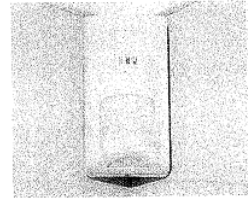
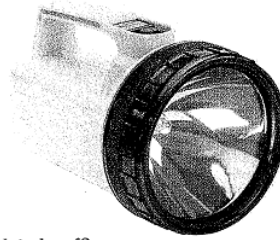
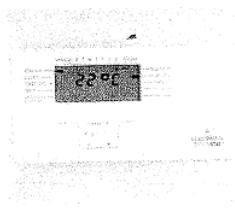


2 Sensors

Start here 1 Which of the following is *not* a sensor? Why not?



- 2 What other sensors can you think of?
 3 With a partner, write a definition of a sensor. Use these or other words.

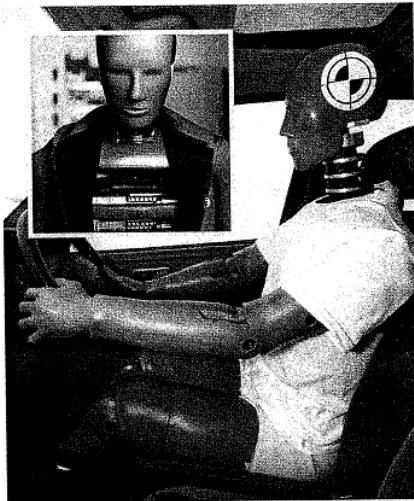
sensor, device, detect, change (n), environment, convert, data

Begin: A sensor is ...

Reading 4 Discuss with your partner.

- What's happening here?
- What are the engineers trying to measure?
- What kind of sensors are used?

- 5 Read this article and complete the statements below using these words: **acceleration, load, motion**.



Two different crash test dummies are used in standard European vehicle crash tests. The first dummy is used for front impact crashes, and the second one is a side impact crash dummy. The dummies, which are made of steel, aluminium and rubber, contain many sensors.

Three types of sensing equipment are used: *acceleration sensors*, *load sensors* and *motion sensors*. The dummy heads contain three accelerometers (single direction acceleration sensors) which are set at right angles (forward-backward, up-down, and left-right). The dummy necks contain load sensors to detect the bending forces, shear forces and tension forces, which put pressure on the neck in a crash. The dummy legs contain load sensors, which measure the bending, shear, compression and tension forces on the leg.

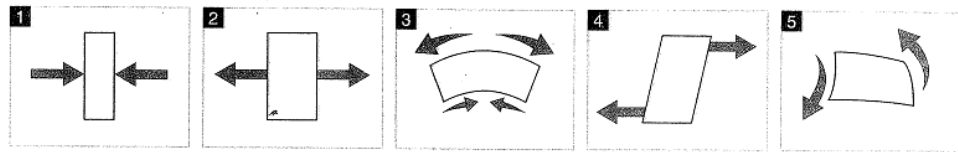
In addition, a front impact crash test dummy has steel ribs fitted with motion sensors which record front rib movement. A side impact dummy has motion sensors which record side chest deflection (or inward movement), and load sensors to measure compression forces on the chest.

Three types of sensors are used in crash test dummies:

- 1 _____ sensors measure deflection (inward movement) of a body part during a crash.
- 2 _____ sensors measure how much a body part increases or decreases speed during a crash.
- 3 _____ sensors measure the force or pressure on different body parts during a crash.

Vocabulary

6 Match the diagrams with (a) the names of the forces and (b) their descriptions.



- (a) bending, compression, shear, tension, torsion
 (b) squeezing or pressing together; sliding in opposite directions; stretching or pulling apart; twisting; squeezing one side + stretching the other side

Language

Noun + noun combinations are very common in technical English.

Examples: acceleration sensors (= sensors which measure acceleration); vehicle crash tests (= tests which crash a vehicle to measure its safety); a side impact crash dummy (= a dummy which measures the impact from the side in a crash).

7 Find phrases in the article in 5 which mean the same as these. All the words in the phrases must be nouns.

- 1 forces which pull something apart
- 2 sensors which detect movement or motion
- 3 deflection of the side of the chest
- 4 crashes which are caused by an impact from the front
- 5 a dummy which is used for testing the impact of a crash from the front

8 Expand these phrases. You can change words and add information.

- 1 a gas flow meter = *a meter which measures/for measuring the flow of gas (along a pipe)*
- 2 an engine speed dial = _____
- 3 a tyre pressure gauge = _____
- 4 a bass volume indicator = _____
- 5 an air pressure sensor = _____
- 6 a fuel intake port = _____

9 Make full sentence definitions from 8.

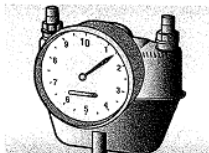
Example: 1 A gas flow meter is a meter which measures the flow of gas along a pipe.

Task 10 List some sensors used in your industry. Complete a table like this one. If possible, work in small groups with others from the same industry.

Industry: civil engineering and construction		
Name of sensor	Function/Use	Application
strain gauge	to measure deformation of structures	high-rise buildings, bridges, roads

11 Explain to the class about the sensors you have listed in your table.

In the field of civil engineering and construction, strain gauges are used for measuring the deformation of structures. They're used in high-rise buildings, bridges and roads, for example.



gas flow meter



engine speed dial



tyre pressure gauge



bass volume indicator