

ABC Waters Learning Trail of Kallang River @ Bishan-Ang Mo Kio Park for preschoolers

Yap Ming Cheng, Chia Dan Peng, Jin Yilei,
Shi Tianqi

Raffles Institution, Singapore,
jasmine.koh@ri.edu.sg

Abstract

As we step into Singapore's jubilee year, our water resources are ever more precious. Of the two water agreements signed with Malaysia in 1961, one water agreement has expired in 2011, with the other expiring in 2061. The scarcity of water has sparked this project, which aims to educate preschoolers on Singapore's precious water resource and biodiversity and bring to their attention the need for water conservation, to achieve the objective of continued education on water sustainability and conservation for our community.

Keywords

Scarcity, education, preschoolers,
conservation, biodiversity

1 Introduction

1.1 The Active, Beautiful and Clean Waters Project Developing a city of Gardens and Waters

The ABC Waters Programme, initiated by the Public Utilities Board of Singapore (PUB), aims to transform integrate Singapore's parks, reservoirs and waterways and the community, transforming our network of drains, canals and reservoirs into beautiful and vibrant waterscapes for recreation and community bonding.

In order to achieve sustainable water management, PUB has been constantly engaging the community to adopt and take ownership of our waterbodies. For example, schools have been encouraged to develop educational trails for the various ABC waters projects so that students can learn and appreciate our waters more. True to the spirit of PUB's 3P approach, which entails the people, public and private sectors, these trails are co-created in collaboration with partner schools and curriculum planners. Designed with students and the lower secondary curriculum in mind, these active, field-based learning trails come supported with resource packages as well. The themes covered in the trails range from biodiversity to heritage, as shown in the diagram. Since

the launch of ABC Waters Learning Trails in 2011, more than 49,470 students from over 90% of all secondary schools have experienced the 10 trails co-created with various partners.



Figure 1.1: The seven objectives of ABC Waters Learning Trail

1.2 Raffles Institution's contributions toward ABC Waters Programme

1.2.1 Background

Raffles Institution was invited to come on board the ABC Waters Programme in 2011. This meaningful collaboration between RI and PUB saw the creation of a learning trail package of the Kallang River @ Bishan-Ang Mo Kio Park for secondary schools, which was officially launched in 2012. Since then, RI has been working very closely with PUB and NParks on the facilitation of the trail and training of

schools in the community to help achieve the objective of educating Singaporeans on the holistic and integrated water management, whose aim is to protect and ensure a sustainable supply of water for our country.



Figure 1.2: Our seniors, Joash Tan and Damien Kee, with our Prime Minister, Mr Lee Hsien Loong during the official launch of the learning trail package in 2012

1.2.2 Our Collaboration with PUB and Institute of Technical Education (ITE)

At the end of 2014, PUB and RI explored the possibility of developing an ABC Waters Learning Trail Package to cater to the learning needs of preschoolers, aged 5-7 years old. The objectives are to raise the awareness of water issues and educate on the scarcity and conservation of the precious resource and the diversity of life it supports among our young.

At the beginning of 2015, RI, together with PUB and the Institute of Technical Education (ITE) embarked on the partnership to design a learning trail package of Kallang River @ Bishan-Ang Mo Kio Park. We, a group of year three students from RI and a group of ITE students specializing in the field of early childhood education, under the supervision of the respective teachers from the 2 organizations, started the project with close directives provided by PUB.

1.2.3 Learning package for preschoolers

Phase One (2015)

In Phase One, there were altogether 3 stages. The first stage was focused on familiarizing ourselves with collected and researched information about the different ABC Waters Learning Trail projects created by different primary and secondary schools in the past and getting to know the features of the Kallang River and Bishan-AMK Park better. In the second stage, we concentrated on the collection of primary data on preschoolers' learning pedagogies and design of the learning package while the last stage saw us making final adjustments to the package and planning the activities for Phase Two.

Phase Two (2016)

In Phase Two, we plan to start it with a pilot run of the learning package followed by a stage of discussions and fine-tuning of the package. The eventual aim is to launch the learning package on 22 March 2016, World Water Day 2016.

2. Methodology

2.1 Stage 1

2.1.1 Online Research

In any project, background research is vital to provide the fundamentals of the project and for the project to develop its preliminary ideas. Thus, we started our research with internet sources to have a basic understanding of the ABC waters project itself. The project has been previously undertaken by other schools – hence, we decided to browse their past work to have a general sensing of how a trail package should be put together, as well the general focuses and learning outcomes of the trails. Next, we explored the area of early childhood education – specifically on the educational pedagogies, psychology and behavioural science of the preschoolers as this would be relevant to the actual implementation of the trail package and impact the effectiveness of the trail package as a learning tool.

2.1.2 Site visit to Bishan Park

We proceeded to carry out a field study at Bishan Park to enable us to have an understanding of the ecosystem and biodiversity of the park as we needed to select the most appropriate content for our target audience. We also used our senior's project as a reference to enhance our understanding of the park, as well as to take into consideration the stations that they have come up with. However, we felt we needed some practical insight into the conducting of the trail, as well as the imparting of the content to the trail attendees; hence, we went for a two-day workshop conducted by PUB. The first session was on the 10th of March. The session lasted for three hours and was carried out at Bishan Park itself. In this three hour session, we gleaned a great deal of knowledge. Firstly, we toured the park under professional guidance from a trainer, where we were introduced to the biodiversity present inside the park. Next, we also gained insights on how the warning system works in the park along with crucial tips on how to run a trail. We also learnt of the possible hiccups that may occur during the trail. For instance, trail participants may arrive late for the trail – on the day of the trail, some trail participants from Guangyang Secondary

School were late for the trail for half an hour. The trainer responded by cutting down on the programme intended for the day; this meant that the trail had to be flexible. On the following day, we attended an indoor workshop session, where we were taught how to handle different situations when conducting the trail. We also learned about other theories of education pertaining to outdoor learning, and got a hands-on experience to carry out the activities. Information on how the park worked to clean the water flowing through it was also relayed to us. With these considerations, we began to work on our preliminary proposal.



Figure 2.3: Group members listen attentively to lecturer



Figure 2.4: Group members concentrating on activity

2.2 Stage 2

2.2.1 Classroom experience at Carpe Diem

On 12 Feb, we visited the preschool located in ITE College Central, *Carpe Diem*, to observe the general conducting of a lesson by the preschool teachers to a group of K1 preschoolers. The ITE students along with their teacher, Miss Dorcas were on-site to explain some of the learning theories involved in conveying concepts to the preschoolers. One of the theories was the Vygotsky's Zone of Proximal Development Theory, which indicated that we had to lower ourselves to the preschoolers level to convey information that would be understandable to the preschoolers; We observed two lessons; the first, where a group of K1 preschoolers were encouraged

to think of their ideal home. Then, they were told to draw out their thoughts on a piece of A4 paper.



Figure 2.1: Preschoolers working on group members take down note



Figure 2.2: Group leader Ming Cheng guiding preschoolers in their tasks

2.2.3 Interview with experts

However, as we still lacked professional advice in the area of preschool pedagogy, we contacted ITE to request an interview from professional educators in the field. ITE responded by engaging their in-house preschool teacher, Ms Mabel, as an interviewee, we were also introduced to an expert specialised in the field of childhood pedagogy, Ms Wendy. Through this interview, we were able to gain many insights into the area of preschool pedagogy. Furthermore, Ms Mabel and Ms Wendy also provided us with some areas of improvement in the preliminary package we proposed, such as shortening the duration of the pre trail and post trail to one day each, due to their short attention span. Using the information we gleaned from the interview, we made some major changes to our preliminary proposal. One of the changes we made to the draft is the adjustments to the duration of the package. We shortened it from one and a half hour each, stretching over five days, to a four day journey, with each session being not more than one and a half hours.

2.2.4 Diagnostic test

On the 16th April, we went down to Carpe Diem once again to conduct our diagnostic tests. The purpose of this was to investigate preschoolers' abilities to cope with different learning styles. This would serve as an important tool in coming up with our trail package by having more activities that cater to the majority of their learning styles. As Howard Gardner's theory of multiple intelligence show, preschoolers learn and grasp knowledge differently; thus, conducting a diagnostic test would be a crucial step in investigating which teaching style we should adopt, as well as the range and complexity of the content to be covered in the trail package.

In total, we conducted five tests. The first was the flashcard test, where we showed preschoolers some pictures of the flora and fauna typically seen around the park and the river. The second was the word search test to investigate their literacy levels, while the third was the colour test, where we showed preschoolers various differently coloured objects to gain insight into their knowledge on shades and colours. Following that, we presented a simple water cycle diagram in a flowchart format and also held a storytelling

session to find out their adaptability to different learning styles. From these experiences, it occurred to us that we would need to establish close relationship and trust between the preschoolers and the facilitators, which would require us to spend more time interacting with them and understanding their needs. However, due to various constraints, further contact with the preschoolers could not be established.



Figure 2.5: Ming Cheng facilitating the flashcard test



Figure 2.6: Ming Cheng facilitating the flashcard test



Figure 2.7: Preschoolers being thrilled by opening of umbrella during colour test



Figure 2.8: Preschoolers crowd around Ming Cheng as he conducts the storytelling session

2.2.5 Work meetings with PUB and ITE

In total, we conducted six work meetings in Phase 1. In these meetings, we discussed about various issues, including logistics, feasibility of trail activities and role delegation. The very first meeting was on 4 February, when ITE and RI were welcome onboard this project by Mr Darryl Tan and Miss April from PUB. On that meeting, we

settled on our role delegation, with RI in charge of the content portion, and ITE in charge of creating the activities. On the two subsequent meetings, RI and ITE presented our trail package proposals, which will be elaborated further in the results section. Following that, the three parties met up again in late-May and mid-June to make final modifications to the trail package, which will also be recounted in detail below.

These meetings provide an effective platform for PUB, ITE and RI to keep updated on the progress of work done by each party, and to clarify any queries or doubts that may exist. They played major roles in ensuring the cohesion and smooth flow of our project on multiple occasions.

Meeting on 28 May

On the 28th of May, ITE and PUB met up with RI to iron out the finer details of the trail package and to incorporate ITE's contributions to the improvements we made to the trail package. During this meeting, we clarified if we could conduct bottle net fishing, to which Ms April replied that further clearance was required from PUB – although the idea did appeal to Ms April. We would also come together to compose

the water story. In this meeting, we also agreed that some activities such as the 'Spot the Difference' previously planned for Station 2 and the dot joining activity would be scrapped due to time constraints. To test the feasibility of the various stations in the trail, we also agreed on 29th May (the next day) as the date to go down to Bishan Park with ITE and PUB's Ms April and run through the whole trail.



Figure 2.9: ITE demonstrating filtration activity



Figure 2.10: Ming Cheng presenting his idea to ITE
at meeting on 28 May

2.2.6 Site Visit to Bishan Park with ITE and PUB

On the 29th May, we meet up with ITE at the McDonald's outlet in Bishan Park, as agreed on the previous day. Upon arrival at the Green Roof, we settled the place where the preschoolers will sit. After this, we moved on to the next station, the stepping stones. Here, we tested out the bottle fishing, where Tetris demonstrated how to set up the bottle net traps. After 2 bottle net traps were set up, we grouped ourselves into two groups to simulate the two groups of preschoolers on the actual trail. Then, we placed the bottle nets in front of the current so that the bottle nets will flow naturally towards a school of fishes. In our first attempt, both groups caught a fish in the trap within seconds. However, in successive attempts to repeat the capture, we weren't so successful as the fish were more wary of the traps. From this, we concluded that the bottle net method wasn't 100% reliable.

Moving on, we went over to the grass patch opposite the stone desks near the stepping stones, where the second activity of the second station was to be carried out. Here, we confirmed the spot where the

preschoolers will lay down their mats and sit on them.

As we were worried of the preschoolers' skins being sensitive to burns from the sun as well as being injured by rocks in the grass, we settled on a grassy patch under the shade of tall trees which was free of rocks or protruding tree roots.

We moved on to the third station of water filtration, where we made final confirmations to the sitting arrangements of the preschoolers as well as how and where the demonstration will be carried out. After this, we moved back into McDonald's to discuss some final issues. Firstly, we came to a decision about how the two groups of preschoolers were to move. Our original idea was for the two groups to move in opposite directions so that the stations won't be overcrowded. However, due to complications such as toilet breaks and other administrative matters, we scrapped the idea and came up with a new idea. Basically, both groups of preschoolers will move off at the same time to the first station. However, at the second station, the two groups will branch off, with one group doing bottle net fishing first, then the other group doing the 4 "2 x 2" puzzle cubes. Then, these two groups will rotate. As the durations for these

two activities are the same, this will help facilitate the flow of activities. Upon completion of both of these activities, both of these groups will move off for the third station. From the third station to the fourth station, the two groups will move together as per normal.

2.3 Stage 3

2.3.1 Final modifications

After the two meetings, we began to work on the final facilitators guide for the pre-trail, trail and post-trail. Essentially, this is a collation and summary of all the details we have confirmed from Stages 1 and 2. It states explicitly the flow of the programme, the protocol for the facilitators at each activity and also mentions the resources required. After both RI and ITE completed the facilitator guides, the three parties met up for the last time (of Phase 1) on 17 June. Here, Ms April confirmed that the bottle fishing activity cannot be conducted as it may introduce unwanted inorganic substances into the river. As such, for the cube puzzle activity in Station 2, we decided to stretch it further by educating the preschoolers on facts about the organism depicted on the cube puzzles. On the day of the meeting, ITE offered their feedback on

the water story, which we took into consideration. We confirmed the practical aspects of the trail and the technicalities of the content coverage for the actual trail.

3. Results

3.1 Diagnostic Test Results

Table 1: Diagnostic Test Results from the 5 tests carried out at Carpe Diem

Test	Observations and further implications
Flashcard Test	Preschoolers were able to make certain links to their everyday lives. Some incorrect concepts--Birds cannot fly because of long legs
Word Search	Looking at words vertically proved more difficult than horizontally. Some do not understand game--circled alphabets instead of words.
Colour Test	Changing of colour excites preschoolers. Some were good at hands-on with rubber bands; others weren't so dexterous. Opening of umbrella thrills preschoolers.

Flowchart Test	<p>Able to understand concept of a cycle as ‘going over and over again.’</p> <p>Able to realise that it is a continuous process.</p> <p>However, preschoolers have little interest</p>
Storytelling	<p>Requires improvisation. Very on edge and unexpected to retain and maintain attention (Therefore, storyteller must be lively and engaging. Advice is to build close connection with preschoolers before proceeding. Must prepare an arsenal of response to different ways the preschoolers may react).</p> <p>Smile more often--exaggerate emotions</p>

3.2 Water Song

In order to make the package more attractive and engaging, we decided to incorporate the idea of nursery rhymes inside the learning trail. As the preschoolers will be more familiar with old tunes and rhymes, we made use of the tune of “Old Mcdonald's” and rewrote the lyrics to relate to the content of our trail. The lyrics depict vivid imageries from the park’s warning systems while it warns the preschoolers to watch out for

these signs, further emphasizing on the importance of safety in the park.

3.3 Water Story

Initially, we came up with a water story in hopes of conveying the learning objective of water cycle in an engaging manner. From our diagnostic tests, we learnt that preschoolers are drawn towards stories and can learn the most out of storytelling sessions compared to other teaching methods such as flipcharts. Hence, we felt that adding in this element of surprise will largely benefit the preschoolers’ experience. The water story covers the water cycle from the perspective of two water droplets, Wally and his partner Sally. (Refer to Appendix 3) However, after PUB responded to us that there was no clearance for the water story to be associated their mascot, a new idea of the water story emerged. Inspired by the suggestion raised by Mrs Low on the fourth meeting in late May, we decided to change our water story into an adventure story. The new water story talks about a princess, Princess Aquarius, being cursed, prompting a group of fictional villagers i.e. the preschoolers to save her. In order to do so, they have

to accomplish various tasks during the trail to lift the curse. As the trail progresses, the water story will be continued at the different stations. This also motivates the preschoolers to pay attention during the trail so as to fulfil their quest. (Refer to Appendix 4)

3.4 Presentation of 1st draft of product

In the preliminary stages, we decided to focus our objectives largely on the water cycle and water conservation. We came up with a four day package comprising two pre-trail days, one day for the trail, followed by another day for post-trail. Then, we also started brainstorming on the activities we wanted to implement in the trail. As the safety of the preschoolers is of the highest priority, we immediately decided on what safety measures to implement. One activity that we retained was the water testing, which has been one of the highlights of the past trails conducted. We thought that this activity would generate interest from preschoolers amid the content-packed trail. (Refer to Appendix 1)

Upon completion of our first draft, we wanted to present our ideas to ITE and PUB

and seek their opinion and feedback. Therefore, we arranged for a meeting on a date which was convenient for both of us. On that date, we presented our ideas, as well as showed both ITE and PUB a prototype of some of the activities we will conduct. After presenting our ideas, we received some feedback on some parts for improvement. For example, PUB wanted the trail to be something that can be conducted without dependence on PUB, and they also introduced the notion of downloadable resources. Therefore, we had to consider changing many of the original ideas to fit into this concept, which unfortunately included the removal of the water testing activity. The four-day package was also shortened to a three day one as the post trail session should be succinct. Also, in this meeting, we clarified many doubts as to the work allocation between ITE and RI. Meanwhile, we also sent ITE our proposal for review.

3.5 ITE's Presentation on 21st May

After the MYCTs, we met up with ITE again on 21st May. Here, the ITE students formally introduced themselves to us, and also gave a presentation on a new and improved version of our original proposal.

In this new version, some of the most major changes they made are the modification of our pre trail into something simpler, with the implementation of the concept of “Scenarios” and downloadable templates and materials. This allowed the pre-trail to be conducted with little dependence on PUB, implementing the idea of downloadable resources. Secondly, they changed some of the activities in the actual trail to ones that are more interactive, such as bottle-net fishing, piecing 4 cubes into a “2 x 2” picture, and conducting a simplified version of the filtration process. (Refer to Appendices 9-11) Thirdly, ITE improved on our activities in the post trail, using electric stoves to demonstrate the process of evaporation as part of the objective of the water cycle.

The improvements made by ITE were then reviewed and we added further creative inputs as well as safety and practicality concerns, which we clarified with PUB. Therefore, we had to wait until the next meeting before we could clarify these issues.

3.6 Final product

The product that materialised after seven months of discussion is a two-day package

consisting of a pre-trail session in a morning, and a trail and post-trail session on a separate day, taking place in the morning and afternoon respectively.

Pre-trail (Refer to Appendix 11)

The pre-trail session is largely centred on the theme of water conservation. This important concept is taught in various ways catering to various preschoolers’ learning style, which is important according to the Multiple Intelligence Theory.

Facilitators' Notes / Activities	Time	Materials
<p>Dramatic Scenes</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ Students will understand that water is an important and scarce resource in Singapore ➤ Students will learn that conservation of water (a precious resource) is crucial and important for Singapore's survival and sustainability 	--	--
<p><u>Dramatic Scene 1 – Turn off the water taps</u></p> <p>Procedures:</p> <ul style="list-style-type: none"> ❖ Prior to the activity, teacher will arrange for some water taps in the common toilets to be turned off. ❖ The students will attempt to turn on the tap, only to discover that there is no water running through some taps. ❖ At this juncture, teacher will solicit responses from the students regarding water as a precious resource in Singapore 	20 minutes	--
<p>K-W-L (Know-What-Learn)</p> <p>K-W-L charts are graphic organizers that help students organize information before, during and after a unit or a lesson. They can be used to engage students in a new topic, activate prior knowledge, share unit objectives, and monitor learning.</p> <p>Procedures involved:</p> <p>Teacher to make the K-W-L charts. There should be 3 columns:</p> <p>Column 1: What do you Know about the topic?</p> <p>Column 2: What do you Want to know?</p> <p>Column 3: What did you Learn?</p>	10 minutes	<p>KWL Chart</p>

<p>Dramatic Scene 2 – No water for lunch (optional)</p> <p>Procedures:</p> <ul style="list-style-type: none"> ❖ The cooking aunty will pretend to run out of the kitchen to the and tell them frantically that there is no water coming out from the tap and there will be no lunch unless they can help to gather water. ❖ At this moment, teacher will bring in 4 pails and instruct the students on what they can do to help the cooking aunty cook their lunch. ❖ In groups of 5, the students will start to deliver the water. ❖ After the whole exercise, teacher will seat the students down and help the students to reflect on the experience ❖ Stretching the students further - What problems do you think the lack of water can bring to you, your family, your country? 	25 minutes	4 pails
<p>KWL Chart (continuation of previous chart)</p> <p>Procedure:</p> <ul style="list-style-type: none"> ❖ At this juncture, teacher may want to refer the students to the KWL Chart once again to assess their understanding of certain concepts and ideas. ❖ Some concepts include scarcity of water, conservation. 	5 minutes	KWL Chart
<p>Water Story</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To prepare and stimulate the interest of the students for the learning trail on 24 June 2015, Wednesday. ➤ To possibly introduce an element of competition to the trail to make it more fun for the students. ➤ To help tie in the various activities of the trail to the water story to 	20 minutes	Water story sheet

<p>make it facilitate understanding and learning of the students.</p> <p>Procedure:</p> <ul style="list-style-type: none"> ❖ Teacher will read out the water story, either as a whole or section by section, depending on the learning needs and abilities of the students. ❖ Teacher is free to add creative elements or ask questions in the story telling process to enhance the learning experience of the students. 		
<p>Safety song</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To learn about the safety features of Bishan Ang Mo Kio Park through visual and auditory learning <p>Procedure:</p> <ul style="list-style-type: none"> ❖ At the start of the activity, teacher may want to play the tune of “Old Macdonald” for the students once OR sing through the water song once to help to familiarise the students to the lyrics, melody and rhythm of the song. ❖ Teacher should go through the song with the students verse by verse first. ❖ Then, the teacher will guide them in singing the song once through. 	20 minutes	Safety song lyrics printed on A4 paper, one for each child
<p>Screening of water video – (if logistics allows)</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To educate the students on the 4 National Taps of Singapore. ➤ To understand and learn about the importance of water conservation 	15 mins	Projector, water video
Briefing--Preparations for the actual trail on 24 June	5 minutes	

Trail (Refer to Appendix 8)

The actual trail planned had 3 unique stations at different locations of Bishan Park, and 1 station for reflections. Each station would focus on a different learning objective. Station 1 would be mainly on safety, station 2 would be mainly on biodiversity and Station 3 will be the water filtration activity,

putting emphasis on the need to keep our waters clean. By separating these learning objectives, the preschoolers would be able to better understand and absorb what we teach them. The reflection station at the end of the trail is to further ensure that the preschoolers remember and can apply to what they have learnt in their daily lives, by asking them questions to jog their memory.

Station 1 Location: Green roof (the sheltered area at Riverside Gallery - River Plains, which is opposite Mcdonalds) Learning Objectives: <ul style="list-style-type: none">➤ To brief the students on the aims of the ABC Waters Learning Trail at Kallang River @ Bishan Ang Mo Kio Park➤ To expose students to the safety measures and features via the safety node so that the students understand the importance of safety in using the park Procedures: <ul style="list-style-type: none">❖ Teacher to introduce and explain the aims of the learning trail to the students.❖ Teacher to conduct a safety briefing next before the students embark on the learning trail.❖ The teacher will proceed to bring the students to the safety node and introduce the safety measures/features.❖ Teacher to explain why it is important to adhere to the safety measures esp. in times of heavy rain or emergencies	15 mins
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<p>Station 2</p> <p>Location: Shaded area under a tree near to the stepping stones</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To spot and identify the plants and animals found in the river, along the river and around the Bishan-Ang Mo Kio park. ➤ To teach the students to understand that different animals and plants thrive in different types of habitats <p>Procedures:</p> <p>Body:</p> <ul style="list-style-type: none"> ❖ Teacher will bring the students to the surroundings to try to spot and identify animals and plants. ❖ After the observation tour, students will be brought to the shaded area to conduct the activity of forming cube puzzles. ❖ Students will be spilt into pairs. (10 pairs); each pair will be given a cube puzzle each. ❖ Teacher will gather all the students after the activity and explain more about the animals and plants on the cube puzzles. 	<p>30 mins</p>
<p>Station 3</p> <p>Location: Steps outside McDonald's</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To learn about the importance of keeping our waterways/rivers clean ➤ To learn via a simple model on how water is purified ➤ To highlight to the students the scarcity of clean water and the importance of 	<p>20 mins</p>

<p>conserving water for all users (including animals and plants) in Singapore.</p> <p>Procedures:</p> <ul style="list-style-type: none"> ❖ With the water scooped up earlier, the teacher will call upon the students to gather around her while she proceeds to demonstrate a simply water purification process (filtering) using two special containers on the steps. ❖ After the filtration demonstration, the teacher will allow the students to observe the difference between the “filtered water” and “original river water”. 	
<p>Station 4</p> <p>Location: Green roof (the sheltered area at Riverside Gallery - River Plains, which is opposite Mcdonalds.</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To give students some time to reflect on the trail and their learning. . ➤ To sum up the learning points of the learning trail <p>Procedures:</p> <ul style="list-style-type: none"> ❖ Teacher will pose the suggested questions below to help guide the students in their reflection of the trail/learning: <ol style="list-style-type: none"> 1. Did you enjoy the trail? 2. What did you enjoy the most? Why? 3. What have you learnt from the trail today? 4. Why should we protect / conserve our water? 5. What can you do to help protect our water? 	<p>15 mins</p>

<p><u>Conclusion:</u></p> <p>❖ Teacher to say this to the students ‘We have come to the end of our learning trail. We hope you have had fun learning about the park as well as the importance of water in our rivers and why we need to take good care of it. Please help to tell your parents about it as well so that everyone can do his/her part in keeping our water clean’</p>	
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Post-trail (Refer to Appendix 13)

The post trail will be held on the same day as the trail, but in the afternoon, most likely after the preschoolers have their afternoon

nap. This 1 hour session will only consist of two activities hosted by ITE. However, discussions on the activities are still in progress and are likely to only be finalised in phase 2 of the project.

Facilitators’ Notes / Activities	Materials
<p>Activity 1: K-W-L Chart</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To consolidate and allow students to share their personal learning experiences of the learning trail. ➤ To allow students to ask questions to deepen their understanding and learning of Singapore water. 	<p>KWL chart</p>

Activity 2 Electric Stove (Optional - To Be Confirmed) Learning Objectives: <ul style="list-style-type: none"> ➤ To teach the students on the concept of the Water Cycle. Procedures: <ul style="list-style-type: none"> ❖ Teacher to prepare a pan with a thin layer of water on it, and place it over an electric stove. ❖ Thereafter, teacher will hold a torchlight above the pan to simulate the sun. ❖ When the electric stove is turned on, the water on the pan should start to bubble and eventually evaporate. This helps to teach the students on the concept of evaporation. ❖ Teacher can ask questions to arouse the interest of the students eg "Where has the water gone?" 	Electric stove Pan Water
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4. Discussion

4.1 Strengths of project

Even though we did not manage to conduct the actual trail before this final report, we still thought that our project has much strength. The trail package offered a visual guide to the preschoolers, which is crucial to the preschoolers as what they perceive involves colour as a crucial component. The water story offered a competitive element to the trail while adding a narrative to the whole trail. Last but not least, the trail

package we came up with was more hands-on and comprehensive than the Sengkang Wetlands preschool trail – a point which Miss April also agreed with.

The process was also commendable. We managed to work together with our external partners, who contributed greatly towards the final products of the project. This benefitted us by training our social skills and abilities to work with external partners. With all our combined efforts, we were able to materialize a full package of our trail to be submitted to PUB, and also come up with a facilitator's guide for the trail.

We believe that some of our strengths exhibited deserve to be recognised. For example, we felt that we worked well as a group, with clear delegation of roles and corroboration. We also exercised critical and creative thinking while coming up with the trail package, such as having to think out of the box to come up with an appealing story for preschoolers. Many other complications also prompted us to think of effective ways in circumventing these challenges, which we did so relatively well.

4.2 Limitations of project

As the date for the pre trail drew nearer however, dengue cases in Bishan also started to rise. Therefore, in view of this PUB decided to postpone the pilot run to a month later. However, the number of dengue cases near the Bishan Park did not decrease, but increased drastically. Therefore, in view of both the facilitator's safety and preschoolers' safety, PUB has decided put the pilot run on hold first, until the situation becomes better.

4.3 Overcoming limitations

Though the pilot run has been put on hold, PUB has kindly offered us another

opportunity to launch this learning trail in 2016, during World Water Day, and we have gladly accepted. Prior to the launch, we had planned for a pilot run was planned for last December. However, on the days of the pilot, we were struck by wet weather; nevertheless, we modified our package to accommodate the indoor setting, to great success. We have since made modifications to our package to include wet weather plans (Appendix 10) Our package has since been launched on World Water Day this year. As always, it is difficult to establish a common time for the three organizations, namely PUB, ITE, and our school to come together due to our differing schedules; however, we have planned to conduct a pilot of the outdoor trail in May this year.

5 Conclusions

In conclusion, although the actual trail was not launched and implemented, we have gained a lot of insight into the elaborate process of coming up with one. Phase 1 of our project has concluded, while Phase 2 is underway. Throughout the seven months, each and every one of us put in a lot of effort into the project, driven by our passion. In retrospect, we have achieved significant progress in the past few months, with the

creation of a trail package targeted specifically at preschoolers that has received favourable responses from both preschoolers and teachers alike. We are also successful in the interaction with PUB and ITE, and definitely gained a lot of insight into how to work effectively with these large organisations. The completion of Phase 2 would involve the testing of the package outdoors, which may extend to the testing of the package with different age groups, to make our package as enriching for preschoolers, be they 4 or 6 years old.

Appendix 1

RI--ITE Sharing Sessions

Potential problems

1. Dramatic Scenarios:
 - # 1 “No water in toilet! Oh no!”
 - # 2 “Aunty has no water” - all facilitators will have to actively play their roles throughout, so there will be many areas where things may go wrong.
2. Electrical stove and thin tray of water - Safety issues and duration of process- heating may be dangerous, and the bubbling of water may splash and scald preschoolers or facilitators
3. Know Want Learn Chart - Not very interesting way to convey and reinforce learning; rather, they will be offered teasers throughout the pre-trail with references throughout trail
4. Pictures and videos- Not too relevant in terms of country (vid) or time (pic)
5. Closing of one sink - Distraction if the timing is different (? I thought all sink is closed but one?)

1st session @RI

- Idea of downloadable resources

2nd session @ITE

- Idea of downloadable resources incorporated into activities ITE presented
- Incorporation of visual and auditory learning through the usage of videos and pictures in pre-trail
- More hands-on activities were put into the proposal, and many of them seemed very engaging
- Incorporation of a KWL chart, (Know, Want, Learn), where preschoolers will display their preexisting knowledge and show us what they want to learn. This is a good activity as it helps them to recall what they have learned as the “Learn” session is where they recall what they have learned
- Post trail: Revisit KWL Chart, consolidate learning points on flipchart and one depiction of water cycle with the sponge and electrical stove apparatus

Groups of 4, 5 sets, prepare 1 extra, 7 sets in total (apparently facilitators need one)

1st session (Our proposed trail)	2nd session (Amendments by ITE)	
Station 1: Green Roof--Introduction and Safety Briefing	Station 1 (The mission arrives): Water story incorporated with a problem that needs preschoolers to solve.	Introduce in pre-trail
Station 2: Grassy patch--Safety features of park and water story. Water testing.	Station 2 (Safety) : Safety node and water song.	Polluted water to be scooped up by preschoolers under facilitation
Station 3: Close-up look at water flow from nearer set of stepping stones	Station 3 (Biodiversity): Bottle fishing. 2x2 cube puzzle.	No more 'spot the difference'
Station 4: Outside Macs--Dot diagram activity, water cycle, catch fish	Station 4: Outside Macs--Filtration activity. (Concept of water purification)	Designated fishing sites. No baits/chemicals.
Station 5: Back to green Roof	Station 5: Reflections. Conclude water story cum adventure. knight in shining armour/ best group gets the i saved bishan park award.	

Activity	Actions to carry out	Remarks/Concerns
1. Tap not working 30 minutes	Facilitate and conduct post-activity reflection Ensure order and direct activity. Children to take turns.	How many in a group? (15-20?) Technical issues--check with teachers Tap can be turned off for most of preschools

2. Show pictures and videos (Water rationing and Adventures of Water Wally) 30 minutes	Bridge gap. Make sure history does not repeat. Learnings from history. (Both RI and ITE)	Context of video: P Malaysia and 1960 Singapore (outdated?)
3. KWL chart 20 minutes	Printed on vanguard paper. (ITE) Revisit during post-trail	Possibly boring?
4. Preparing for bottle fishing 30 minutes		Are we making, or are we teaching children to make? Demonstrate, then make together
5. Post-trail: Electric stove--water cycle		Need to discuss further.

Thursday: 2.55pm meet. Ms April to look at our
ideas and give her suggestions.

Thursday night: Finetune

Friday: Finalise

Post-trail: 1st activity: KWL Chart, 2nd activity:
Electric stove, 3rd activity: Close the story.

Appendix 2

Old Mcdonalds tune

We should watch for our safety,
Yes we should indeed!
Even when we're having fun,
Make sure not to run!
Red blinking lights,
Safety signs,
Look out for these warnings everyone!
Keep it safe and have some fun,
Safety's number one!

Appendix 3

Once a upon a time, there lived a princess by the
castle over the river.

So sparkling were her eyes as the river in the
day

So pure was her heart as the water that ran
through the land

So loving was her spirit as the animals that
roamed on land and water

That she was named Princess Aquarius at birth

And all the elements were invited to celebrate
her birth

All but one

Terra

Who was the ground that people worked on
He had a terrible temper

And rumbled and tumbled all through the year
So the King did not invite him

On the day of the celebration
Terra stormed into the palace.
“A foolish act to have left me out
For this comes punishment no doubt!”
And he spoke
That on the 16th birthday of Princess Aquarius
The lands will shake
That her eyes will sparkle no longer
That her heart will be pure no more
That her spirit will never be free

The king of the land begged for help
But the other elements could not lift the curse

Finally, the other elements
Blessed the princess
Would live as long as the rivers flowed
The waters were clean
And the animals roamed

So the king ordered
That the people conserve the lands
Preserved the forests
And use the river wisely

And so 15 years went by
As the princess blossomed to a beauty
And the land was happy
But on the night before Princess Aquarius' 16th
birthday
The earth started rumbling
And it shook and shatter
It rumbled and rolled

And the castle sank into the ground

Princess Aquarius was no more
Her eyes no longer of light
Her heart, now one of stone
Her spirit, one that stilled
And she fell into a deep sleep

The villagers were determined to save their
beloved princess
And so their quest began...

The villagers had to cross a bridge
But it seemed to disappear randomly
How could they know when they could cross the
bridge?

<After water song>

They saw the bridge had lampposts
And when the lamps were red
None could pass
And so slowly but surely, all of them crossed the
bridge

But the princess was lost if the forests and the
waters were not restored.

Then, the element of the forest, Silva, and the
element of the rivers, Fluminis, appeared.

“To restore balance and bring Princess Aquarius
to life

All will have to win the favour of the animals”

“Of the forests,
The animals have stood the test of time and
memory
And now so will you
To put the pieces of the memory together”

“Of the river,
The fish are tired
Let them listen and follow you
And your work is almost done”

And so the villagers set about to work.

<After Station 2>

As the last of the villagers breathed a sigh of
relief,
Terra suddenly appeared
“Not so fast...”
And he huffed
And he puffed
And he blew the trees down
The animals up
The fishes up
And the bridge down
“Good luck cleaning the river now!”

Then

Silva and Fluminis appeared

“Quick
Silva will lead the animals to restore the forests
But all of you will need to help restore the river
Or the princess’ heart
Will forever be one of stone”

<After station 3, proceed to Green Roof>

At long last, the river and forests were restored
The villagers rushed into the palace
Up the staircases
Into the princess’ chambers

And they watched the princess
Sleeping peacefully
Had they failed?
And they watched
And they stared
And they peered

Then
Slowly but surely,
The princess opened her eyes
With the same sparkle of the river in the day
Colour returned to her face
As her heart started beating again
And then
She began to smile
As her spirits returned

The villagers shouted with joy as the princess
stood up
As the world was restored
And the land was happy again.

Appendix 4

Learning Trail – Kallang River @ Bishan Ang Mo Kio Park 2015

Water Story

Our task

To save Princess Aquarius from Earth
with the approval of the different
fairies in Bishan Park.

Scenario:

Once upon a time, there lived a
princess by the Green Roof castle
over the Kallang River in Bishan Park

So sparkling were her eyes as the
river in the day

So pure was her heart as the water
that ran through the land

So loving was her spirit as the animals

That she was named Princess
Aquarius at birth

And all the fairies were invited to
celebrate her birth

Flora, the fairy of trees

Fauna, the fairy of animals

Water, the fairy of rivers

All but one

Earth

Who was the ground that people
worked on

He had a terrible temper

And rumbled and tumbled all through
the year

Stomping through the land

So the King did not invite him

On the day of the celebration

Earth stormed into the palace.

“A foolish act to have left me out

For this comes punishment no doubt!”

And he spoke

That on the 16th birthday of Princess
Aquarius

The lands will shake
That her eyes will sparkle no longer
That her heart will be pure no more
That her spirit will never be free

So, the king begged for help
But the other fairies could not lift the curse

Finally, the other fairies
Blessed the princess
Would live as long as the rivers flowed
The waters were clean
And the animals roamed

So the king ordered
That the people protect the animals,
Save the trees
And use the water in the river wisely

And so 15 years went by
As the princess blossomed to a beauty

And the land was happy
But on the night before Princess
Aquarius' 16th birthday
The earth started rumbling
And it shook and shatter
It rumbled and rolled
And the Green Roof Castle sank into
the ground

Princess Aquarius was no more
Her eyes no longer of light
Her heart, now one of stone
Her spirit, one that stilled
And she fell into a deep sleep

(Question to ask the students : Do you
want to save the princess?)

The villagers were determined to save
their beloved princess
And so their quest shall begin on 24
June, Wednesday

(End of pre trail)

Actual Trail

At the start of Station One at the
Green Roof (Ming Cheng)

The villagers had to cross a bridge

But the river fairy was upset

That the bridge might sink

Before rising again

How could they cross the bridge?
(Task 1)

(Go into the features of safety node)

<Students to recap Water Song>

They saw the bridge had lampposts

And when the lights were red

The river would rise

And none could pass

Knowing this

The villagers crossed the bridge

Slowly but surely

Students to cross the stepping stones

and proceed to the shaded area

But Princess Aquarius is still asleep

Then, the three fairies appeared.

“To restore balance and bring
Princess Aquarius to life

Piece the plants and animals back
together” (Task 2)

And so the villagers set about to
work.

(Facilitators will guide students to
observe the flora and fauna in the
vicinity and complete puzzle)

<After Station 2>

Before station 3

As the last of the villagers breathed a
sigh of relief,

Earth suddenly appeared

“Not so fast...”

And he huffed

And he puffed

And he blew the trees down

The animals up

The fishes up

And the bridge down

“Good luck cleaning the river now!”
(Task 3)

Proceed to station 3

<After station 3, proceed to the Green
Roof>

At long last, the river, trees and
animals were back

And nature's balance was restored

The villagers rushed into the castle
up the staircases

Into the princess' chambers

And there, they watched the princess

Sleeping peacefully

Had they failed?

And they watched

And they stared

And they peered

Facilitator and students to open the
envelope

Then

Slowly but surely,

The princess opened her eyes

With the same sparkle of the river in
the day

Colour returned to her face

As her heart started beating again

And then

She began to smile

As her spirits returned

The villagers shouted with joy as the
princess stood up

As the world was restored

And the land was happy again

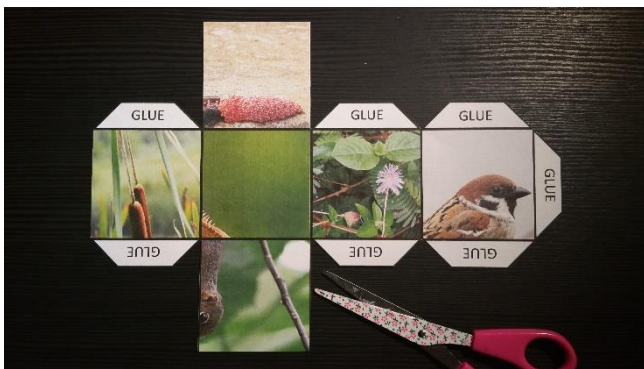
(Note: Facilitators are at their discretion to provide direct references to the Bishan Park. The story serve mainly to tie the challenges together, as well as a lead in to the activity ongoing in each station.)

Appendix 5

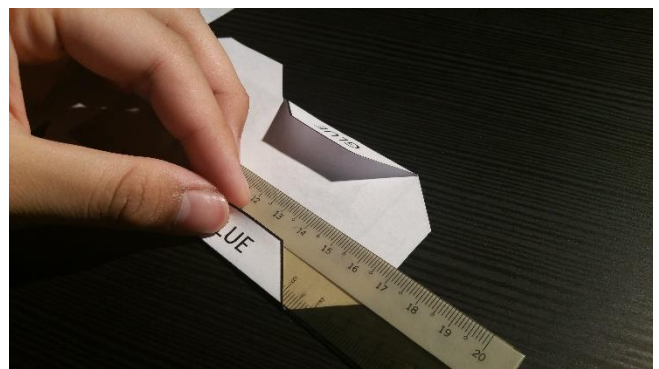
Cube Puzzle Instructions

Instructions: Cube Puzzle

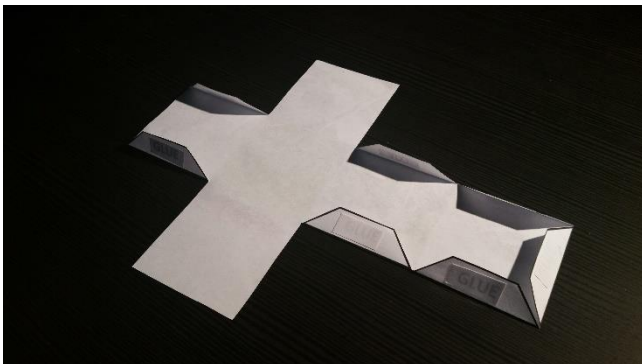
Materials needed: Scissors, double sided tape or glue stick, ruler.



Step 1: After printing all 4 templates, cut along the outline of the figure.



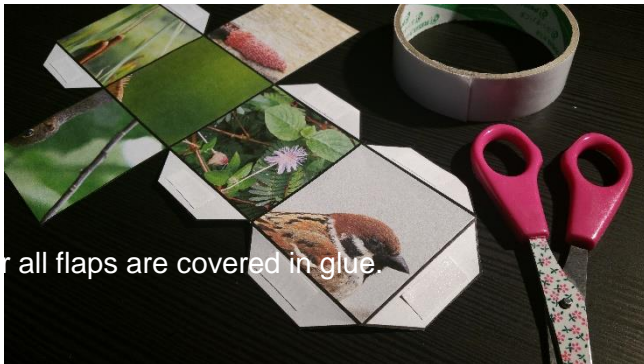
Step 2: Fold in the flaps. Use a ruler as a guide.



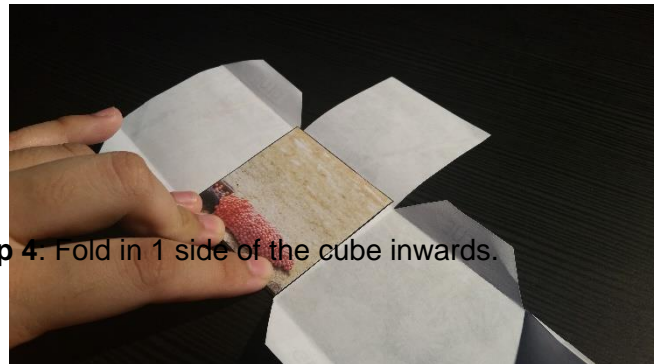
After all flaps are folded.



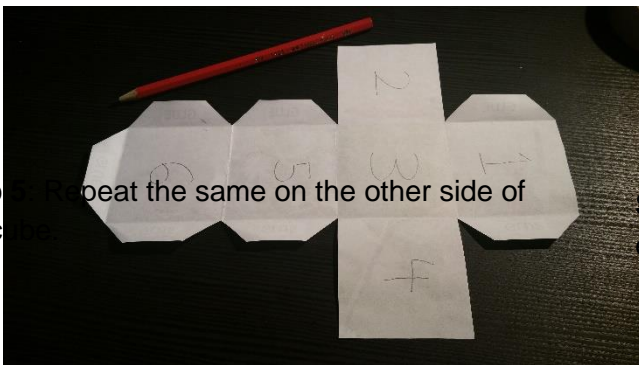
Step 3: Cut 2cm strips of double sided tape and stick over the 'GLUE' on the flap. You can use glue stick too!



all flaps are covered in glue.



Step 4: Fold in 1 side of the cube inwards.



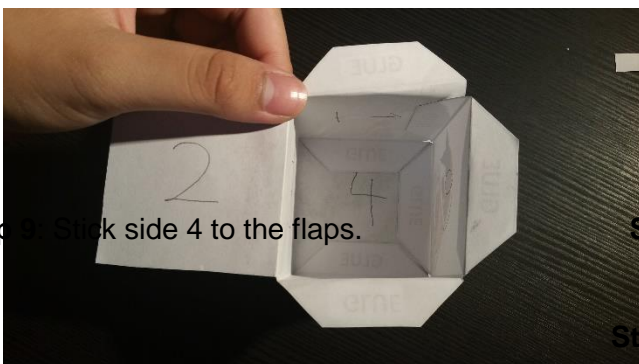
Step 5: Repeat the same on the other side of the cube.

Step 6: Label each side of the cube as 1, 2, 3, etc.



Step 7: Fold in side 6 to side 1.

Step 8: Stick side 1 to the flaps.



Step 9: Stick side 4 to the flaps.

Step 10: Press on the flaps inside to secure.

Step 11: Stick side 2 into to the flaps.

Step 12: Secure all loose ends with double sided tape or glue stick.



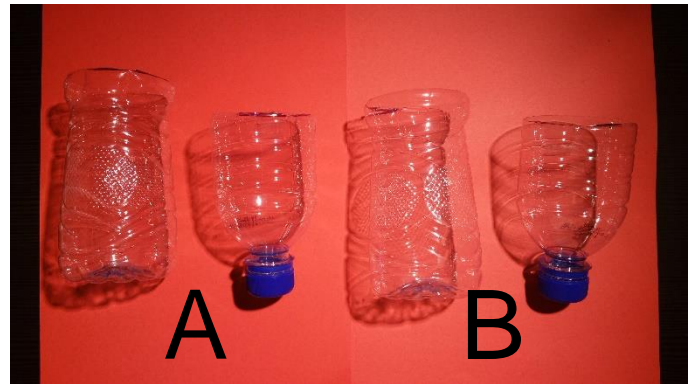
Appendix 6

Filtration instruction

Materials needed: 2x 500ml plastic bottles, scissors, permanent marker, masking/cloth tape, cotton pads, filter paper, and river water.



Step 1: Get 2 bottles of 500ml plastic water bottle. With a permanent marker, indicate a line halfway across the bottle.



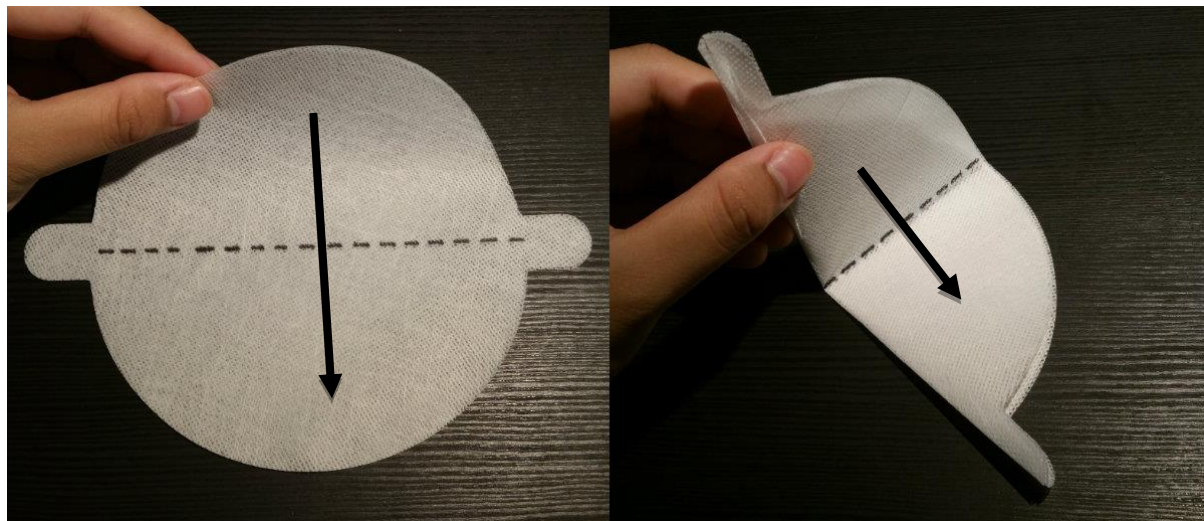
Step 2: Use a pair of scissors to cut along the line, Label the bottles A & B.



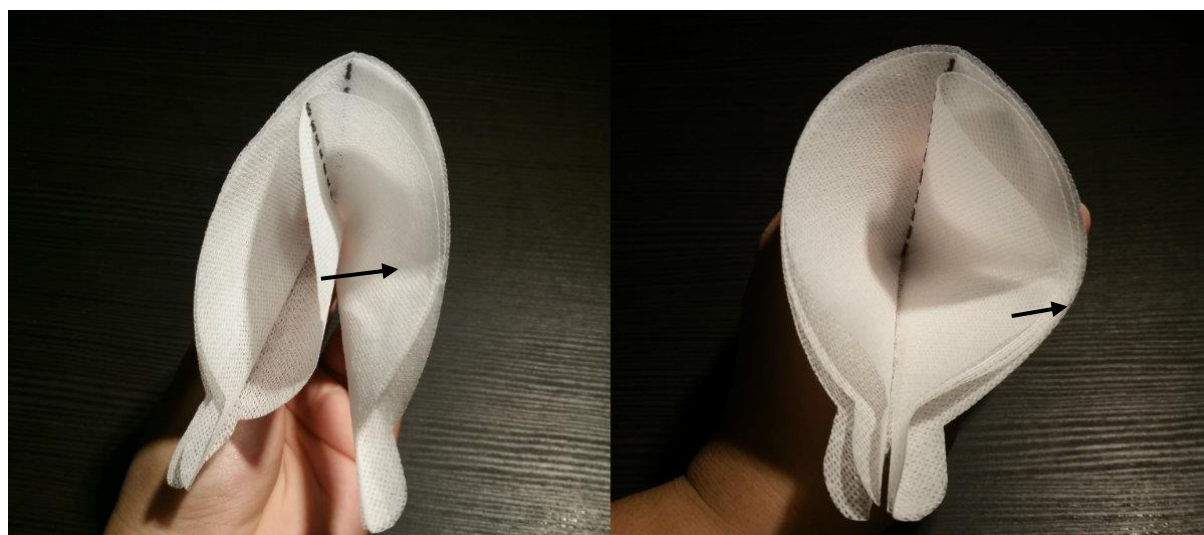
Step 3: Trim off all rough edges and use masking tape/cloth tape to prevent cuts.



Step 4: Take 5-6 pieces of cotton pads and place it in Bottle A.



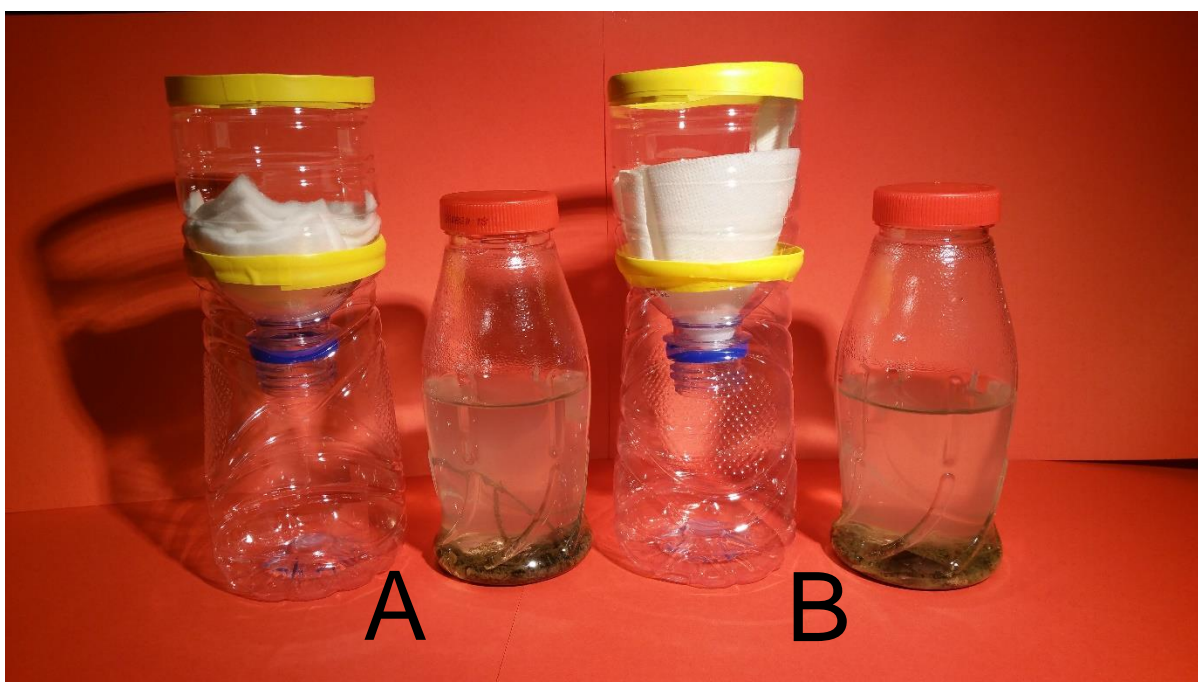
Step 5: Get the coffee filter. Firstly, fold it in half. Then fold into quarters.



Step 6: Grab one of the flaps and bring it in towards the center to make a 'funnel'.



Step 7: Place the coffee filter in the top half of Bottle B. The cotton pad will be placed in Bottle A.



Step 8: Collect some river water (same amount from the same spot), & start the filtration process!



Step 9: Pour in the river water into the 2 inverted bottles.



A

B

Step 10: After the filtration process has ended, you will be able to see that there is a colour change in the river water itself and lesser residue is found at the bottom half of the bottle.



Residue can be found on the cotton pad & coffee filter.

Appendix 7

Learning trail – Kallang River @ Bishan – Ang Mo Kio Park 2015

Pretrail on 22 June, Monday

Location: Carpe Diem @ ITE Central

Approximate Duration: 2 hours*

(*Please note that the stated duration is only an estimation and the following activities are merely suggestions. The teacher / facilitator is free to choose and conduct any activities deemed suitable for the learning needs and abilities of his or her students.)

Facilitators' Notes / Activities	Time	Materials
Dramatic Scenes Learning Objectives: <ul style="list-style-type: none">➤ Students will understand that water is an important and scarce resource in Singapore➤ Students will learn that conservation of water (a precious resource) is crucial and important for Singapore's survival and sustainability	--	--
<u>Dramatic Scene 1 – Turn off the water taps</u> Procedures: <ul style="list-style-type: none">❖ Prior to the activity, teacher will arrange for some water taps in the common toilets to be turned off.❖ After the students have finished playing in the playground (or similar activity), teacher will direct them to the toilet and instruct them to wash up as per	20 minutes	-

<p>normal.</p> <ul style="list-style-type: none"> ❖ The students will attempt to turn on the tap, only to discover that there is no water running through some taps. ❖ At this juncture, teacher will step in to ask questions and solicit responses from the students regarding water as a precious resource in Singapore ❖ Some suggested questions include: <ul style="list-style-type: none"> ❖ How do you feel when you see no water coming out of the water tap? ❖ Did you feel scared/angry/frustrated? ❖ After soliciting some responses from the students, teacher will instruct them to take turns to wash up. This exercise would allow the students to experience the inconvenience of not having enough water (with some taps turned off) ❖ Teacher to lead the students back to the classroom after the wash up. ❖ Teacher to get ready to proceed to the K-W-L activity. 		
<p>K-W-L (Know-What-Learn)</p> <p>K-W-L charts are graphic organizers that help students organize information before, during and after a unit or a lesson. They can be used to engage students in a new topic, activate prior knowledge, share unit objectives, and monitor learning.</p>	<p>10 minutes</p>	<p>KWL Chart:</p> <ul style="list-style-type: none"> ● Facilitator will print out the KWL chart and paste it onto a piece of corrugated cardboard or vanguard sheet

Procedures involved:

Teacher to make the K-W-L charts. There should be 3 columns:

Column 1: What do you **K**now about the topic?

Column 2: What do you **W**ant to know?

Column 3: What did you **L**earn?

Learning Objectives:

- To activate prior knowledge of the students on the topic “Water in Singapore”. (**K**)
- To arouse interest in students by asking them to list down things they would like to know more about with regard to water matters/issues in Singapore. (**W**)

Procedures:

- ❖ Teacher will gather the students in a circle and present the KWL Chart pasted on the whiteboard.
- ❖ Teacher will ask students questions to gain an insight into their prior knowledge on water issues and conservation in Singapore
- ❖ Teacher will continue to arouse the interest of the students by asking them the following questions to inquire what the students would like to know:
 - ❖ *Where do you think the water from the tap comes from?*
 - ❖ *Where do you think your home tap gets water from?*
 - ❖ *Where does Singapore get her water?*
- ❖ Meanwhile, the responses of the students will be

<p>recorded on the K-W-L sheet on the whiteboard by the teacher/assisting teacher.</p> <ul style="list-style-type: none"> ❖ After consolidating all the responses on the KWL Chart, teacher will tell the students to leave the “L” part for the post-trail session. 		
<p>Dramatic Scene 2 – No water for lunch (optional)</p> <p>Procedures:</p> <ul style="list-style-type: none"> ❖ During the break time, the teacher will send a cue to the kitchen, where the cooking aunty will assume a role in the activity. ❖ The cooking aunty will pretend to run out of the kitchen to the area where the children are having their break, and tell them frantically that there is no water coming out from the tap and that there will be no lunch for them unless they can help to gather water. ❖ Teacher to play along by adding on to what the cook said with words like "Oh no!", “What should we do?” ❖ At this moment, another teacher will bring in 4 pails and instruct the students on what they can do to help the cooking aunty cook their lunch. ❖ Teachers will proceed to split the students into 4 groups of 5 and distribute a pail to each group. ❖ The students will be ordered to help deliver water from other taps to the cooking aunty who will be stationed in the kitchen using the pails given. ❖ In groups of 5, the students will start to deliver the water. ❖ Other assisting teachers will station themselves at the working taps to help fill up the pails. ❖ Teacher must ensure the safety of the students throughout the exercise at all times. One way is to ensure that the pails are only partially filled with water. 	<p>25 minutes</p>	<p>4 pails</p>

<ul style="list-style-type: none"> ❖ Teacher will guide the students with their filled pails into the kitchen. ❖ After the whole exercise, teacher will seat the students down and help the students to reflect on the experience (of not having water to cook lunch and delivering water from the other taps to the kitchen). ❖ Teacher may ask the following questions: ❖ How did you feel when you heard that there is no water to cook your lunch? ❖ Did you feel scared/frustrated/angry? ❖ Did you like the experience? Why? ❖ Would you like to experience this again tomorrow? ❖ Can you imagine home / Singapore without enough water? ❖ Stretching the students further - What problems do you think the lack of water can bring to you, your family, your country? ❖ After seeking the responses from the students, teacher will proceed to consolidate the following learning points from the 2 dramatic activities: <ul style="list-style-type: none"> ❖ Inadequate water resources will bring about negative impacts on Singapore and her people. ❖ Water is a highly precious resource in Singapore. ❖ It is important for all people living in Singapore to conserve water. Every drop counts! ❖ Water is crucial to Singapore's survival and sustainability ❖ Teacher can then share some ways to conserve 		
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<p>water with the students. Ways to conserve water at home, in school and in public areas.</p> <ul style="list-style-type: none"> ❖ Possible ways include turning off the tap when not in use; use a cup to hold water for brushing of teeth instead of allowing water to run freely etc 		
<p>KWL Chart (continuation of previous chart)</p> <p>Procedure:</p> <ul style="list-style-type: none"> ❖ At this juncture, teacher may want to refer the students to the KWL Chart once again to assess their understanding and learning of certain concepts and ideas. ❖ Some concepts include scarcity of water, conservation. 	5 minutes	KWL Chart
<p>Water Story</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To prepare and stimulate the interest of the students for the learning trail on 24 June 2015, Wednesday. ➤ To possibly introduce an element of competition to the trail to make it more fun for the students. ➤ To help tie in the various activities of the trail to the water story to make it facilitate understanding and learning of the students. <p>Procedure:</p> <ul style="list-style-type: none"> ❖ Teacher to print out the water story sheet before the activity. ❖ Teacher will then distribute the water story sheet to the 	20 minutes	Water story sheet

<p>students to pique their interest.</p> <ul style="list-style-type: none"> ❖ Teacher will read out the water story, either as a whole or section by section, depending on the learning needs and abilities of the students. ❖ Teacher is free to add creative elements or ask questions in the story telling process to enhance the learning experience of the students. 		
<p>Safety song</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To learn about the safety features of Bishan Ang Mo Kio Park through visual and auditory learning <p>Procedure:</p> <ul style="list-style-type: none"> ❖ Teacher will print out the lyrics of the water song beforehand. ❖ At the start of the activity, teacher may want to play the tune of “Old Macdonald” for the students once OR sing through the water song once to help to familiarise the students to the lyrics, melody and rhythm of the song. ❖ Upon piquing the students’ interest, facilitators will then hand out the lyrics of the song to each student. ❖ Teacher should go through the song with the students verse by verse first. ❖ Then, the teacher will guide them in singing the song once through. 	<p>20 minutes</p>	<p>Safety song lyrics printed on A4 paper, one for each child</p>

<p>Screening of water video – (if logistics allows)</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To educate the students on the 4 National Taps of Singapore. ➤ To understand and learn about the importance of water conservation <p>Procedures:</p> <ul style="list-style-type: none"> ❖ Teacher will download water video and set up projector before the commencement of this activity. ❖ Teacher to direct the students to the earlier dramatic scenes activities and questions asked eg where do we get our water from? ❖ Teacher to brief the students on the content of the video before playing it. ❖ At the end of the video, the teacher will consolidate learning points for the students. <ul style="list-style-type: none"> ❖ Water is a highly precious resource in Singapore. ❖ It is important for all people living in Singapore to conserve water. Every drop counts! ❖ Water is crucial to Singapore’s survival and sustainability 	15 mins	Projector, water video
<p>Preparations for the actual trail on 24 June</p> <p>Procedures:</p> <ul style="list-style-type: none"> ❖ Teacher will brief the students on the learning trail 	5 minutes	

<p>(objectives, the 4 stations, the things to bring etc)</p> <p>Checklist Overview:</p> <ul style="list-style-type: none">➤ Water bottle➤ Umbrella/ Raincoat➤ Mosquito repellent (Optional)➤ Sunblock (Optional)		
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End-of-pre-trail

Appendix 8

Learning trail – Kallang River @ Bishan – Ang Mo Kio Park 2015

Actual trail on 24 June, Wednesday

Location: Bishan Ang Mo Kio Park – River Plains (the one with Mcdonalds)

Approximate Duration: 2 hours*

(*Please note that the stated duration is only an estimation and the following activities are merely suggestions. The teacher / facilitator is free to choose and conduct any activities deemed suitable for the learning needs and abilities of his or her students to achieve trail objectives.)

Facilitators' Notes / Activities	Time	Materials
Toilet Break before the commencement of the trail	5 mins	--
Station 1 Location: Green roof (the sheltered area at Riverside Gallery - River Plains, which is opposite Mcdonalds) Learning Objectives: <ul style="list-style-type: none">➤ To brief the students on the aims of the ABC Waters Learning Trail at Kallang River @ Bishan Ang Mo Kio Park➤ To expose students to the safety measures and features via the safety node so that the students understand the importance of safety in using the park Procedures: <u>Introduction:</u>	15 mins	Ming cheng <ul style="list-style-type: none">• Recap the water story• Activities done during pre-trail• Objectives of the trail must be clearly spelt out• 1st task of the water story is to cross the river via the stepping stones

- ❖ Teacher to gather the students and split them into 2 groups of 10 students each
- ❖ Next, the teacher will recap on the learning points from the pre-trail and refresh students' memory on the water story (the quest to save Princess Aquarius by completing 3 tasks during the actual trail) and water song.
- ❖ Teacher to direct the students to the task envelope with aim of helping to check the progress of the students on the trail.
- ❖ Teacher to introduce and explain the aims of the learning trail to the students.
- ❖ Teacher to conduct a safety briefing next before the students embark on the learning trail.
- ❖ Some things to include in the briefing are as follows:
- ❖ Inform the teacher immediately when you feel unwell, or are stung or bitten by an insect/animal.
- ❖ Always move in pairs/groups and do not leave the group without permission from the teacher.

Body:

- ❖ The teacher will proceed to bring the students to the safety node and introduce the safety measures/features.
 - ❖ **Safety node** – in times of heavy rain as water level rises, the safety nodes will be activated. Park users will see the red and yellow flashing lights, hear warning announcements and sirens.
 - ❖ **Warning sirens** – go off when the water level rises and when a heavy rain warning is received. When the sirens go off, listen to the announcements and move out of the river, beyond the red markers
 - ❖ **Red markers** – placed along the river. When water level rises, move away from the river, beyond the red markers (3 metres)
 - ❖ **Safety lines** – placed across the river. They will float with the water level and serve as an additional precautionary

measure for river users.

❖ **Life buoys** – placed along the river to serve as another precautionary measure in case of drowning in an emergency

- ❖ Teacher to explain **why** it is important to adhere to the safety measures esp in times of heavy rain or emergencies (highlight that river as a flood plain whereby water flow is normally confined to a narrow stream (Kallang river) during the dry weather flow; however, when it rains, the banks will be used to contain rainwater as water level rises)

Conclusion:

❖ Teacher will do a quick recap of what has been taught and discussed at the safety node. Teacher may ask the following questions:

- ❖ *What should you do when you hear the warning siren go off?*
- ❖ *Why should we do that when the siren goes off?*
- ❖ *What are the things we should not do in the park?*
- ❖ Next, teacher will lead the students in the singing of the water song to conclude the learning of this station and to reiterate the importance of safety in using the park and river.
- ❖ Lastly, teacher will refer the students to the 1st task of the water story – to cross the river via the stepping stones

<p>Station 2</p> <p>Location: Shaded area under a tree near to the stepping stones</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To spot and identify the plants and animals found in the river, along the river and around the Bishan Ang Mo Kio park . ➤ To teach the students to understand that different animals and plants thrive in different types of habitats ➤ To educate the importance of keeping the river and park clean so as to support the biodiversity (and learn how everything collectively forms the macro-system (inter-dependency on one another) ➤ To help to develop the students’ psychomotor skills <p>Procedures:</p> <p><u>Introduction:</u></p> <ul style="list-style-type: none"> ❖ At the start of this station, teacher will welcome the students to the new station and settle them. ❖ Next, the teacher will refresh their memory of the second part of the water story and the task they have to complete. ❖ Teacher can arouse students’ interest in what they are going to do in the second station by asking <ul style="list-style-type: none"> a. Let’s keep very quiet and listen to the sounds around us, what can you hear? b. Look around you, can you see any animals? c. Do you know the names of some of the plants here? ❖ Teacher to encourage the students by responding with “Yes indeed! Looks like there are many living things in the park. 	<p>30 mins</p>	<p>6 “2 × 2” cube puzzles</p> <p>- 5 sets of 4 6-sided cubes</p> <p>(4+1 back-up)</p> <p>- 6 laminated pictures of the pictures used in the puzzle</p> <p>Dan Peng / Tianqi</p> <p>Other possible activities at this station:</p> <ul style="list-style-type: none"> ● “hunter and squirrel game” ● Water cycle flipchart ● Teacher to catch some fish / snails from the river using nets
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Let's take some time to have a good look at them, shall we?"

Body:

- ❖ Teacher will bring the students to the surroundings to try to spot and identify animals and plants.
 - ❖ Some animals and plants that can be spotted and identified:
 - ❖ Apple snail and eggs
 - ❖ Mimosa plants
 - ❖ Dragonflies
 - ❖ Changeable lizard
 - ❖ Cattails
 - ❖ Eurasian tree sparrow
 - ❖ Plantain squirrel
 - ❖ After the observation tour, students will be brought to the shaded area to conduct the activity of forming cube puzzles.
 - ❖ Students will be split into pairs. (10 pairs)
 - ❖ Each pair will be given a cube puzzle each.
 - ❖ Animal on the cube puzzle are:
 1. Apple snail and eggs
 2. Mimosa plant
 3. Changeable lizard
 4. Narrow leaf cattail
 5. Eurasian tree sparrow
 6. Plantain Squirrel
- (The names of these creatures can be found on <https://www.nparks.gov.sg/biodiversity/wildlife-in-singapore/species-list>)

- ❖ After each pair manages to complete a cube puzzle, teacher will show them a picture of the animal/plant they have formed, for example, Apple snail.
- ❖ The pair that forms the puzzle fastest will get a smiley sticker.

Conclusion:

- ❖ Teacher will gather all the students after the activity and explain more about the animals and plants on the cube puzzles

Apple Snail and eggs

- They eat anything that can be torn by them.
- Their eggs should never be covered by water as it will drown the baby snails.
- Life span of an Apple Snail is between 1 to 4 years.
- They have poor vision and are not able to hear.

Mimosa Plant

- Their leaf closes when touched.
- Blooms during summer.
- Wind and insects are responsible for pollination.
- It belongs to the pea family.
- Also known as the “sleeping” or “sensitive” grass

Changeable Lizard

- It is not harmful.
- It eats insects and smaller lizards.
- Head and shoulders of male lizard changes colour to bright orange during mating season.
- They are related to Iguanas.
- They are able to move each of their eyes in different directions.

Narrow leaf cattail

- Seeds of the cattail are small and dry. They can only be dispersed by wind.
- Grows in wet meadows.
- They are considered as an important source of food and shelter for some animals.

Eurasian tree sparrow

- Lives near people.
- Its eggs are either white or light gray.

Plantain Squirrel

- Commonly seen in Singapore.
- It has a red belly.
- Eats fruit pulps and seeds of flowers.
- They are active during the day time.

- ❖ Teacher to recap the animals and plants the students have spotted, identified and learnt earlier.
- ❖ Some suggested questions include:
 - ❖ So what are the animals we saw earlier?
 - ❖ Can you name me the plants we saw on the river bank just now?
 - ❖ Can someone tell me the features?
 - ❖ Do you think we can bring them home with us? Why yes? Why not?
- ❖ Teacher to guide students to understand and appreciate the rich biodiversity present in the Kallang River and Bishan Ang Mo Kio park.
- ❖ Students should also learn that different animals and plants thrive in different types of habitats.
- ❖ Teacher to refer students to the 2nd completed task of the water story and instruct students to get ready to move off to

<p>the next station.</p> <ul style="list-style-type: none"> ❖ Teacher may reiterate the fact that Princess Aquarius is still asleep as the spell has not been lifted, and encourage the students to follow him to the next station to complete the last task. 		
<p>Station 3</p> <p>Location: Steps outside McDonald's</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To learn about the importance of keeping our waterways/rivers clean ➤ To learn via a simple model on how water is purified ➤ To highlight to the students the scarcity of clean water and the importance of conserving water for all users (including animals and plants) in Singapore. <p>Procedures:</p> <p><u>Introduction:</u></p> <ul style="list-style-type: none"> ❖ Before the start of the activity, teacher to gather the students and sit them on the stepped seats outside McDonalds. ❖ Teacher will proceed to scoop up some water from the river using a cup/bottle and ask students the following questions: <ul style="list-style-type: none"> ❖ "Are you thirsty? Do you want to drink some 	<p>20 mins</p>	<p>3 pieces of Oil filter paper (2 for actual use, 1 backup)</p> <p>5 pieces of cotton wool (3 for actual use, 2 backup)</p> <p>2 special containers</p> <ul style="list-style-type: none"> ● Cut an empty 500ml mineral water bottle into two ● Invert the top half and place it on top of the bottom half ● The inverted top half of the mineral water bottle will act as a funnel

<p>water?”</p> <ul style="list-style-type: none"> ❖ Would you like some of the water here? ❖ Why won't you drink this water? ❖ Why is the water unclean? What are the reasons? ❖ How can we make the water clean? <ul style="list-style-type: none"> ❖ Teacher to give time and solicit responses from the students. ❖ Teacher will then ask the students if they think the water in the river is clean. ❖ Teacher to refer the students to the last task of the water story, which is to clean the water, which they think is not that clean. <p><u>Body:</u></p> <ul style="list-style-type: none"> ❖ With the water scooped up earlier, the teacher will call upon the students to gather around her while she proceeds to demonstrate a simply water purification process (filtering) using two special containers on the steps. ❖ Filtration demonstration steps <ol style="list-style-type: none"> 1. Pour the river water into the special container 2. Swirl the bottle to allow the water to settle and be filtered by the oil filter paper 3. Wait for around 1 - 2 minutes for full filtration 4. In the meantime, the teacher will scoop up more water from the river and place it in a mineral water bottle ❖ After the filtration demonstration, the teacher will allow the students to observe the difference between the “filtered water” and “original river water”. <p><u>Conclusion:</u></p>		<p>1 empty mineral water bottle</p> <p>1 facilitator – Tetris and Dan Peng</p> <p>Tian qi</p> <p>Link everything back to water story</p>
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<ul style="list-style-type: none"> ❖ Before the teacher concludes with the learning points, she may want to ask the following questions: <ul style="list-style-type: none"> ❖ Now that the water is cleaner, would you drink it? Why not? ❖ Do you think we can make water clean with other methods? ❖ Can you think of other ways to keep our water clean? ❖ What will you do to help make our water clean? ❖ Next, the teacher will explain to the students that our water from the reservoirs has to go through a very thorough process of filtration and cleansing before it reaches our taps. ❖ Another question to ask can be “why do we need to keep our water clean?” ❖ Teacher to conclude with the following important message: ❖ Part of water sustainability is being able to ensure that our precious water resource is free from pollution. It is essential that our reservoirs and waterways (Kallang River in this case) be kept clean so that it can help to reduce the cost of water treatment/purification. Good water is also important in supporting life in and around the river and for recreational activities. (eg, public using it to fish) ❖ Teacher to refer to the last task of the water story, which is to clean the water! ❖ Teacher to ask students if they want to know if Princess Aquarius has woken up and lead the students back to the Green Roof. 		
<p>Station 4</p> <p>Location: Green roof (the sheltered area at Riverside Gallery - River Plains, which is opposite Mcdonalds.</p>	15 mins	<p>Ming Cheng</p> <ul style="list-style-type: none"> • Recap everything • envelope

Learning Objectives:

- To give students some time to reflect on the trail and their learning. .
- To sum up the learning points of the learning trail

Procedures:**Introduction:**

- ❖ Teacher to settle the students under the Green Roof and remind them to drink water for hydration.
- ❖ Students are then instructed to sit in a circle to better facilitate discussions.
- ❖ Teacher to refer the students to the water story and ask the following questions:
 - ❖ What do you think Princess Aquarius is doing now? Is she still sleeping?
 - ❖ Would you want to know if we have managed to save her from the spell cast by Earth?
 - ❖ Shall we open the envelope to find out?
- ❖ Next, the teacher will open the envelop and reveal the answer to the students (Princess Aquarius has woken up and the King would like to thank each and every one of the students for the work well done)
- ❖ Teacher to read out the last part of the water story to the students.

Body:

- ❖ Following this, the teacher will pose the suggested questions below to help guide the students in their reflection of the

trail/learning:

6. Did you enjoy the trail?
7. What did you enjoy the most? Why?
8. What have you learnt from the trail today?
9. Why should we protect / conserve our water?
10. What can you do to help protect our water?

❖ Or the teacher can also ask the following questions to better guide the students in reflecting their learning for the respective stations:

Station 1 - Safety measures

1. What should we do if it rains?
2. Should we play near the water when it is raining?
3. What should we do when we see the warning lights flashing?
4. What is the red safety mark for?
5. What is found in the river to ensure safety?

Station 2 - Biodiversity in the park

1. What are some animals and plants found in Bishan Ang Mo Kio Park?
2. What is the name of this animal? (teacher to show the pictures of animals/plants)
3. How can we help these animals and plants to live well in the park?

Station 3 - Importance of keeping our water clean

<ol style="list-style-type: none"> 1. What should we do to the water in the river? 2. Can I throw litter in the river? 3. Can you see any litter lying around? 4. What can we do? <p><u>Conclusion:</u></p> <p>❖ Teacher to say this to the students ‘We have come to the end of our learning trail. We hope you have had fun learning about the park as well as the importance of water in our rivers and why we need to take good care of it. Please help to tell your parents about it as well so that everyone can do his/her part in keeping our water clean’</p>		
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End of Actual Trail

Appendix 9

Learning trail – Kallang River @ Bishan – Ang Mo Kio Park 2015

Post-trail on 24 June, Wednesday

Location: Carpe Diem @ ITE Central

Approximate Duration: 1 hour*

(*Please note that the stated duration is only an estimation and the following activities are merely suggestions. The teacher / facilitator is free to choose and conduct any activities deemed suitable for the learning needs and abilities of his or her students to achieve trail objectives.)

Facilitators' Notes / Activities	Time	Materials
<p>Activity 1</p> <p>K-W-L Chart</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To consolidate and allow students to share their personal learning experiences of the learning trail. ➤ To allow students to ask questions to deepen their understanding and learning of Singapore water. <p>Procedures:</p> <ul style="list-style-type: none"> ❖ After their afternoon nap, the students will be gathered in the comfort of their classroom once again. ❖ After settling the students, teacher will bring out the KWL Chart and paste it on the whiteboard. ❖ Students will be instructed to look at the “K” and “W” columns on the chart. ❖ Next, the teacher will ask the students if they have managed to find answers to their questions under the “W” column. ❖ Teacher to put down the students’ responses (learning / answers) in the “L” column. ❖ Next, students will be given time to share with their class on what they have learnt and/or their personal experiences on the trail. ❖ Teacher to scribe all sharing down on the “K” column. ❖ Teacher will ask students if they have new 		<p>KWL chart</p>

<p>questions that they would like to put under the “W” column.</p> <ul style="list-style-type: none"> ❖ If not, teacher will congratulate the students on their completion of the learning trail (and saving Princess Aquarius). 		
<p>Activity 2</p> <p>Electric Stove (Optional - To Be Confirmed)</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To teach the students on the concept of the Water Cycle. <p>Procedures:</p> <ul style="list-style-type: none"> ❖ Teacher to prepare a pan with a thin layer of water on it, and place it over an electric stove. ❖ Thereafter, teacher will hold a torchlight above the pan to simulate the sun. ❖ When the electric stove is turned on, the water on the pan should start to bubble and eventually evaporate. This helps to teach the students on the concept of evaporation. ❖ Teacher can ask questions to arouse the interest of the students eg "Where has the water gone?" 		<p>Electric stove</p> <p>Pan</p> <p>Water</p>

End of Post-trail

Appendix 10



Learning Trail at Kallang River @ Bishan - Ang Mo Kio Park



Table of Contents

Lesson Plans.....	2
Pre-trail	2
Actual Trail	6
Post-trail.....	12
Annex 1	13
1.1 Know-What-Learn Chart.....	13
1.2 Water Story.....	14
1.3 Water Story Puppets	18
1.4 Water Song	20
1.5 Checklist for the actual trail	21
Annex 2	22
2.1 Map of Kallang River @ Bishan – Ang Mo Kio Park	22
2.2 Red marker	23
2.3 Safety node	24
2.4 Cube Puzzle Templates	25
2.5 Station 2 Photos	29
2.6 Filtration Activity	35
2.7 Water Story (Wet Weather Programme)	37



Pre-trail

Approximate Duration: 2 hours*

(*Please note that the stated duration is only an estimation and the following activities are merely suggestions. The teacher/ facilitator is free to choose and conduct any activities deemed suitable for the learning needs and abilities of his/ her students.)

*The trail is tied neatly with the water story so as to keep up with the ‘adventure mode’ of children.

Facilitators’ Notes/ Activities	Time	Materials
<p>Dramatic Scenes</p> <p>Learning Objectives:</p> <ul style="list-style-type: none">➤ Students will understand that water is an important and scarce resource in Singapore.➤ Students will learn that conservation of water (a precious resource) is crucial and important for Singapore’s survival and sustainability. <p>Procedure:</p> <ul style="list-style-type: none">❖ Prior to the activity, teacher will arrange for some water taps in the common toilets to be turned off.❖ After the students have finished playing in the playground (or similar activity), teacher will direct them to the toilet and instruct them to wash up as per normal.❖ The students will attempt to turn on the tap, only to discover that there is no water running through some taps.❖ Teacher will then instruct the students to wash their hands with the few taps available.❖ After the wash-up, teacher can ask questions and solicit responses from the students regarding water as a precious	20 minutes	--

<p>resource in Singapore.</p> <ul style="list-style-type: none"> ❖ Some suggested questions include: <ul style="list-style-type: none"> ○ How did you feel when you saw no water coming out of the water tap(s)? ○ Did you feel scared/ angry/ frustrated? <p>Why so?</p> ❖ This exercise aims for students to experience the inconvenience of not having enough water to satisfy our needs. 		
<p>Water Rationing Explanation Activity</p> <ul style="list-style-type: none"> ❖ To start, the teacher to explain how water scarcity will eventually lead to water rationing. ❖ Printed pictures of past water rationing exercises can be shown. ❖ Some suggested questions include: <ul style="list-style-type: none"> ○ Did you find it troublesome to queue up to wash your hands earlier? ○ That must be how the people in the picture felt like too! How long do you think it takes to get water now? ○ When water is scarce, water rationing will occur! Water rationing is a very inconvenient and slow process. Saving water is thus very important and especially for Singapore, where water resources are scarce. 	5 minutes	Pictures of water rationing in the past
<p>K-W-L (Know-What-Learn)</p> <ul style="list-style-type: none"> ❖ K-W-L charts are graphic organizers that help teachers organize information before, during and after a lesson. ❖ They can also be used to engage students in a new topic, activate prior knowledge, share unit objectives, and monitor learning. <p>Teacher to make the K-W-L charts.</p> <p>Column 1: What do you Know about the topic?</p> <p>Column 2: What do you Want to know?</p> <p>Column 3: What did you Learn?</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To activate prior knowledge of the students on the topic 	10 minutes	<p>KWL Chart:</p> <ul style="list-style-type: none"> ● Teacher to print out the KWL chart and paste it onto a piece of corrugated cardboard or vanguard sheet (<i>Refer to Annex 1.1</i>)

<p>“Water in Singapore”. (K)</p> <ul style="list-style-type: none"> ➤ To arouse interest in students by asking them to suggest things they would like to know with regards to water matters/issues in Singapore. (W) ➤ To record what the students have learnt at the end of the lesson/journey. (L) <p>Procedure:</p> <ul style="list-style-type: none"> ❖ Teacher will ask students questions to gain an insight on their prior knowledge on water issues and conservation in Singapore. ❖ Teacher can continue to arouse the interest of the students by asking suggested questions below: <ul style="list-style-type: none"> ○ Where do you think the water from our taps come from? ○ Where do we get our water? ○ Do you think Singapore has a lot of water? ○ How can you tell? ❖ Meanwhile, the responses of the students are recorded on the K-W-L sheet. ❖ After consolidating all the responses, teacher will leave the “L” part for the post trail session. 		
<p>Water Story</p> <ul style="list-style-type: none"> ❖ Teacher can read the Water Story to start students on a journey of discovery (learning trail) into water resources and issues in Singapore. <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To prepare and stimulate the interest of the students for the learning trail. ➤ To introduce an element of competition to the trail to make it more fun for the students. ➤ To tie in the various activities of the trail to the water story and facilitate students’ understanding. <p>Procedure:</p> <ul style="list-style-type: none"> ❖ Teacher will read out the water story, either as a whole or section by section, depending on the learning needs and abilities of the students. ❖ Teacher is free to add creative elements/ hand gestures or ask questions to deepen/ enhance the learning experience of the 	20 minutes	Water Story (Refer to Annex 1.2 and Annex 1.3)

<p>students.</p> <ul style="list-style-type: none"> ❖ Teacher may improvise and add explanations to help students understand the story. 		
<p>Water Song</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To learn about the safety features of Bishan - Ang Mo Kio Park through visual and auditory learning. <p>Procedure:</p> <ul style="list-style-type: none"> ❖ Teacher are strongly encouraged to use visual aids to facilitate students' learning of the lyrics. ❖ Teacher may play the tune of “Old Macdonald” and sing the water song to help students familiarize with the lyrics and melody of the song. ❖ Teach the students the lyrics of the water song. Add the melody and sing the song together. 	20 minutes	<p>(Optional) Water Song lyrics written on flipchart (Refer to Annex 1.4)</p>

<p>Screening of water video – (if logistics allows)</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To educate the students on the 4 National Taps of Singapore. ➤ To understand and learn the importance of water conservation. <p>Procedure:</p> <ul style="list-style-type: none"> ❖ Teacher to download the water video and set up the projector. ❖ Teacher to recap the earlier dramatic scenes and questions discussed. ❖ Teacher to give a brief introduction of the video. ❖ At the end of the video, the teacher can consolidate some learning points: <ul style="list-style-type: none"> ○ Water is a highly precious resource in Singapore. ○ It is important for all people living in Singapore to conserve water. ○ Every drop counts! ○ Water is crucial to Singapore’s survival and sustainability. 	15 minutes	<p>Projector, water video</p> <p>Link: https://www.youtube.com/watch?v=5BGUT7BjPl0</p>
<p>Preparations for the actual trail</p> <p>Procedure:</p> <ul style="list-style-type: none"> ❖ Teacher to brief the students on the learning trail. ❖ Tell them to pray that Earth is not angry tomorrow, for if he is, then it may rain! 	5 minutes	(Refer to Annex 1.5)

End of pre-trail

Actual Trail

Location: Kallang River @ Bishan - Ang Mo Kio Park, River Plains (the park with McDonalds)

Approximate Duration: 2 hours*

(*Please note that the stated duration is only an estimation and the following activities are merely suggestions. The teacher/ facilitator is free to choose and conduct any activities deemed suitable for the learning needs and abilities of his/ her students.)

Facilitators' Notes/ Activities	Time	Materials
Toilet Break before commencement of the trail.	5 minutes	--
<p>Station 1</p> <p>Location: Green roof (the sheltered area at Riverside Gallery - River Plains, opposite McDonalds)</p> <p>Learning Objectives:</p> <ul style="list-style-type: none">➤ To brief the students on the aims of the ABC Waters Learning Trail at Kallang River @ Bishan - Ang Mo Kio Park.➤ To expose students to the safety measures and the safety node so that they understand the importance of safety when using the park. <p>Procedure:</p> <p><u>Introduction:</u></p> <ul style="list-style-type: none">❖ Recap on the learning points from the pre-trail and refresh students' memory on the water story (the quest to save Princess Aquarius by completing 3 tasks during the trail) and water song.❖ Teacher to introduce and explain the aims of the learning trail.❖ Conduct a safety briefing:<ul style="list-style-type: none">○ Inform the teacher immediately when you feel unwell, or are stung or bitten by an insect/ animal.○ Always move in pairs/ groups and do not leave the group without permission from the teacher.○ Hydrate yourself regularly.	15 minutes	(Refer to Annex 2.1 – 2.3)

<p><u>Body:</u></p> <ul style="list-style-type: none"> ❖ The teacher to bring the students to the safety node and introduce its safety measures/ features. <ul style="list-style-type: none"> ○ Safety node – in times of heavy rain as water level rises, the safety nodes will be activated. Park users will see the red and yellow flashing lights, hear warning announcements and sirens. ○ Warning sirens – go off when the water level rises and when a heavy rain warning is received. When the sirens go off, listen to the announcements and move out of the river to beyond the red markers. ○ Red markers – placed along the river. When water level rises, move away from the river, beyond the red markers (3 metres). ○ Safety lines – placed across the river. They will float with the water level and serve as an additional precautionary measure for river users. ○ Life buoys – placed along the river to serve as a precautionary measure in case of drowning in an emergency. <p><u>Conclusion:</u></p> <ul style="list-style-type: none"> ❖ Do a quick recap of what has been taught and discussed at the safety node: <ul style="list-style-type: none"> ○ What should you do when you hear the warning siren go off? ○ Why should we do so when the siren goes off? ○ What are the things we should not do in the park? ❖ Lead the students in the water song to reiterate the importance of safety in using the park and river. ❖ Refer the students to the 1st task of the water story – to cross the river via the stepping stones. 		
<p>Station 2</p> <p>Location: Shaded area near the stepping stones</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To spot and identify the plants and animals found at Bishan - Ang Mo Kio Park. ➤ To teach the students the different habitats that various animals and plants thrive in. ➤ To educate them the importance of keeping the river and park clean to support the biodiversity (and learn how 	30 minutes	<p>“2 × 2” cube puzzles</p> <ul style="list-style-type: none"> • 4 students to share a set <p>of cube puzzle</p> <p><i>(Refer to Annex 2.4)</i></p>

- everything collectively forms the macro-system).
- To develop the students' psychomotor skills.

Procedure:

Introduction:

- ❖ Puzzle Cubes and laminated pictures to be prepared.
- ❖ Read the water story and tell the students the task they have to complete.
- ❖ Teacher can arouse students' interest by asking:
 - Let's keep very quiet and listen to the sounds around us, what can you hear?
 - Look around you, can you see any animals?
 - Can you name any plants/ animals here?

Body:

- ❖ Split the students into groups of 4.
- ❖ Bring each group to observe the biodiversity in the park.
- ❖ Some animals and plants that can be spotted and identified:
 - Lalang
 - Mimosa Plant
 - Little Egret
 - Scaly-breasted munia
 - Squirrel
 - Elephant Plant
 - Cattail
 - White-breasted Waterhen
- ❖ After the observation, students to be brought to the shaded area for cube puzzle activity.
- ❖ Each group to be given a set of cube puzzle.
- ❖ Teacher will show a picture of the animal/ plant and the students will piece the cube puzzle.

Conclusion:

- ❖ Teacher to explain about the animals and plants on the cube puzzles.
- ❖ Recap the animals and plants the students have spotted, identified and learnt earlier. Suggested questions include:
 - Name some animals we saw earlier.
 - Can you name the plants we saw on the river bank just now?
 - Can someone describe its features?
 - Do you think we can bring them home with us? Why

<p>yes? Why not?</p> <ul style="list-style-type: none"> ❖ Teacher to refer students to the 2nd completed task of the water story (piece the puzzles together) and instruct them to get ready for the next task. ❖ Teacher may reiterate the fact that Princess Aquarius is still asleep as the spell has not been lifted, and encourage the students to the next station to complete the last task. 		
<p>Station 3</p> <p>Location: Steps outside McDonalds</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ To learn the importance of keeping our waterways/ rivers clean. ➤ To learn how water is purified through a simple filtration activity. ➤ To highlight the scarcity of clean water and the importance of conserving water for all users (including animals and plants) in Singapore. <p>Procedure:</p> <p>Introduction:</p> <ul style="list-style-type: none"> ❖ Gather the students and sit them on the stepped seats outside McDonalds. ❖ Read the water story and disclose the 3rd task (to clean the water). ❖ Teacher to scoop some water from the river using a cup/ bottle and ask students: <ul style="list-style-type: none"> ○ Are you thirsty? Do you want to drink some water? ○ Would you like some of the water here? ○ Why won't you drink this water? ○ Why is the water unclean? What are some reasons? ○ How can we clean the water? <p>Body:</p> <ul style="list-style-type: none"> ❖ Teacher to demonstrate a simple water filtration process. ❖ Filtration demonstration steps: <ol style="list-style-type: none"> 1. Place the cotton wool in the funnel. 2. Pour the river water through the funnel. 3. Swirl the bottle to allow the water to settle and be filtered by the cotton wool. 4. Wait for around 1 - 2 minutes for full filtration. ❖ After the filtration demonstration, allow the students to observe the difference between the “filtered water” and “original water” ❖ The water filtered with the cotton wool is cleaner. 	<p>20 minutes</p>	<ul style="list-style-type: none"> • 500ml plastic bottle • Scissors • Permanent marker • Masking/ cloth tape • Cotton pads • River water <p><i>(Refer to Annex 2.5)</i></p>

<p><u>Conclusion:</u></p> <ul style="list-style-type: none"> ❖ Discuss with the students: <ul style="list-style-type: none"> ○ Now that the water is cleaner, will you drink it? Why not? ○ How does Singapore clean our water? ○ What other methods are there to clean our water? ○ As a Singaporean, how can we help to keep our waterways/ canals clean? ❖ Explain to the students that our water from the reservoirs goes through a very thorough process of filtration and cleansing before it reaches the taps in home. ❖ Conclude with the following important message: <p>Part of water sustainability is to ensure that our precious water resource is free from pollution. It is essential that our reservoirs and waterways be kept clean so that it can help to reduce the cost of water treatment/ purification. Clean water is also important in supporting life and for recreational activities.</p> ❖ Teacher to ask students if they want to know if Princess Aquarius has woken up and lead the students back to the Green Roof. 		
<p>Station 4</p> <p>Location: Green roof (the sheltered area at Riverside Gallery - River Plains, opposite McDonalds)</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> ➤ Reflect on the trail and their learning. ➤ To sum up the learning points of the learning trail. <p>Procedure:</p> <p><u>Introduction:</u></p> <ul style="list-style-type: none"> ❖ Students to sit in a circle to facilitate discussion. ❖ Teacher to refer to the water story and ask the following questions: <ul style="list-style-type: none"> ○ Do you think Princess Aquarius is still sleeping? ○ Do you want to know if we have managed to save 	15 minutes	--

her from the spell cast by Earth?

- ❖ Teacher to read the last part of the water story to the students. (Princess Aquarius has woken up and the King would like to thank each and every one of the students for the work well done)

Body:

- ❖ Pose the suggested questions below to help students in their reflection:
 - Did you enjoy the trail?
 - What did you enjoy the most? Why?
 - What have you learnt from the trail today?
 - Why should we protect/ conserve our water?
 - What can we do to protect our waters?

- ❖ The teacher can also ask the following questions:

Station 1 - Safety measures

- What should we do if it rains?
- Should we play near the water when it is raining?
- What should we do when we see the warning lights flashing?
- What is the red safety marker for?
- What is found in the river to ensure safety?

Station 2 - Biodiversity in the park

- What are some animals and plants found in Bishan - Ang Mo Kio Park?
- What is the name of this animal? (teacher to show the pictures of animals/plants)
- How can we help these animals and plants to live well in the park?

Station 3 - Importance of keeping our waters clean

- Can we throw litter in the river?
- Can you see any litter lying around?
- What should we do?

Conclusion:

- ❖ We have come to the end of our learning trail. We hope you have had fun learning about the park as well as the importance of water in our rivers and why we need to take

good care of it. Please help to tell your parents about it as well so that everyone can do his/ her part in keeping our water clean!		
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End of Actual Trail

Post-trail

Approximate Duration: 60 minutes*

(*Please note that the stated duration is only an estimation and the following activities are merely suggestions. The teacher/ facilitator is free to choose and conduct any activities deemed suitable for the learning needs and abilities of his/ her students.)

Facilitators' Notes/ Activities	Time	Materials
K-W-L Chart Procedure: <ul style="list-style-type: none">❖ Students to look at the “K” and “W” columns of the chart.❖ Ask the students if they have managed to find answers to their questions under the “W” column.❖ Teacher to put down the students’ responses (learning/ answers) in the “L” column.❖ Students to share on what they have learnt and/ or their personal experiences on the trail.❖ Teacher to note the sharing on the “K” column.❖ Teacher will ask students if they have new questions that they would like to put under the “W” column.	10 minutes	KWL chart
Art Gallery <ul style="list-style-type: none">❖ Teachers can print out photos taken during the trail.❖ Teachers can paste the photos of the students and the trail onto a wall/ noticeboard.❖ Ask the students to recall their most memorable memories of the trail.❖ Provide art and craft materials for students to draw them.❖ Students can share on their drawings.❖ Some suggested questions:<ul style="list-style-type: none">○ What have you drawn?○ What do you want to tell us about your drawing?○ Why did you draw this/ that?	20 minutes	<ul style="list-style-type: none">• Blue-tack• Photos of students and the trail• Drawing materials• Paper

End of Post-trail

Annex 1

Annex 1.1

Know-What-Learn Chart

What do you K now?	What do you W ant to know?	What have you L earnt?

Water Story

Our task

To save Princess Aquarius from Earth with approval of the fairies at Kallang River @ Bishan - Ang Mo Kio Park.

(Note: Facilitators are at their discretion to provide direct references to the Bishan Park. The story serves mainly to tie the stations together. Facilitators can also add in gestures/ actions to engage the students.)

Pre-Trail

Once upon a time, there lived a princess by the Green Roof castle over the river
So sparkling were her eyes as the river in the day
So pure was her heart as the water that ran through the land
So loving was her spirit as the animals
That she was named Princess Aquarius at birth

And all the fairies were invited to celebrate her birth

- **Flora**, the fairy of trees
- **Fauna**, the fairy of animals ad
- **Water**, the fairy of rivers

All but one

- **Earth**, who was the ground that people worked on

He had a terrible temper
And rumbled and tumbled all through the year
Stomping through the land
So the King did not invite him

On the day of the celebration
Earth stormed into the palace
“A foolish act to have left me out
For this comes punishment no doubt!”
And he spoke
That on the 16th birthday of Princess Aquarius

The lands will shake
That her eyes will sparkle no longer
That her heart will be pure no more
That her spirit will never be free

So, the King begged for help
But the other fairies could not lift the curse

Finally, the other fairies
Blessed the princess
Would live as long as the rivers flowed
The waters were clean
And the animals roamed

So the King ordered
That the people protect the animals
Save the trees
And use the water in the river wisely

And so 15 years went by
As the princess, like a flower
Blossomed by the hour
The land was merry
With love from the fairies
But on the night before Princess Aquarius' 16th birthday
Earth swore he would make them pay
And the ground started rumbling and tumbling
And it shook and shattered
It fumbled and folded
And the castle sank into the ground

Princess Aquarius was no more
Her eyes, no longer of light
Her heart, now one of stone
Her spirit, one that stilled
And she fell into a deep sleep
And for that many would weep

(To ask the students: Do you want to save the princess?)

The villagers were determined to save their beloved princess
And so their quest began...

(Tell the students: To save the princess, we will have to go to the Bishan – Ang Mo Kio Park! Will you help the villagers save the princess?)

Actual Trail

Station 1: Green Roof

The rains were many
And never too friendly
But the villagers had to cross the river
Before the rains made them shiver
Still Water the fairy was troubled
As the river would soon double

How then might they pass?

(Teacher to teach/ recap features of the safety node and Water Song.)

They saw the park had beacons (small lights on top of the node)
Whose lights never weaken

Always will the water level be raised
Should the red lights go ablaze (when the lights shine bright red, the water level will rise)
Thank the heavens for the lovely days
And the villagers soon headed their ways
Into the woods

Task 1: Students to cross the stepping stones at the river and proceed to the shaded area.

But alas the curse was still not broken
Just as hope was lost
The three fairies appeared

Task 2: Learn about the plants and animals, piecing the cube puzzle.

And so the villagers set about to work

(Facilitators will guide students to observe the flora and fauna in the vicinity and complete puzzle.)

Station 3: Steps near McDonalds

As the last of the villagers heaved a sigh of relief
A chilly wind left an air of grief
With a rumble, Earth appeared

“So you have saved her spirit it seems”
“But the princess’ heart has yet to be redeemed”
And he huffed
And he puffed
And he blew the trees down
The animals up
The fishes down
The animals down
The fishes up
“Good luck cleaning the river now!”

Task 3: *Filtration activity, clean the waters.*

Station 4: Green Roof

At long last, the river, trees and animals were back
And nature was back on track
The villagers rushed into the castle
Ran up the stairs in a hustle
Into the princess’ chambers they stormed
A circle around her they formed

And there, they watched the princess
Free from all woes and (di)stress
Deep in her slumber
And they wondered

Had they failed?
And they watched
And they stared
And they peered

Then
Slowly but surely
The princess opened her eyes
With the same sparkle of the river in the day
Colour returned to her face
As her heart started beating once more
A yawn replacing her gentle snore
And then
As a rainbow appeared through the rain
Her spirit returned, free from pain

The villagers shouted with joy as the princess stood up

As the world was restored
And the land was happy again

Water Story Puppets



Earth



Flora



Water



Fauna



Princess Aquarius in deep sleep



Princess Aquarius

Water Song

(Sing to Old McDonalds tune)

We should **watch** for our safety,

Yes we should indeed!

Even when we're **having fun**,

Make sure **not** to **run**!

Red blinking lights,

Safety signs,

Look out for these warnings **everyone**!

Keep it **safe** and **have some fun**,

Safety's **number one**!

Suggested Actions/ Gestures

We	- Point to yourself with both thumbs
Watch	- Close your fingers into a tight palm and raise them over your eyes
Yes	- Make a 'V' sign with your index and middle finger on both hands and wave them from side to side
Even	- Start nodding head until 'Having Fun'
Having Fun	- Pump fists into the air
Make sure	- Point both index fingers forward
Not	- Wag your index finger
Run	- Mimic running by swinging both arms
Red blinking lights	- Form a beak shape with your fingers, then open and close, open and close
Safety Signs	- Draw a square in the air

- Look out** - Open your eyes big, then look left, straight and right (Action lasts for the whole sentence)
- Everyone** - Sweep one hand across the air in front of you
- Safe** - Close both fists and place them over your chest in a cross
- Have some fun** - Pump fists into the air
- Safety's** - Draw a big circle in the air with one finger
- Number One** - Raise the same finger high up in the air

Annex 1.5

Checklist for the actual trail

- Water bottle
- Umbrella/ Raincoat
- Sunblock (Optional)
- Mosquito repellent (Optional)

Annex 2

Annex 2.1

Map of Kallang River @ Bishan – Ang Mo Kio Park

Credits to: Jacqueline Ong

Bishan Park AMK



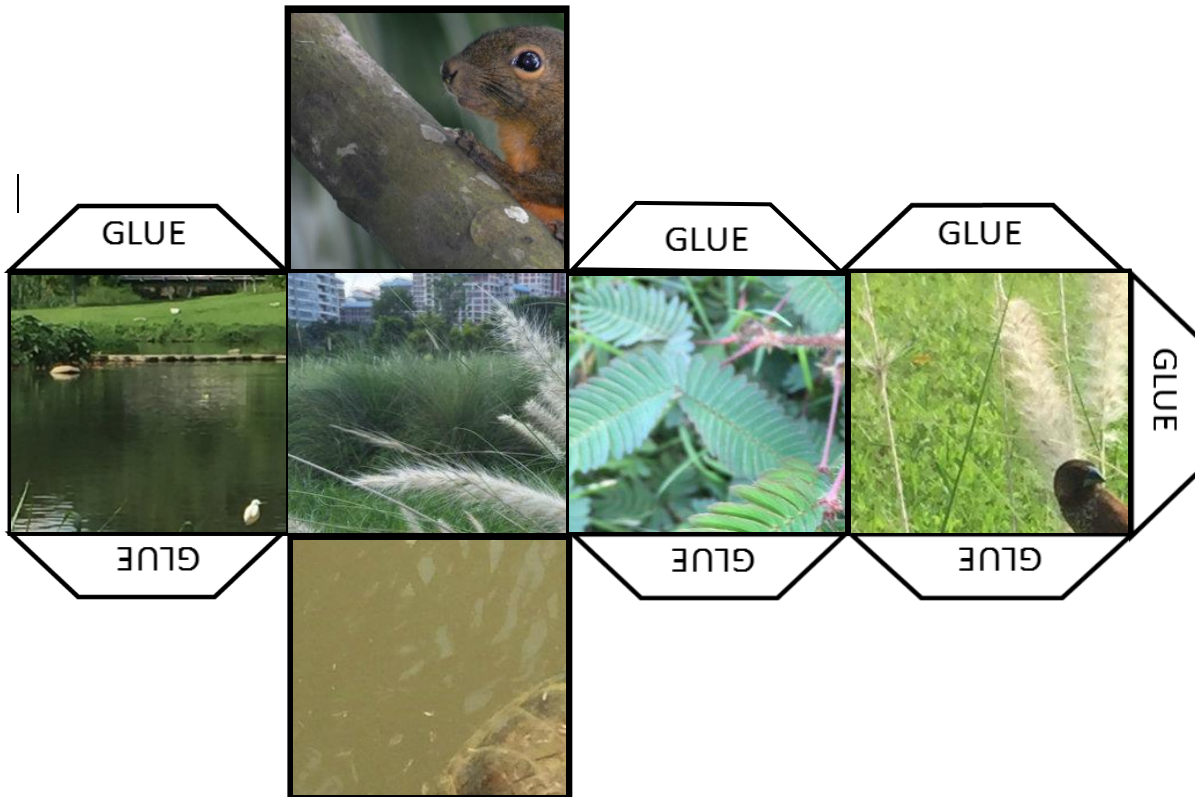
Red marker



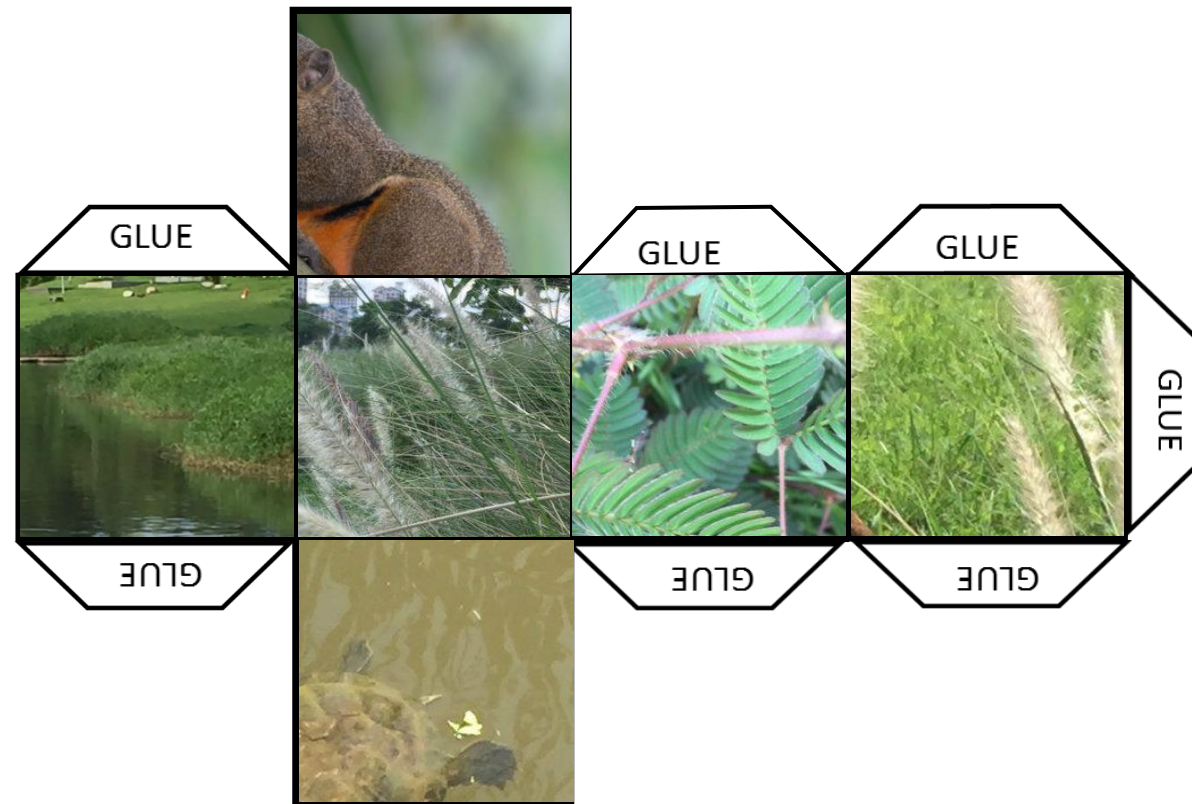
Safety node



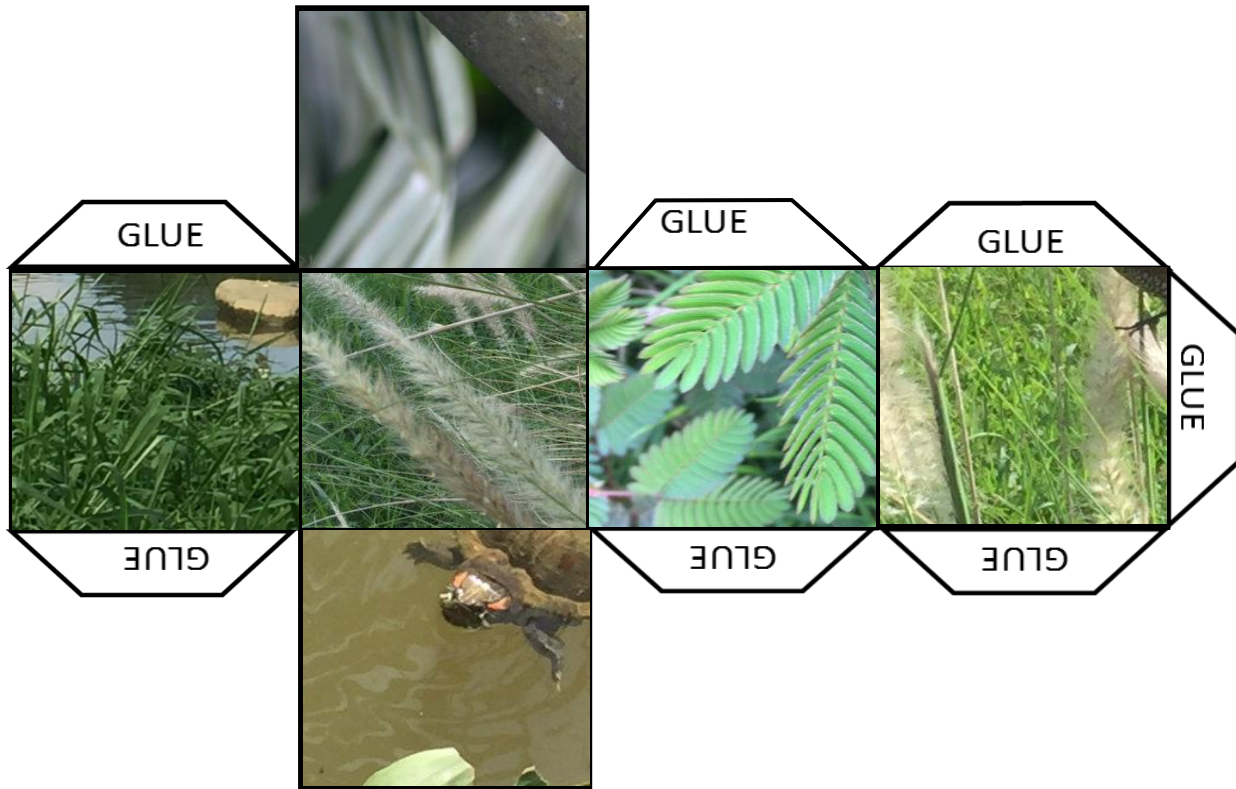
Cube Puzzle Templates



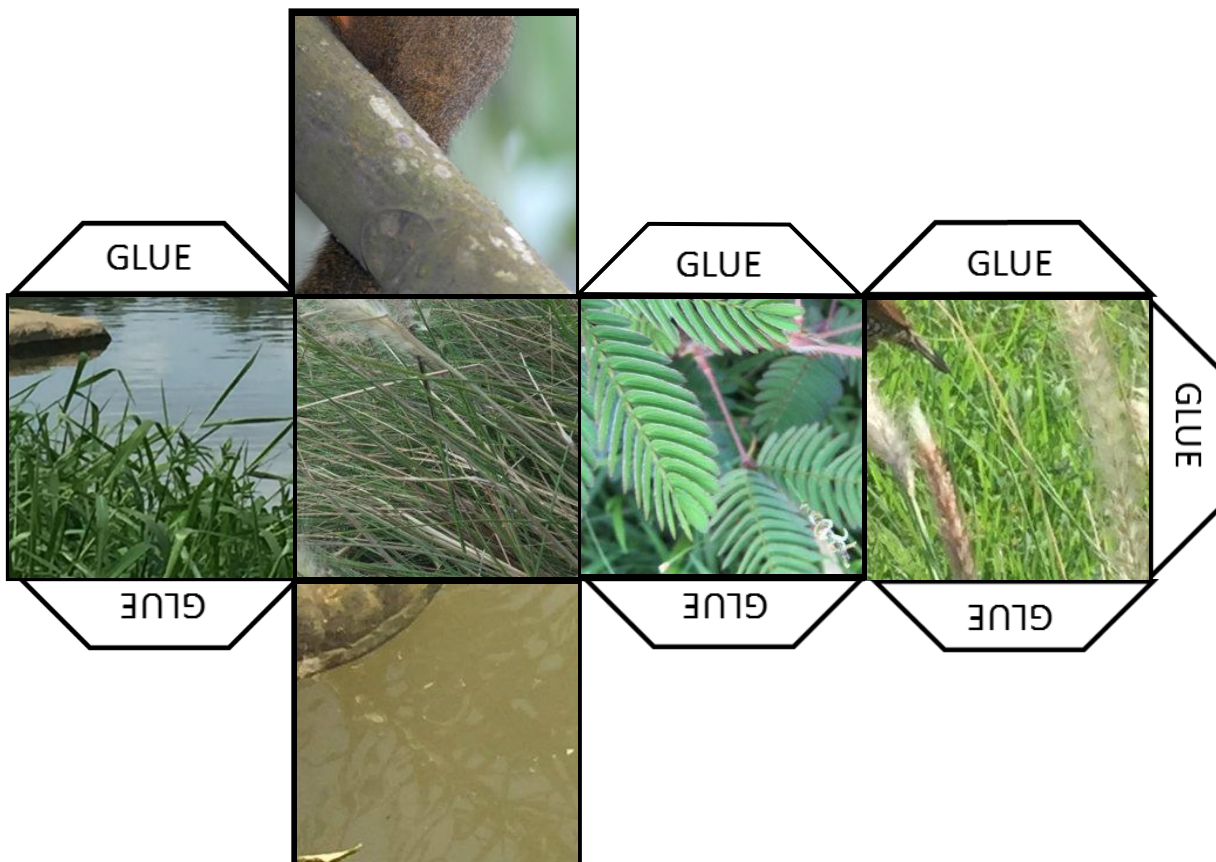
(Template for Cube 1)



(Template for Cube 2)



(Template for Cube 3)



(Template for Cube 4)

Picture of Bird—Scaly-Breasted Munia:



Picture of Mimosa Plant



Picture of Little Egret (tentative)



Picture of Red-eared Terrapin



Picture of Lalang



Picture of squirrel (Credits to Cai Yixiong)



Filtration Activity

Materials needed for each set:

- 500ml plastic bottle
- Scissors
- Permanent marker
- Masking/ cloth tape
- Cotton pads
- River water

Recommended to have 4 students share a set of materials.

Instructions:



Step 1: With a permanent marker, indicate a line halfway across the 500ml plastic water bottle.



Step 2: Use a pair of scissors to cut along the line.



Step 3: Trim off all rough edges and use masking tape/ cloth tape to prevent cuts.



Step 4: Take 5-6 pieces of cotton pads and place it in the top half of the bottle.



Step 6: Collect some river water & start the filtration process!



Step 7: Pour the river water into the bottle.



Step 8: After the filtration process has ended, you will see that less residue is found in the bottle.



Step 9: Residue can be found on the cotton pad.

Water Story (Wet Weather Programme)

Our task

To save Princess Aquarius from Earth with the approval of the different fairies.

Actual Trail

Station 1: With white board or projection screen available

Setting: Layout some stable tables, chairs or mobile tunnels that can be connected so as to form the “bridge” for the children to cross over, similar to an obstacle course.

The rains were many
And never too friendly
But the villagers had to cross the river
Before the rains made them shiver
Still Water the fairy was troubled
As the river would soon double

How then might they pass?

(Teacher to teach/ recap features of the safety node and Water Song.)

They saw the park had beacons (small lights on top of the node)
Whose lights never weaken

(Show pictures of the beacons, safety node, life buoys and water markers via pictures or projection on screen)

The water level did raise
And the red lights went ablaze
But the rain was mere
And gone were their fears
And the villagers soon headed their ways
Into the woods

Task 1: Cross the “Bridge”.

Station 2: Within the same class

Setting: Facilitators will hide pictures of common flora and fauna found in the park within the classroom for a session of treasure hunt later.

But alas the curse was still not broken
Just as hope was lost
The three fairies appeared

Task 2: *Learn about the plants and animals, piecing the cube puzzle.*

(Go through with students pictures of flora and fauna that will be commonly found in the park. Thereafter allow children to look around for all the hidden pictures. Once the students are back from the picture hunting, form them into groups of 4 max, to complete the puzzle using the puzzle cube. Show them the full picture one at a time.)

And so the villagers set about to work

Station 3: Within the same classroom

Setting: Facilitator may need to prepare the “muddy water” before-hand so that the activities can still be carried out as per lesson plan.

As the last of the villagers heaved a sigh of relief
A chilly wind left an air of grief
With a rumble, Earth appeared
“So you have saved her spirit it seems”
“But the princess’ heart has yet to be redeemed”
And he huffed
And he puffed
And he blew the trees down
The animals up
The fishes down
The animals down
The fishes up
“Good luck cleaning the river now!”

Task 3: *Filtration activity, clean the waters.*

Station 4: Green Roof

At long last, the river, trees and animals were back
And nature was back on track
The villagers rushed into the castle
Ran up the stairs in a hustle
Into the princess’ chambers they stormed
A circle around her they formed

And there, they watched the princess
Free from all woes and (di)stress
Deep in her slumber
And they wondered

Had they failed?
And they watched
And they stared
And they peered

Then
Slowly but surely
The princess opened her eyes
With the same sparkle of the river in the day
Colour returned to her face
As her heart started beating once more
A yawn replacing her gentle snore
And then
As a rainbow appeared through the rain
Her spirit returned, free from pain

The villagers shouted with joy as the princess stood up
As the world was restored
And the land was happy again