I-LOFAR

Lesson Plan: Lunar Landers

Duration: 35-45 mins			
Learning objectives: 1. Be able to explain why lunar craft need to be able to make gentle landings 2. Follow the engineering process - design, build, test, amend 3. Understand the properties of materials and select accordingly			
Links to Curriculum: ❏ Primary School - SESE - Science - Energy and forces ❏ Primary School - SESE - Science - Environment ❏ TY Project - a more advanced version			
Activity	**Procedure**	**Materials**	**Time**
Introduction to Moon landings - class discussion	• Pose questions such as what do you know about the first moon landing? Who was there? What was the spacecraft called? • Show gifs of first moon landing	PowerPoint presentation	5

Class discussion about how to build a lunar lander	• What needs to be taken into account when trying to build a lunar lander?
	  ○ No atmosphere - how to slow down?
	  ○ Environment
	  ○ Safety of astronauts
	  ○ No damage to equipment
	  ○ Soft landing
	• How do we land safely when we jump off the ground?
	  ○ Have students try it and discover how their knees provide a safe, bouncy landing
	• Ask how this spring mechanism we use in our legs could be applied to a lunar lander
			5

Building the lunar module	• Start by building the lunar module where the astronauts will be • Cut up into a toilet roll tube about a third of the way, all the way around, to make a 'skirt' out of one end of the tube • Flatten out the cardboard skirt and tape it onto the flat cardboard piece • Place an astronaut inside the toilet roll tube. This is the lunar module	Toilet roll tube, piece of flat cardboard about A5 size, 'astronauts' (game pieces/ Lego / etc), scissors	5-10

Engineering process - adding legs	• Set the students a challenge - to design some sort of legs for this lunar module that will allow the spacecraft to land softly, not get damaged, and not let the astronaut fall out, from a drop of, say, 30 cm
	• With the materials available to the students, allow them to try out different designs for their legs - reminding them of the spring mechanism previously discussed
	• Suggest ways to make a spring from cardboard if necessary - eg: concertina strips of cardboard or circles of cardboard
	• Show examples from PowerPoint for inspiration or problem solving if necessary
	• Options for extending this activity:
	  ○ Increase the drop height
	  ○ Change the landing position - the Moon isn't a nice flat surface like the floor, what would happen if you had to land on something lumpier such as your shoes?
	  ○ Add features to the spacecraft - a name, seatbelts, safety equipment, design details
		Plenty of cardboard of different lengths / widths / stiffness, tape, scissors, ruler, PowerPoint, markers (optional)	15-20

Classroom discussion - explain your design	• Have students explain their design and its features and demonstrate how it works • Have students walk through their different ideas / failed attempts that led them to this working prototype		5-10

Additional resources:

Video explaining the design process of the first lunar landing and other info on Apollo 11
https://www.youtube.com/watch?v=oX8-IXdABuc

Link to source of activity:

https://www.stem.org.uk/system/files/elibrary-resources/2019/06/Mission%20to%20the%20Moon.pdf