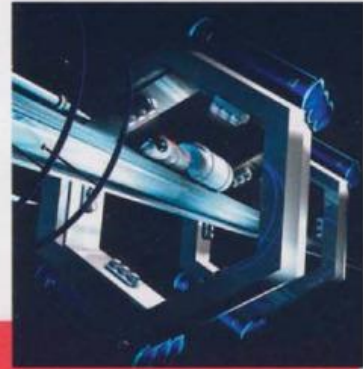


Explaining how technology works

6 a In pairs, look at the picture and discuss the following questions.

- How do you think a space elevator would work?
- What could it be used for?
- What technical challenges would it face?
- How seriously do you think the concept of space elevators is being taken at present?

b Read the following article and compare it to your answers in Exercise 6a.



Space elevators: preparing for takeoff

IN his 1979 novel, *The Fountains of Paradise*, Arthur C. Clarke wrote about an elevator **connecting** the earth's surface to space. Three decades later, this science-fiction concept is preparing to take off in the real world. NASA has launched the Space Elevator Challenge, a competition with a generous prize fund, and several teams and companies are working on serious research projects aimed at winning it.

As its name suggests, a space elevator is designed to **raise** things into space. Satellites, components for space ships, supplies for astronauts in space stations, and even astronauts themselves are examples of payloads that could be **transported** into orbit without the need

for explosive and environmentally unfriendly rockets. However, the altitude of orbital space – a colossal 35,790 km above the earth – is a measure of the challenge facing engineers. How could such a height be reached?

The answer is by using an incredibly strong and lightweight cable, strong enough to **support** its own weight and a heavy load. The design of such a cable is still largely theoretical. This would be **attached** to a base station on earth at one end and a satellite in geostationary orbit (fixed above a point on the equator) at the other. Lift vehicles would then **ascend** and **descend** the cable, **powered** by electromagnetic force and **controlled** remotely.

c Match the verbs (1–9) from the text in Exercise 6b to the definitions (a–i).

1 connecting	a carried (objects, over a distance)
2 raise	b hold something firmly / bear its weight
3 transported	c climb down
4 support	d provided with energy / moved by a force
5 attached	e joining
6 ascend	f driven / have movement directed
7 descend	g fixed
8 powered	h climb up
9 controlled	i lift / make something go up

7 a James, an engineer, is giving a talk on space elevators. Complete his notes using the correct form of the verbs (1–7) in Exercise 6c.

Space Elevators

- Challenge of (1) connecting a satellite to earth by cable is significant.
- To (2) support its own weight, and be securely (3) attached at each end, cable would need phenomenal strength-to-weight ratio.
- How could vehicles be (4) powered into space, up cable?
- Self-contained energy source problematic, due to weight (heavy fuel or batteries required to (5) ascend vehicle).
- Two possible ways round problem:
 - 1 Transmit electricity wirelessly. But technique only at research stage.
 - 2 Solar power. But would only allow vehicle to (6) climb up slowly. Not necessarily a problem, as car could be controlled remotely, allowing it to (7) transport payloads unmanned.