MIST Quiz Bowl Topic 1:
The Flow of Water: Balancing Scarcity, Use, and Waste

For MIST Quiz Bowl Topic 1: **The Flow of Water: Balancing Scarcity, Use, and Waste**, we encourage students to explore how human systems like households, agriculture, industry, and public infrastructure, and what happens when the access and usage is imbalanced. Using data, reports, and real-world examples, these materials highlight patterns of shortage, overconsumption, and inefficiency around the world. Our goal for this topic is to encourage students to consider how decisions surrounding water use affect health, food security, and long-term sustainability across communities.

Questions will be asked from the following:

How AI Uses Our Drinking Water - BBC World Service

Water Scarcity - World Wildlife Fund (WWF)

Drinking Water - World Health Organization (WHO)

Water Scarcity in Agriculture: The Greatest Threat to Global Food Security - University of Tennessee

The United Nations World Water Development Report 2024 Water for Prosperity and Peace

The United Nations World Water Development Report 2024 Water for Prosperity and Peace Facts Figures and Action Examples

Note:
All information in the materials is fair game for questions, including but not limited to: graph/figure content (labels, numbers, statistics, etc.), dates, numbers/statistics, names and background of speakers or individuals mentioned, and definitions for key terms. However, references do not have to be read.

For questions about the materials, please reach out to hkhattak@getmistified.com

TOPIC 1 Transcript Library

Note: Transcripts may have grammatical errors to mimic speaker tones. Please contact hkhattak@getmistified.com with any questions or errors here.

How AI uses our drinking water - BBC World Service

BBC Narrator

One-fifteenth of a teaspoon. That's how much water the average single interaction with ChatGPT uses. According to Sam Altman, the boss, of OpenAI. So if you type, “Can you help me solve this maths problem?” That's a drop. Or “can I put lime instead of lemon in this recipe?” That's a drop. Or “why is the sky blue? Help me write this email. Help me improve my website code.”

Mr. Altman claims there are 1 billion messages sent to ChatGPT every day. And ChatGPT is just one AI bot. Chuck in Gemini, DeepSeek, Claude, and others. It's clear that the AI revolution is a thirsty one. Striking though it is, some experts are more than a little skeptical of Sam Altman's estimate on water usage.

Professor Shaolei Ren

At this point, there was just not enough information for me to agree with or trust the number. Their number was perhaps referring to some tiny models. We're considering a medium-sized, large-language model. That's the size of GPT-3. Basically, if you write an email or ask some questions, if you have 10 to 50 queries, you're going to be consuming roughly 500 milliliters of water.

BBC Narrator

This calculation includes water used in cooling and electricity generation. The BBC asked OpenAI for more details about Sam Altman's estimate, but the company declined. Either way, it's clear. AI uses a lot of water. But why?

Every time you send a prompt to an AI, it has to run complex calculations to understand and respond. This work is done by the most powerful and specialized computer chips in the world, housed inside enormous data centers. Even before users can send prompts, the training process for the models uses the chips to carry out intense work. And all that extra power means

the hardware can overheat and become damaged if not cooled properly. Most data centers use air cooling systems, which was fine until AI came along.

Abhijit Dubey

But now, because these data centers and the infrastructure that's going in are so much more energy intensive, there are liquid cooling approaches that are now being implemented.

BBC Narrator

For liquid cooling, the water must be clean to prevent bacteria growing or clogs and corrosion in the system, which means using mostly drinking water. Here's how the most common liquid cooling process works. It begins by piping coolant over the processing chips within the servers. This cooling liquid absorbs the heat and takes it away from the electrics to a heat exchange unit.

BBC Narrator

Water is used to reduce the temperature of the coolant. The coolant then recirculates back to cool the servers. Meanwhile, the now hot water is piped to cooling towers, where a combination of fans and water vapor dissipate the heat, cooling the water. Some of the water evaporates in that process, while the rest is recirculated through the cooling process several times before being discharged back into the nearby water source. Overall, up to 80% of the water evaporates.

Lorena Jaume-Palasí

What it means is that this type of water is gone and that we are extracting water from a water circuit that is necessary for irrigation, for human consumption, and hygiene.

BBC Narrator

Communities around the world concerned about data centers putting stress on water sources and electricity grids are pushing back. Protests have been held in Spain, India, Chile, Uruguay, and parts of the US. And it's not just the operations within the data center that need water. Generating the electricity to run them requires a lot of water too, because power plants like coal, gas, and nuclear heat water to create steam, which drives a turbine. The International Energy Agency has said electricity demand for AI-optimized data centers is expected to

increase by 400% by 2030 to 300 terawatt hours. That's roughly the electricity consumption of the whole of the UK for a year.

And aside from electricity, water is also needed when manufacturing the semiconductor chips used to run AI.

Lorena Jaume-Palasí

So water is both used directly and indirectly in the whole supply and creation chain of AI technologies. It is used for the refinement of the critical raw materials that are needed to create the hardware of AI.

BBC Narrator

Getting accurate figures on how much water it takes to build AI systems and run them is difficult. Google, Meta, and Microsoft release annual figures showing that their data centers use billions of liters of water every year from local sources, but none of them indicate how much. Much of it is due to AI. Most tech giants recognize the impact it's having. Many, including Google, Microsoft, and Meta, have pledged to be water neutral by 2030.

Thomas Davin

We hope that can happen, that there is a long way to go to get to those kind of numbers. Part of what we hope to see is, across the industry, a range of innovations that allow us to maybe minimize the use of water.

BBC Narrator

Companies are trialing, for example, ways to cool data centers without evaporating any water at all. and to use the heat that's generated to warm homes. There are also experiments to move data centers away from communities entirely, under the sea, to the Arctic. or even off the planet.

Abhijit Dubey

Can we actually put capacity open space? It's very very early stage, so what you know we at NTT are looking at is: can we launch satellites that can at least do some more backup-oriented or other-oriented tasks?

BBC Narrator

Though skeptics point to the many hurdles that need to be overcome, there is optimism too, about a more sustainable future.

Thomas Davin

Let's remember that that Gen AI capability is still very very young; it's moved exponentially fast, but as an industry and as a use, it is still young. Ideally, we can learn together, as a society and as a world society, how do we minimize against the use of water and energy? Because this is all, you know, a world resource when we talk about water.