Facilitator Script for 2025 MFC Olympics (Session 1)

Slide 1: Introduction

Facilitator: "Welcome everyone to the 2025 MFC Games! Today, we're going to dive into the world of microbes and learn how they can generate electricity. It's a unique mix of science and competition that's both fun and educational!"

• Introduce yourself and your role in the session.

• Set the tone for an engaging session where participants will explore exciting scientific concepts.

Slide 2: Table of Contents

Facilitator: "Here's a quick look at what we'll be covering today:"

• What are microbes?

• How do microbes generate electricity?

• How does a Microbial Fuel Cell (MFC) work?

• Hands-on activity: Get ready to learn, experiment, and build your own MFC!

• Briefly explain that the session will start with foundational knowledge and lead into building their own MFC.

Slide 3-5: What are Microbes?

Facilitator: "Let's start by understanding what microbes are. Microbes are tiny organisms that live all around us—in the air, in soil, and even in our bodies."

• Mention that microbes are essential for life and that there are 10 times more microbial cells in our bodies than human cells.

• Highlight that microbes can be found in diverse environments, adapting to places like dry skin, wet areas, and even in our guts.

• Use the video on microbes to explain key points:

1. 10x more microbial cells than human cells

2. Microbes have adapted to live in different parts of our body (wet, oily, dry, etc.)

3. The gut is the most complex and diverse microbial habitatMicrobes help protect and feed us.

Slide 6: How Small are Microbes?

Facilitator: “Microbes are incredibly small. To give you an idea, over 100 microbes can fit on the width of a single strand of hair!”

• Ask participants to imagine a 2 cm square, and share that around 400 million microbes could fit into that space.

• This slide emphasizes the scale and ubiquity of microbes.

Slide 7: Types of Microbes

Facilitator: “Microbes come in many forms, including bacteria, viruses, algae, fungi, and protozoa. But for our activity today, we’ll focus mostly on bacteria, which are the most important for generating electricity.”

• Provide examples of extreme environments where bacteria live, such as in acidic pools or hydrothermal vents.

• Mention that these bacteria, despite living in tough conditions, play a role in processes we can use to generate electricity.

Slide 8: How do Microbes Get Energy from Food?

Facilitator: “Just like us, microbes need energy to survive. They break down food, releasing energy in the form of electrons.”

• Explain the difference between aerobic respiration (using oxygen) and anaerobic respiration (using other materials like iron or sulfur).

• Highlight that electrogenic bacteria can release electrons externally, allowing us to capture them to generate electricity.

Slide 9: Meet Shewy

Facilitator: “Let’s meet Shewy, a bacteria that has incredible abilities. Shewy can help clean up toxic waste and also generate electricity.”

• Mention that Shewy is studied by NASA for potential space missions, where it could perform tasks like generating electricity or treating wastewater.

• Emphasize Shewy's importance in sustainability and electricity generation.

Slide 10: Bacteria Could Help Us Colonize Mars

Facilitator: "Scientists believe that bacteria like Shewy could help us colonize Mars. By producing electricity and helping with other essential tasks, these microbes may one day power space colonies."

• Explain how bacteria can thrive in harsh environments, making them perfect candidates for future space exploration and colonization.

Slide 11: Meet Geo

Facilitator: "Next up is Geo, the 'Iron-breather.' This bacteria lives in places without oxygen and generates electricity by breaking down iron and other nutrients."

• Mention how Geo thrives in anaerobic environments and uses nanowires to transfer electrons. This ability makes Geo another key player in generating electricity.

Slide 12-16: How Does a MFC Work?

Facilitator: "Now, let's explore how we can harness the power of microbes using a device called a Microbial Fuel Cell, or MFC."

• Walk through the process:

1. Bacteria in the mud break down nutrients and release electrons.

2. These electrons travel from the anode, up to the blinker circuit, where they generate electricity.

3. The electrons then return to the cathode, where they combine with oxygen and hydrogen to form water.

• Use the visual diagram to guide participants through the electron flow and how the MFC converts microbial activity into electricity.

Slide 17: Bring Two Cups of Mud for Next Session

Facilitator: "For our next session, we'll be building our own MFCs! Please bring two cups of mud from your backyard or a garden."

• Encourage participants to get excited about the hands-on part of the session, where they'll see the science in action.

• Remind them to think of fun names for their MFC teams and prepare for a creative, scientific challenge.

Slide 18-19: Any Questions?

Facilitator: “That’s it for today’s session. Do you have any questions about how microbes generate electricity or how MFCs work?”

• Answer any questions and provide further explanations as needed.

• Thank participants for their attention and enthusiasm, and remind them to bring their mud for the next session.