Topic 3- From Source to Tap (Key Stage 2)

English voice over script and super:

Super: Topic 3 From Source to Tap Key Stage 2

FVO: Topic 3 From Source to Tap Key Stage 2

Water Save Dave: Yea! I finally made it to my destination this time!

Girl: What do you mean, Dave?

Water Save Dave: Although I try my very best to reach my destinations such as a household faucet or a showerhead every time, accidents do occur and that prevent me from reaching my destinations.

Girl: What kind of accidents?

Super:
Water Loss

Water Save Dave: The most common accident is the “Water Loss”.

Girl: Water loss? What is that? Why is there an accident? How does it occur?

Water Save Dave: Haha, it is great that you are eager to learn! If you are really curious, I will tell you my story.

Girl: Sounds good, Dave!

Water Save Dave: My journey is in a cyclic manner and it begins from a lake. When the sun heats me and my friends up from oceans, rivers, lakes and plants, we evaporate and become water vapour. We rise to the sky holding onto each other in low temperature, thus forming a cloud. As the cloud gets heavier, we will become raindrops falling onto the ground from the sky. Some water drops turn into vapour again while others stay on the ground and continue the journey in the city.

Girl: How is your journey in the city?

Water Save Dave: We fall into the river and travel to the reservoir through a catchwater. The reservoir is to collect and store rainwater, but for us, visiting the reservoir is a vacation as there are impressive scenery and beautiful plants.

Super:
Water Treatment Works
Sediment
Impurities
Sterilised
Kill off bacteria
Stay in line with World Health Organisation's standards

Water Save Dave: After having a vacation in the reservoir, we will travel to the water treatment works, where we are being purified to remove sediment and impurities and also being sterilised to kill off bacteria to stay in line with World Health Organisation's standards.

Super:
Water Treatment Works
Service Reservoirs
Sewage Treatment works

Water Save Dave: After treatment, we are then distributed to different service reservoirs through the underground piping network for transient storage, until we finally made it to the destinations via distribution mains, that is your home. For the used and dirty water, it will be transported to sewage treatment works. Some treated water will be discharged into the sea while some will be recycled for non-potable uses. The story of water goes over and over again.

Girl: Wow! Dave, your journey is really special!

Water Save Dave: Indeed, we have to go through collection, treatment, filtration and distribution in order to arrive at your home. Unfortunately, it is not a must that we can reach our destinations every time because accidents do happen.

Girl: What kind of accidents?

Super:
Water Loss
Travel record

Water Save Dave: Generally, there are two types of accidents: first, I arrive at destinations without being measured; second, I simply cannot be delivered to the destinations. Collectively, we call them “Water Loss”.

Girl: Well I am not so sure Dave. Can you elaborate more?

Super:
Water Loss
Unmetered consumption
Aged water meter
Unlawful taking of water

Water Save Dave: The first type of “Water Loss” means water is used without being measured by a water meter nor fully paid, we call this “unmetered consumption”. This may be resulting from aged water meters or unlawful taking of water by individuals.

Girl: Unlawful taking of water?

Super:
Unlawful taking of water
through a fire service
public water mains
unregistered water meters

Water Save Dave: Unlawful taking of water commonly refers to a deliberate by-passing of the water meter for water used in order to avoid payment on the actual water consumed. Generally speaking, there are various means to take water illegally, such as unlawful connection to public water mains, unlawful connection to unregistered water meters, or taking water through a fire service such as fire hose reels inside a building for any purpose other than for firefighting.

Girl: I never thought people would steal water in Hong Kong!

Water Save Dave: I was directed to the fire hose reel in a building once, I thought I

would have a chance to extinguish the fire. Upon arrival, I was so disappointed as I was used for car washing only by a man.
Girl: That's very bad. But Dave, what is another type of "Water Loss" that you have mentioned?

Super:
Main burst
Water leakage

Water Save Dave: Another type of water loss can be a result of a main burst or water leakage from aged mains or poor connections.

Girl: What are the reasons for water leakage?

Water Save Dave: Ageing of the mains is the main cause. As the water mains were laid decades ago, they are approaching the end of their service life and thus chances of leakage are getting higher. As a result, we are leaked out and isolated underground for years until water cycle can take place.

Girl: How about main burst?

Water Save Dave: In addition to the ageing of water mains, there are other external factors which contribute to main burst.

Girl: What are the external factors?

Water Save Dave: One of the factors is the "fill in the blank".

Girl: "Fill in the blank"? Just like my homework!

Water Save Dave: Haha, they are not the same. What I am saying is the backfilling materials around the mains. If inappropriate materials are used for backfilling or with inadequate compaction, it may cause the surrounding ground to settle.

Water Save Dave: If the backfilling hasn't been carried out properly, the filling materials will be vibrated by external disturbance easily, which causes ground settlement adjacent to or below the existing water mains, and eventually the mains experience pressure and burst.

Girl: How are the filling materials being disturbed?
Water Save Dave: The water mains underneath the ground are constantly being disturbed, by cars and trucks running over them.

Girl: Oh dear! Do you mean those huge container trucks? I am also scared of them sometimes

Water Save Dave: Not only you, we are all scared of trucks. Normally we feel the vibration along water mains whenever a car goes over us. But when there is a heavy truck, we really have to pay attention...

Girl: Any other pressure besides busy traffic?

Water Save Dave: Of course! Piling from building construction, explosion from ground excavation, as well as maintenance works by utility companies also create pressure to the mains. But the scariest one must be accidentally hammering onto the water mains by construction workers.

Girl: Hammering onto the mains?

Water Save Dave: I remember there was a road repair worker who cut a running water main accidentally, so my friends and I were forced to burst with a ten-metre-high water jet.

Girl: Wow! What a waste. But it seems like a lot of the water main burst are due to construction. If there are fewer construction works, do you think the chances of water burst will be reduced as well?

Water Save Dave: Not exactly. First of all, a lot of construction works are required and unavoidable. Secondly, there is another fundamental reason that makes water mains leak or burst...

Girl: What is that?

Super:
Hong Kong Topography

Water Save Dave: That is the topography of Hong Kong.

Girl: Topography?

Water Save Dave: Yes. Due to Hong Kong's hilly topography, our water distribution network is pressurised to ensure water supply to buildings in highland areas. The higher the pressure, the faster water flows; at the same time, the more likely water mains may burst.

Girl: So, what can we do to reduce water loss?

Super:
1990s

Water Save Dave: WSD(Water Supplies Department) has different measures for water loss management. In the nineties, as a substantial portion of government water mains were reaching the end of their service life, their maintenance became increasingly difficult, therefore, we encountered an increasing number of main burst and leakage cases at that time.

Super:
Replacement
Rehabilitation
Year 2000
Replacement and Rehabilitation Programme of Water Mains
3000 km Aged water mains
Leakage rate
Year 2000
>25%
Year 2018
15%

Water Save Dave: As a result, replacement and rehabilitation of aged water mains was the most effective solution to stop the rapid increase in water main bursts and leakages. Therefore, since 2000, WSD launched a 15-year Replacement and Rehabilitation Programme of Water Mains (the R&R Programme) to replace about 3,000 kilometres of aged water mains. With the substantial completion of the R&R Programme, the leakage rate has been reduced from exceeding 25% in 2000 to about 15% in 2018.

Girl: This is good!

Water Save Dave: Nonetheless, the R&R Programme I have just mentioned does not cover all the mains and so the ageing problem of water distribution network still exists. Therefore, WSD still needs to take action and carry out different measures to prevent main burst and leakage.

Girl: What can they do?

Super:
2014
Water Intelligent Network

Water Save Dave: The condition of water distribution network has been significantly improved after the implementation of the R&R Programme. Nevertheless, mainly relying on large-scale replacement and rehabilitation of water mains may no longer be as effective as before for maintaining and even further improving the water supply network. Riding on the advancement of new technology in recent years, WSD has progressively established the Water Intelligent Network (WIN) since 2014.

Girl: What is the Water Intelligent Network? Is it something we can do online?

Super:
2000 Discrete areas

Water Save Dave: The Water Intelligent Network, or we call it WIN, is a system utilising advanced technologies to maintain and monitor the healthiness of the water distribution network in a holistic manner, reducing the chances of main burst. Under WIN, the water distribution network will be divided into about 2000 discrete areas. Flow and pressure data as well as other associated network data will be collected from monitoring and sensing equipment in each area. And all data will be analysed by an intelligent network management computer system, for continuous monitoring of the condition of the network.

Girl: What are the advantages of having the WIN?

Super:
intelligent network management system

prompt and proactive application of improvement measures
striking a balance among the performance of the network
cost implications
disturbance to the public

Water Save Dave: The WIN can enable WSD to detect any abnormal conditions within the water supply network to avoid problems of water supply and leakage. With sufficient data on hand, the WIN enables more effective analysis and management of the network by utilising intelligent network management system; enabling prompt and proactive application of most effective improvement measures to specific areas in need; and therefore striking a balance among the performance of the network, the cost implications and the disturbance to the public arising from the water main improvement works.

Girl: This is a very important plan indeed!

Water Save Dave: Yes, the entire WIN is targeted to be completed in 2023. Although the WIN is still under construction, we have already taken actions on water mains with suspected leakages based on data collected from individual district metering areas that have been established.

Girl: I hope this plan can be fully launched as soon as possible. But Dave, how about water loss in private properties?

Super:
“Waterworks Ordinance”
Management companies
Repair
WSD
Briefing
Providing a reference list
Publishing a guideline

Water Save Dave: According to the Waterworks Ordinance, it is the responsibility of the management companies to repair any leakages in the communal water mains in housing courts or estates. WSD will take different measures to assist property owners and management companies in leak detection and maintenance of water mains including giving presentations to raise their awareness on detecting leakages and

maintaining water mains within their housing courts or estates proactively; providing a reference list of local service providers of leak detection; and publishing a guideline on leak detection and maintenance of private water mains etc.

Girl: I see. How about the measures for “unmetered consumption”?

Super:
Unmetered consumption
Smart meters
Automatic Meter Reading (AMR) System
WIN

Water Save Dave: WSD is promoting wider use of smart meters and the Automatic Meter Reading (AMR) System. They will work in conjunction with the WIN to help identify water supply problems.

Super:
Unlawful taking of water
Maximum HK$25,000

Water Save Dave: Regarding the unlawful taking of water, WSD will step up enforcement actions in accordance with the Ordinance, any person who contravenes the provisions, he or she shall be liable to a maximum fine of HK$25,000; as well as to pay a charge for the water so taken; and to a further fine of HK$1,000 for every day during which the offence continues!

Girl: Oh! I didn’t realise there are such heavy penalties.

Water Save Dave: Well, the consequence of unlawful taking of water goes deeper than penalty! A fire service system could be rendered ineffective by illegal usages. Just imagine if the water stored in the fire service roof tank is used up by illegal usages and when the pumpsets supplying water to the roof is not functioning properly during a fire…

Girl: I cannot imagine the consequence when there is no water to put out a fire!

Super:
Unlawful taking of water

Fresh water service tank
Flushing water service tank
Water quality

Water Save Dave: Unlawful taking of water may cause pollution to water too. For example, using fresh water for flushing by connecting fresh water service tank to flushing water service tank may contaminate the fresh water and impose threats to the health of the people.

Girl: I can't imagine this...so awful. We really have to keep water clean by abiding the law.

Water Save Dave: Not only be a lawful citizen, but we also need to protect our precious water source from pollution. As you now understand the entire water supply is in a cycle, any upset on a part can affect the entire system, not just the people including you and me, but also animals and plants.

Girl: So how can we protect water source from pollution?

Water Save Dave: There are many ways to safeguard water from pollution. Let me give you some tips!

Girl: Great!

Water Save Dave: First of all, we need to reduce waste at source, conserve the water! For example, you can reuse some of the water, you don't have to throw it down the drain immediately.

Girl: What kind of water can be reused?

Water Save Dave: Water for washing fruit or vegetables can be reused for planting, water for rice washing can be reused as a facial wash, the collected water from the dehumidifier can also be reused to mop the floor. Just use your creativity and you may find many applications for water to be reused.

Girl: I see.

Super:
Detergent or Chemicals
Environmental friendly

Water Save Dave: Another good practice is to reduce the use of detergent or chemicals in washing. Choose environmental friendly ingredients to reduce water pollution.

Girl: I don't understand. I thought traditional detergents are more "powerful"?

Water Save Dave: Well, more power comes with more poison.

Girl: Sounds scary!

Super:
Chemicals

Water Save Dave: Traditional detergents are composed of many chemicals, so the more effective the detergent is, the more synthetic chemicals they will contain, and some of the chemicals are poisonous and indecomposable, which are harmful to people, water and soil, making a serious impact on the ecology as well…

Girl: Wow, we better use environmental friendly detergents.

Water Save Dave: Yes. In fact, environmental friendly detergents can be as "powerful" or effective as traditional detergents.

Girl: I have heard that fruit peels can be used as natural enzyme for dirt removal, and they smell good too. Let me ask my mum to try it!

Water Save Dave: You should also make the natural enzyme with your mum. Let's use natural, decomposable, low-pollutant and environmental friendly detergents from today!

Girl: Sure!

Water Save Dave: In addition, have you heard of microplastics?

Girl: Yes. I often hear from the news about microplastics polluting the oceans...

Super:
Facial wash
Clean
Shower gel
exfoliate dead skin
Microplastics <1mm

Water Save Dave: Correct. Microplastics are added to personal care products such as facial wash, shampoo and shower gel, for the purpose of achieving the claimed effects of cleansing the skin and exfoliating dead skin cells. However, these microplastics are tiny, with a diameter of less than 1 mm, and they cannot be filtered off at sewage treatment works. As a result, microplastics will be discharged into the ocean together with the treated sewage.

Girl: So, what's the consequence?

Water Save Dave: There will be a huge impact! The toxic substances will adhere to and accumulate onto the surface of microplastics. Once they are in the ocean, they may enter our food chain, first eaten by small fish, then by bigger fish, and ultimately by us, humans.

Girl: This is really a big trouble. We must stop consuming products containing microplastics.

Water Save Dave: By the way, apart from choosing cleansing products carefully, remember we should not swim in reservoirs when we go hiking near the reservoir areas. It is unlawful and will pollute our water sources. Also, remember to take your garbage with you when you leave!

Girl: Of course. I have a strong sense of civic-mindedness, and I clean up before I leave.

Water Save Dave: In addition to managing your own garbage, you can take a lead in clearing leftovers by others. Given that water is precious, please love and care for our environment, cherish water resources, reduce pollution and conserve water!

Girl: Yes sir. Thank you, Dave.