2. Main Questions with Student Comments

Question 1

Student comment: "When we look at Earth from space it's called the 'blue planet,' so it seems like we have endless water. But in class we learned that most of it is salty ocean water, and only a small percentage is actually freshwater we can drink or use for farming."

Question: "From your perspective, what are the biggest challenges when it comes to protecting and managing the small amount of freshwater we really depend on?"

Follow-up options:

- "Can you share an example of a project where your work actually made a difference?"
- "Are there common misconceptions about water availability that surprise people?"

Imagine all the water on Earth as one big bottle. The drinkable water in that bottle would be only a tiny spoon. That shows how precious freshwater really is.

Unfortunately, we waste water every day. For example, we leave the tap running while brushing our teeth, washing dishes, or washing our cars. Clean water is also sometimes polluted by illegal spills or used in places where lower-quality water could be used instead.

- My Master's thesis at university was about cleaning underground water that had been polluted by diesel. We used natural and very cheap materials to clean it. After treatment, that water could be used for cooling tanks and washing roads inside a refinery.
- Many people think water shortages only happen in very dry or poor countries. But even modern cities can have water problems if there are long droughts, pollution, or if the population grows very fast. A fun fact about using water as cooling liquid: One person's question in an AI application creates the need of 0,5ml of cooling water!

Question 2

Student comment: “We’ve noticed that people often take water for granted. We turn on the tap and clean water just comes out—but there’s a whole system working behind the scenes to make that happen.”

Question: “Can you explain what actually happens behind the scenes to ensure water is safe and available for communities?”

Follow-up options:

- “What’s the most surprising thing you’ve learned about water treatment?”
- “How do you balance cost, safety, and efficiency when designing these systems?”

In Greece, and especially in Athens, we are lucky because our water quality is very high. Only a few cities in Europe—like Vienna, Copenhagen, Oslo, and Stockholm—have water of better quality. Athens receives water from natural sources such as Lake Marathon and Lake Yliki, and the water often comes from mountain areas where it is naturally filtered by rocks and soil. Engineers and scientists from EYDAP, the Athens water company, perform thousands of tests every year to make sure the water stays safe and clean. Behind the scenes there are many systems working together: pipes, reservoirs, pumps, and treatment plants. There is even a large wastewater treatment plant on a small island near Piraeus called Psitaleia.

- You might also be surprised to learn that part of water treatment uses microorganisms. These tiny bacteria help break down pollution, and then all polluted parts are gathered in the form of sand and can be easily be removed, so the water no longer contains any impurities.
- When we use the word safety, the next word should always be FIRST, because safety always comes first. After that we try to improve efficiency and save energy. Cost is also important, but water is essential for life, so quality should never be reduced just to save money.

Question 3

Student comment: “We were surprised at how much water is used in agriculture. Producing food, especially in dry regions, can require huge amounts of water.”

Question: “What are some innovative ways engineers and farmers are working together to use water more efficiently?”

Follow-up options:

- “Are there technologies that have been game-changers in this area?”
- “How do you convince farmers or communities to try new methods?”

Around 70% of freshwater in the world is used for agriculture to grow food. Today, farmers and engineers work closely together. Farmers know what their crops need, and engineers help them provide water in the most efficient way.

- One common method is drip irrigation. Instead of spraying water everywhere, small drops of water go directly to the roots of the plants. We even use similar systems in our school garden. Modern farms also use soil moisture sensors that measure how wet the soil is. These sensors can be connected to smart irrigation systems that give plants exactly the water they need—no more and no less. In large farms, drones with special cameras can check the health of crops and see which areas need more water.
- The best way to convince farmers to try new technologies is to show results: using less water while keeping the same or even better crop production.

Question 4

Student comment: “Climate change can bring droughts to some regions and floods to others. We were curious how this affects water management.”

Question: “How is climate change changing the way engineers plan and manage water systems for the future?”

Follow-up options:

- “Can you give an example of a project that had to adapt because of climate changes?”
- “How do you predict future water availability?”

Water systems are usually designed using historical weather data. But because of climate change, weather patterns are becoming less predictable. That means engineers must design systems that are more flexible and resilient. Some solutions include building larger water reservoirs, finding underground water sources, and reusing treated wastewater when possible.

- A very interesting example is Singapore. This small country used to import much of its water from neighboring countries. Today, it produces part of its water using advanced technology called NEWater, which cleans wastewater using special membranes and ultraviolet light so it can be reused safely. These methods are very expensive, but everything is already expensive in Singapore, so I didn’t created much difference!
- Engineers also use computer models and artificial intelligence to predict rainfall and water demand. This helps cities manage water better and avoid shortages. Excessive water from rainfall can be delivered to places with less rainfalls. Also quantities and quality of water will be monitored and necessary actions will be taken instantly so no water goes to waste.

Question 5

Student comment: “We saw how rivers and lakes can get polluted from industry, agriculture, and plastic waste. It really shows how fragile water systems can be.”

Question: “What are some of the most serious threats to water quality today, and what solutions are engineers developing to address them?”

Follow-up options:

- “What’s the most rewarding project you’ve worked on to improve water quality?”
- “How can everyday people help prevent water pollution?”

Water pollution can come from many sources. Some of the most common ones are industrial chemicals, pesticides from agriculture, plastic waste, and untreated sewage. The good news is that nature is very strong and can recover when we protect it. Industries are monitored to make sure they treat their wastewater properly before releasing it. Many dangerous pesticides have already been banned. One of the biggest challenges today is microplastics. These are extremely small plastic particles that are very difficult to remove from water. That is why the best solution is to prevent plastic from entering the environment in the first place by reducing plastic use and recycling more.

- I was a part of a project in a tiny African country, where a lot of poison called Arsenic was spilled all over the main port. All contaminated soil was removed, until only clean soil was found. All this contaminated soil was packed into special bags, loaded into a ship and came to Europe in a specialized company that cleaned the arsenic from the soil, so it was returned spotless to the Earth.
- Everyone can help protect water by not throwing trash into rivers or the sea, reducing plastic use, recycling, not pouring oils, chemicals, or medicines down the sink.

Question 6

Student comment: “Some cities are starting to reuse treated wastewater. At first that sounded strange, but it seems like a smart way to conserve water, especially in dry regions.”

Question: “Could you explain how water recycling works and why it’s becoming so important?”

Follow-up options:

- “Are there limits to where or how recycled water can be used?”
- “What technologies make recycling more efficient?”

Wastewater from homes and cities is collected and transported to wastewater treatment plants. There, microorganisms break down pollutants. After that, the water goes through several cleaning steps where solids are removed and the water becomes much cleaner. Some of this treated water can be used again for agriculture, industrial processes, or watering parks. In some advanced systems it can even be treated further to become drinking water.

- However, not all wastewater can become drinking water, because potable water must follow extremely strict quality standards.
- There is an amazing Greek word OSMOSIS which describes the use of membranes that filter out very tiny particles from water, leaving it very clean.

Question 7

Student comment: “It surprised us that many people still don’t have reliable access to clean drinking water. Some communities have to walk long distances every day just to collect water.”

Question: “How can environmental engineers help solve these global water access challenges?”

Follow-up options:

- “What has been the most inspiring project you’ve seen in this area?”
- “How do engineers work with communities to make solutions sustainable?”

Unfortunately, in many parts of the world—especially in some regions of Africa—people still do not have easy access to clean drinking water. Environmental engineers can help by finding new water sources and designing systems to bring that water to communities. Using modern technologies such as satellites and geological surveys, engineers can locate underground freshwater sources even many kilometers below the ground. Solar-powered pumps can then bring this water to the surface.

- I once visited a small village in Ivory Coast where the only clean water came from a deep well. The pump was so large that two strong people had to operate it to bring the water to the surface. It was very tiring, but after hours in the hot sun, that cool clean water felt amazing.
- Engineers work closely with local communities to design systems that they can operate and maintain themselves.

Question 8

Student comment: “Sometimes people assume technology will solve all environmental problems, but individual habits—like taking shorter showers or fixing leaks—also matter.”

Question: “In your experience, how important are everyday actions compared with large engineering solutions?”

Follow-up options:

- “Do you have examples where small community changes made a big difference?”
- “How do you encourage people to adopt new water-saving habits?”

Solving water problems requires teamwork. Engineers build the infrastructure—dams, pipelines, treatment plants, and pumps. But people also need to change their habits.

- Cities can improve water use by replacing old pipes that leak, you might see in the streets truck that carry those huge cement cylinders. Use of drip irrigation for parks, and watering plants during cooler hours instead of the hottest part of the day. Education is also very important. Today you are not in school, your lesson today is learning by doing instead of the traditional class. You are learning things that are new and still not in the books
- We all need to change our habits, based in 3 Rs (reduce, reuse, recycle). There is a beautiful idea that says: “We do not inherit the Earth from our parents; we borrow it from future generations.”. This means we must take care of our planet so the next generations can enjoy it too.

Question 9

Student comment: “Some of us are thinking about careers in sustainability. Environmental engineering seems like a mix of science, problem-solving, and creativity.”

Question: “What inspired you to become an environmental engineer, and what advice do you have for students interested in this field?”

Follow-up options:

- “Are there skills or classes you think are especially important?”
- “What’s one project that made you feel most proud in your career?”

What inspired me to become an environmental engineer was the idea that science and technology can be used to improve people’s lives and protect the planet. Engineering combines science, creativity, and problem-solving to address real challenges such as water resources, waste management, and climate change. One great thing about engineering is that every day is different. Engineers are always learning and solving new problems.

- For students interested in this field, my advice is to stay curious. Study subjects like science, chemistry, biology, and mathematics, but also develop creativity and critical thinking and do not abandon the other classes, they are equally important.
- The project I’m most proud of in my career is a pesticides project in Ecuador, a small country in Latin America famous for its bananas. For many years, bananas there were grown using huge amounts of agrochemicals, some of which are now banned because of their toxicity. The locals had collected all those expired chemicals, but they did not have a solution for how to get rid of them safely. That is where I stepped in, guiding them in separating, packing, and finally exporting them to Sweden, where they were safely disposed of in a large specialized incinerator. Now I know that every banana my kids eat has a smaller environmental footprint compared to the ones when I was a kid.

Question 10

Student comment: “Learning about water scarcity and pollution can feel overwhelming sometimes.”

Question: “From your experience, what gives you hope about the future of water conservation and sustainability?”

Follow-up options:

- “Are there trends in technology or community action that make you optimistic?”
- “How can young people make an impact today?”

Excellent word, “scarcity”! You might have heard that Albert Einstein said that the next World War will be caused by water. The part about Albert Einstein saying this is actually a hoax, but the essence of the sentence is still very important. For us in Europe, it seems like we simply open the tap and water comes out, but billions of people around the world do not have that kind of access to fresh water. Every day new inventions are developed, so hopefully this problem will be solved in the coming years, just like diseases that were lethal 100 years ago but today we mostly only remember them. We are all responsible, and the efficient use of water is the number one way to help solve these problems.

Young people should be educated, learn about these issues, and use good practices in their daily lives.

3. Closing Segment (1–2 minutes)

Student 1: “Thank you so much for sharing your insights! It’s amazing to hear how engineering, technology, and everyday actions all work together to protect water.”

Student 2: “We learned so much—from water recycling to global access issues—and it really inspires us to think about how we can help.”

Student 1: “For our listeners, remember: every drop counts, and there are so many ways we can conserve and protect water. Thanks for tuning in to *Water Matters*!”