



HANDS-ON EXPERIMENTS

VORTEX RINGS



We normally can't see how air twists and flows around us but when vapour or smoke is added we can suddenly see the fascinating patterns of air flow.

Vortex rings are studied by scientists and engineers and help us understand weather patterns, jet planes and even volcanoes! The picture (left) shows Mount Etna spitting out one of these giant vortex rings.

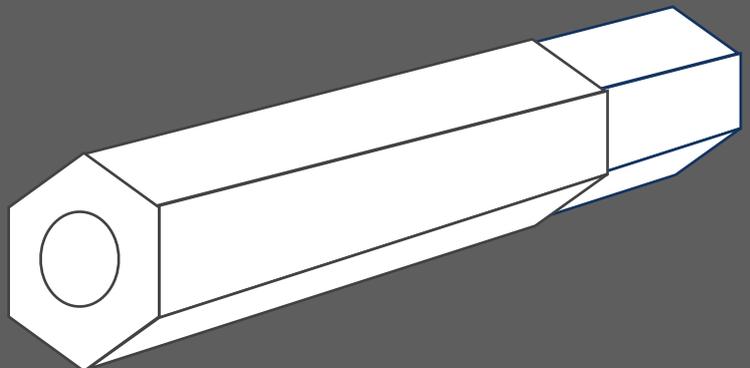
Procedure

What you'll need: The vortex cannon template, a candle, a smoke machine (optional), cardboard (optional).

- Cut out, fold and assemble the outer and inner tubes of the vortex cannon template. The tubes are hexagonal.
- Cut out the rear cap and stick it over one end of the inner tube. Cut out the front cap and stick it over one end of the outer tube. Make sure you cut the circle out of the front cap.
- Now fit the inner tube inside the outer tube so that pushing and pulling on the inner tube forces air out of the front cap.
- Set up a target, a candle or anything else that can be blown over and try firing a vortex ring from the cannon. Keep moving the target further back and see how far it away you can hit it from. If you push too hard, no vortex is produced, you'll need to give it a short, sharp tap.
- Extinguish the candle and then hold the vortex cannon over it so that you can collect the smoke inside the cannon. If you use the cannon now, you'll be able to see the vortex rings!

Investigation

- Experiment with the different front caps and with different shapes of opening (square, triangle etc). How does changing the aperture affect the vortex ring?
- What happens when two vortex rings interact? Try filming this process and watching it in slow motion.
- Try making a larger version of the vortex cannon using some cardboard. There's no limit to how big you can build one but you may need a smoke machine to see the vortex rings from a very big cannon.



Safety Considerations:

- Always be careful with open flames like the candle.

VIDEOS FOR THIS RESOURCE AT:

INTRODUCTION:



Clickable Link:

<https://youtu.be/TLFbmmDomp4>

CONCLUSION:



Clickable Link:

<https://youtu.be/cUaeF31BlAM>

