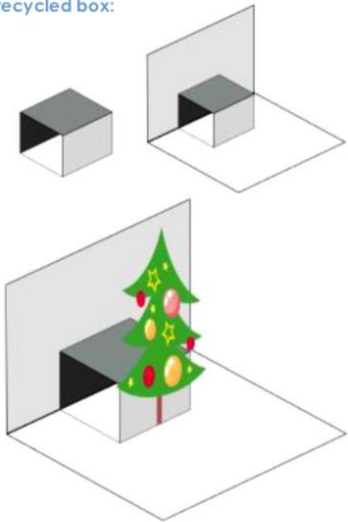## Levers and Linkages

Making a pop-up from a small section of a recycled box:
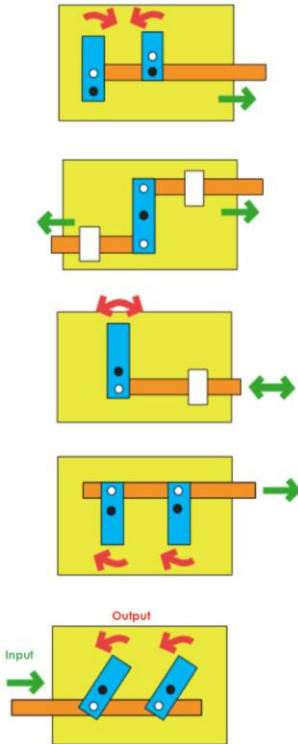
1. Cut a slice off a small box.
2. Glue two sides to the paper.
3. Stick a picture to pop up on the front.

Fixed pivot
Loose pivot

Lever and linkage mechanisms usually produce oscillating or reciprocating movement:

Linear – in a straight line

Reciprocating – backwards and forwards in a straight line e.g. a slider

Rotary – round and round e.g. a wheel, cam, pulley, gear wheel

Oscillating – backwards and forwards in an arc e.g. a lever

Output

Input

When you push the card strip (input movement), the two levers move (output movement).

Engineer Study

Sir James Dyson

✓ James Dyson is a British designer and inventor. He founded the Dyson Company and is best known for devising and promoting the Dyson Dual Cyclone bagless vacuum cleaner.

✓ Dyson experimented with a bagless vacuum cleaner design during the 1970s. He also devised the idea of using a ball instead of wheels, allowing the machine to turn more easily.

✓ The James Dyson Foundation was set up in 2002 to encourage education in design and engineering.

Sir James Dyson

Vocabulary

Mechanism – a device used to create movement in a product.

Lever – a rigid bar which moves around a pivot. Levers are used in many everyday products. In this project children will use card strips for levers and paper fasteners for pivots.

Linkage – the card strips joining one or more levers to produce the type of movement required. The term 'linkage' is also used to describe the lever and linkage mechanism as a whole.

Slot – the hole through which a lever is placed to enable part of a picture to move.

Guide or bridge – a short card strip used to keep lever and linkage mechanisms in place and control movement.

Loose pivot – a paper fastener that joins card strips together.

Fixed pivot – a paper fastener that joins card strips to the backing card.

System – a set of related parts or components used to create an outcome. Systems have an input, process and an output. In a lever and linkage mechanism, the 'input movement' is where the user pushes or pulls a card strip. The 'output movement' is where one or more parts of the picture move.