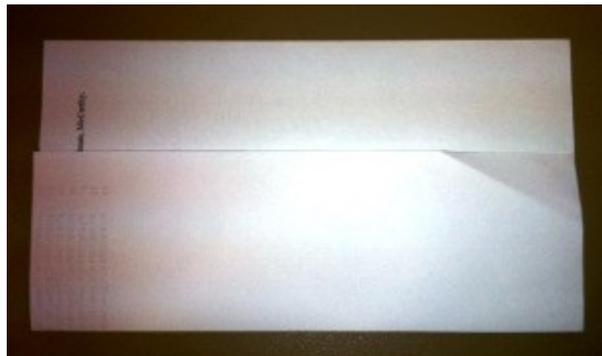


## The Physics of Firearms: Gyroscopic Inertia

During your visit to the Castle and Museum the pupils got to see and hold a Short Magazine Lee Enfield rifle from the First World War. This activity explores some of the science behind what makes rifles accurate.

### Activity Suggestion

1. Ask your pupils to recall what they learned about the rifle during their visit to the Museum.
2. Explain to the class that a rifle is called a rifle because it has *rifling* inside the barrel. This means that inside the barrel are spiral grooves which make the bullets spin as they are fired.
3. Spin is what makes the bullets really accurate. Spin makes things fly straighter and further. Can anyone in the class think of anything else that you would spin to make it go straighter and further? (Good examples are a rugby ball and a Frisbee). Spin gives objects a property called *gyroscopic inertia* – all it means is that they'll go further and straighter if they are spinning.
4. We can demonstrate this science with a spinning paper plane! Give everyone a piece of A4 paper and ask them to hold it landscape in front of them.
5. Fold the paper so that a couple inches are still visible at one end, not quite in half.



6. Fold the creased end up to the edge of the folded section. Repeat.



7. Run the creased edge of the paper along the table to help curve the edge.



8. Unfold the last crease you made. Curl the paper into a tube, tucking one end into the other.



9. Fold the creased end of the tube, along the line where you unfolded the paper in step 4, in towards the centre of the tube.



10. FINISHED! Now try throwing your paper tube without spinning it and then again spinning it. Does it fly better with some spin?



11. It can take a while to get the hang of throwing them and spinning them at the same time but keep practicing! It's a lot like throwing an American football; you want to hold it in your hand with the heavier, folded end facing forward and spin it off the ends of your fingers as you throw it.