



Rover Race

Subjects

Physics Earth Science
Space Science Mathematics
Earth and Space

Topics

Physics Engineering Motion
Air Pressure Space Exploration/Space Education
Atmosphere Outside of the Earth

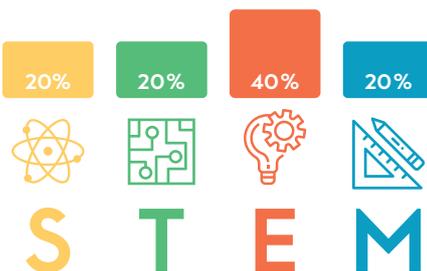
Key Words

Space Education Space Exploration
Creativity Physics Engineering
Independence Wheeled Vehicle Motion
Teamwork Gases in Outer Space Model Cars

Connection to SDG



STEM Chart



Time for Activity

2 hours

Introduction

Space education is trending nowadays especially given the current developments in the field of space exploration. It is very important that students become aware of various breakthroughs, updates and technologies related to space science. The best way to keep them on track is to bring space related activities inside the classroom.

This activity is intended to link space related concepts in designing a vehicle that will run on its own using the given materials. It showcases students' creativity, imagination and critical thinking in applying their knowledge on physics, chemistry, mathematics and space science while developing engineering skills, self-confidence and autonomy. The activity is designed as a playful 'race' to playfully engage young scientists. It helps students develop team spirit and cooperation skills and gives them a sense of responsibility and accomplishment after the game.

The proposition involving vehicles, motion and racing can also be utilized with different concepts from other fields of science, such as biology, in experiments to explore the race of sperm cells to fertilize an egg cell, the transportation of materials in plants or the circulation of materials in the human body. In chemistry, the movement of gas particles could be explored. In physics, speed, acceleration, displacement, the laws of motion, impulse, momentum etc. could be investigated.

Key Objectives

- 1 Designing a good space vehicle.
- 2 Creating the most stable wheeled vehicle that moves by itself using only the given materials.
- 3 Participating in the rover race.



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Materials

- 1 Toy balloon
- 2 Plastic straws
- 3 Cardboard pieces
- 4 Adhesive tape
- 5 Pair of scissors

Safety

- 1 Be careful when using a pair of scissors.



Guiding Questions

- 1 Can you make a wheeled vehicle out of the given materials?
- 2 How are you going to construct the most stable structure/design of your space vehicle?
- 3 Which of the materials listed can be used to make the vehicle move on its own?
- 4 What are the factors that may affect the movement of your vehicle?
- 5 Is it possible to use your vehicle in space? Explain.

Task

- 1 Divide the class into groups of a preferred number of members.
- 2 Explain the situation: If your team was given the chance to construct a mars rover, what would the design look like and how do you make sure that it can move on its own, given the set of materials?
- 3 Distribute the materials to each group and give them 20 minutes to construct their rover.

- 4 When all the wheeled vehicles are ready, do the brainstorming: Is it possible to use a balloon-powered vehicle in space?
- 5 Discuss the mechanics of the race and establish evaluation criteria.
- 6 Start the race.

Suggested Mechanics of the Race

- 1 Line up all the vehicles behind the same starting line.
- 2 Make sure that each balloon is already inflated.
- 3 Upon signal, balloons are released at the same time to power the vehicles move.
- 4 The vehicle that can travel the longest distance wins.
- 5 In case of a tie, a tie-breaker game will be done.



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Assessment

Suggested criteria for evaluation:

Stability of vehicle	25 %
Steady/smooth movement of the vehicle	25 %
Structure/design of the vehicle	25 %
Distance traveled by the vehicle (ranking)	25 %
Total Points	100 %