Environmental Sustainability

For Kids

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Introduction

Helping youth to understand their environmental footprint and contribute to their future

Water is the essential resource of life, used for cleaning, farming, cooking, and drinking. It also ensures the flourishing of natural life in its surrounding, with the quantity and quality of water being an important factor for both the environment and the local people. Only a very small fraction of the water on Earth is readily available for human use, and the quality of this small fraction is frequently threatened by human activities [1].

Agriculture is the largest cause of water degradation across the world; areas that utilize chemical pesticides and fertilizers are some of the worst offenders when it comes to water pollution. As the global population rises, water scarcity becomes an increasingly large concern and the need to conserve our water resources becomes more and more important. Environmental educational programs are becoming increasingly more common in order to educate the youth of today to become sustainable citizens of tomorrow [1].

This program aims to provide students aged 6–11 with a broad introduction to environmental sustainability in an interactive and fun fashion [1].This teaching plan is student-driven, rich in active sessions using investigation and experimentation. Learning takes place in classrooms and outside. Teachers receive practical tips to help them conduct activities in a safe and effective way. These activities are intended for use in the classroom and as a part of a structured Sustainability Day; however, the program can be adapted to whatever environment is most convenient and would facilitate the most student learning. It is possible to carry out the teaching in the classroom only, but it is our aim to convince all teachers that activity-based learning is an effective and fun way for students to learn about their environment, with less effort than they might have imagined [1].

Sustainability Half-Day

A day of hands-on learning dedicated to teaching youth about the importance of water resources

This Sustainability Half-Day has been created to most effectively suit the needs of Baan Yang School. We recommend that the Sustainability Half-Day topics should rotate every year to prevent students from becoming bored with the topic from year to year. The Sustainability Half-Day should be conducted in groups of grades 1-3 and 4-6.

Within grades 4-6, teachers should create three groups prior to the sustainability day. The program is designed to have three activities running in parallel, with each group rotating from activity to activity within a designated amount of time. The Sustainability day can last as long as necessary; however, the schedule below allows for a three-hour schedule. If needed, the schedule can be modified to accomodate for a longer or shorter day.

Basic Outline of Sustainability Half-Day Program

Time	Title	Description
09:00	Introduce Program	Explain the reason for having the sustainability day and explain the theme for today. Be sure to take the time to thoroughly introduce the program and any outside volunteers who are present! The students should be aware of the day's timeline from the beginning to prevent any confusion or boredom.
9:10	Ice Breaker	Ice breakers will let students play a quick game to introduce themselves better to the instructors. The goal of this is to make students comfortable to participate in the program and to provide an introduction to any outside volunteers.
9:20	"Yes" or "No" Game	A "yes" or "no" statement will be made and students will go to 1 corner if they believe the answer is yes and the other corner they believe it is no. A person from each group can say why they are in that group.In a way, the Yes/No game is also an icebreaker game, and includes lots of running around, but also helps disseminate knowledge to the students.
9:30	Split	Teachers should have groups split ahead of time. Split team into 3 groups!
9:35	Activites Round 1	Students will split into groups of 20 each and go do different programs. Make sure to explain the point of the program and the program itself thoroughly before you begin!
10:10	Sanuk Break	Water-related Icebreakers and snacks, also possible to just let students play sports and run around. A list of possible games as at the end of this paper.
10:20	Activities Round 2	Students will split into groups of 20 each and go do different programs. Make sure to explain the point of the program and the program itself thoroughly before you begin!
10:55	Poster Making	Ensure to read out the problem statement to the students.
11:25	Presentation	Each group will get 2-3 minutes to show off their poster and tell the class their ideas for a solution. Make sure everybody in the group gets to talk!
11:45	Conclusions/Survey/Prizes	Have a final discussion with the students to see if they have any more questions and if they had fun. If there is a want to have some sort of survey or questionnaire of the students now would be the time. It would also be nice to give a small prize to each student at this time.

Icebreaker Games

Activity #1: Cat and mouse

Time: 10 - 15 mins

Introduction:
This activity needs an open space for students to run around, therefore, when planning this activity ensure the space selected is spacious.

Goal:
The goal of this activity is to engage students before starting any activities and to ensure students become comfortable with each other as well as with the teacher.

Procedure:

1. Ask for two student volunteers to play the cat and the mouse. The other students should form a circle and hold hands. The student who is the mouse should stand inside the circle and the cat should stand outside the circle.
2. **The mouse must stay moving while inside the circle but cannot stay inside the circle for more than 10 seconds.**
3. The cat cannot come into the circle but they can reach into the circle to grab the mouse. The circle players have to try and keep the cat away from the mouse by holding up their hands to let the mouse in and out of the circle.
4. If the mouse is caught, the mouse becomes the **new cat** and a student in the circle will be the new mouse. The old cat takes the place of a player holding hands.

Activity #2: You Never Walk Alone Game

Time: 10 -15 minutes

Introduction:
This activity needs an open space for students to run around, therefore, when planning this activity ensure the space selected is spacious.

Goal:
The goal of this activity is to engage students before starting any activities and to ensure students become comfortable with each other as well as with the teacher.

Procedure:

1. Make students sit in a circle
2. Choose one student out from the circle in order to create a hole between two students. Then the two students that sit between the hole need to stand up and run across the circle to take someone from other side and come back to their own seat in order to close their hole.
3. As the first two students grab another person from another side and after he/she left his/her seat this creates a new hole. Then two students who sit between that hole need to stand up and run across the place to get someone to fill in their hole.
4. This will repeat again and again until the time is over and who is left over, or who that don't have a seat will lose.

Activity #3: Land - Water - Wind Game

Time: 5 - 10 minutes

Introduction:
This game will promote critical thinking among the students.

Goal:
The goal of this activity is to engage students before starting any activities and to ensure students become comfortable with each other as well as with the teacher.

Procedure:

1. Let the student sit in a circle and the teacher stands in the center
2. The teacher walks around the group and then points at a random student, saying ethier “Land” “Water” or “Wind”
3. The chosen student needs to give an example of the animal in that category as fast as possible
    a. Land; this word represent land animal
    b. Water; this word represent aquatic animal
    c. Wind; this word represents a type of bird
4. Play until there are 4 - 5 students who do not answer correctly or fast enough

Activity #4: Windy Windy Where's the Wind Blow.

Time: 5 - 10 minutes

Introduction:
This game will make student run around and will allow the students to get to know each other.

Goal:
The goal of this activity is to engage students before starting any activities and to ensure students become comfortable with each other as well as with the teacher.

Procedure:

1. Ask the students to sit in a circle
2. One student volunteers to sit in the middle
3. The teacher recites the rhyme
    a. “Windy windy, where’s the wind will blow? Windy windy what’s the thing that the wind will blow? Windy windy, the wind will blow... (state what type of people will the wind blow)”.
    b. **eg: a person who wear a white shirt**
    c. Students who are wearing a white shirt must switch seats
    d. The student in the middle needs to steal the seat from a person who needs to switch their place
4. Whoever left out from the circle loses!
5. The teacher needs to start singing and choose any object that most of the students wear.
6. Repeat for multiple rounds

Activity #5: Rock Paper Scissors

Time: ~10 mins

Introduction:
This game is a simple activity that will encourage students to be active before starting the real activity.

Goal:
The goal of this game is for a student to stay active and have fun.

Materials:
None

Procedure:

1. Let each student pair up then start to do “Rock Paper Scissor”
2. Loser needs to line behind the winner and then the winner needs to find a new competitor and do “Rock Paper Scissor” again.
3. Repeat until there are only two lines left and there is a loser!

Activity #6: Squirrels going back home

Time: ~ 10 -15 minutes

Introduction:
This game will promote critical thinking and problem solving skills.

Goal:
The goal of this activity is to engage students before starting any activities and to ensure students become comfortable with each other as well as with the teacher.

Procedure:

1. Ask students to stand in a circle, girls are habitats and boys are squirrels
2. All students walk in a circle while singing a song (any kind of song)
3. The teacher will shout out the number of habitats and squirrels, then students have to come together into a group.
    a. If the teacher shouts out one habitat and three squirrels, the group would include one girl and three boys
4. If some students cannot combine as the request, those students will lose!

Theme 1: Water Conservation

Introduction

This module helps students understand the importance of water conservation and the allocation of water resources. This theme discusses how Baan Yang gathers and uses their water. Students will be introduced to water input and output in a system, which allows them to incorporate data gathering and can introduce students to the tasks of an engineer. This theme is important because it introduces Baan Yang's water collection system and introduces students to the main theme of water conservation. Students will participate in a discussion and activity around water conservation and how water usage varies with different activities. Given the problem of the lack of water, students will be given the opportunity to creatively come up with solutions and discuss how they can reduce individual water consumption in their day to day lives.

Subject areas, objectives

Subjects: water conservation, interpersonal skills, and citizenship [1].
Cognitive learning outcomes: water cycle; how to conserve water [1].
Methodological learning outcomes: carrying out measurements; creating models; reasoning and critical thinking; finding creative solutions [1].
Social/interpersonal impact: collaboration; applying knowledge to action for sustainable development [1].

Yes/No Game

Time: 10-20 mins

Introduction:
This activity is for some initial fun and moving around, along with assessing how much the students already know about water.

Instructions:
Tell students that each side of the room is designated for a different answer. Then read out one of the questions and assign an answer to each side of the room, students should move to the side of the room which represents the answer they agree with. Next, get one student from each side of the room to speak about why they think they are correct. Finally, tell students about the correct answer (only if there is one).

Questions:

1. When you brush your teeth should you keep the tap water on? **(No)**
   Yes No
2. Should you take a shower or a bath?
3. What time is the best to water plants? **(Evening)**
   Middle of the Day Evening
4. How many liters of water does the average person use a day? **(it's 250)**
   More than 100 Less than 100
5. How many days do you think people can live without water? **(One week)**
   3 days one week
6. Does water cover more or less than 50% of the Earth's surface? **(70%)**
   More than 50% Less than 50%
7. Which one is not a surface water source? **(groundwater)**
   Groundwater waterfall
8. Which one is man made water source? **(Dam)**
   Dam canal

Activity 1: Water Usage

Time: 30-45 mins

Introduction:
In this program, we are going to draw out and do an experiment for how water is collected and used in Baan Yang. Later we will do an experiment about how using tap water affects the total amount of water in Baan Yang.

Part 1: Water Usage Discussion

For this part, we want the kids to think about where their water comes from, it doesn't just magically come through the tap. The worksheet and mapping activity is to have the kids think and share their ideas before we explain to them how they actually get it in Baan Yang. We should go as far as to mention the water cycle, specifically rain in the wet and dry season to be the ultimate source of water.

Have the kids sit in a circle with us and have a ball to toss around. Ask the following questions, and toss the ball to 2 or 3 volunteering kids to answer.

Note: it is important for the teacher to facilitate discussion, hear their ideas and be supportive but guide them in the right direction. The purpose of these questions is to get them thinking about how communities get their water, we want them to use
these ideas to draw a map in the following activity.

1. So where does water come from?
2. How does it get to your house?
3. How does it get to your neighbor's house?
4. What about the rest of Baan Yang?

Procedure:

1. Break students into groups and pass out the worksheet.
2. Allow **up to 7 minutes** to do the worksheet.
3. Have a discussion about what students wrote on their worksheet - **up to 6 min**

a. During this create a combined picture on the board and tell them exactly how Baan Yang gets their water

Water Usage Worksheet

Answer the following questions (raise your hand if you have a question):

1. How is water stored? Before you get it from your tap?

   _____

2. Where does the water come from before storage?

   _____

3. How does it get to your house?

   _____

4. Draw a picture of how water is collected, is stored, and travels to your house

Part 2: Water Experiment

Goal:
For this part, we want the kids to visualize what happens when a community uses more water than is available, or that can be replaced by their source of water. When they see that if they use more water then is being replaced by the rain, we would like to have them brainstorm actual ways that they can reduce their water usage.

Materials:
Pitcher of Water
1 Plastic Container
Water Bottle (with the bottom cut off and two holes in the cap)
Tape

Pre- Questions: **5 minute** demonstration and answer questions

1. What can affect the water level in storage tanks?
    a. What can make the water level rise? (rain, river, etc.)
    b. What can make the water level fall? (shower, brushing teeth, etc.)
2. Make sure to do a thorough presentation of how to do the upcoming lab (including drawing a graph on the board and counting out loud)

Procedure:

1. Make sure that are all the materials are in place with 3-4 students at each lab kit, with the pitcher full of water
2. Explain to students that the water bottle represents the water storage system, any input water fills the storage system and any water that will be used (pumped out) reduces the water level in the storage system
3. Cover the holes with tape for the required amount of output (fast, slow, or none)
4. Pour water from the bottle, either slow or fast, and start counting seconds when you pour the water
5. Graph what happens in front of the class using the time you are counting as a basis
6. Discuss how engineers have to do this constantly to make sure that there is enough water for everyone
7. Have students discuss if having a larger or smaller container for the water storage tank would change anything
8. Give the worksheet to students to do by themselves

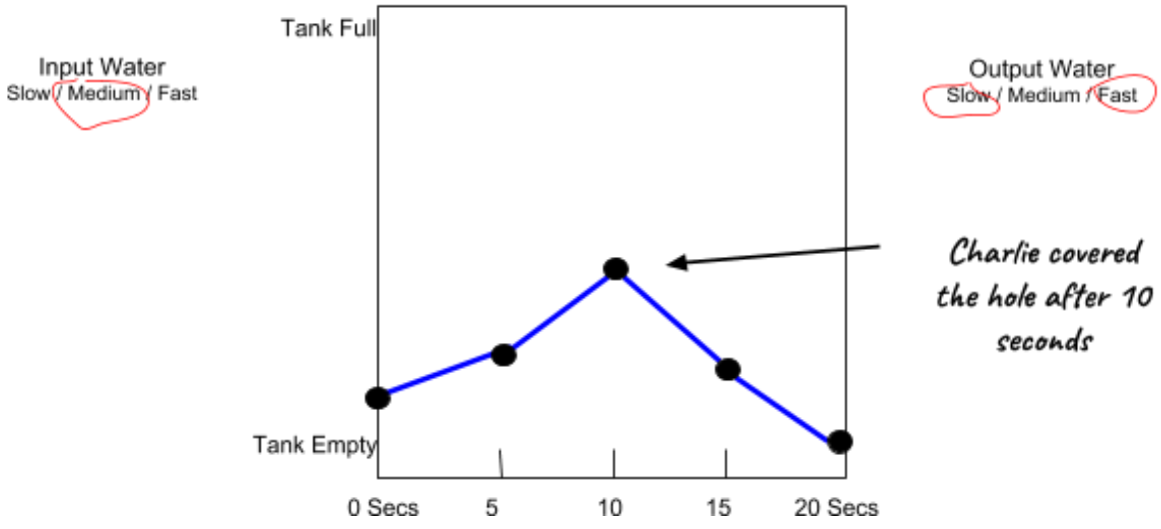
a. If students need an extra challenge: challenge the student to keep the water level stable, meaning that water input and output remains the same

Instructions:

1. Split into groups of 3 or 4 students each
2. Before each program make sure to decide how much water will be used and make sure to tape over any holes if necessary
    a. “A lot” - both holes will be open
    b. “A little” - one hole will be open
    c. “None” - No holes will be open
3. When doing the activity, one student should hold the bottle over the container (to not make a mess), one student should pour the water into the tank as instructed, and one student should be keeping track of the level of water
4. Make sure to count seconds out loud to help with creating the graphs

Example:

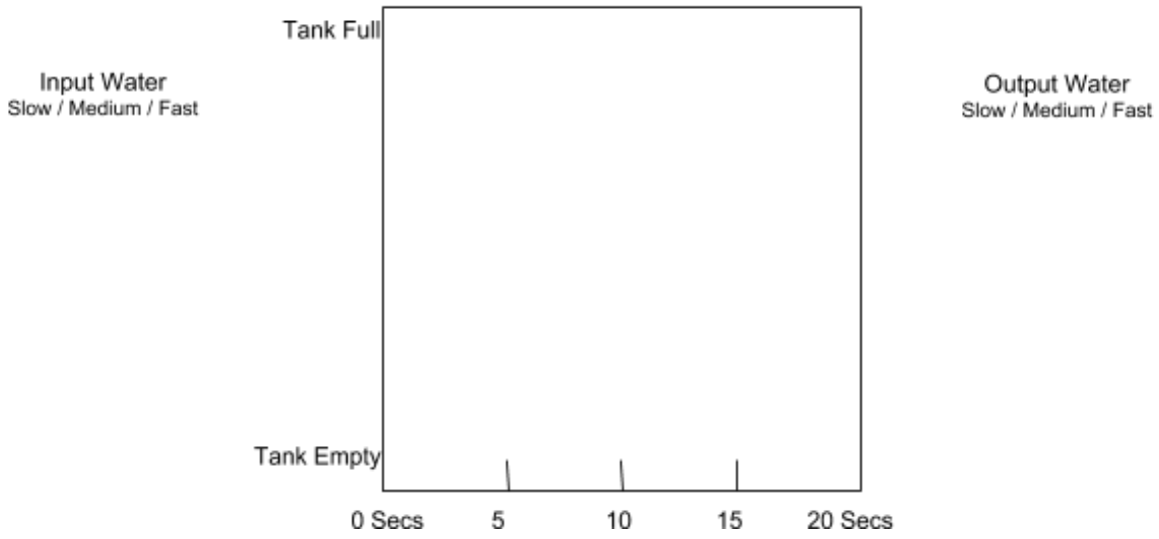
1. The village uses ‘a little’ water for the full 20 seconds
2. There is a slow rain from 0 to 10 seconds



Scenario 1:

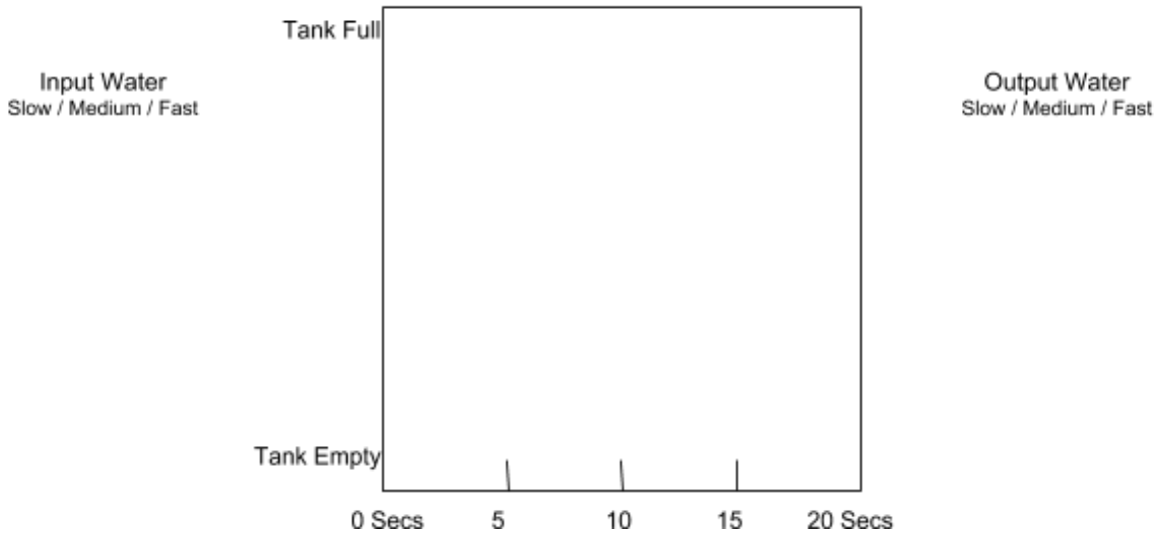
1. There is a strong rain from 0-5 seconds

2. The village uses ‘a lot’ of water for the full 20 seconds



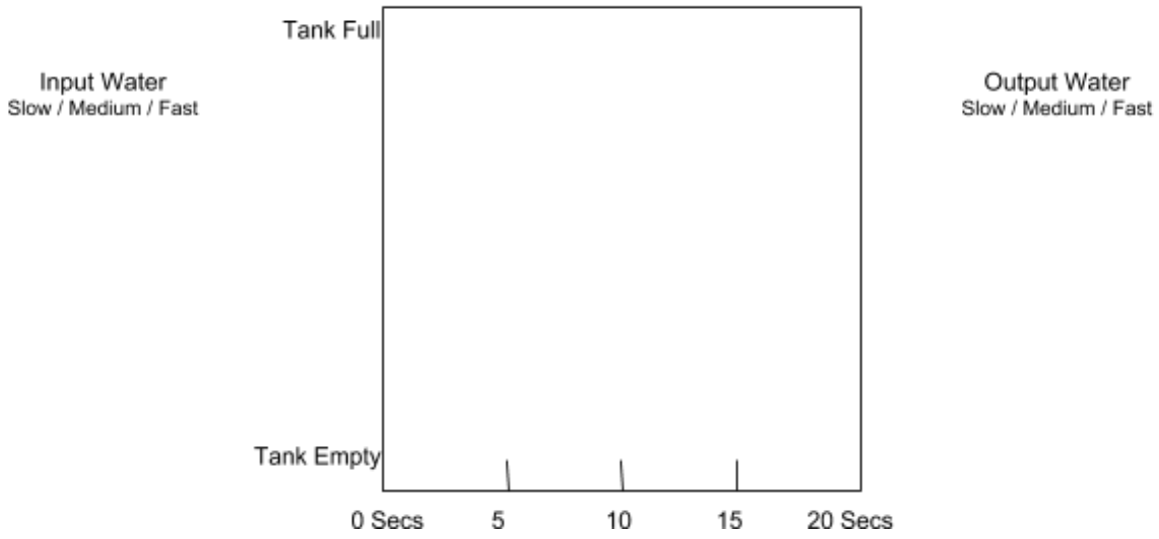
Scenario 2:

1. There is a slow rain for the whole 20 seconds
2. The village uses ‘a little’ water for the full 20 seconds



Scenario 3:

1. There is a strong rain from 0-5 seconds and 15-20 seconds
2. The village uses ‘a lot’ of water for the full 20 seconds



Questions:

1. How long does it take to drain the tank if ‘a little’ water is used by the village _____

2. How long does it take to drain the tank if ‘a lot’ of water is used by the village _____

3. Make a list of how villagers can conserve water if there is a long period without rain

Activity 2: Water Distribution Game

Time: 30-45 mins

Introduction:
This program will teach students how much water they use in their day-to-day lives and will start a discussion on water conservation and allocation. Students should also learn about the water resources in their area and if the water is being overdrawn.

Part 1: Water Distribution Discussion

Pre-Questions:

1. How much water do you use everyday (in terms of a liter bottle)? What for?
2. Do you always have enough water? If not why?
3. Does everyone in the world have enough water? Does everyone in Thailand have enough water? (tell them no)
    a. (ie. Nearly 40% of people in Uganda need to travel at least 30 minutes to get clean water, people in Israel don't have enough water and thus have to treat 80% of their sewage to have enough drinking water, people in California are only allowed to water their lawns during certain hours of the week)
4. Can you help? How?

Part 2: Water Distribution Activity

Materials:
Activity sheet
Blue beads
Cups

Procedure:

1. Divide kids into groups of 3-5 and give them a map of a made-up town with icons for farming, bathing, cooking, laundry, water storage, rivers, etc.
2. First round: Give each group a large amount (approximately 200, see picture below for reference) of beads.

3. Tell students that this is a town with a large water supply that lasts for one month and instruct them to allocate the beads to the different areas according to how much water each area/task needs
4. Tell students each bead is about 40 liters
    a. Based on 250 liters per person per day * 30 days in a month

5. Have a discussion about the results and determine what the kids believe is the most important place to use water
6. Second round: say there's a new town in an area where there is enough water in the rainy season, but not during the dry season. Give them a smaller amount of beads and say that it's the rainy season, have them distribute the beads.
7. Take away all the beads that were not placed in water storage, now they have to allocate the water that was in the storage tank to the rest of the town during the "dry season."
8. Discuss the results, emphasizing the importance of using water carefully and planning for the future

Activity Sheet for Water Distribution Game

Activity 3: Poster Making

Time: 30-45 min

Introduction:

In this activity we will let the student to do presentation about what they have learned from the program and evaluate with friend to gain more knowledge about water conservation.

Problem Statement:

A little girl one year from the future came to me the other day and told me that in her village in Northern Thailand, there will not be a lot of rain next year. She is worried that they will run out of the water!
Make a poster about suggestions that you have for this girl so they don't run out of water. Make sure to use lots of colors!

Materials:

1. Poster paper
2. Markers or colored pens

Procedure:

1. Divided student to group of 5 students
2. Give the problem for the presentation
3. Let the student create the poster for 20-30 minutes, or until they are finished
4. Let every group present for 2-3 minutes and make sure that everybody is respectful and paying attention

Theme 2: Water Quality

Introduction

This module helps students to understand the importance of clean water. Human activities across the world such as agriculture, manufacturing, and oil production decrease the quality of drinking water for everyone. The module then provides perspectives on the importance of these complex ecosystems and engages students to act to look after and safeguard forests for the future. It includes class activities as well as outdoor learning, with tips on how to structure and conduct work safely [1].

Subject areas, objectives

Subjects: science; language; geography; interpersonal skills and citizenship [1]. ·
Cognitive learning outcomes: forest layers; food webs; forest ecosystem diversity; plant growth [1].
Methodological learning outcomes: carrying out measurements; creating models; reasoning and critical thinking [1].
Social/interpersonal impact: collaboration; applying knowledge to action for sustainable development [1].

Yes/No Game

Time: 10-20 mins

Introduction:
This activity is for some initial fun and moving around, along with assessing how much the students already know about water.

Instructions:
Tell students that each side of the room is for a different answer. Then read out one of the questions and assign an answer to each side of the room, students should move to the side of the room which represents the answer they agree with. Next, get one student from each side of the room to speak about why they think they are correct. Finally, tell students about the correct answer (only if there is one).

Pre-Questions and Discussion:

1. Pure water is tasteless. **(Yes)**
2. Rainwater is the purest form of water **(No)**
3. Water availability will not be a problem for future generations **(Yes- it will be !)**
4. If groundwater gets contaminated, then surface water like lakes and streams can become polluted also, since the two are often connected **(Yes. Most surface water interacts with underground water sources. Thus, if groundwater is contaminated, connecting springs, streams, and lakes may suffer the consequences as well)**
5. If the water is clear, it is clean! **(No, many pollutants are odorless, tasteless, and colorless)**
6. When I'm brushing my teeth I should turn the faucet off **(Yes -About 20 – 25 litres of water are wasted if you leave the tap running. Turning it off saves water and money)**
7. Running or moving water purifies itself to "drinking water quality" (**False: Running water in an open conduit or stream bed does not guarantee purity or safety. In fact, the greater likelihood of physical and bacteriological contamination of surface water makes it generally unsafe for household use unless reliable filtration and disinfection treatment is provided)**

Activity 1: Reforestation

Time: 30-45 mins

Introduction:
This project focuses on teaching students about reforestation and soil erosion. Students should see that plants hold the soil together and resist soil erosion. A connection to growing forests should be made. Furthermore, students should learn about the other positive effects of growing trees, such as oxygen production and long term pollution cleaning.

Note: this program may require some set up a few days before the program, mainly planting plants in a cut-open water bottle.

Part 1: Water Usage Discussion

For this part, we want the kids to think about using pesticides for the betterment of crops. While pesticides are useful, and help farmers make more money, they are harmful to the environment. Students should talk about the pros and cons of pesticides and also learn about organic pesticides that they may have lying around. After the discussion make a pro/con chart on the use of pesticides.

Have the kids sit in a circle with us and have a ball to toss around. Ask the following questions, and toss the ball to 2 or 3 volunteering kids to answer. Note: it is important for the teacher to facilitate discussion, hear their ideas and be supportive but guide them in the right direction. The purpose of these questions is to get them thinking about how Baan Yang uses pesticides and the pros and cons of doing so.
these ideas to draw a map in the following activity.

1. What are pesticides and what are they used for?
2. What kind of chemicals do pesticides use?
3. What are some positive aspects of pesticides?
4. What are some negative aspects of pesticides?
5. Are there any alternatives to pesticide use?

Part 2: Reforestation Experiment

Goal:
For this program, we want students to understand that having a forest is important to the surrounding topography. When students see that having a strong forest is important to hold soil together, we want them to brainstorm any places that they know that might have this problem and how to fix that problem.

Materials:
Water bottle, cut in half (1.5 Liters) with cut located above the bottle's neck
Soil
Water
Small plants
Leaves/Pebbles/Gravel
Food coloring

Pre- Questions: **5 minute** demonstration and answer questions

1. What are reasons that people cut down trees?
2. What are some negative and positive things that can happen when trees are cut down?

Procedure:

1. Discuss with students the importance of the forest and plants' role in soil erosion.
2. Create three "ecosystems," this can be done ahead of time in large bottles and used as a demonstration, or can be done with the students, who will make each ecosystem in a team together
    a. Ecosystem 1: Fill bottle with soil
    b. Ecosystem 2: Fill bottle with soil, add dead leaves and gravel to cover the top of the soil
    c. Ecosystem 3: Fill bottle with soil, add small plants to the soil
3. Tell students that we will pour water into each bottle; Let students guess which bottle will yield the clearest water and have them support their guess
4. Ask for three volunteers to help test our hypotheses
5. Allow students to slowly pour water into each bottle and watch as the water comes out of the bottleneck into the clear container below
6. Compare the water from each bottle

7. Spray some food coloring on top of the plants in the bottle with plants and explain to students that this represents pesticides
8. Have students pour water on the plants bottle again and observe the color of the water
    a. Did the pesticides get into the groundwater?
9. Discuss the results with students and segue into a discussion on reforestation efforts in their community

Activity 2: Build Your Own Filter (Competition)

Time: 30-45 mins

Introduction:
This project focuses on water filters and is a good introduction for how to clean dirty water. Furthermore, this is a good example of how ground water cleans water and is usually suitable for consumption, despite the fact that the water may not look perfectly clear.

Materials:
Water bottles cut in half
Clear bowls
Bowl of gravel
Bowl of sand
Bowl of larger rocks
Cup of water mixed with dirt

Pre-Questions:

1. What are some signals that water is of poor quality?
2. How can you clean this water
3. Other question

Ensure to do a run through of the presentation and explain all the materials beforehand.

Procedure:

1. Do the experiment together in a group
    a. Put in the upside down part of the bottle a mixture of sand, large rocks, and gravel (let the students tell you how much to put)
    b. Hold the bottle top over a clear bowl and pour the dirt water through it
    c. Show students that water is clearer and 'cleaner' after running through the filter
    d. Explain that you can try different amounts of each material for the filter and that you can experiment to see what works best
2. Split the team into groups of 4 or 5

3. Give each group a bottle and a handful of the gravel, sand, and large rocks - along with a cup of the dirty water
4. Announce that there is a competition and that the students can make their filter however they want, with the one that cleans the water the most being the winner
5. Give students 15ish minutes to experiment and build the best filter
6. Hold a competition with the whole class to see which filter is best, ensure to remind them that the clearer water will win

Post-Discussion:
Discuss with students what they found works out best for the filters. Furthermore, ask if they realize how the ground can clean the water and explain that Baan Yang actually gathers its tap water from groundwater. Also tell students that the main quality issue that Baan Yang faces if from calcium carbonate, or water hardness, and encourage for students to do research on their own.

Activity 3: Poster

Time: 30-45 min

Introduction:
In this activity we will let the student do a presentation about what they have learnt from the program and evaluate with friends to gain more knowledge about water quality.

Problem Statement:
Farmers from a nearby village decided that they will use more pesticides so that they can grow more food. They come to you wondering if doing so will have any effect on their environment and water.
Make a poster about suggestions that you have for the farmers so that they can grow more food, but not harm the environment. Make sure to use lots of colors!

Materials:
Poster paper
Markers or colored pens

Procedure:

1. Divide student to group of 5 students
2. Give the problem for the presentation
3. Let the student create the poster for 20-30 minutes, or until they are finished
4. Let every group present for 2-3 minutes and make sure that everybody is respectful and paying attention

Theme 3: Reduce, Reuse, Recycle

Introduction

This program helps students learn about reusing and recycling throughout day-to-day life. Around the world and in Thailand, waste that can be reused is thrown away needlessly. Even in Baan Yang itself, organic materials are burnt to make space. This waste can have adverse effects on our environment as well, and an ulterior response should be taken. Students will learn that they are able to reuse their waste into fun and perhaps useful objects. Furthermore, waste from all parts of life, including agricultural waste can be reused and be turned into a valuable product someplace else. Finally, students will be challenged to create a poster where they can give recommendations for what to do with local waste.

Note: students should be asked to bring any extra recycling or trash they may have lying around their house the day before the program. This will be used in activity 2.

Subject areas, objectives

Subjects: science; conservation; interpersonal skills and citizenship. [1]
Cognitive learning outcomes: recycling; compost; forest ecosystem; plant growth [1].
Methodological learning outcomes: creative construction; reasoning and critical thinking [1].
Social/interpersonal impact: collaboration; applying knowledge to action for sustainable development [1].

Yes/No Game

Time: 10-20 mins

Introduction:
This activity is for some initial fun and moving around, along with assessing how much the students already know about water.

Instructions:
Tell students that each side of the room is for a different answer. Then read out one of the questions and assign an answer to each side of the room, students should move to the side of the room which represents the answer they agree with. Next, get one student from each side of the room to speak about why they think they are correct. Finally, tell students about the correct answer (only if there is one).

Pre-Questions and Discussion:

1. Recycling materials always saves energy? **(No- We are told that it sometimes takes more energy to recycle plastic than to use raw material--therefore it is best to limit use of disposable plastic items)**
2. Recycling an item is better than reusing it?**(No- It is much better to reuse it as it takes energy to recycle something)**
3. An aluminium drinks can will take approx. how many years to begin to decompose in a landfill site? Between 50 and 100 years
   Or between 100 and 200 years **(between 100 and 200 years)**

4. It takes around 400 years for a plastic bottle to biodegrade if it ends up in a landfill site. (**Yes!)**
5. If you could recycle one plastic bottle you could light a bulb for 60 mins. **(Yes!)**
6. It takes 200 years for a plastic bag to decompose in a landfill? **(No- 500 years!)All bottles, cans and containers - whether metal, glass, or plastic - should be empty and rinsed clean before recycling.**
7. Soda bottles should be empty before they go in the recycling bin **(Yes! All bottles, cans and containers - whether metal, glass, or plastic - should be empty and rinsed clean before recycling)**

Activity 1 : Compost Activity

Time: 30-45 mins

Introduction:
This program is focused on teaching students the importance of recycling one's food waste. Currently many farmers in Thailand burn their waste, but this is toxic for the environment and for the air that we breathe. An alternative to doing this is composting your food and agricultural waste, which also produces fertilizer that can be used for growing crops in the future.

Part 1: Waste Discussion

For this part, we want the kids to think about what local community members and farmers do with their waste. Students should realize that waste happens, but it should be minimized and used if possible.

Have the kids sit in a circle with us and have a ball to toss around. Ask the following questions, and toss the ball to 2 or 3 volunteering kids to answer. Note: it is important for the teacher to facilitate discussion, hear their ideas and be supportive but guide them in the right direction. The purpose of these questions is to get them thinking what communities do with their waste.

1. What kind of waste does Baan Yang create?
2. What kind of waste do farmers create?
3. What do farmers and the community currently do with their waste?
4. Is this good or bad for the environment, air, us, etc.?
5. Are there useful things that they can do with this waste? If so, why do they not do it?

Part 2: Compost Experiment

This activity should be performed in small groups of 3-4 each. If necessary, separate students by age and have older students constitute two groups.

Materials:
1 empty two-liter soda bottle
Shredded newspaper

Dirt (not potting soil, use dirt from outside)
Compost materials (such as grass clippings or vegetable scraps)
Small handful of dead leaves
Flat dish to hold composter
Spray bottle with water

Preparation:

1. Rinse the bottle and peel off the label.
2. Cut off just the top of the bottle as shown and set the top aside.
3. Use the nail to punch 8 to 10 small air and drainage holes along the sides and bottom of the bottle.
4. Put the bottle on the tray.
5. Make sure to do an example with the whole class before letting them experiment on their own.

Procedure:

1. Have each group put some dirt, shredded newspaper and old leaves inside the composter. This is the compost starter.
2. Use the spray bottle to wet the compost starter.
3. The students are ready to add to their compost! (Try grass clippings, vegetable scraps, coffee grounds, or eggshells, but do not add dairy or meat.)
4. Turn the bottle top upside down and put it in the open top of the bottle. It will act like a funnel for adding a little bit of water each day to keep the contents damp.
6. Place in a spot where sunlight can reach it.
7. Have the kids stir it every few days, keep the contents damp, and let it rot! As the compost breaks down, they can add more kitchen scraps or plant litter, as well as some more soil from outside to mix in.
8. Cover the top of the compost with a kitchen towel when not in use.

Activity 2: Egg Drop (Competition)

Time: 30-45 mins

Introduction:
This program is meant to show that we can use our recycling and trash to do other fun stuff, perhaps even something useful. Students should use only trash and recycling items to do the activity and also brainstorm what other stuff they can use their trash for in order to recycle.

Materials:
Any recycling and trash that students/teachers bring with them
Tape
Staples
Markers (to make your lander look pretty)

Pre-Questions:

1. Why is recycling important?
2. Is using our trash to do activities and play games recycling?

Procedure:

1. Explain the challenge to the students: using any of the trash/recycling available they must build something to protect their egg from breaking when being dropped from the second floor
2. Split team into groups of 4 or 5
3. Give students 20ish minutes to build their lander
4. When time is up have each team go to the second floor of the school and drop their lander to see if their egg breaks
    a. If more than one team has an intact egg at the end of the first trial you can try having a trial run where the egg and its lander is thrown up from the second floor (rather than just dropped)
5. Crown the winner of the competition

Post-Discussion:
Discuss what are other fun or useful ways we can use our recycling for and make sure to create a list on the board as a class.

Activity 3: Poster

Time: 30-45 min

Introduction:
In this activity, we will let the students do a presentation about what they have learnt from the program and evaluate with friends to gain more knowledge about water quality.

Problem Statement:
Farmers from a nearby village come and tell you that they have to much trash and they do not know what to do with it! Create a presentation to teach them what they can do with their recycling and trash.
Have fun!

Materials:
Poster paper
Markers or colored pens

Procedure:

1. Divide student to a group of 5 students
2. Give the problem for the presentation
3. Let the student create the poster for 20-30 minutes, or until they are finished
4. Let every group present for 2-3 minutes and make sure that everybody is respectful and paying attention

Sanuk Break Possible Games

Activity #1: Water Counting Game

Time: 10-15 minutes
Introduction:
In this activity, each student is representing one amount of water. Then we will let them think or guess about how much water they use for each activity and let them group up together. At the end of the game, we will ask them to have some discussion on how much they use the water for everyday life and how we can reduce this amount of water. We will play this game for three to four rounds, which will have different question on each round.

Goal:
For this game, we want the kids to know about how much they use water on each activity each day. After the student knows the amount of water that they spend on each thing, we can ask them whether is it too much or too small and ask them to decide how they can conserve it.

Materials:
None

Procedure:

1. Ask every student to stand up and prepare to run into a group.
2. Tell the students that each of them is representing to 2, 5, 10, and 20 liters of water for each round respectively.
3. Come up with everyday activity and ask students to form a group that represents the water that might be used on each activity

    List of the activity

    a. Machine Laundry **(164 liters)**
    b. Showering **(68 liters per 8 minutes)**
    c. Cooking **(7 liters; average per day)**
    d. Washing dishes **(10.5 liters)**
    e. Drinking **(average 2 liters per day)**
    f. Brushing our teeth **(6 liters; twice a day)**
    g. Toilet **(100 liters per day)**

4. After every student finishes forming a group, we can have some discussion about their idea on the amount of water that they used, whether is it too much or too small?
5. Then give the right amount of the water that is used for each activity.

Activity #2: Grab and Go Game

Time: 10-15 minutes
Introduction:
In this game, students will sit in a circle, the students will pass around a ball as music is playing. We will ask them some question before we give the ball and let them answer when the music stop. This game will play for three rounds and each round should have four to five different answers from the student.

Goal:
In this game, we want the students to share their idea and thought about water conservation or any advantages of the use of water.

Materials:
Ball or any tangible object (doll, napkin, toy etc.)

Procedure:
1. Let the student sit in a circle and hand them a ball
2. Ask question before start the music (Pick one question for each round)
    a. Why do we need to save water?
    b. Which activity that we need to use water?
    c. How can we save water?
    d. Brand of drinking water?
    e. Sources of water?
    f. How can we collect the water
3. After we say the question, we can start the game by playing the music and letting the student move the ball around for a second. and then stop the music. Who has the ball need to give one answer for that question. Then we can start the music again and allow the ball to move around then we stop the music. We can rotate the ball for two to three times for each round (in order to get different answers) then change the question.

Activity #3: Reuse, Reduce, Recycle

Name_____

REDUCE REUSE AND RECYCLE! ANSWERS

REDUCE	REUSE	RECYCLE
Walk or ride a bike instead of driving	Use refillable water bottles	Recycle plastic containers
Use energy efficient bulbs and appliances	Use re-useable grocery bags	Recycle soda cans
Turn the water off when brushing your teeth	Use re-useable lunch boxes	Recycle cardboard boxes
Compost food to change it into rich soil	Use the back side of paper	Recycle paper newspapers and magazines
BUY LESS!	Reuse materials for crafts	Compost leaves and yard waste

Time: 10 -15 minutes

Introduction:
In this activity, the student is going to be divided into two different teams. Then let each team compete with each other. Each team will have one basket that lots of different types of simple object that student can find around them such as a plastic bottle, leaves, newspaper, or A4 paper. At another corner of the class (or a little bit far from the starting place), there will be a board (or a basket) that state “REDUCE”, “REUSE”, and “RECYCLE”. These three baskets are used for the student to place each picture in it. However, if student make

any mistake on put the picture in the wrong basket teacher who is in charge on that table need to take it out and tell the next person to redo it again, repeat it if the student still putting in the wrong place. Which group who can finish all the pictures first will win this game.

Goal:
This game will encourage a student to learn how to “REDUCE”, “REUSE” and “RECYCLE” things that they have in their house. This will help a student to learn how to protect the environment, conserves natural resources and know how to reduce pollution in their society.

Materials:

- 8 baskets (can be the plate or things that can put the picture)
- Pictures :
    a. REDUCE
        i. Plastic bag
        ii. Car
        iii. Water usage
        iv. Buy things less
        v. energy
        vi. Air condition
        vii. Plastic bottle
    b. REUSE
        i. Refillable bottle
        ii. Grocery bag
        iii. Lunch box
        iv. One side used A4 paper
        v. Clothes
        vi. Gallon Jugs
    c. RECYCLE
        i. Books
        ii. Used A4 paper
        iii. CD and DVD
        iv. Batteries
        v. Tv
        vi. Plastic bottle
        vii. Can
        viii. Cardboard

ix. Leaves

- A paper that state “REDUCE”, “RECYCLE”, “REUSE”

Procedure:

1. Divide students into two groups equally and let each team be on their station. Which each station will have a bunch of pictures that mix randomly(both stations should have the same picture).
2. Before starting the game, make sure that the opposite station is ready for the student to put each picture in the plate that state “REDUCE”, “REUSE”, “RECYCLE”.
3. After preparing all of the stuff, line the student up in line and start the game!
4. Allow ONE STUDENT per one time and allow them to take only ONE PICTURE at one time.
5. A person who has the picture on hand should put that picture in the right basket as fast as possible and which team can finish all of the pictures first will win the game.

Activity #4: Fishy, Fishy Cross my Ocean

Time: 10 min

Materials:
Field

Instructions:
Have 2-4 kids volunteer to be sharks
Have the other students line up on one end of the field, they are the “fish”
The sharks say “fishy fishy cross my ocean” and all the fish have to run across the field and avoid getting tagged by the sharks!
When a fish gets tagged they have to freeze in place and become seaweed that can also tag the “fish” as long as they don’t move!
Keep going until one fish is left, they are the winners!
Can repeat once or twice depending on time!

Activity #5: Water State Game

Time: 10 mins

Materials:
Field

Instructions:
Explain the three different states of water (solid, liquid, gas) and how particles behave under those scenarios
Have the students spread out in the field and listen to what the instructor shouts
When the instructor shouts...
'Ice' - the students should get really close together (like the particles in a solid)
'Water' - the students should walk around really close together while bumping into each other (like the particles in a liquid)
'Water Vapor' - the students should run around while not touching anybody (like the particles in a gas)

References

1) Nations, F. a. (2017). *STATE OF THE WORLD'S FORESTS FORESTS for KIDS*. Rome: FAO.