

ES	TECHNOLOGY TECHNOLOGY SCIENCE SCIENCE	Knowledge & understanding Skills in designing & making K & U - Energy and forces K & U - Earth & space	Needs Preparing Properties of energy Materials from Earth	Resources Carrying out Conversion of energy Changing materials	Processes Reviewing Forces <i>unbalanced, levers gravity, friction</i>
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Our Traction Trebuchet will throw projectiles, but we have very little control over either direction or range. What we need is a device which we can set to throw a given projectile a consistent distance, time and time again.

So... what is needed?

If the projectile is always the same, ie. same mass and same density, and it can be placed in the same position on the machine every time, and if the force applied is always the same, then the range (distance thrown) should be constant. It should be easy to control the characteristics of the projectile, so the problem lies in applying a constant force. That's the problem with our traction trebuchet. If we pull the string harder, the projectile will travel a greater distance.

How can we achieve a constant force?

What has been used in the past?

A falling weight?

A spring?

STAGE ONE

Investigate siege engines*. Here are a few unusual names that might help your search :

mangonel - ballista - onager.

Play with the traction trebuchet to see if it offers any clues.

Define the problem.

What are you going to use as a test projectile?

A 1cm wooden cube? A wooden or plastic bead? A ping-pong ball? An aero ball?

Approximately how far should it throw this object to be a successful design?

Does it matter? More than 1 metre? More than 2 metres?

What materials are available for constructing the machine?

STAGE TWO

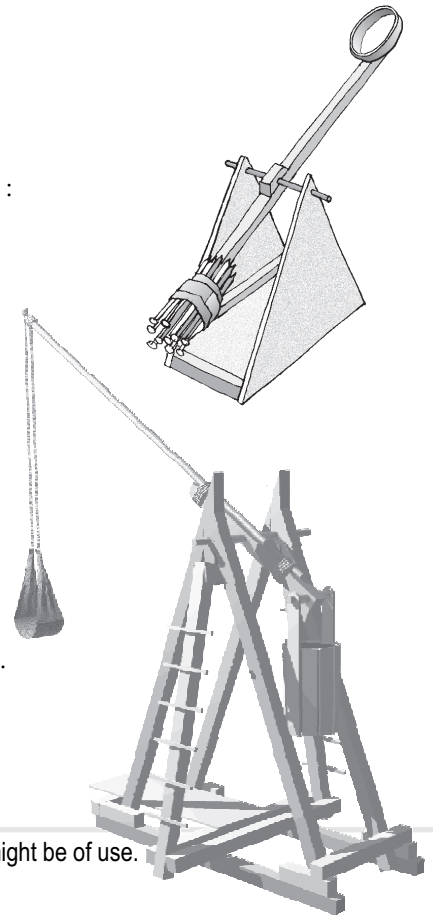
Build the prototype machine. Test and modify throughout the construction phase.

Is it possible to incorporate some method of adjustment?

STAGE THREE

Set up a test firing range. Work out a scheme that will test the machine's performance.

What percentage of shots hit the target? (An empty litter bin perhaps)



* Historic Scotland's Education Department produces a siege engine pack for schools which might be of use.

