

### ACTIVITY THREE: SEEING OVER THE TOP

#### Learning Objectives:

To be able to use mirrors to reflect light to see over the top of an object

**ALL:** Students to be able to use a periscope to see over the top of an object and explain how it works with a ray diagram.

**MOST:** Students to add a design to a periscope that will camouflage the object and not draw enemy fire.

**SOME:** Students can use a basic design of a periscope to design one that can be increased in length.

#### HSW:

- Identifying differences, similarities or changes related to simple scientific ideas and processes

#### Resources:

- 1cm square pieces of mirror:** can be bought in bulk and then cut up (use plastic coated for safety) 2 per group
- Periscope design printed on card:** To build the periscope
- Sticky tape:** to stick design together
- Paint or coloured pens:** To camouflage the periscope

#### STARTER:

##### Discuss the following questions:

Why was it important for the officers in WWI to be able to see over the top of the trench? Why was it too dangerous for them just to climb up and look?

#### INTRODUCTION:

##### Light travels in straight lines

We can reflect light with a shiny surface or mirror: Use a large piece of mirror and a torch to show this behaviour on top of a piece of white paper.

The angle it bounces back from the mirror is the same as the angle that it hits the mirror: demonstrate by changing the angle to make it smaller or larger.

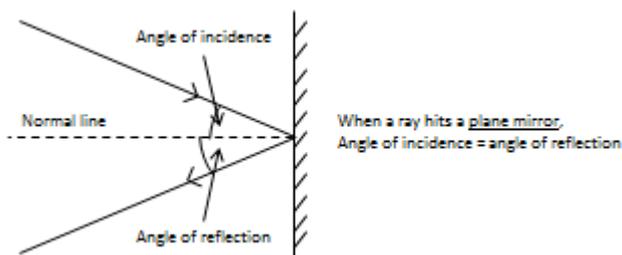
##### Introduce ray diagram rules:

Rays of light must be drawn with a ruler!

The light starts at the source, then travels into the mirror and reflects off in a straight line into the eye of the observer.

Arrows must be drawn onto the rays to show direction.

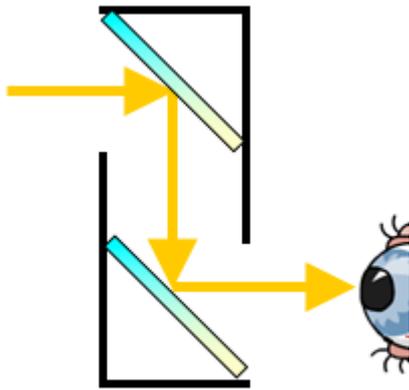
##### For example:



## MAIN TASKS

1. Students cut out periscope along full lines and bend on dotted lines.
2. Attach mirrors using sticky tape.
3. Fold together design so that students can see the outside of the periscope.
4. Discuss different types of camouflage – a white piece of card can be seen easily and will be a target for enemy fire – what colours were common in the trenches? Maybe link to some contemporaneous paintings.
5. Students complete a camouflage design on the outside of the periscope then stick together and use to observe objects over a wall/makeshift dugout.

**Extension:** Using the below ray diagram, students to try to work out how they could adapt the original design for a periscope in a lower dugout.



## REVIEW:

Discuss with students the need for knowledge of light to help observe 'no man's land' between the set of enemy trenches.