Science - Year 3

Light – Block 3L

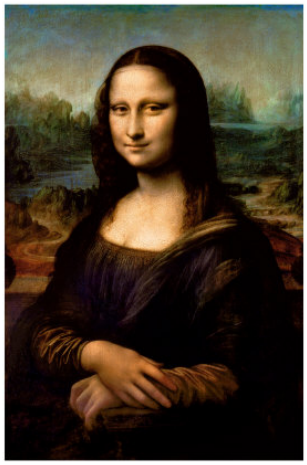
Light and Shadows

Session 3

Resource Pack

Task 1

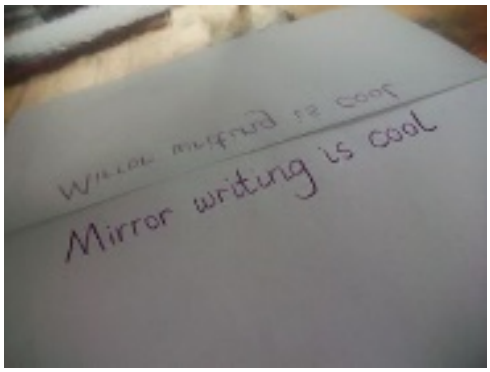
I can investigate reflections



Mirror Writing

Mirrors can help you write secret messages in code! The famous painter and inventor Leonard da Vinci wrote all his notes in a mirror code. Here is his most famous painting, the Mona Lisa.

1. Write a short message at the top of a small piece of paper. Try to keep it to 4 words or less!
2. Ask a friend to hold a mirror onto the paper just above it as shown
3. Look at the reflected message. It is almost impossible to read! Carefully, copy the reflected message onto another sheet of paper



4. Ask a different friend to read the mirror coded message you have written. If they can't, show them how to decode your reflected message by holding a mirror above it. It will be decoded like magic!

Emergency vehicles often use mirror writing so the driver in front can read it when they are looking in their mirror.

Write your observations and ideas about this task on your Reflections sheet.

Task 2

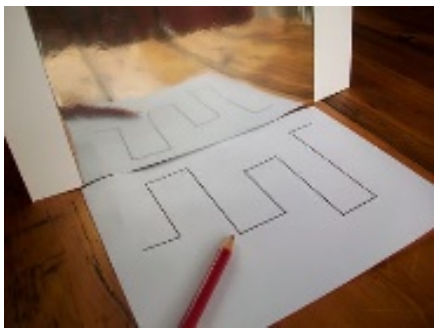
I can investigate reflections

Mirror Maze

A reflection in a mirror can be very confusing. This task will test your skill in the mixed up world of reflections. As you navigate the tricky mirror maze, try to work out why the task is so much more difficult than it first seems.

1. Sit at a table and place a copy of the maze in front of you.

2. Ask a friend to hold an upright mirror onto the table just beyond it so you can see the reflection of the maze.



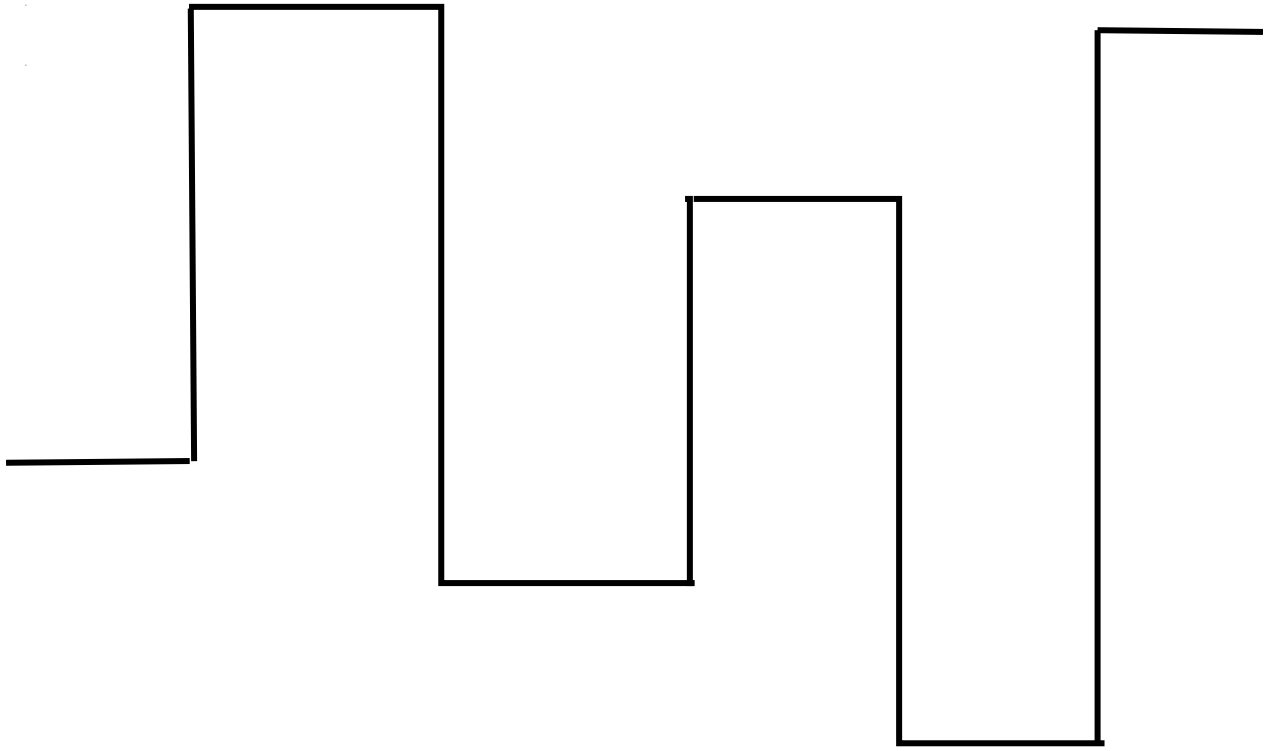
3. Ask another friend to hold up a large book or a sheet of thick card between you and the maze to act as a screen. You should be able to see the reflection of the maze, but not the maze itself!

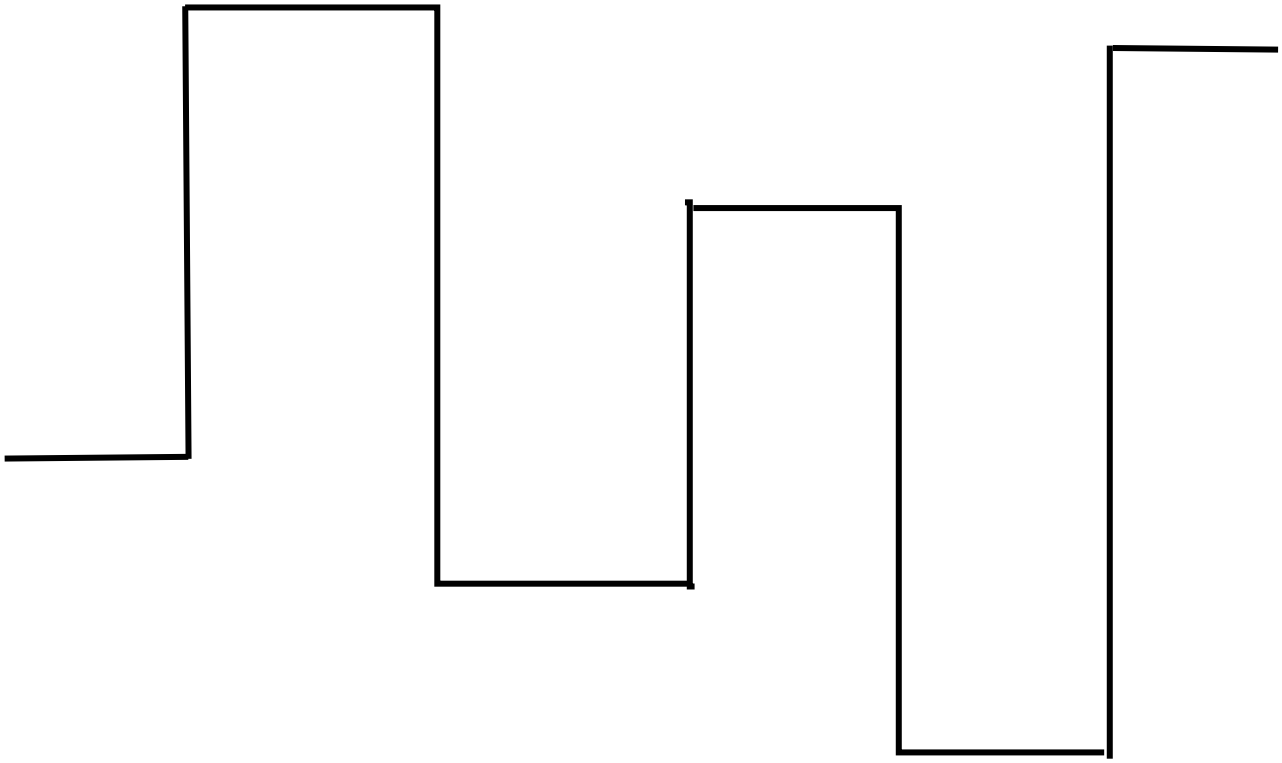
4. Using a coloured pen or crayon, trace over the maze from one side to the other. Remember, you should not be able to see your hand; you must navigate the maze using only the reflection! You may find it is harder than you think!

5. Now swap tasks so everyone in your group gets a chance to experience the strange world of mirror navigation!

6. Write your observations and ideas on your Reflections sheet.

Task 2 Mazes



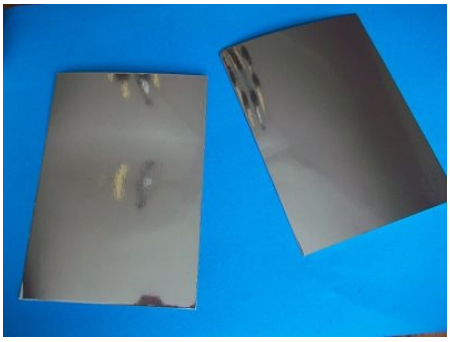


Task 3

I can investigate reflections

Mirror Multiplying

When you make a mirror hinge (a pair of mirrors that have been taped together so they open and close like the inside of a greeting card), something rather strange can happen to objects placed in front! It is another example of the mysterious world of mirrors!



1. You may have a mirror hinge ready to use. If not, take 2 mirrors and turn them face down. Then join them together with a piece of masking tape. Trim the extra tape from the top and bottom with scissors and your mirror hinge is ready to use.

2. Open your hinge and place an object in the middle. What do you notice? Try moving it closer to one mirror than the other. What happens now?

3. Try putting 2 objects inside the hinge, e.g. 2 different coloured pencils or crayons. What happens?

4. Can you predict what the reflection will look like if you add a third coloured crayon?

5. Try different objects including some that have interesting shapes like a flower or a hand.

6. Go back to one small object like a pencil. What happens if you begin to close the hinge? How many pencils can you make?

7. Think about what is happening in the mirror hinge. Test out your ideas. Write your observations and ideas on your reflections sheet.

Task 4

I can investigate reflections

Reflective Surfaces

When light hits an object it bounces off it again or in other words it is reflected. If the object is rough, the light will bounce off in all directions but if it is smooth and shiny, the light beams are reflected in the same direction, giving a clear reflected image.

Look at the two reflections here. Why are the flamingos clear and the moon blurry?

1. Look around your classroom. How many surfaces can you find that give a clear reflection? Make a list of these on your Reflections sheet. Do they have anything in common?

2. Can you find any surfaces that reflect something of an image but no detail e.g. you might be able to see a reflection of the windows. Make a list of these. Do they have anything in common?

3. Your teacher may have given you a collection of shiny objects to investigate. Look at the reflections you can see in curved surfaces. What do you notice? Why?

4. Compare surfaces that curve outwards, e.g. the outside of a saucepan with surfaces that curve inwards, e.g. the bowl of a spoon. Look at the reflections in each. What do you notice? Why do you think this is?

An inward curve is called a **concave** curve and you will find one inside the bowl of a spoon

An outward curve is called a **convex** curve. You will find one on the outside of a saucepan or mug

Name:

I can investigate reflective surfaces and reflections and observe the scientific processes involved

Reflections

Task 1 – Mirror Writing

Why do you think it is hard to read a message written in mirror code?	
Why do you think you can read it when you hold a mirror up to the coded message?	

Task 2 – Mirror Maze

What was difficult about tracing the maze by looking at a reflection of it?	
Why do you think this happened?	

Task 3 – Mirror Multiplying

Why do you think you see 3 of each object when you look into the mirror hinge?	
What happens to the reflection when you close the hinge? Why?	

Task 4 – Reflective Surfaces

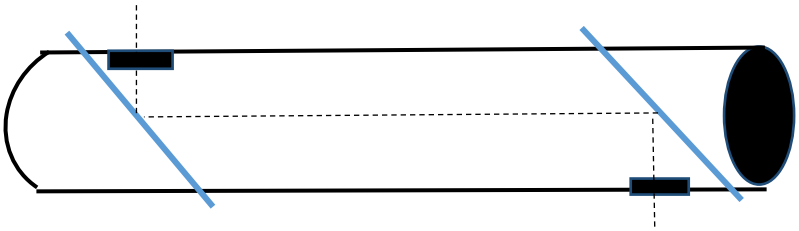
Which surfaces in the classroom give a clear reflection? Why?	
Which surfaces in the classroom give a hint of a reflection? Why?	
Which surfaces in the classroom give no reflection? Why?	
What did you notice about reflections in curved surfaces	

Teacher's Instructions on How to Make a Demonstration Periscope

You will need:

A poster tube, 2 fairly rigid safe mirrors, a craft knife, a long bladed knife, a set square (45º) and some masking tape

1. Use your set square to draw a line 45 degrees to the end of the tube at both ends. Use your craft knife to slit along each line.
2. Next use a sharp knife with a long straight blade. Insert it into the slit and score right through to the other side of the tube. Do this at both ends.



3. Use your craft knife to cut a corresponding slit on the other side of the tube at both ends using the score line as a guide.
4. Insert a mirror into the slit at each end so it goes right through and out of the other side. Make sure the reflective side is facing down the tube! Ideally the mirror should fill as much of the space as possible. If necessary secure the mirror on the outside with some masking tape to hold it in place.
5. Cut a small rectangular viewing hole in the tube at each end over the centre of the mirror
6. Your periscope is finished! Look through one viewing hole and see out of the other! You can even see round corners!