



SLEEP SCIENCE

Lesson Plan

Target Age: 11–13 years

Duration: 1 hour

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MoBaT Source: MoBaT Museum Hub, Reykjavik University Sleep Lab, Radboud University MRI Lab, and Radboud University Sleep & Memory Lab

Aims & Goals

- **Core Goal:** To understand that sleep is a complex biological process that requires different scientific approaches, from observing the brain with neuroimaging to tracking health data with wearables.
- **Learning Objectives:**
 - Students will be able to distinguish between **Empirical Neuroscience** (using data to understand the brain) and **Clinical Neuroscience** (using data to treat disorders like sleep apnea).
 - Students will be able to explain how technology like PSG and MRI helps us understand memory consolidation and dreaming.

Introduction

- **Source:** The MRI Lab Welcome video at the start of the Radboud University MRI Lab.
- **The Prompt:** "Our guide at Radboud University is a sleep scientist who uses a giant magnet to see what's happening in your brain while you sleep. If your brain is 'active' while you sleep, are you actually resting?"

Core Learning Activities

- **Task - The Sleep Research Trail:**
 - **The Magnet:** Visit the MRI Lab. Follow the red numbered icons to learn how fMRI tracks which brain regions are active during slow-wave sleep to file away your memories from the day.
 - **The Wearables:** Navigate to the Reykjavik University Sleep Lab. Locate the wearable sensors and big data displays. How does tracking a person's breathing in their own bed help scientists treat sleep apnea? What are the pros and cons of collecting sleep data inside and outside the lab?
 - **The Dreamers:** Enter Radboud University's Sleep & Memory Lab. Find the EEG cap and the information about Lucid Dreaming. Explain how measuring the electricity on someone's scalp with EEG is different from using the giant MRI magnet.
- **Integration:** This journey moves students through ***Dimension 1: Empirical & Clinical Neuroscience*** to ***Dimension 2: Theoretical Neuroscience*** and ***Dimension 7: Clinical Neurotechnology***, understanding how these different disciplines work together to help patients in the real world.

Assessment

- **The Lab Consultant:** "You have been hired to build a 'Dream Team' of scientists. A professional athlete wants to improve their memory for new plays and fix their snoring problem. Which lab's technology (MRI, EEG, PSG, or Clinical Wearables) is best for each task, and why?"