Uphill Struggle

The problem

Jack and Jill have made a luxury double-seater cart, but it is very heavy to push up the hill.

Can you design a way to stop the cart from rolling back down the hill when they stop to catch their breath?

Uphill Struggle

Objectives

Applying knowledge of:
- Wheels and axles
- Friction
- Ratchets and gears
- Predicting and measuring
- Applying principles of fair testing and product safety

Other materials required

- A metre rule or measuring tape
- A plank to make a sloping hill
- Card and tape to make a runoff ramp at the bottom of the hill
- A desk fan to provide the energy for wind-assisted carts
- Optional: playdough for making test pilots

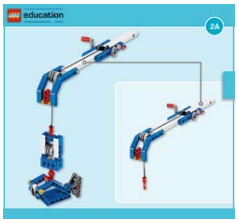
Fair testing and fun

- Can the cart carry the weight of at least one weight brick?
- Does it roll freely?
- Does the autostop feature work?
- How safe and comfortable is your luxury cart?

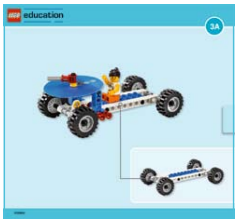
Extra challenges

- Harness wind energy to help push the cart uphill. Make sure that the autostop will stop it rolling down the hill again if the wind stops.
- All Terrain Cart! Can you find a way to make the cart climb over rulers and maybe even pencils that are put in its way on the hillside.
  Tip: Create a means of storing energy on board the cart.

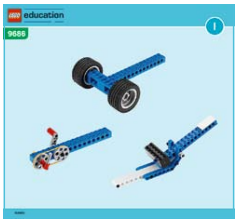
Need help?
Look at:



Fishing Rod



Freewheeling



Principle Models Building Instructions booklet for wheels and axles