

# Design your own mission to the Moon!

Test your skills by creating a lunar rover like Roo-ver and give it a mission ready for the Moon!





## Welcome, Mission Specialist!

You are about to take part in the Roo-ver Mission. Your job is to design and plan a lunar rover, just like engineers and scientists do. By the end of this workbook, you will have created your own mission plan and briefing card.

Every space mission has a plan. Here's your mission map:

#### Part 1: Mission Design

- Choose your mission objective (p.3)
- Plan how your rover will sense, move, and use tools (p.4)



#### Part 2: Rover Design

- **Draw** and label your rover (p.5)
- Plan how to keep your rover operating in the harsh lunar environment (p.6)



 Check your rover design against the mission checklist (p.7)



#### Part 4: Concept of Operations

**Plan** out your mission timeline (p.8)



- Imagine your rover's discovery (p.9)
- Complete your Mission Briefing Card (p.10)

At the end, you will be ready to share your rover mission plan with your very own briefing card!

#### **PART 1: MISSION DESIGN**



## Your Mission Objective

It's always good to start by knowing what you want to achieve. Create a goal for what you want your rover to do on the Moon!

What do you want your rover to do? **Circle** your favourite.



#### a) Search for water

Help scientists find **frozen water** in the lunar soil so future astronauts have something to drink.

#### b) Study Moon dust

Discover what the **fine lunar dust** is made of and what problems it can cause for **machines** and **astronauts**.





c) Collect Moon rocks
Gather rock samples to learn
about the Moon's history and

about the **Moon's history** and how it was formed.

Why do you think this is the best objective?

#### **PART 1: MISSION DESIGN**



### How will Your Rover Work?

What tools will your rover use to do its mission?

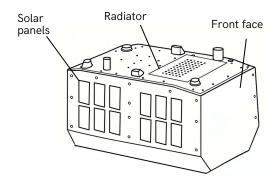
hear, see or touch things?	l II
Hint: Cameras	These are called sensors
help a rover see	<u> </u>
	<u> </u>
How will your rover <b>move</b> ? Does it nee arms or legs, or wheels or springs?	d 
t	Hint: Arms can pick things up or move things closer

#### **PART 2: ROVER DESIGN**



### Draw and Label Your Rover

Draw on the image below to show what your rover will look like with all its sensors and moving parts. Labelling helps other people understand what you've drawn.



Bonus activity:
Using cardboard
and craft
supplies, have a
go at building the
rover you've
drawn!

#### **PART 2: ROVER DESIGN**



## Keep Your Rover Operating

You're sending your own special rover to the Moon and you need to make sure it stays safe up there by itself!

Protection plan: The Moon gets very hot in the sun and very cold in the shade. It also gets more radiation than Earth which can hurt electronics. How will you protect your rover?
Communication plan: How will your rover talk to Earth, what could block its signals?
Gravity plan: With 1/6 <sup>th</sup> of the gravity of Earth on the Moon, it's easier to fall over. How will you stop your rover from tipping?
Power plan: Where will your solar panels be? How will you make sure your rover stays in the sun?
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## PART 3: DESIGN REVIEW Mission Checklist



Make sure you have prepared everything you need!

	<b>Mission Objective:</b> Have you chosen what your rover will do (find water, study dust, or collect rocks)?
	<b>Senses (Sensors):</b> Can your rover see, touch, or detect what it needs to complete its task?
	<b>Movement (Mobility):</b> Can your rover move around the lunar surface? Does it have wheels, arms, or other tools to explore?
	<b>Design:</b> Have you drawn and labelled your rover to show its parts?
	<b>Protection:</b> Does your rover have a way to stay safe from heat, cold, and radiation?
	<b>Power:</b> Will your rover's solar panels keep it charged during the lunar day?
	<b>Communication:</b> Can your rover send information back to Earth (or through a lander)?
	<b>Gravity:</b> Will your rover stay balanced in the Moon's weaker gravity?
Next	Steps:
	<b>Mission Timeline:</b> Plan your rover's daily tasks from launch to the end of the mission?
	<b>Mission Success:</b> Show what a successful mission would look like for your rover.
	Briefing Card: Record your mission.

## PART 4: CONCEPT OF OPERATIONS (ROVER Mission Timeline



Remember, your tasks should help vour rover achieve its main Mission With missions as important as Obiective! this, we need to be really organised! Plan out what your rover will do each day to meet Earth Day -10: Launch from Earth, What its goals! will you be doing? Task: Earth Day 0: Land on the Moon. First signal sent from your rover. First signal: Earth Day 1: First task on the Moon. Task: Earth Day 4: Midway progress check: What has your rover found? Earth Day 7: Second task on the Found: Moon. What else does your rover need to do? Task: Earth Day 10: Your big win. What has vour rover taught us? Earth Day 14: End of Mission, What Lesson: \_\_\_\_\_ does your rover say? Last signal:

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#### **PART 5: MISSION COMPLETE**



## Mission Discoveries

Your rover has reached the end of its journey. Show the world what it discovered!

What did your rover find? (Draw or write in this box)	What will people on Earth do with your discovery? (Circle or write)	
	Study it in a science lab	
	• Use it to help astronauts	
	• Put it in a museum	
	Share it with the world	
	Something else:	

#### **PART 5: MISSION COMPLETE**

## Mission Briefing Card for your Lunar Rover

Make your mission official and fill out your Mission Briefing card below:

Draw yourself or your rover here:	R • VER
Launch date:	
Mission commander:	(Your name!)
Rover name:	
Mission objective:	
The best thing about	your rover:
What will you find on	your mission to the Moon?