

ACTIVITY 05 | PRIMARY



Investigating inventions

KS2

Art and Design, Design and Technology, History, Science

Second level

Expressive Arts, Maths, Sciences, Social Studies, Technologies



Investigating inventions

While Leonardo's drawings of machines look impressive, could they really work?


Three investigative teams will work concurrently on themes connected to Leonardo, flight and machines, then provide feedback to the class on their findings.

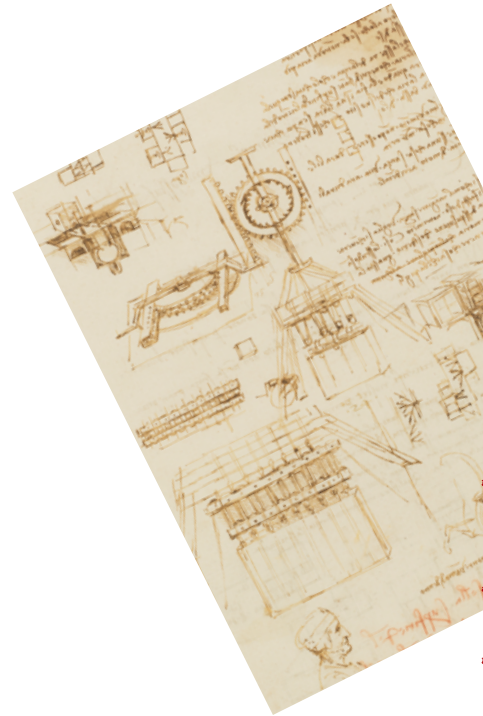
To hear from an expert talking about Leonardo's machine designs, watch our short interview with Martin Clayton, Head of Prints and Drawings at Royal Collection Trust: [There are many drawings of Leonardo's inventions. Did he make any of them?](#)

DON'T FORGET

Tell pupils that Leonardo was ahead of his time and designed the parachute, the helicopter and armoured vehicles.



Focus image: [Studies for casting apparatus, and miscellaneous notes, c.1492–3 \(RCIN 912349\)](#) 



IN THIS ACTIVITY PUPILS WILL:

PRACTISE close observation and sketching and know this leads to a better understanding of how simple machines work.

BE INSPIRED by Leonardo's drawings to explore and trial ideas.

PREDICT how small machines work and explain how they work through trialling.



WATCH A SHORT FILM

To find out more about Leonardo's machine designs, your class could watch: [Can we use Leonardo's drawings to make his inventions today?](#)

INVESTIGATION 01

Leonardo's dreams of flight

Pupils can see Leonardo's parachute drawing from another Leonardo notebook – *Codex Atlanticus* [here](#), together with *The bones and muscles of a bird's wing, c.1512–13* (*RCIN 912656*).

Can your pupils make a Leonardo parachute fly?

If so, would they trust it to carry an egg or their favourite toy or teddy bear? It would be ideal for pupils to play with the idea of flight if you could provide some pre-sourced parachute toys that work and adapt.

Why not try an [Egg drop activity](#) with Leonardo's parachute?

INVESTIGATION 02

Leonardo's flying machine

Look at the drawing *The bones and muscles of a bird's wing* for inspiration.

Use toys to experiment with flying, such as a glider or whistling rocket toy to identify what works.

Then compare different wing shapes for their flying machines and discuss what might be best for their designs.

Pupils can carry out some online research of flying machines for inspiration.

Being creative and basing ideas on their research, pupils will invent their own flying machine, sketching and annotating their ideas. For pupils who benefit from a starting point, why not base their ideas on a bird-wing drawing?

INVESTIGATION 03

Leonardo's mechanical machine

Provide the group with one tool to examine in detail and the 'Marvellous Machines' worksheet. Encourage pupils to draw a system, starting at one point and drawing each part and connection in order.

Leonardo liked to draw diagrams and write ideas to show how the machine works. Pupils can show how parts connect rather than making the drawing look like the small machine. **Remind pupils to annotate what is happening.**

For more advanced pupils, they can experiment with sketching enlarged views and cut-away views to show parts that are very small or hidden by other parts. Leonardo often left out the casing and structure surrounding machines in his illustrations, so that he could show the workings more clearly.

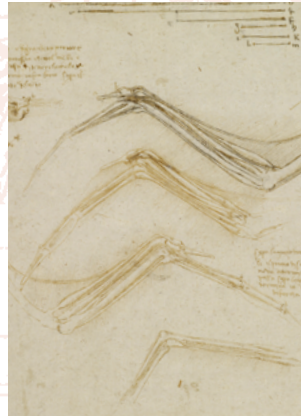
Resources



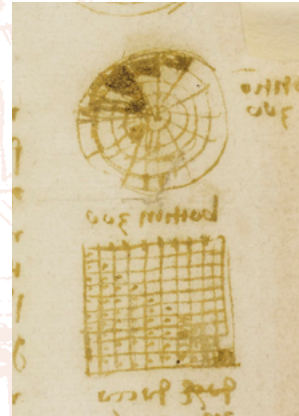
EQUIPMENT

- Leonardo's drawings
- The 'Marvellous Machines' Activity Sheet
- Everyday machines: such as bottle opener, toy car, adjustable spanner, hand drill.
- Toys
- Drawing equipment
- Martin Clayton's film, [*There are many drawings of Leonardo's inventions. Did he make any of them?*](#)

RESOURCE IMAGES



[*The bones and muscles of a bird's wing, c.1512-13 \(RCIN 912656\)*](#)



[*Designs for a water-clock, c.1508-10 \(RCIN 912688\)*](#)

FANTASTIC FINISH



At the end of the session, have pupils display and explain their diagrams to other groups so that they transfer their learning to others. Discuss forces and energy at play in the diagrams. Remind them that if they know the forces that are acting on the object, they can predict its motion. Students can try and identify these in Leonardo's drawings.

More activity ideas



Your pupils can also complete and improve Leonardo's sketches by finishing or refining his ideas. Let their ideas take flight!

For older children, consider what ideas Leonardo would have been interested in exploring if he was alive today.

If suggestions are needed for the current 'big' questions, ask them to give ideas for inventions for our environment, especially as Leonardo loved nature.

For example:

What inventions may be helpful to combat global warming and sustainable transport?

What of Leonardo's inventions could they develop, such as his helicopter?

Use their investigations above to help. For examples of other children's ideas for improving the world, please see this external [link](#).

Marvellous machines!

Examine a tool

Take a tool to examine in detail. Take it in turns to operate the tool and see how each part moves.

Discuss with the group

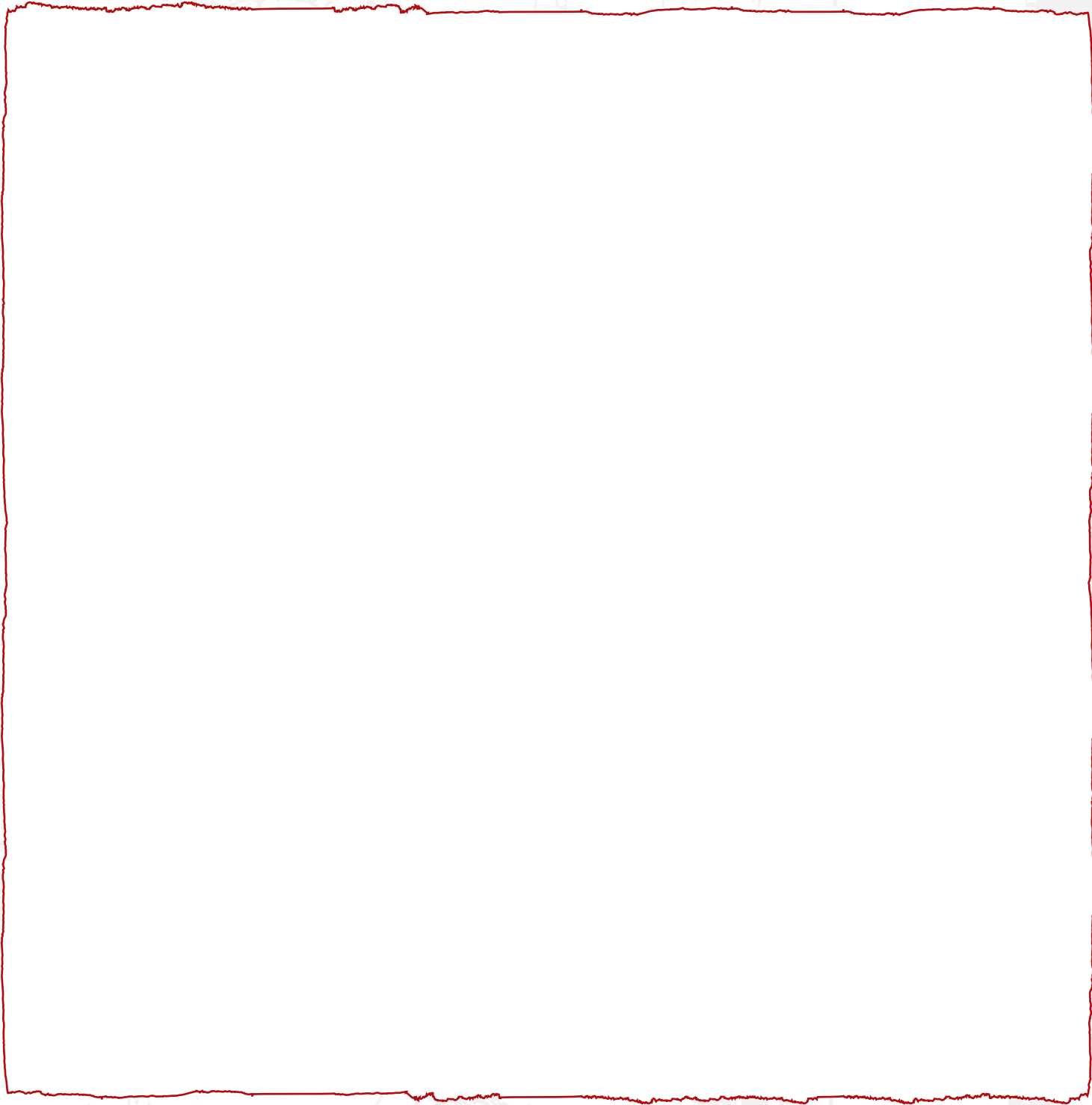
Discuss the tool with the group and create your own questions about it. What 'type' of machine is it – a screw or wheel and axle, or something else (lever, pulley, inclined plane, wedge)?

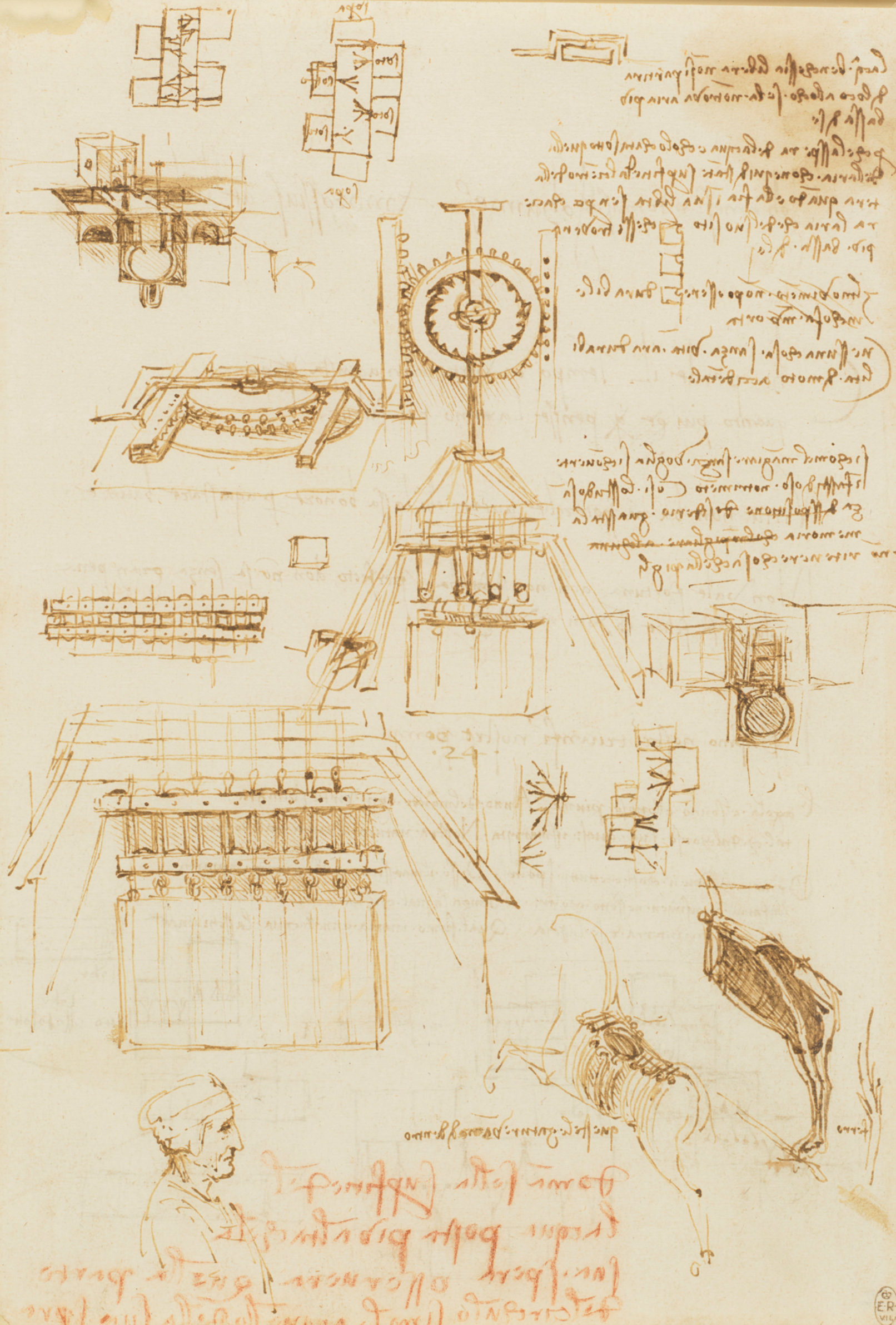
Get sketching

Sketch the tool from your own point of view first. Then, move places and draw it from different points of view to show all the working parts.

Annotate

Add arrows and annotations to show directions of motion for each part, label the simple machines involved and explain the connections. Can you label forces?





Studies for casting apparatus, and miscellaneous notes c.1492-3 (RCIN 912349)

