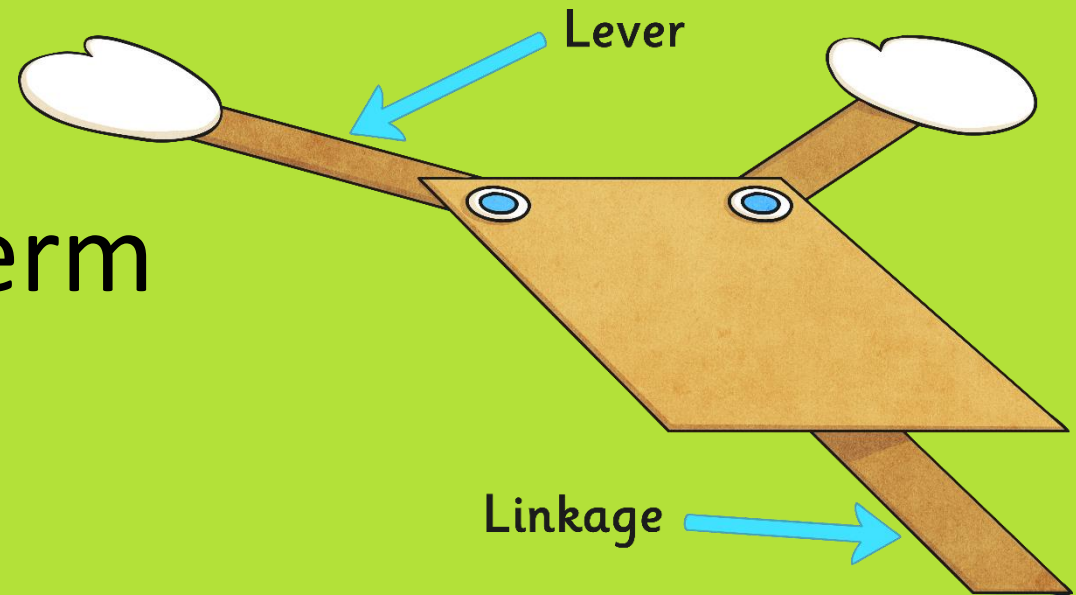
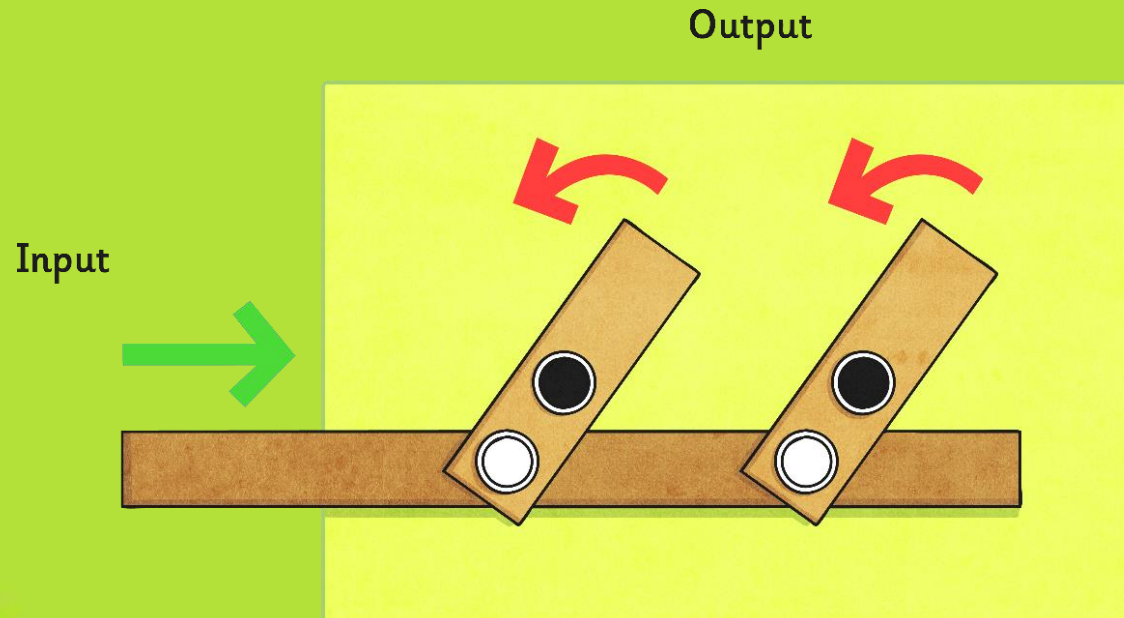


# Linkages and Levers Mechanisms

Year 3 Summer Term



# Exploring Mechanical Systems - Inputs and Outputs



Which parts move?

How does it work?  
(Input and Output)

Many mechanisms take one type of **input** motion, and **output** it as a different type of motion.

In a lever and linkage mechanism, the '**input**' is where the user pushes or pulls a card strip. The '**output**' is where one or more parts of the picture move.

When you push the linkage (input), it moves the two levers (output).

# Making it Move

**Lever** - The simplest type of mechanism is called a **lever**. A lever is a stiff bar which moves around a pivot. The pivot can be **loose** or **fixed**. Levers are used in many products.

In this project you will use card strips for levers and split pins for pivots.

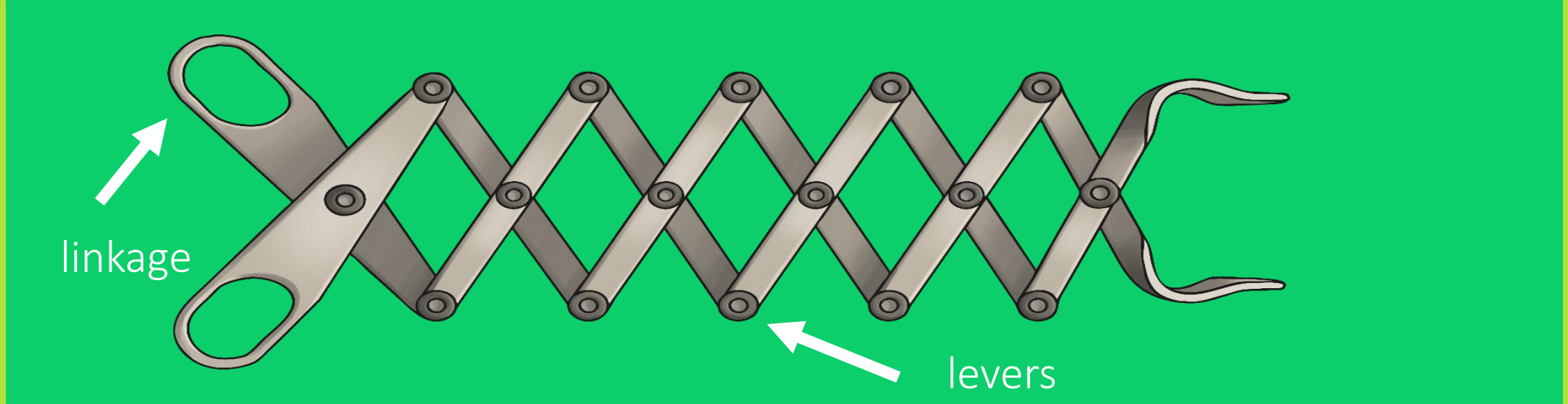


pivot

stiff bar

# Making it Move

**Linkage** - the card strips joining one or more levers to produce the type of movement required.

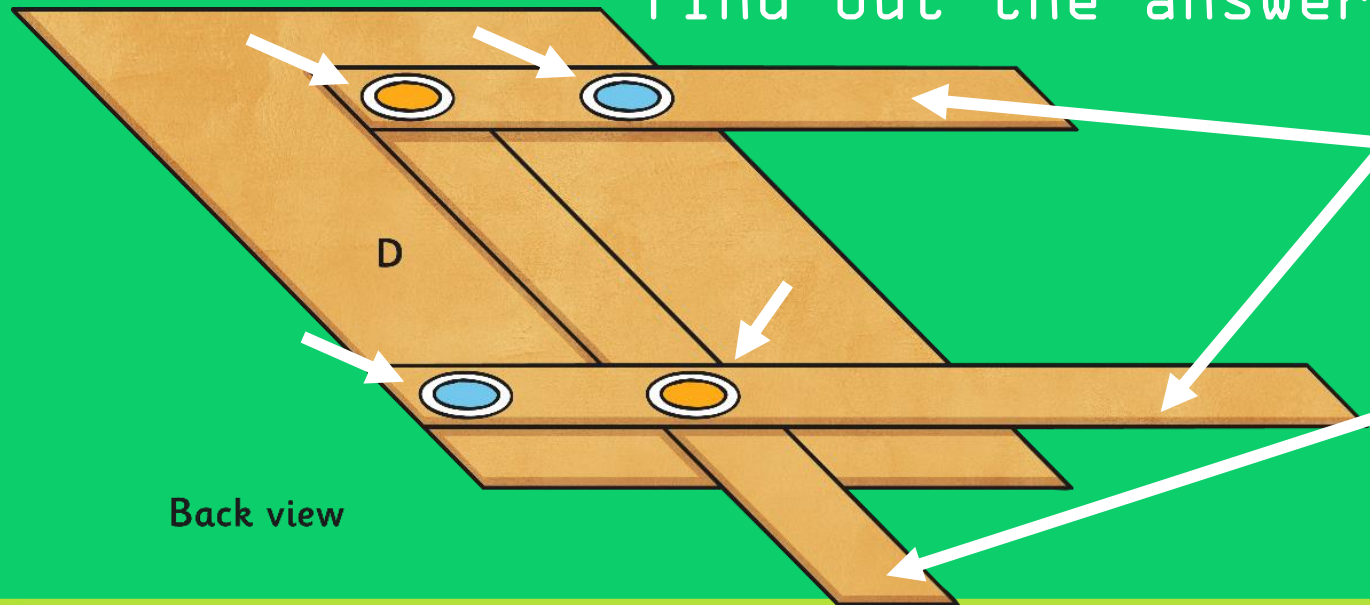


Can you explain the difference between a lever and a linkage?



# Identifying Levers and Linkages

Can you identify the levers and linkages? Discuss with your group and then click on the questions to find out the answers



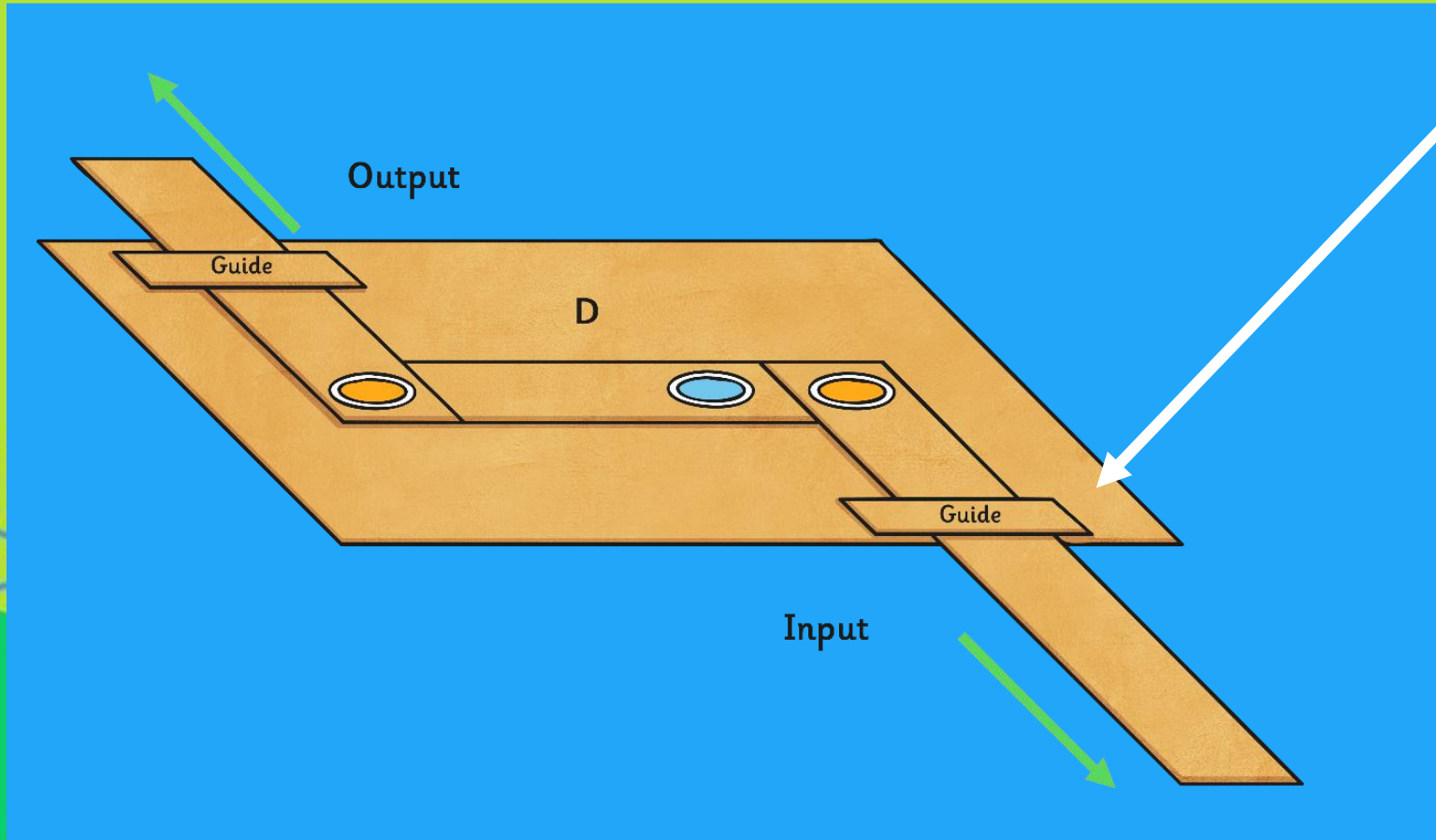
Which are the levers?

Which are the linkage?

**Loose pivot** - a split pin that joins card strips together.

**Fixed pivot** - a split pin that joins card strips to the backing card.

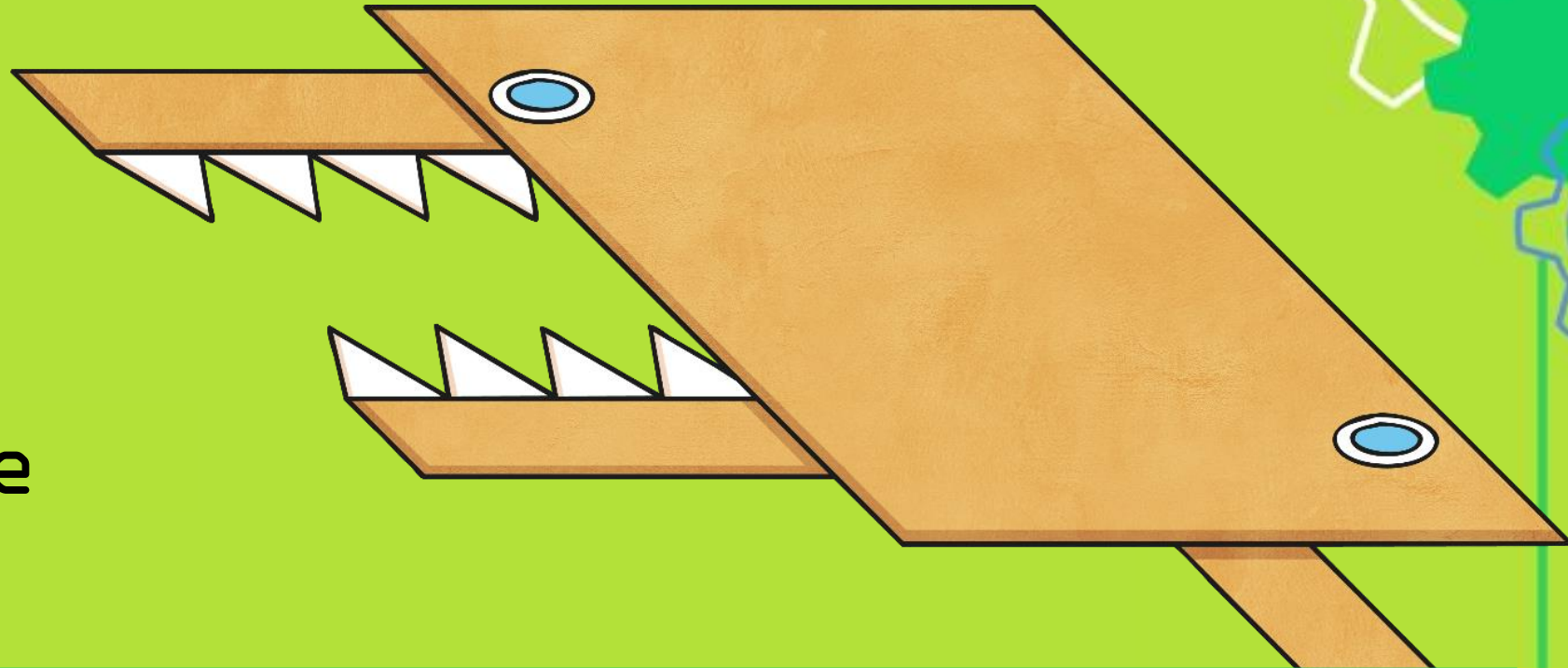
# Identifying Levers and Linkages



**Guide** - a guide is used to keep lever and linkage mechanisms in place and control movement.

# Identifying Levers and Linkages

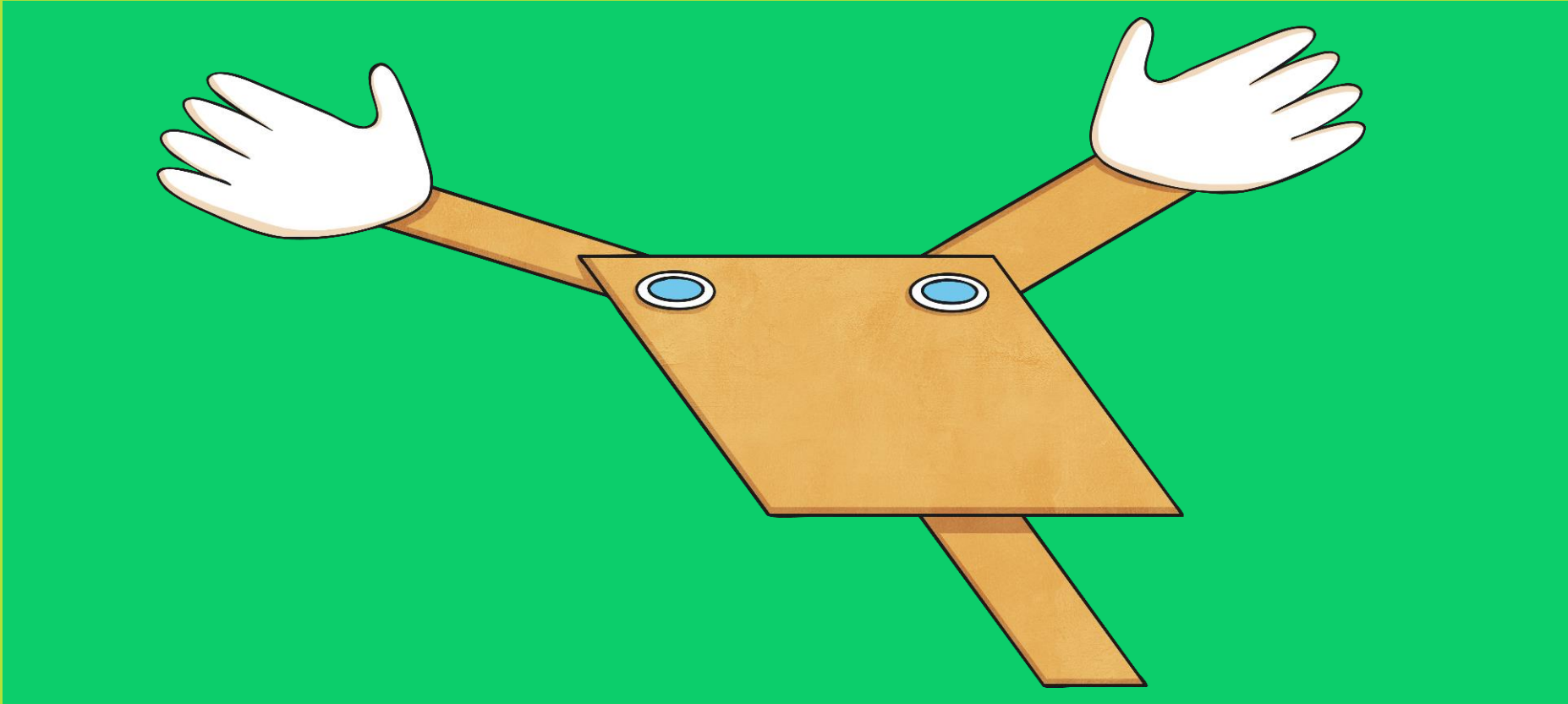
Which are  
the levers?  
Which are  
acting as the  
linkages?



Can you find the loose pivots- a split pin that joins card strips together.

Can you find the fixed pivots - a split pin that joins card strips to the backing card.

# Let's Make



Follow the instructions  
to make a mechanism of  
your own.



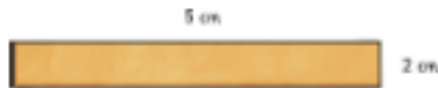
# Clapping Hands

Follow the instructions to make the moving mechanism.

## Step 1

Cut **two** strips of card with the measurement:

**5cm x 2cm (A and B)**



## Step 2

Cut **one** strip of card with the measurement:

**7cm x 2cm (C)**



## Step 3

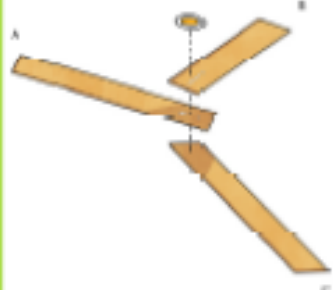
Cut a rectangle with the measurements

**5cm x 4cm (D)**



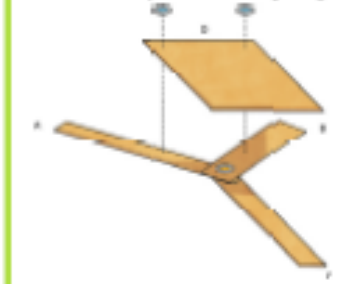
## Step 4

Make two small slits in strips A and B. Then push a split pin through the three strips of card as shown.



## Step 5

Split pin the strips to the rectangular piece of card. Don't fix the split pins tightly. Make sure the card strips can move freely.



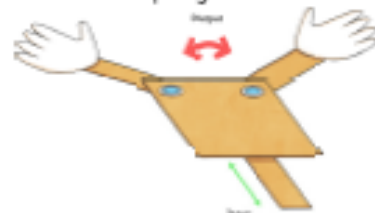
## Step 6

Cut two hands out and stick to the arms.



## Step 7

Pull the strip up and down and the hands will clap together!

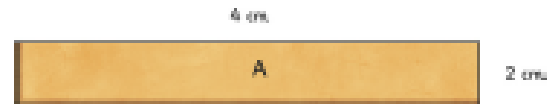


# Moving Dragon

Step 1

Cut **one** strip of card with the measurements:

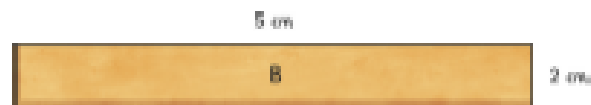
**4cm x 2cm (A)**



Step 2

Cut **one** strip of card with the measurements:

**5cm x 2cm (B)**



Step 3

Cut **one** strip of card with the measurements:

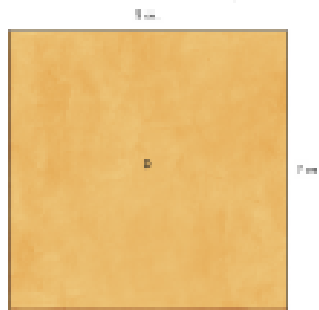
**7cm x 2cm (C)**



Step 4

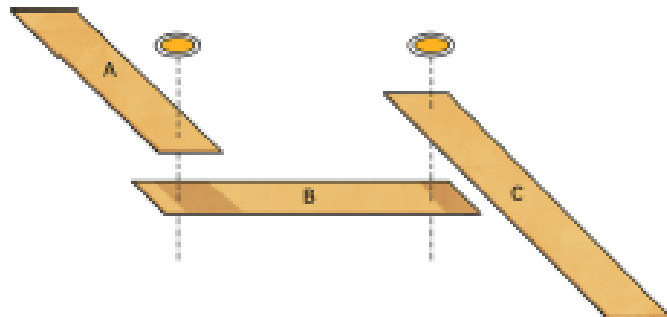
Cut a rectangle with the measurements

**5cm x 7cm (D)**



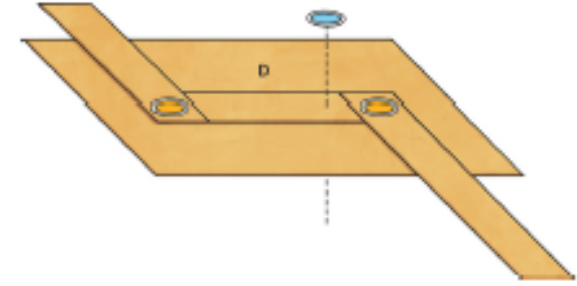
Step 5

Split pin the three strips together in the positions shown. Do not fasten the split pins tightly.



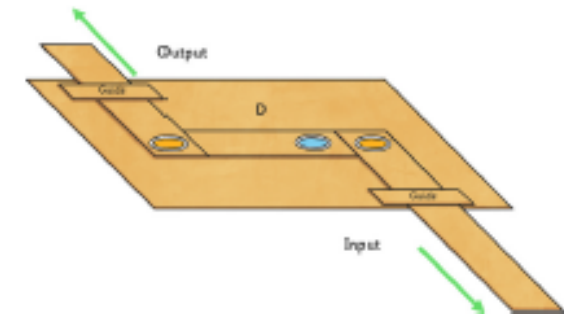
Step 6

Split pin the strips to the rectangle in the position shown. Do not press the split pin tightly.



Step 7

Cut two guide strips out of card and glue down in the position shown.



Step 8

Draw and cut out a head and tail of a dragon and stick in the position shown.



# Waving Hand

## Step 1

Cut **one** strip of card with the measurements:

**7cm x 2cm (A)**

7 cm



## Step 2

Cut **one** strip of card with the measurements:

**9cm x 2cm (B)**

9 cm



## Step 3

Cut a rectangle with the measurements

**7cm x 5cm (C)**

7 cm



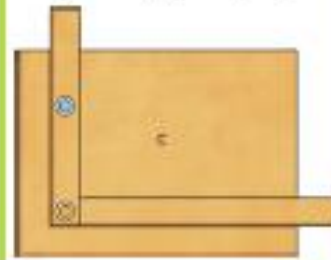
## Step 4

Split pin the strips to the rectangular piece of card. Don't fix the split pins tightly.



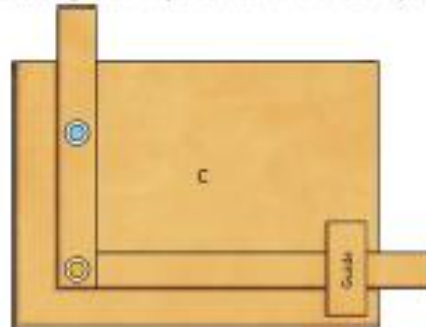
## Step 5

Split pin the strips to the rectangular piece of card. Don't fix the split pins tightly.



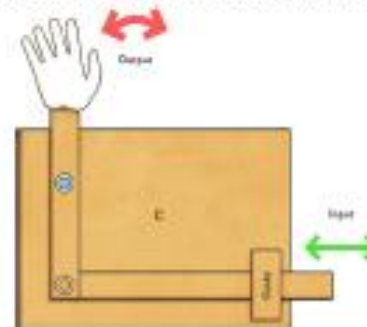
## Step 6

Add a guide strip as shown in the diagram.



## Step 7

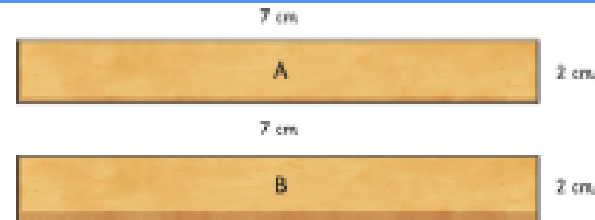
Draw and cut out a hand and stick it in place.



# Moving Flags

Step 1

Cut **two** strips of card with the measurements:  
**7cm x 2cm (A and B)**



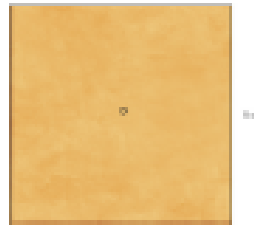
Step 2

Cut **one** strip of card with the measurements:  
**9cm x 2cm (C)**



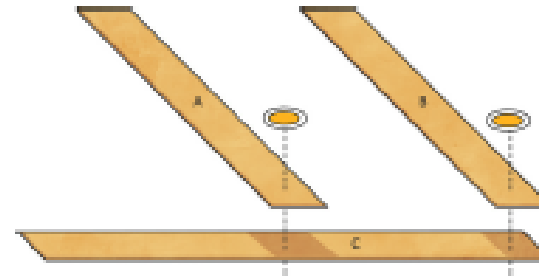
Step 3

Cut a rectangle with the measurements:  
**7cm x 5cm (D)**



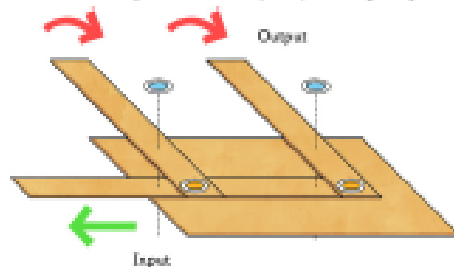
Step 4

Split pin the three strips together in the positions shown. Do not fasten the split pins tightly.



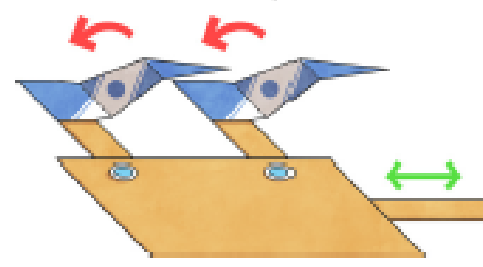
Step 5

Split pin the strips to the rectangle as shown. Do not fasten the split pins tightly.



Step 6

Carefully cut out and fold the two flags and stick in place.





# Snapping Crocodile

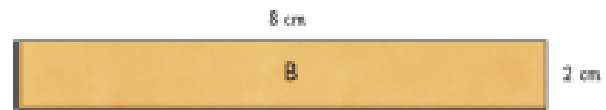
Step 1

Cut **one** strip of card with the measurements:  
**6cm x 2cm (A)**



Step 2

Cut **one** strip of card with the measurements:  
**8cm x 2cm (B)**



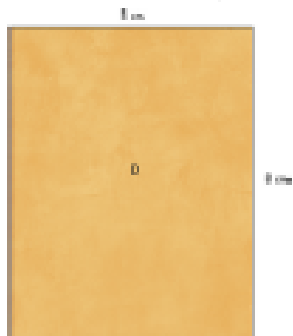
Step 3

Cut **one** strip of card with the measurements:  
**9cm x 2cm (C)**



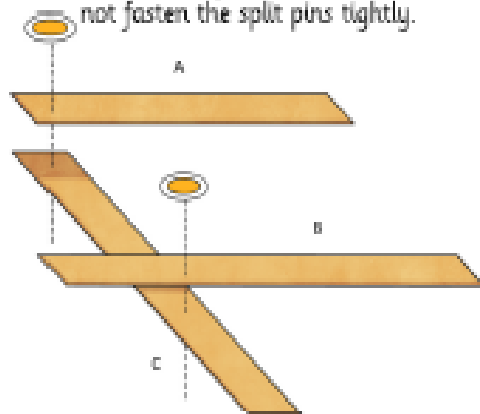
Step 4

Cut a rectangle with the measurements:  
**5cm x 8cm (D)**



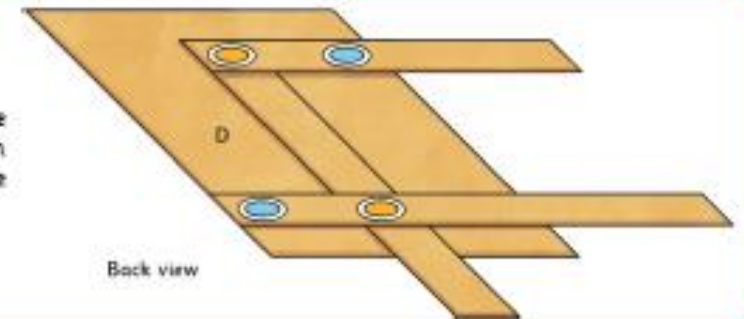
Step 5

Split pin the three strips together in the positions shown. Do not fasten the split pins tightly.



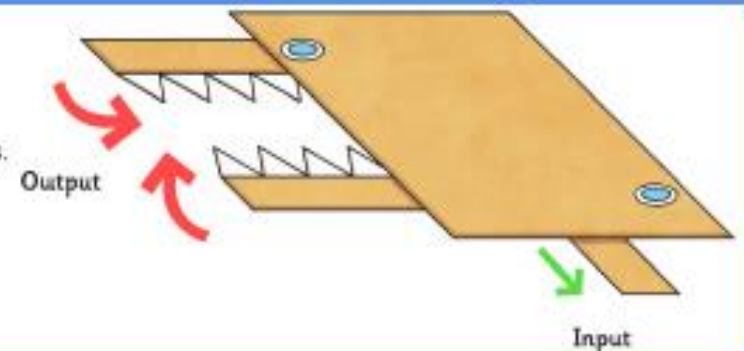
Step 6

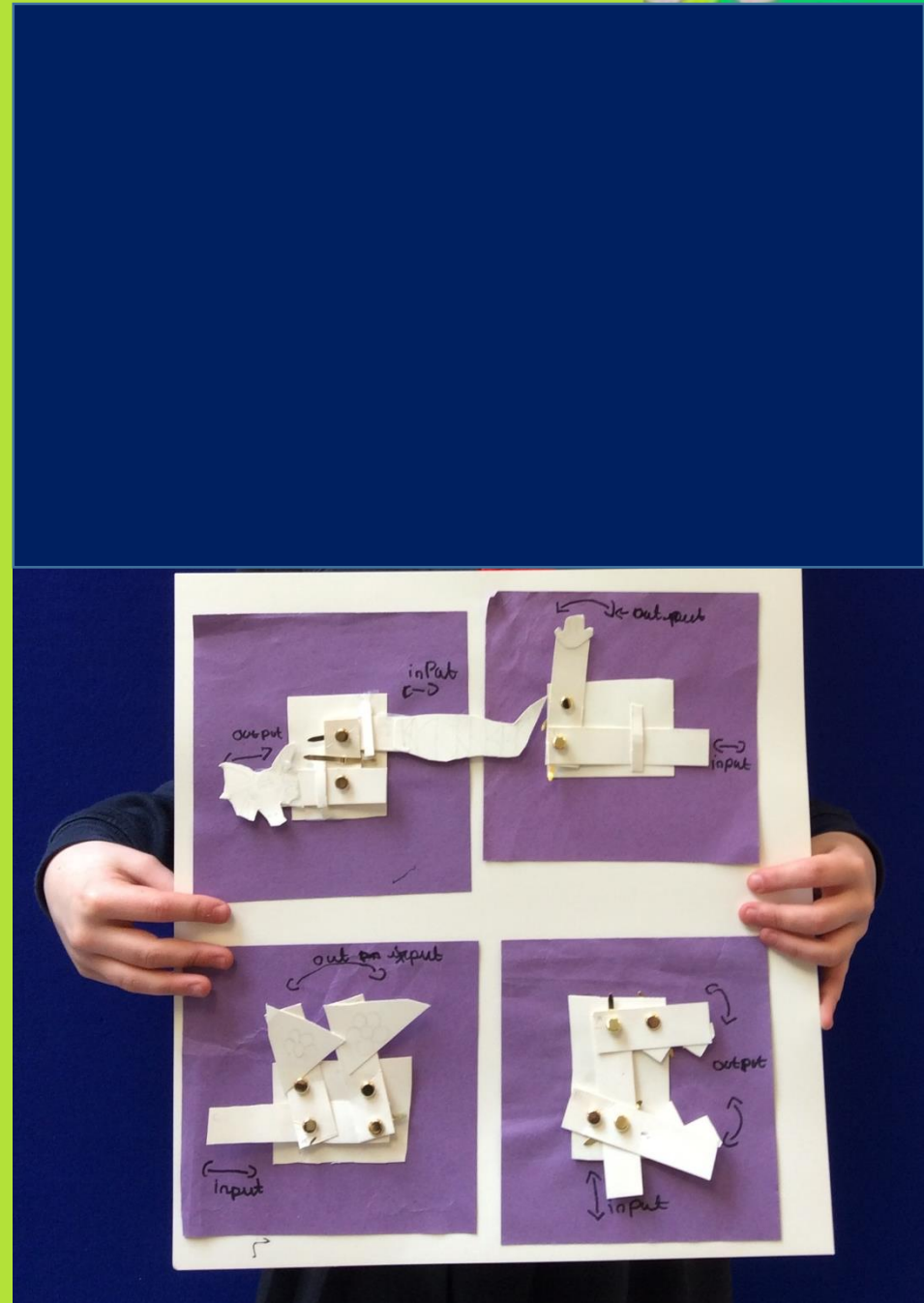
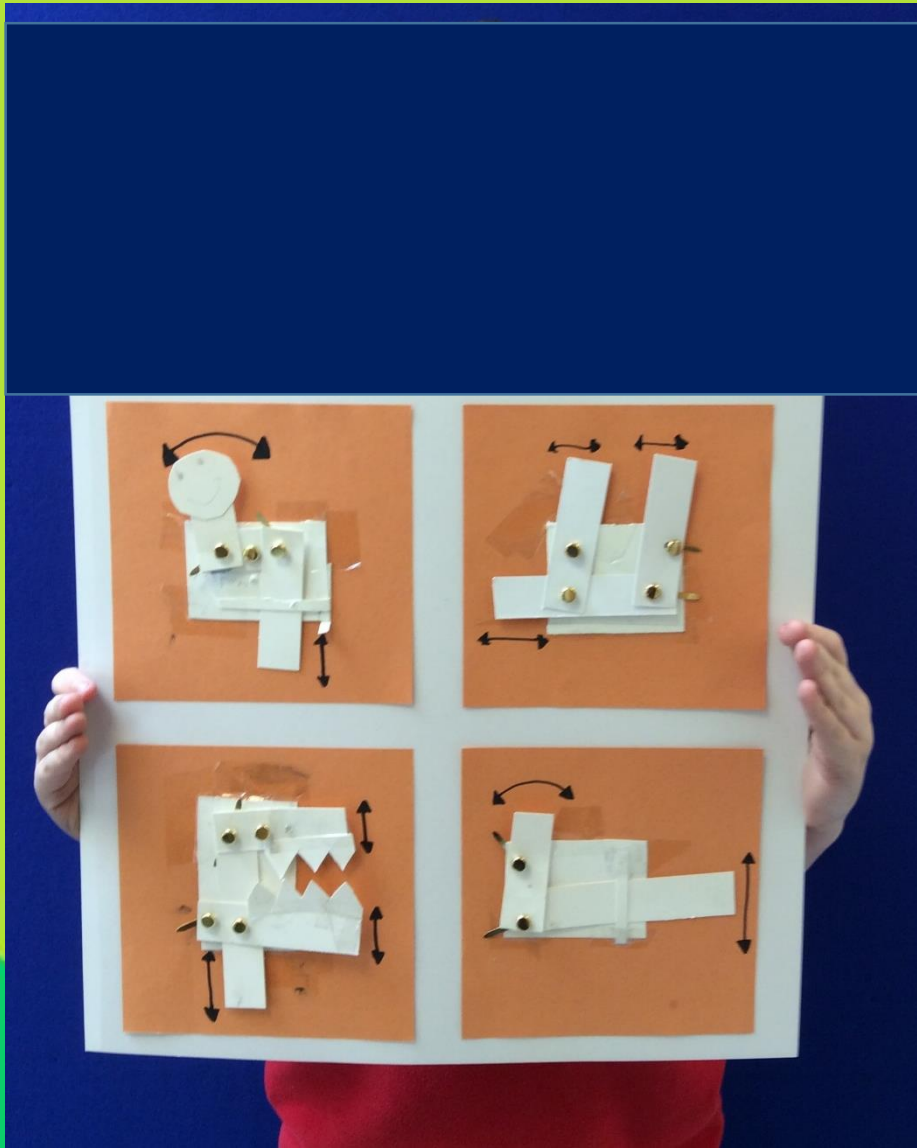
Split pin the strips to the rectangle in the position shown. Do not press the split pin tightly.



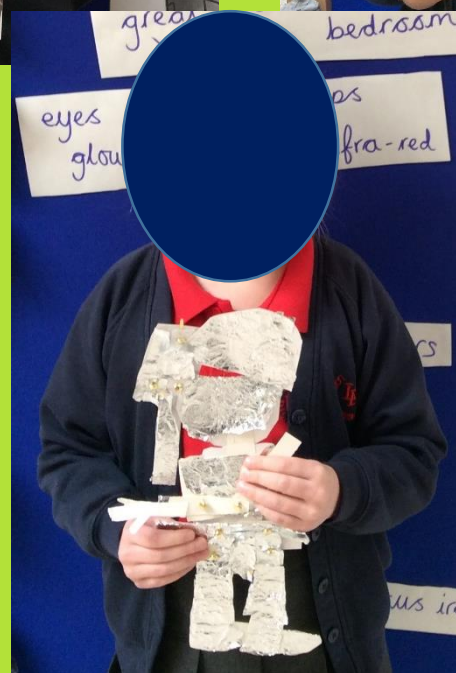
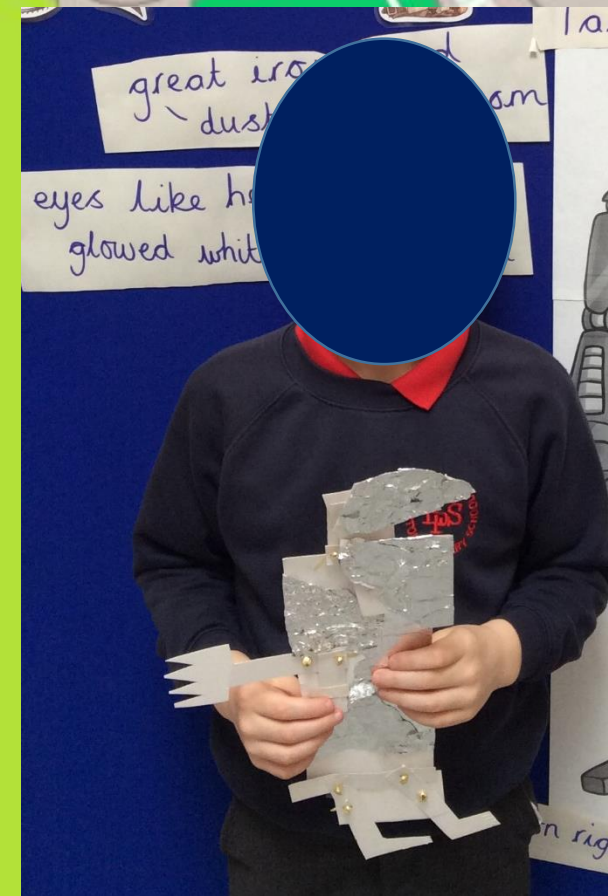
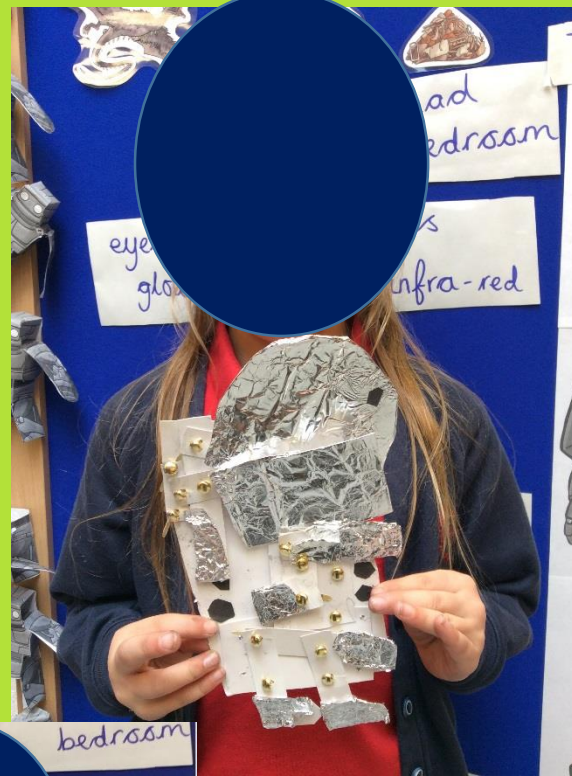
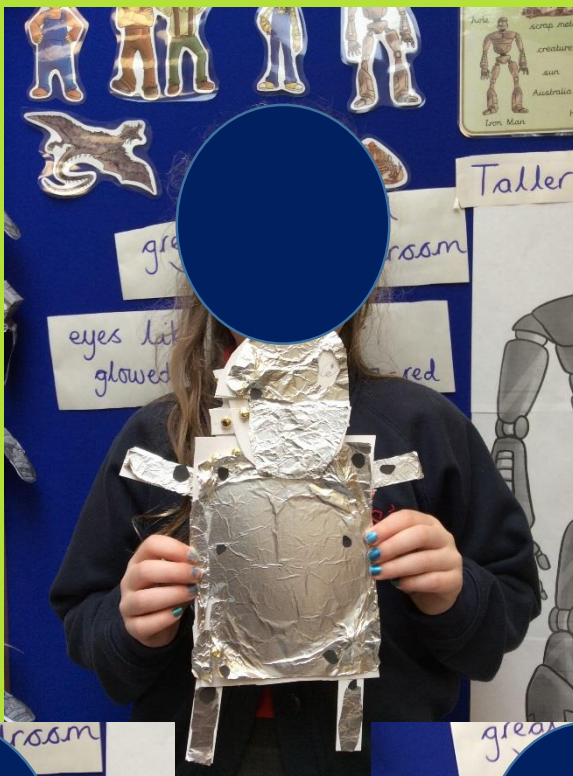
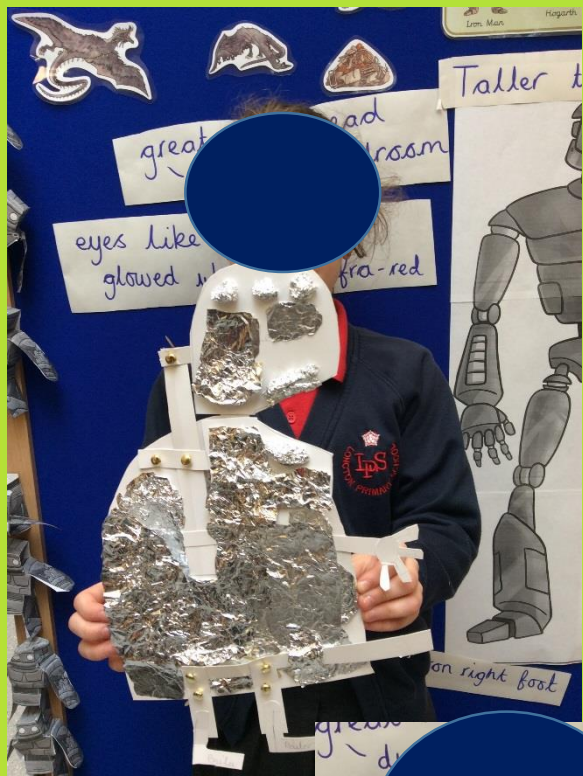
Step 7

Draw and cut out two sets of teeth and glue the teeth onto the strips. Push the slider up and down to operate the jaw.









What will your  
Iron Man  
look like?