



Power Car

Design and technology

- Combining components
- Gears
- Wheels

Science

- Friction
- Measuring distance, time and force
- Scientific investigation

Vocabulary

- Counter balance
- Friction
- Gears
- Grip
- Torque

Other materials required

- Metre rule or measuring tape
- Plank – 240 cm or longer
- Small books or other objects to make a load
- Stopwatch or timer

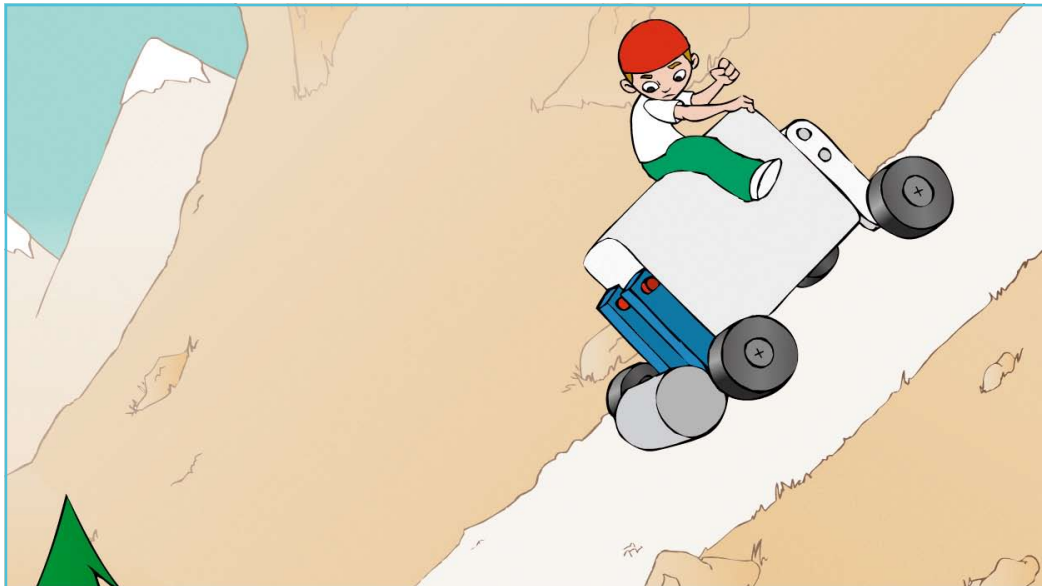
Connect

Jack and Jill are out in the hills behind their house testing their Power Car. It's great fun and a great way for Zog to keep fit too. The car works just fine on level ground but it just can't seem to climb those hills.

The wheels skid, the motor makes terrible noises, and the front end of the car lifts off the ground.

Jack thinks the car needs to be heavier. Jill thinks the gears are all wrong for going up hills.

**How can you make a Power Car that climbs hills?
Let's find out!**

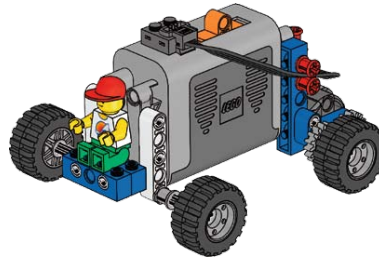


Construct

Build the Power Car

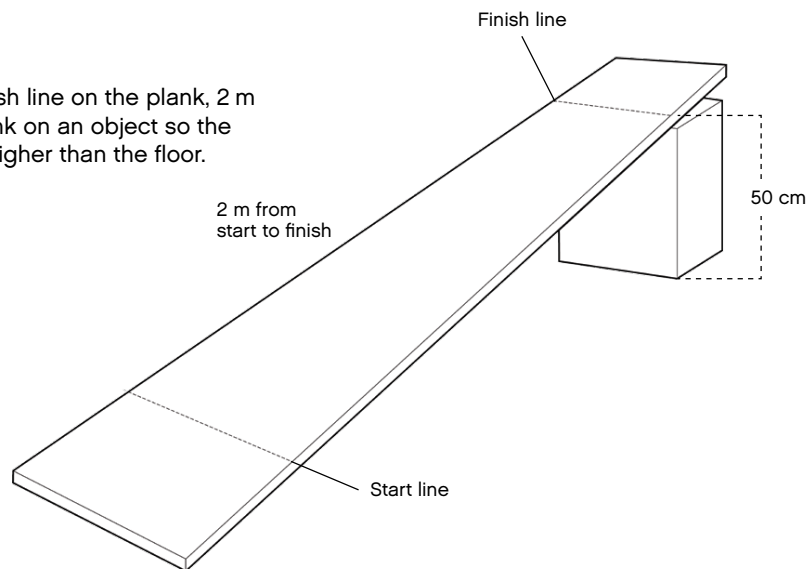
(all of book 11A and book 11B to page 9, step 10).

- Turn on the motor by pushing the battery box switch forward
- Make sure all the wheels turn freely and do not rub on the sides of the Power Car



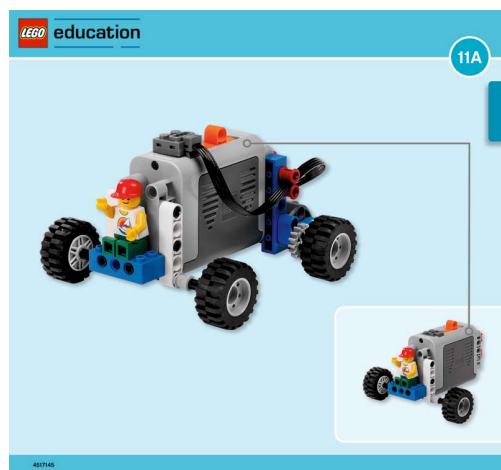
Build your test hill

Mark a start and finish line on the plank, 2 m apart. Place the plank on an object so the finish line is 50 cm higher than the floor.



Tip:

The Power Car can travel very fast, even up hills, so it might be a good idea to put the ramp against the wall in a corner to prevent it going over the edge.



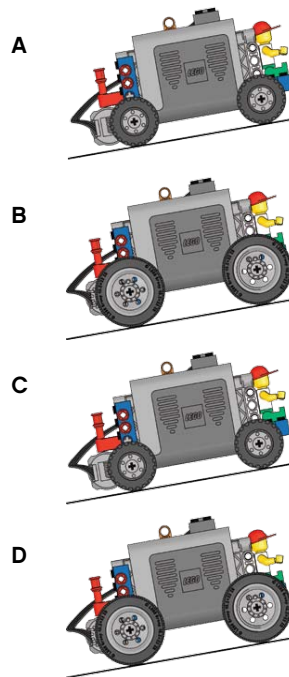
Contemplate

Which is the fastest uphill Power Car?

The Power Car needs to be as fast as possible when driving uphill.

First predict how fast Power Car A will travel 2 metres uphill. Then test your prediction. Next, follow the same procedure for Power Cars B, C and D.

Test several times to make sure your results are consistent. Test results may vary depending on surface of the hill.



Did you know?

The circumference of the small wheel is 9.6 cm



The circumference of the big wheel is 13.6 cm



Optional: How steep a hill?

How steep a hill is your Power Car able to climb? Place the plank on an object so the finish line is 70, 80, 90 or more cm higher than the floor. Test which of the Power Cars A, B, C or D is best at climbing steep hills.

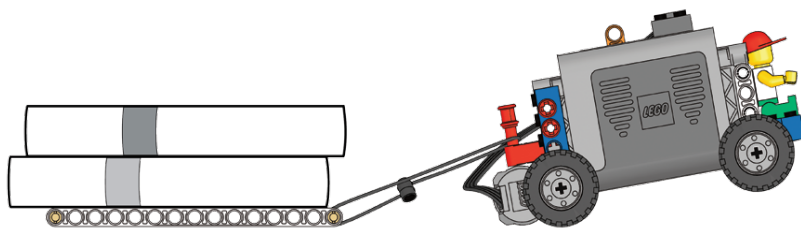
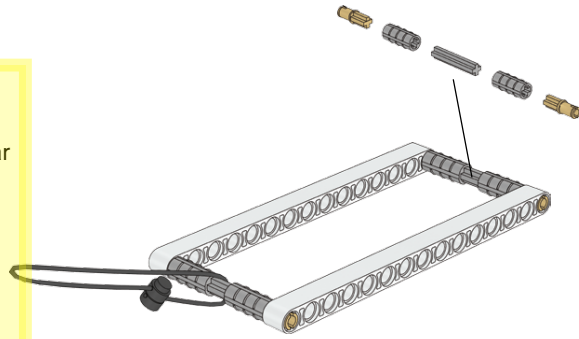
Continue

How strong is your Power Car?

Build a sledge and attach it to your Power Car using a string around the hook at the rear.

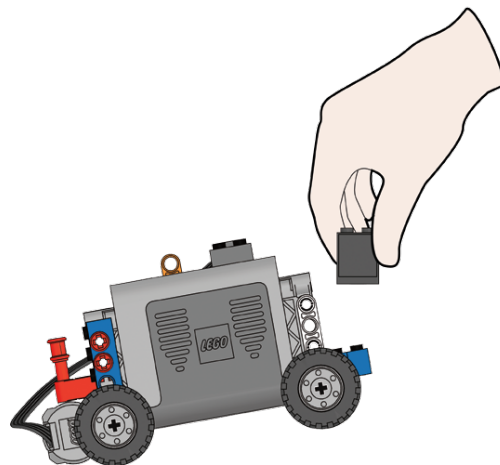
Load the sledge with books.

First predict how heavy a load Power Cars A and C can pull. Then test which Power Car can pull the heaviest load.



Also try adding counterbalance to the front of the Power Car.

Try different combinations of wheels and gearing to achieve the best pulling power.



Tip: Use the weight element as a counterbalance.