

# Astronome worlds

## *Tidal Power Plant World*

### lesson plan

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2024

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<https://astronome.erasmusplus.website/>

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*Disclaimer: This lesson plan is designed to be used alongside the teacher's guide developed in the Astronomie project, which is available here in PDF: <https://astronomie.erasmusplus.website/teachers-manual>*

*Promotional video here:*

<https://www.youtube.com/watch?v=FCLP4z2O5LQ>



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Astronomie - Tidal Powerplant



## Before the lesson

1. Download and install Minecraft: Education Edition on all the students' devices that will be used for the workshop. Ensure these devices are running Windows 7 or later, macOS, iPadOS, or ChromeOS.
2. To import the world we will be using in the workshop, follow these steps after opening Minecraft: Education Edition with your Office 365 account:
  1. Click on "Play."
  2. Select "Import."
  3. Choose the Astronome file.
  4. Once you see the message "Level import completed," go to "View My Worlds," and the world will appear.
  5. Click on the Astronome world and wait for the prompts to load.



# Connecting the Tidal Power Plant World to the Teacher's Guide

## Tidal Power Plant World: Lesson Guide for Primary Teachers

The *Tidal Power Plant* world focuses on how the movements of celestial bodies, particularly the Sun and Moon, influence tides and other natural phenomena on Earth. In this Minecraft world, students will explore the science behind tides, as well as their practical applications in modern energy generation.

### 1. Learning Objectives

This world introduces primary students to the relationship between the Sun, Moon, and Earth, and how these celestial bodies influence tides and related natural phenomena. Students will:

- Understand the causes of tides and how the gravitational forces of the Moon and Sun impact the Earth's waters.
- Learn how ancient and modern societies have used the understanding of tides for practical purposes.
- Explore modern applications like tidal power plants and their role in renewable energy production.
- Develop problem-solving skills by modelling tidal phenomena and energy generation.

### 2. Key Activities

#### Activity 1: Exploring Tides and Gravitational Forces

(Reference: Guide Chapter 7.6 - Exploring the Marvels of Tides)

- **Objective:** Students will learn about how the gravitational pull of the Moon and Sun creates tides on Earth.
- **Minecraft task:** Students will simulate tidal forces in Minecraft, building a representation of the Earth, Moon, and Sun, and observe how their movements influence the rising and falling of water levels in oceans.
- **In-class:** Teachers can explain how the positions of the Sun and Moon affect the height of tides, using Minecraft to show how these forces interact. This activity will give students a visual understanding of how tides work.

#### Activity 2: Building a Tidal Power Plant

(Reference: Guide Chapter 7.6 - Exploring the Marvels of Tides)

- **Objective:** Students will explore how the power of tides can be harnessed to generate energy.
- **Minecraft task:** Using Minecraft, students will design and build a tidal power plant. They will simulate how the rising and falling tides can be used to generate electricity by driving turbines.
- **In-class:** Teachers can explain the principles behind tidal energy and how it is a renewable energy source. The Minecraft activity will reinforce this concept by having students build a



functioning power plant model that shows how energy can be produced using the natural movement of tides.

### Activity 3: Understanding Eclipses and Their Effects on Tides

(Reference: Guide Chapter 7.5 - Lunar and Solar Eclipses)

- **Objective:** Students will learn about how solar and lunar eclipses affect tidal patterns.
- **Minecraft task:** Students will simulate a solar and lunar eclipse using Minecraft and observe the effect of these eclipses on the tides in their virtual world.
- **In-class:** Teachers can introduce the idea that during solar and lunar eclipses, the alignment of the Earth, Sun, and Moon can cause extreme tides (spring tides). The Minecraft model will allow students to visualise these alignments and their effects on the ocean.

### 3. Teaching Suggestions

- **Hands-on demonstration:** Use simple objects (e.g., balls representing the Earth, Sun, and Moon) in class to physically demonstrate the gravitational forces that cause tides before the students build their models in Minecraft.
- **Group work:** Divide the class into teams. One team can work on modelling the tidal forces, while another team focuses on building the tidal power plant. This encourages collaboration and allows students to explore different aspects of the lesson.
- **Link to modern challenges:** Encourage students to discuss how renewable energy sources like tidal power can help address environmental challenges, linking the science behind tides to real-world applications.

### 4. Evaluation

- **Minecraft creations:** Assess students based on the accuracy and creativity of their Minecraft simulations and constructions. Did they effectively model tidal forces and build a functioning tidal power plant?
- **Class participation:** Evaluate students' ability to explain how gravitational forces cause tides and how tidal power plants function. Are they able to connect the science of tides with its applications in energy generation?
- **Problem-solving:** Challenge students to improve their tidal power plant designs in Minecraft, considering factors such as efficiency and sustainability.

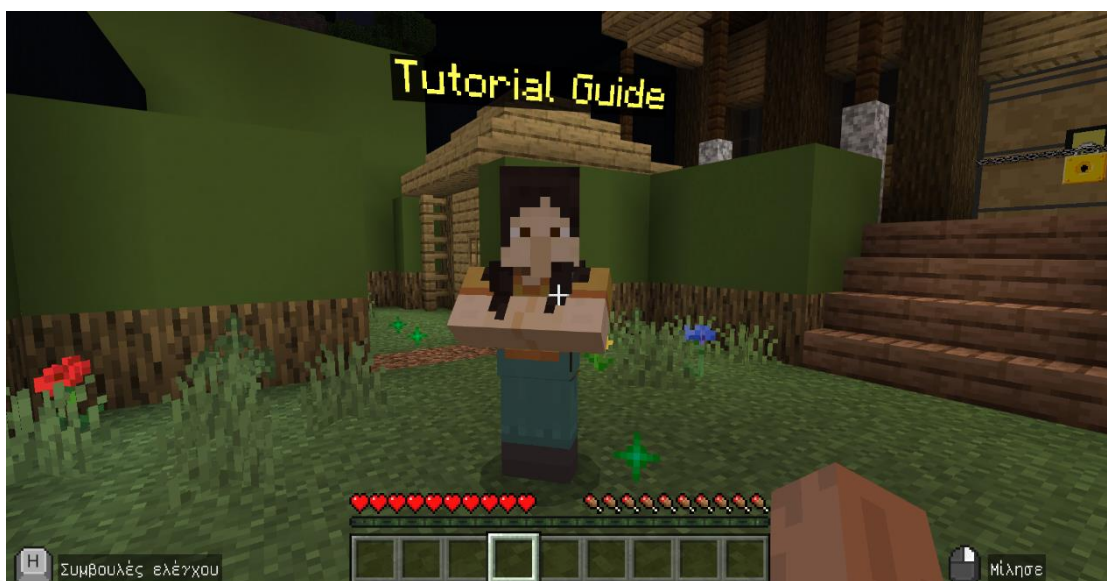


## Starting Point: Balloon Room

The game starts in a room where you have to pop the balloons.



- Action: Meet the NPC, who will ask you to build a key consisting of two pieces.

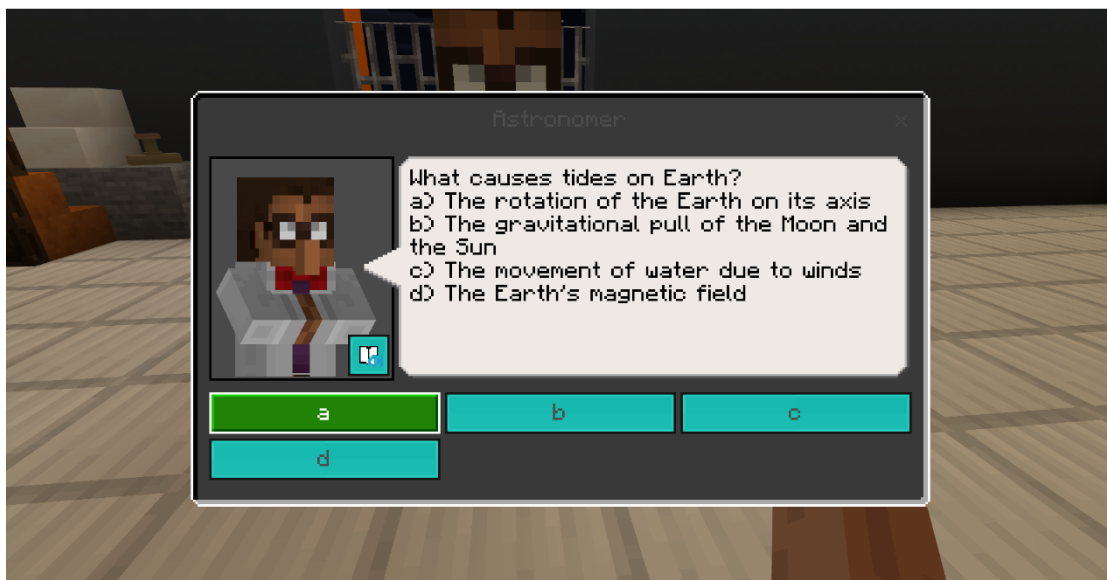




- Action: Assemble the key and unlock the door leading to the workshop.



In the workshop, you will meet the astronomer. Answer the quiz correctly to proceed.





## Riddle Stage

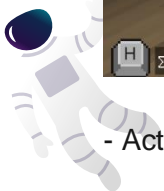
You will be passed to the next room after winning a hint.



You will find an underground hole leading to a room with a riddle.



- Action: Solve the riddle. The correct answer is 'MOON.'

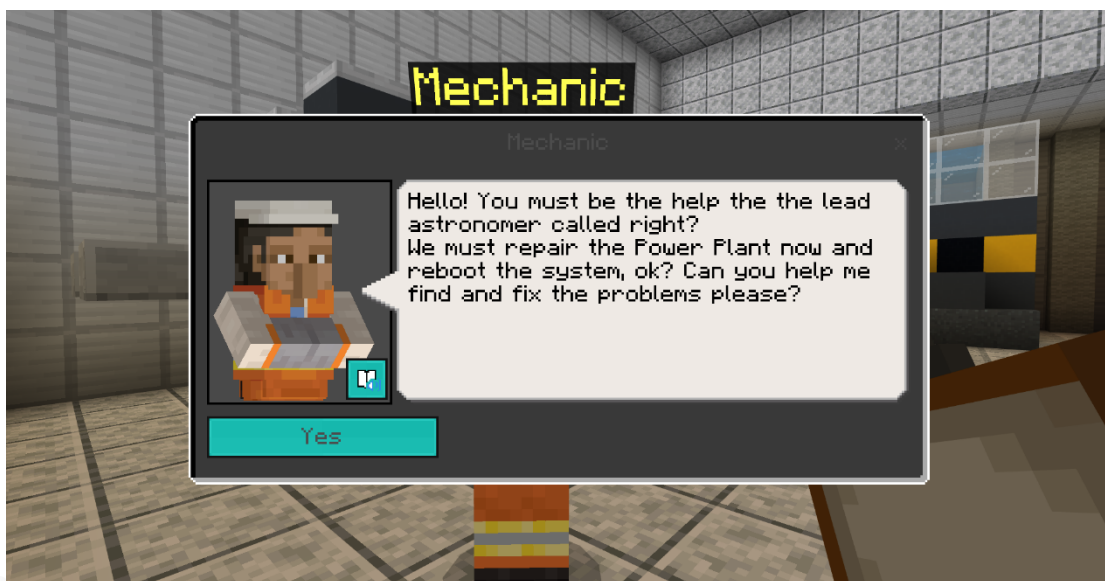


# Power Plant Repair Stage

Next, meet the engineer and undertake the task of repairing the power plant.



- Action: Find parts to repair the engines.

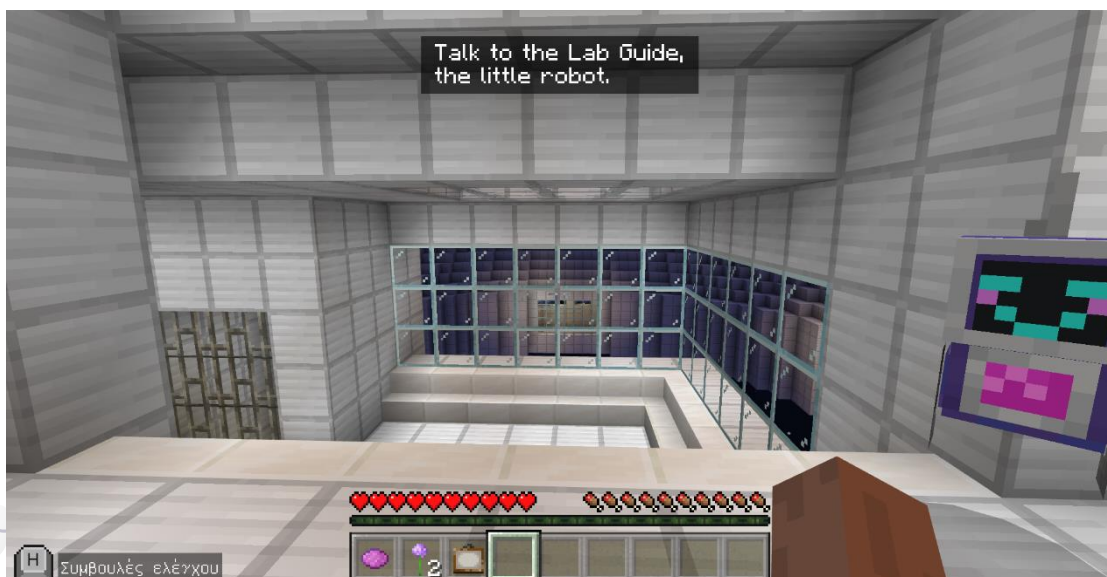


- Action: Climb the control tower and pull the lever to activate the power plant.



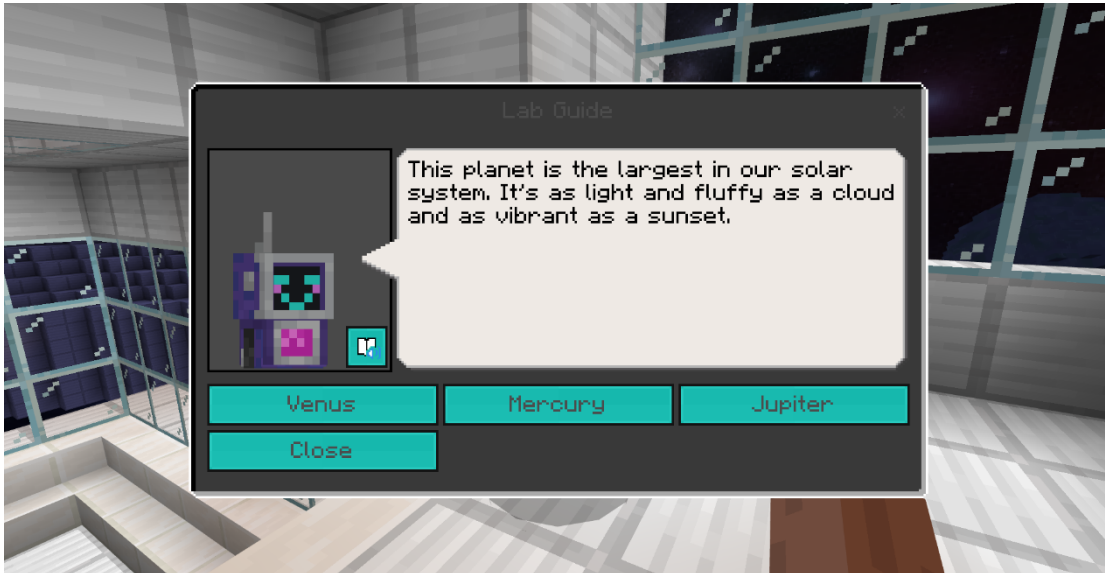
## Planet Quiz Stage

After activating the power plant, speak with the astronomer to advance to the planet identification stage.





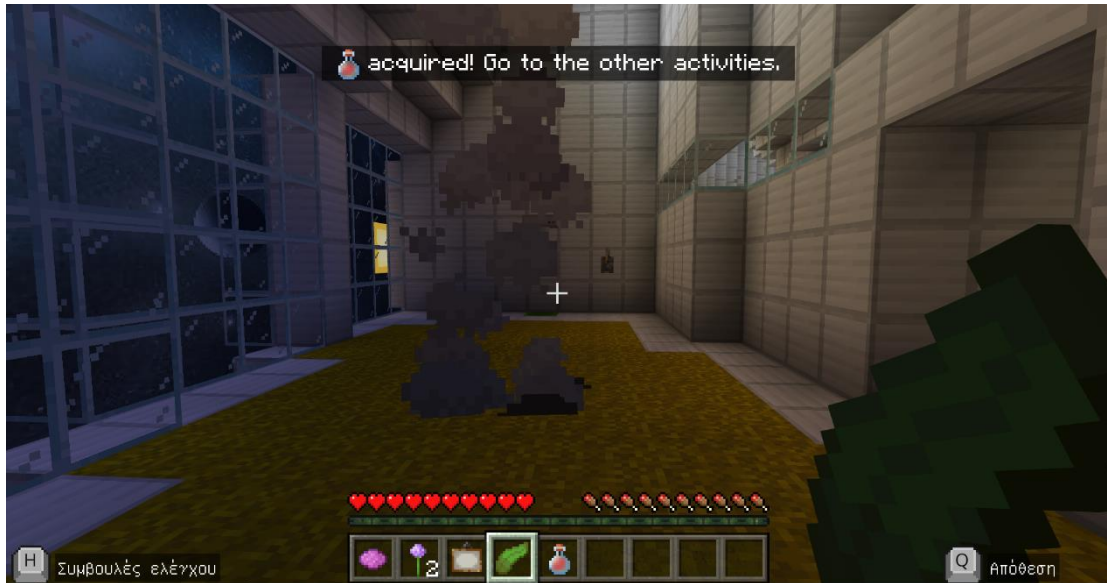
- Action: Answer the planet quiz correctly.



## Robot Activation Stage

Proceed to the next room, where you need to pull the lever to get a hint and activate the robot.





- Action: Avoid falling into a hole without touching the clouds.



# Maze and Materials Collection Stage

Enter a new room and stop the wagons in the green frame.



- Action: Navigate through the maze and find a piece of ice.



- Action: In the next room, search for and find sand.







- Action: Make a pickaxe out of diamonds.





## Final Quiz and Ending

After crafting the pickaxe, it's time to find iron.



- Action: Successfully answer the final quiz to complete the game.

