Topic 4- Quality Water (Key Stage 1)

English voice over script and super:

Super: Topic 4 Quality Water Key Stage 1

FVO: Topic 4 Quality Water Key Stage 1

Girl: Oh dear, I am all sweaty after a full day out. I feel great after taking a bath.

Water Save Dave: I got you.

Girl: Dave, how can you understand my discomfort?

Water Save Dave: Of course I understand. Before I am taken to have treatment just like your bath, it feels even worse than your sweat.

Girl: Are you exaggerating?

Water Save Dave: Let me show you a picture.

Water Save Dave: Now, can you see how I look before my bath?

Girl: From what I can see, you are not too bad. You are really exaggerating!

Water Save Dave: Then you are mistaken. The water you see from the picture is called raw water. It is not yet treated. Therefore, it contains sediment and solid waste as well as many microscopic organisms, bacteria and viruses that you can only see under the microscope.

Girl: What? So many impurities! Are we going to get sick after drinking raw water?

Super:
Guidelines for Drinking-water Quality

Water Save Dave: Take it easy. The Water Safety Plan established by WSD(Water Supplies Department) complies with World Health Organisation's Guidelines for Drinking-water Quality. It ensures that we have quality water.

Girl: What is the Water Safety Plan?

Super:
Water Safety Plan
Before
After
Risk

Water Save Dave: The Water Safety Plan is to ensure drinking water quality from source to distribution. In simple terms, it provides a guide to reduce the risk of contamination before and after water treatment, and to ensure safety of the entire water supply network.

Girl: How can water sources be contaminated?

Super:
Water quality

Water Save Dave: There are plenty of potential contaminations of water sources, for example, heavy rainfall can carry all kinds of contaminants to catchwaters, droughts can even increase the density of contamination. In addition, man-made contaminants from sources such as agricultural or industrial activities, changes in land use, residential development and chemical leakages can all affect water quality.

Girl: Wow, water quality can be affected by so many factors. What can we do?

Super:
Catchment management
Regular inspection
Law enforcement

Water Save Dave: In order to prevent contamination at the water source, we must impose effective catchment management, such as regular inspection and law enforcement. As for you, make sure you don’t swim in the reservoir! It is unlawful and you may pollute the water source.

Girl: Yes, Dave! Now that we have all the measures in place, water should be clean

enough for drinking directly, right?

Water Save Dave: Not quite! Water is still dirty at this stage and contains impurities, bacteria and viruses, pending further treatment before distributing it to homes.

Girl: So what is the further treatment?

Super:
Controlling Water Treatment

Water Save Dave: This relates to Step Two of the Water Safety Plan, that is controlling water treatment to meet the safety standards. In other words, this is how my bath is taken!

Girl: So what kind of bath do you prefer? Shower? Bath tub? What kind of shower gel will you use?

Water Save Dave: None of them are correct. I am not using a shower, nor a bath tub, not even shower gel!

Girl: So…How do you take a bath?

Water Save Dave: My bath is commonly known as water treatment and involves lots of processes, which is much more complicated than yours!

Girl: Please let me know how complicated it can go.

Water Save Dave: First, there are lots of fishes and leaves in the reservoir I stay. So, before the water treatment, I have to flow through the filter to filter off bigger impurities. Then I will be transported to the treatment works, where I take my bath.

Girl: What is it like in the treatment works?

Super:
Clarifiers
Filters

Water Save Dave: From afar you can observe two distinct shapes of pools. The round

ones, which look very similar to car wheels, are clarifiers. The grid-like rectangular ones, are filters. Water from all sources are treated here.

Girl: So how many treatment works are there in Hong Kong?

Super:
Water treatment works x 20
2124
Sha Tin Water Treatment Works
Largest in Hong Kong
One quarter

Water Save Dave: Hong Kong has 20 water treatment works with a total capacity of 5.31 million cubic metres per day, which is equivalent to the volume of 2124 standard size swimming pools. To me, I came from Sha Tin Water Treatment Works, which is the largest water treatment works in Hong Kong and handles over one quarter of our total treatment capacity every day.

Girl: Sounds impressive! So, what is your bath like here?

Super:
chemicals

Water Save Dave: Upon arrival at the water treatment works, I am mixed with different chemicals. A stirring process will enable the smaller impurities to bond together as bigger pieces.

Girl: Then?

Water Save Dave: Then I flow into the round pools called clarifiers. The floating substance you just saw will sink to the bottom of clarifiers. A machine scrapes and drains the deposits to form sludge cakes, they will be sent to landfill sites for disposal. As for me, since I become cleaner, I can flow to the rectangular pools called filters to continue my bath.

Girl: What? Have you still not yet finished bathing?

Water Save Dave: Yes, since there are still a lot of finer impurities on my body, I need

to further remove those finely divided suspensions on the filter bed.

Girl: Filter bed? Are you sleeping or taking a bath?

Water Save Dave: Don’t be misled by its name. The filter beds are not real beds, they are filters.

Girl: How can beds filter?

Water Save Dave: Filter beds are made of three different materials, which can segregate the remaining impurities. After this, I am cleansed.

Girl: I have a question.

Water Save Dave: What question?

Girl: If the filter beds are used continuously, where will the remaining impurities go?

Water Save Dave: You are quite smart to come to this conclusion. Like beddings and pillow cases, they get dirty after use. So once in a while, filter beds are cleaned just like how beddings are changed. The way to clean the filter beds is called backwashing. It can clean the entire filter bed and prepare it for the next round of filtering.

Girl: What a wonderful process! Now the water is clean.

Water Save Dave: Not quite. Although I become clean after filtration, the Three-treasures are needed.

Girl: What are the Three-treasures? Some kind of candy snacks?

Super:
Three-treasures
3 types of chemicals

Water Save Dave: Don’t always think of food! The Three-treasures are three types of chemicals.

Girl: I thought you are all clean at this stage. Why do you need these chemicals?

Super:
Old water mains
Water storage tanks
Iron
Rust
Chemicals

Water Save Dave: Of course there are reasons. Some old water mains or water storage tanks are made of iron. As you know, iron rusts. Therefore, we need the chemicals to lower the risk of rusting.

Super:
Water treatment works
Water storage tanks
Houses
Bacteria-free

Water Save Dave: In addition, water needs to be pumped to water storage tanks on top of high-rises from the treatment works. Given the long travelling distance of water, we need to add chemicals to ensure that water is bacteria-free during the transportation.

Super:
Healthy teeth
Clear water tank
Pumping station
Residential water tank
User

Water Save Dave: Last but not least, water is added with a chemical to protect your teeth, so that our oral health can be maintained while drinking water. After adding the Three-treasures, my bath is completed and I am drained to a clear water tank, which leads to a pumping station and to the residential water tank thereafter.

Girl: Your bathing process is really complicated, Dave...

Super:
Water quality testing

Water Save Dave: Yup. WSD has been conducting research on water treatment technology to prevent and reduce water contamination. Periodic sampling of water is undertaken to ensure water quality standard is being maintained. However, detailed testing and analysis of water quality take time...

Girl: Oh dear! What if we drink contaminated water without being notified before any of the testing results are out?

Super:
Biosensing Alert System

Water Save Dave: Don't worry. WSD has developed an innovative Biosensing Alert System. It integrates biological, computer, telecommunication and automation technologies, which can monitor the water quality continuously and also enable us to determine rapidly and accurately whether the water quality is safe for drinking.

Girl: Sounds interesting.what kind of biological technology are you referring to?

Water Save Dave: Let's see.

Girl: So cute! What kind of fish is that?

Water Save Dave: Zebrafish is its name, and it is very sensitive to contaminants which may be present in water. Once Zebrafish detects abnormal water quality, it will react differently, such as evading, running into each other or even sudden death. Through information technology and internet, the officers can observe activities of the Zebrafish in real-time, or download previously recorded videos and data to monitor and control the computer programme anytime and anywhere. Once any abnormal activity or death of Zebrafish is detected, alert e-mails and SMS will be sent automatically to the responsible officers.

Girl: I didn't realise the importance of Zebrafish until now.

Water Save Dave: Of course. But in addition to Zebrafish, we also have another partner to help us with monitoring. Take a look here.

Girl: These are not fish...what are they?

Super:
60 mins
Accuracy
Efficiency
Testing cost

Water Save Dave: These are light-emitting bacteria. Like Zebrafish, they are sensitive to water quality. When it is normal, light-emitting bacteria will glow as usual; but when contamination takes place, light-emitting bacteria will not glow. The benefits of adopting light-emitting bacteria is that they can be tested over one thousand harmful substances within sixty minutes accurately and efficiently, and at a low testing cost. As a result, both Zebrafish and light-emitting bacteria work together to form our Biosensing Alert System.

Girl: Fantastic! We have such innovative and effective means to monitor water quality. I am sure our drinking water must be clean.

Water Save Dave: Yes indeed. But there are still chances that clean water coming from treatment works can be contaminated. For example, improper commissioning of new plumbing system, substandard plumbing materials, defective water main connections, or even vandalism, can all lead to water contamination.

Girl: What can we do about that?

Super:
Water Safety Plan
Before
After
Risk
Avoiding water contamination during transportation
Design + Operation + Maintenance
Ultimate water quality
Cleaned + Flushed + Sterilised

Water Save Dave: This relates to the third part of the Water Safety Plan about avoiding water contamination during transportation. The design, operation and maintenance of the water network are critical to the ultimate water quality. WSD has established procedures and guidelines to manage, reduce and control the hazards that may affect

the safety of the drinking water supply in the distribution system. For example, a newly laid fresh water main has to be properly cleaned, flushed and sterilised according to established procedures before putting into use. In addition, property owners should also be responsible for its regular inspection and maintenance.

Girl: I now realise that every drop of water doesn't come easily; it has gone through so many processes…

Water Save Dave: Honestly speaking, you can also make sure the water you use is in good quality and is safe.

Girl: Me? How?

Super:
2 mins
Hot water
Cold water
Plastic

Water Save Dave: If water stays stagnant overnight, make sure you let it run for at least two minutes before using it for cooking or drinking. The over-ran water can be saved for planting or washing. As a reminder, we should not use hot water directly from the tap for cooking because the hot water may cause the impurities in the mains to be released, which can contaminate the water. In addition, we should avoid using plastic utensils for hot drinks, as carcinogenic substances can be released from heated plastic.

Girl: Oh yes. I just realise there is so much to learn.

Water Save Dave: As population increases with urbanisation and industrialisation, water demands increase. Fresh water is a precious natural resource that we have to cherish, drop by drop. Don't take clean and safe drinking water for granted.

Girl: Yes, Dave.