



## The Walker

### Design and technology

- Gears
- Levers
- Linkage
- Ratchet
- Using and combining components

### Science

- Force
- Friction
- Measuring time
- Scientific investigation

### Vocabulary

- Balance
- Gears
- Grip
- Levers
- Linkages
- Ratchet

### Other materials required

- Large thin book with a hard cover – big book or ring binder
- Ruler
- Stopwatch or timer
- Up to 1 m of floor space

## Connect

Jack and Jill are having a great day out hiking. But it's hot, they are getting tired and their backpacks seem to be getting heavier and heavier.

When Jack and Jill stop for a short break, a line of ants passes them!

"How can they walk and carry so much so easily?" says Jack.

Jack and Jill think it would be great if an ant could carry them too!

**How can you make a Walker that will carry Jack and Jill along the trail?**

**Let's find out!**

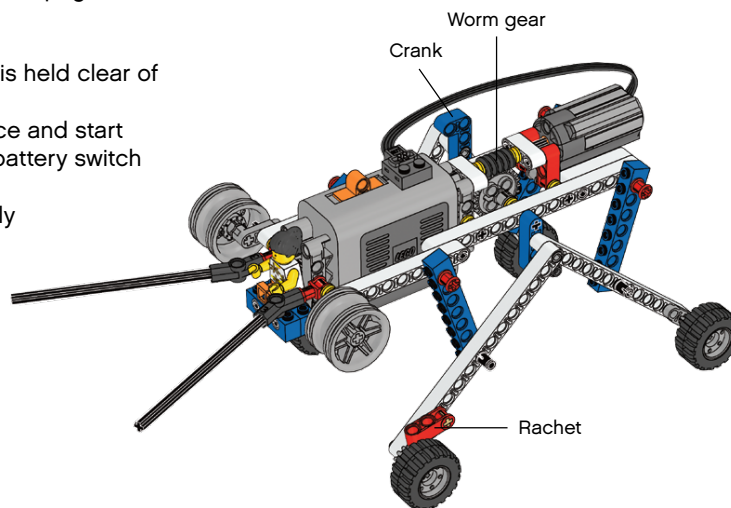


## Construct

### Build the Walker

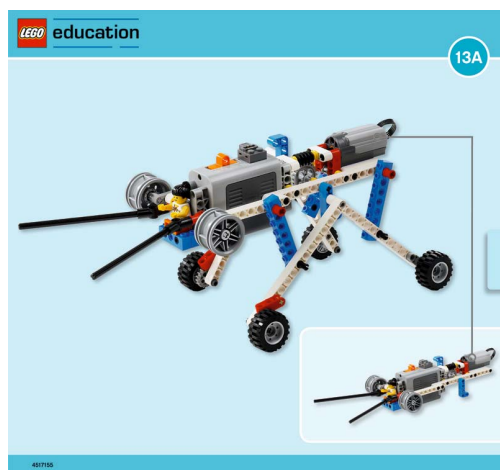
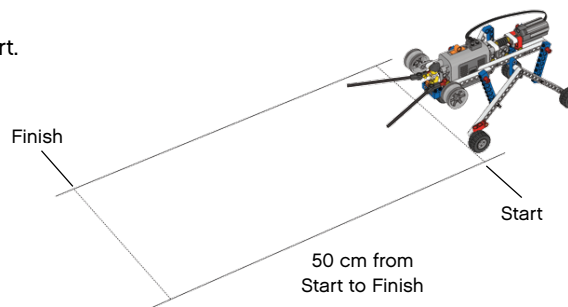
(all of book 13A and book 13B to page 13 step 18.)

- Make sure the power lead is held clear of all moving parts
- Place it on a smooth surface and start the motor by pushing the battery switch forward
- The legs should move freely



### Mark your test track

- Mark a start line and finish line 50 cm apart.



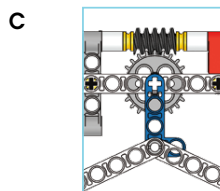
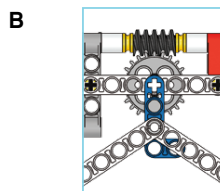
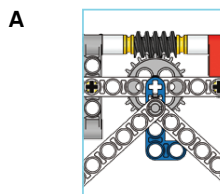
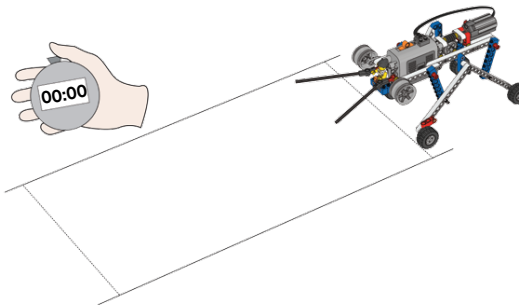
## Contemplate

### How fast can the Walker walk?

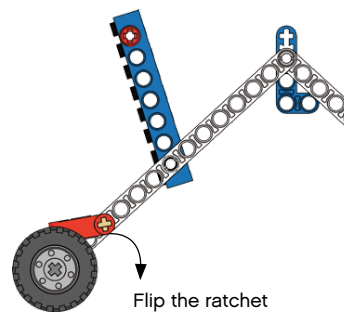
The Walker will walk at different speeds depending on the leg settings.

First predict how long it will take the Walker to walk 50 cm using leg setting A. Then test your prediction. Next, follow the same procedure for leg settings B and C.

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



### Can you explain what the ratchets do?

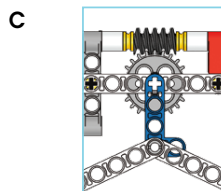
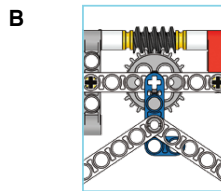
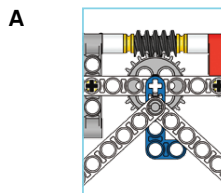
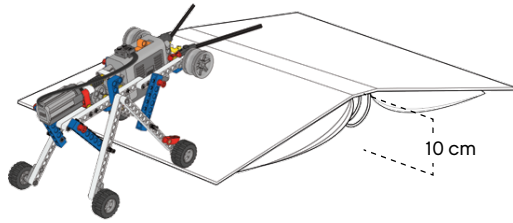


**Continue**

**Which Walker is the fastest hill climber?**

Make a 10 cm hill from a big book or ring binder. Place the Walker as shown in the illustration.

First predict which leg settings A, B or C is fastest for climbing over hills? Then test which in fact is the fastest hill climber.



**What else happens?**

**Optional: Make the Walker move in different ways**

**Did you know?**  
A walking robot called Dante 2 is designed to climb down very steep rocky slopes into the gas-covered floors of dangerous volcanoes. It can also abseil down ropes and climb over rocks up to 1 m high!

**Tip:**  
These crank settings will make the Walker move differently.

