

CATAPULT

This is a very popular activity with the children that links well into history topics on Romans, Ancient Greece or Medieval Britain. The design of catapult shown here is not historically accurate but uses the principles of the trebuchet, one of the simplest and most common medieval siege weapons. Ancient Roman and Greek catapults such as the ballista and onager worked on very different principles which are difficult to build safely in a school environment.

The ballista used the same power as a crossbow with a string between two large springs which was pulled back and a projectile placed in the middle of the string. When the string was released the projectile was thrown forward by the springs.

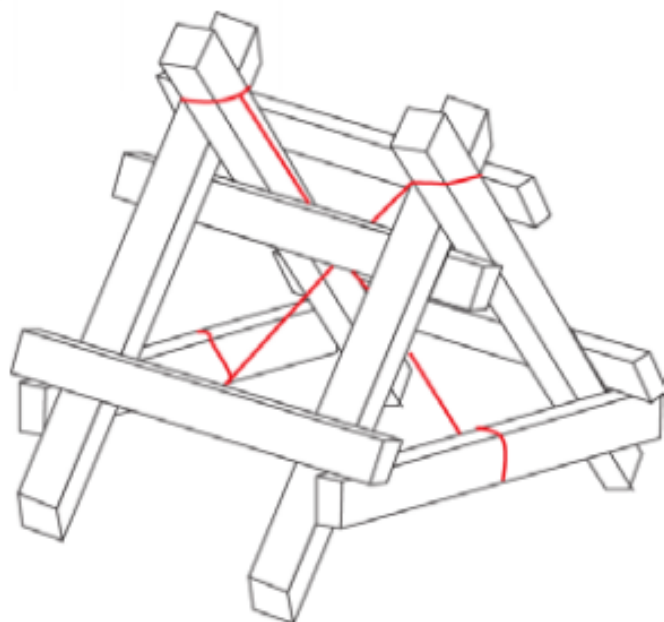
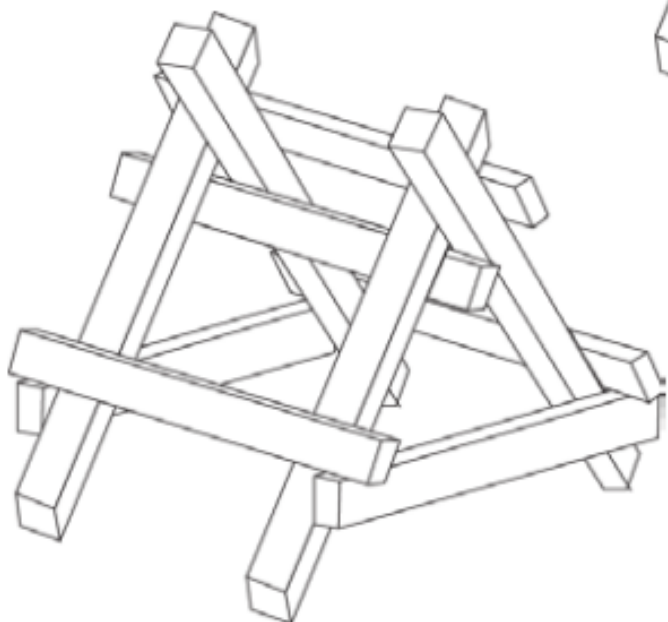
The onager looked very similar to the catapults we are building here but the principle is very different. The projectile was held on the end of a long arm, the other end of which was held in a bundle of ropes that was twisted to create torsion. The arm was pulled down against the torsion of the ropes, the projectile put into the end of the arm which was then released.

The trebuchet uses a heavy weight attached to one end of an arm and the projectile is placed in a sling on the other end. The arm is attached to a frame in the middle with an axle. When the arm is released the weight pulling down throws the other end of the arm upwards until it is stopped by the frame and the projectile is thrown out.

The trebuchet probably originated in China but the first use in European history was in the Byzantine Empire in the 5th century. They were commonly used across Europe throughout the medieval era. They were also used in World War 1 for throwing grenades across large distances and more recently in riots in Syria and Ukraine to throw projectiles.

The catapult built here is technically a traction trebuchet, powered by people pulling on ropes.

Build two simple A frames using square lashings to hold them together. These can be built using square sawn timber and nailed together to make the activity easier.

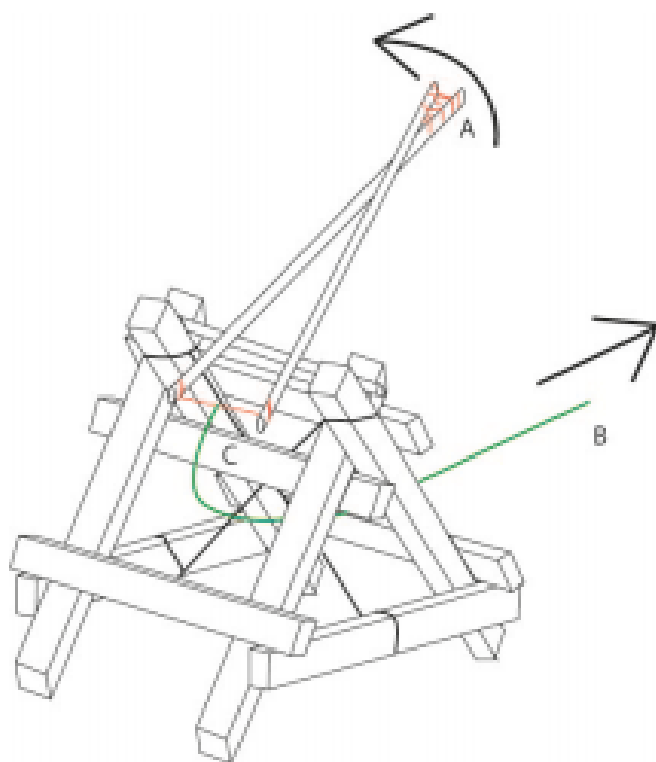
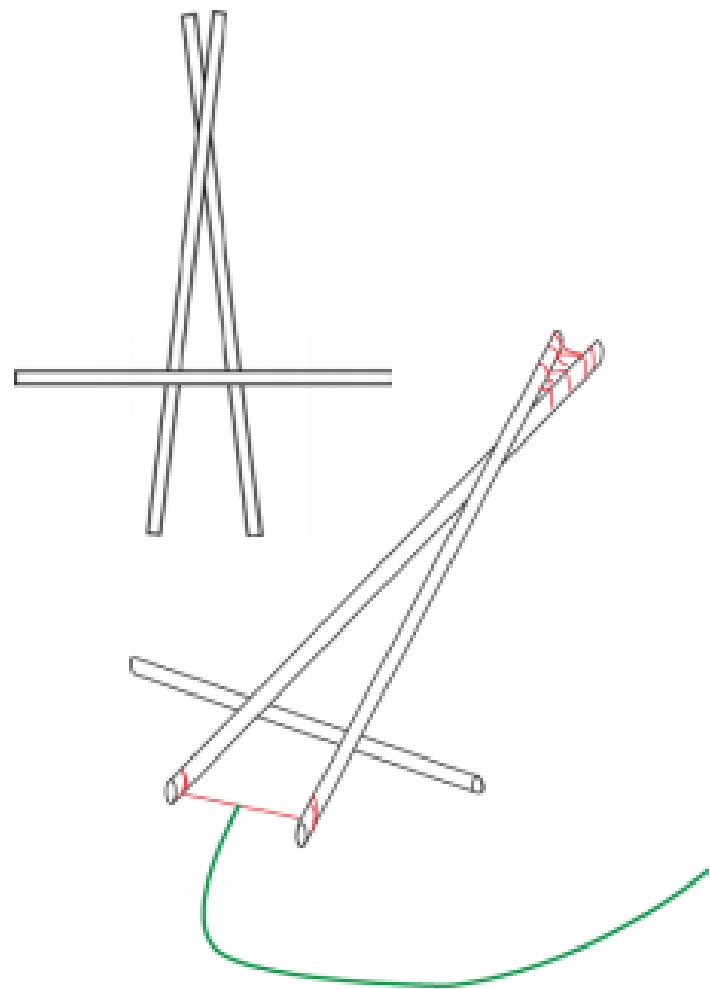


Connect the two A frames together with four poles or square section planks, two at the bottom on the outside, one at the top on the outside and one at the top on the inside. Tie these on using square lashings. The resulting structure will be decidedly wobbly.

Tie a length of rope from the top of each A frame to the middle of the bottom of the other A frame. These should be as tight as possible to add rigidity to the structure.

Construct another A frame, this time using round timber with the two diagonals longer than the horizontal and only narrowly spaced. Square lashings should again be used to make this the lashing holding the ends of the long poles will be difficult to tie as they are at a close angle. This will be the arm which holds the projectile. The area where the two long poles cross over at the end can be made into a simple basket by wrapping rope around both poles. A rope should be tied between the other two ends of the long poles to hold them together and a long rope tied in the middle of this one.

This assemblage is then placed with the shorter pole in the top of the two A frames on the main part of the catapult. It will then rotate using the short pole as an axle. A rope should be tied around the top of the two main A frames to prevent the arm from coming off when the catapult is fired. The long rope is taken through the middle of the catapult and out of the back. Pulling on this rope should cause the arm to swing upwards.



To fire the catapult place a soft projectile such as a soft toy or ball in the end of the arm A. Ensure that everyone is at least arms distance away from the catapult and that no one is standing in front of it. Pull rope B as hard as possible. Arm A will swing upwards until it is stopped by block C at which point the projectile will fly out.