意：老師需要向學生解釋工作內容及進行方法。

步驟三：檢查 (CHECK)
根據活動計劃檢查已進行的工作，確定沒有任何遺漏。

步驟四：總結及改善 (ACT)
讓我們總結一下，看看學習了些甚麼，例如：

1. 廢物是可以重覆使用。

注意：老師需要和學生一同討論，總結經驗。



活動工作紙

活動名稱：_____

活動目的：_____

團隊隊名：_____

團隊成員：_____

步驟一：計劃 (PLAN)

我們要知道需要做甚麼、如何做、由誰來做和何時做。

1. 需要準備的材料及工具：

2. 工作項目及負責人：

工作/ 次序	活動內容	負責人	日期/時間

活動工作紙



步驟二：執行 (DO)

按照以上表格列出的活動計劃去進行。

步驟三：檢查 (CHECK)

根據活動計劃檢查已進行的工作，確定沒有任何遺漏。

步驟四：總結及改善 (ACT)

讓我們進行總結，看看學習了些甚麼和如何做得更好。



We and the Environment

We, human beings, are currently use 120 per cent of our Earth's resources. By 2050, we will need two planets, but we have only ONE Earth. As our Earth cannot regenerate fast enough, our natural environment will collapse. Everyone living in the world needs to increase the awareness of our relationship with the environment and use the Earth's resources wisely by reducing waste. We need to reduce, reuse and recycle.

Let's brainstorm



- List 3 actions that will help to protect the environment in Macau

Item	Helpful Actions	Reasons
1	Produce natural fertilizer at school	Put waste into good use
2	Community gardening at school	Plants will help to beautify the environment
3		

- List 3 actions that will hurt the environment in Macau

Item	Harmful Actions	Reasons
1	Just throw away things that could be recycled or reused	A lot of energy is used during incineration; landfill capacity will soon be exhausted
2	Concrete buildings everywhere	Very little "green" space (trees and flowers) left for us and other animals
3		





What Can We Do?

We can learn and build up our experience in protecting our environment by implementing environmental friendly projects at school. Producing natural fertilizer from natural waste and community gardening are examples of what WE can DO to save our environment.

Useful tips



You have to believe that you can improve the environment.



Action

Participate in environmental protection activities, such as community gardening, producing natural fertilizer, or reuse trash for other purposes etc.

Useful tips



Follow our sample projects.



How Can We Make A Difference?

Under the supervision by your teacher, form a team of 4 to 6 classmates. Choose a project that you are interested in. Then, work out a plan and define how you and your team members can contribute to protecting the environment.

Notes: Team Formation

The four stages in team formation are:

- ➔ **Forming:** Team members define each other's roles and responsibilities.
- ➔ **Storming:** As team members need to communicate and coordinate when working together, they experience difficulties and conflicts.
- ➔ **Norming:** Team members gain a better understanding each other's responsibilities and are willing to follow the rules defined by the team; they will provide each other with constructive suggestions, and solve problems with an open, trusting and sharing attitude.
- ➔ **Performing:** Team members are performing effectively, moving closer and closer to achieving the planned objectives.



Useful tips



By following any one of the sample projects provided, you will see how you have contributed to protecting the environment.

How Do We Implement a Project?

We can use the PDCA Cycle:

Step 1 Plan

At this stage, we will define what we need to do, how to do it, who will do it and when to do it.

Step 2 Do

We will put our plan into action at this stage.

Step 3 Check

At this stage, we will check if what we have done matches what we have planned.

Step 4 Act

We will do an overall review, conclude what we have learned and how we can do it better.



Sample Project A – Community Gardening



Step 1 – Plan

Let's define what needs to be carried out, how to carry out, who will carry out and when.

1. As preparation, we need to know what materials/tools are required for carrying out this project:

- Flower pots or a small plot of land
- Soil
- Flower or vegetable seeds
- Watering cans
- Gardening tools
- Gardening gloves
- Compost
- Select an area for gardening



2. What are the activities that need to be done?
How to carry them out?

Item/Step	Project Activities	Responsible party	Date/Time
1	Provide the necessary materials/tools and explain to the students	Teacher	Day 1
2	Select a suitable gardening area and explain to the students	Teacher	Day 1
3	Put soil into the flower pot(s)	Member(s) assigned	Day 2
4	Select the kinds of flower or vegetable seeds	Member(s) assigned	Day 2
5	Sow the seeds, covering with soil (if appropriate)	Member(s) assigned	Day 2
6	Water the plant	Member(s) assigned	Every day
7	Remove weeds, if necessary	Member(s) assigned	Every day
8	Record the day when seeds start to germinate, plants start to blossom, or start to bear fruits	Member(s) assigned	Every day
9	Add compost, if necessary	Member(s) assigned	When needed

Sample Project A – Community Gardening



Step 2 - Do:

Let's carry out the activities planned in the above table.

Note: Teacher needs to explain to the student the activities to be carried out and how to do them.

Step 3 - Check:

Let's check and make sure that we have not missed carrying out any one of the activities planned.

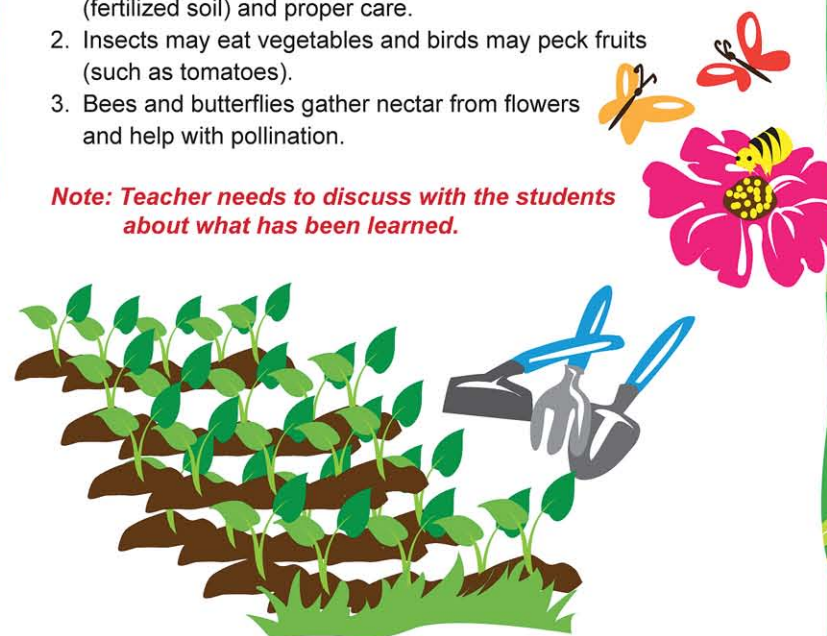
Step 4 – Act:

Let's review and conclude what we have learned.

Some of the examples may be:

1. Plants need water, sunlight and fertilizers (fertilized soil) and proper care.
2. Insects may eat vegetables and birds may peck fruits (such as tomatoes).
3. Bees and butterflies gather nectar from flowers and help with pollination.

Note: Teacher needs to discuss with the students about what has been learned.



Sample Project B – Produce Natural Fertilizer

Step 1 – Plan

Let's define what needs to be carried out, how to carry out, who will carry out and when.

- As preparation, we need to know what materials/tools are required for carrying out this project:
Containers (transparent, plastic bottles)
Soil
Earthworms
Dead vegetation
Gardening tools
Gardening gloves
Needles (to be used for punching holes in the containers)
Plastic cling wrap
Elastic bands
- What are the activities that need to be done?
How to carry them out?



Item/Step	Project Activities	Responsible party	Date/time
1	Provide the necessary materials/tools and explain to the students	Teacher	Day 1
2	Put soil into the container(s)	Member(s) assigned	Day 2
3	Put earthworms into the containers	Member(s) assigned	Day 2
4	Put dead leaves on the soil	Member(s) assigned	Day 2
5	Cover the container(s) with plastic cling wrap and keep it in position with elastic band	Member(s) assigned	Day 2
6	Place the container(s) in a designated area	Member(s) assigned	Day 2
7	Add some water into the container(s) on a daily basis	Member(s) assigned	Every day
8	Observe how many days the earthworms take to digest the leaves	Member(s) assigned	Every day
9	Observe if there is any fertilizer being deposited on the soil	Member(s) assigned	Every day

Sample Project B – Produce Natural Fertilizer

Step 2 - Do:

Let's carry out the activities planned in the above table.

Note: Teacher needs to explain to the student the activities to be carried out and how to do them.

Step 3 - Check:

Let's check and make sure that we have not missed carrying out any one of the activities planned.

Step 4 – Act:

Let's review and conclude what we have learned. Some of the examples may be:

- Dead vegetation can be decomposed by natural means.
- In addition to earthworms, there are other insects that can perform the same task.

Note: Teacher needs to discuss with the students about what has been learned.



Sample Project C – Reuse Plastic Bottles as Containers in Sample Projects A/B



Step 1 – Plan

Let's define what needs to be carried out, how to carry out, who will carry out and when.

- As preparation, we need to know what materials/tools are required for carrying out this project:
Scissors
Plastic bottles
Needles (to be used for punching holes in the plastic bottles)
Marker pens
- What are the activities that need to be done?
How to carry them out?

Item/Step	Project Activities	Responsible party	Date/time
1	Provide the necessary materials/tools and explain to the students	Teacher	Day 1
2	Identify what containers are needed in Sample Project A or B	Member(s) assigned	Day 2
3	Use marker pen to draw on the plastic bottle(s) the shape of the container(s)	Member(s) assigned	Day 3
4	Cut the plastic bottle(s) according to the shape drawn (note: this must be done under teacher's supervision to prevent accidents.)	Member(s) assigned	Day 3
5	Deliver the container(s) to members of Sample Project A or B	Member(s) assigned	Day 4
6	Check if these container(s) are fit for use	All members	Day 5



Sample Project C – Reuse Plastic Bottles as Containers in Sample Projects A/B



Step 2 - Do:

Let's carry out the activities planned in the above table.

Note: Teacher needs to explain to the student the activities to be carried out and how to do them.

Step 3 - Check:

Let's check and make sure that we have not missed carrying out any one of the activities planned.

Step 4 – Act:

Let's review and conclude what we have learned.
Some of the examples may be:

1. Trash can be reused for other purposes.

Note: Teacher needs to discuss with the students about what has been learned.



PROJECT WORKSHEET



Project Name: _____

Project Objective: _____

Team Name: _____

Team Members: _____

Step 1 – Plan:

Define what needs to be carried out, how to carry out, who will carry out and when.

1. What are the materials/tools required for carrying out this project?

2. What are the activities that need to be done? How to carry them out?

Item/Step	Project Activities	Responsible party	Date/time

PROJECT WORKSHEET



Step 2 – Do:

Carry out the activities planned in the above table.

Step 3 – Check:

Check activities planned to make sure no activity is missed.

Step 4 – Act:

Let us review the lessons learned and conclude the improvements that can be made.
