



MUSEUM OF
NATURAL HISTORY
AND PLANETARIUM
Roger Williams Park

Engineering Design

A Pre-Visit Information Guide for Teachers

NGSS: 4-PS3-1-2, 3-5-ETS1-1-3, MS-PS2-2, MS-ETS1-1-4

After working through the engineering design process, compete in a hands-on STEM engineering design challenge where participants build a wind-powered miniature car and propel it using only their breath.

OBJECTIVES

- Students will identify ways that wind energy can be used to perform work.
- Students will understand that the position of an object can be changed through pushing or pulling. The amount of change is dependent on the mass of the object and the strength of the force acting upon it.
- Students will recognize that engineers use creativity and problem solving when designing solutions to a problem.

Students will have the opportunity to build and race their own car in a Puff Mobile Derby. A Puff Mobile is a vehicle made from common household items that is propelled using the force of wind created as you blow on the car. The challenge is to design and create a vehicle that will move as quickly as possible in a linear direction on a five-meter course. In this activity, students will become engineers as they design, construct, test, and modify their Puff Mobiles.

ACTIVITIES

Teachers are encouraged to conduct pre-visit and post-visit classroom discussions and activities with their classes to make the most of their experience. <https://montanarenewables.org/renewable-energy/renewable-energy-activities-for-kids/>

HELPFUL VOCABULARY

Brainstorm: To think of many different ideas to solve a problem

Criteria: The measurable standards or requirements a design must meet to be successful

Constraints: The limitations or conditions—such as cost, size, or materials—that a design must satisfy

Prototype: An early, working model of a design used for testing and refining

Evaluation: The systematic process of determining how well a solution meets the established criteria

Model: A simplified representation, simulation, or replica used to test and analyze a design