

Investigation 8: Motorless Motion

Teacher Notes

For engineers, one of the most exciting aspects of memory metal is that it is capable of providing motion without the use of a motor. Memory metal can easily be caused to contract by running an electric current through it. As the current passes through the wire, the wire heats up and moves from the martensite to austenite phases. When the current is removed, the metal cools and returns to its original phase. Use a current to heat the wire can provide a simple way to regulate the movement of the wire.

This investigation contains two plans. The first plan is for a simple paper airplane launcher. (It might also be used to launch many other projectiles.) It is relatively simple, requires few materials, and uses a small length of 250 μm of memory wire. The next project is an electronically activated catapult that is quite simple to make but is a little more expensive to make than the launcher (though it still costs less than \$2 per catapult).

Supplies

See the attached *Memory Metals Projects: Muscle Wire* section for supplies, building and operating instructions.