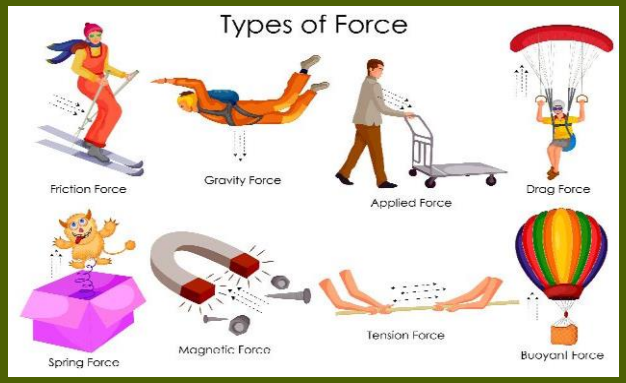
PLAN
Planning for assessment



Examples of Work

Max

Forces and magnets - Year 3

Primary Science
Education Consultancy

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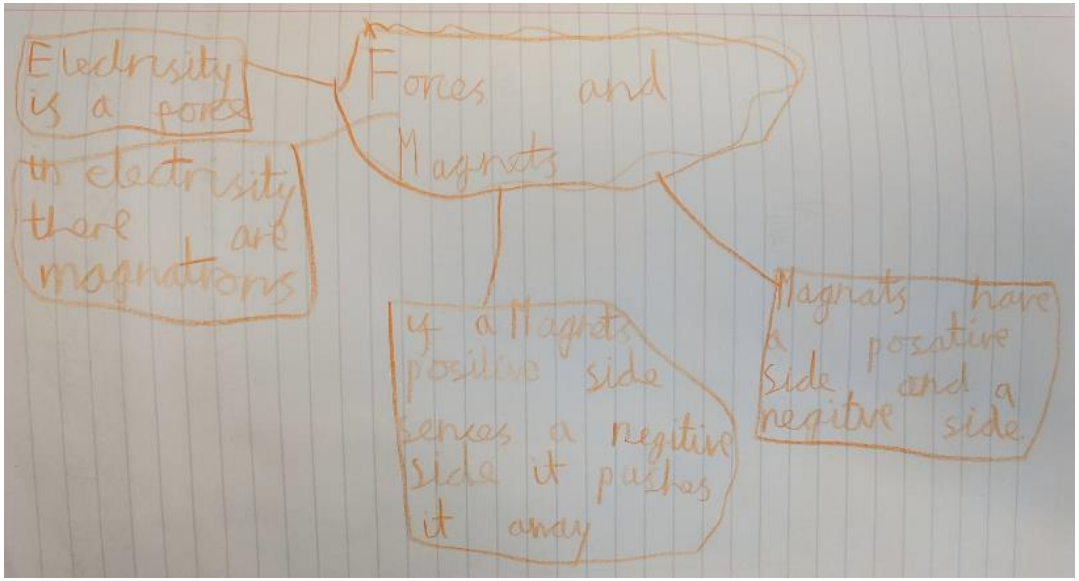
Year	3	Topic	Forces and magnets

Focus of assessment (National Curriculum statements)

- Observe how magnets attract or repel each other and attract some materials and not others.

Description of activity

The pupils were asked to complete a mind map of what they knew about forces and magnets.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Max shows an understanding of how magnets respond when brought near to each other. He knows that the two ends of a magnet are different, but he does not refer to these as poles and also does not use the vocabulary of 'attraction' and 'repulsion'.
Teacher observations		Working scientifically

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Year	3	Topic	Forces and magnets

Focus of assessment (National Curriculum statements)

- Notice that some forces need contact between two objects, but magnetic forces can act at a distance.

Description of activity

The pupils were shown the image below and asked to discuss it, considering the following three questions: What is moving? Why is it moving? What is in contact to create movement?

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher: "What is moving in this picture?" Max: "The dog is moving his legs to make it go. The woman is gripping the lead attached to the dog and sometimes there are bumps on the path that are making it slow down a little bit. The dog is making a pulling force." Teacher: "Why is it moving?" Max: "The lead, the dog's legs and the skateboard are moving. The wheels are moving." Teacher: "Is the lead moving?" Max: "No, but if it wasn't there, nothing would move. [Pause] The wind might be helping."		Max is familiar with the word 'force' and uses it appropriately. He recognises that the movement of one object can create a force that may move another object in contact with it. He also identifies that bumps in the path may slow the skateboarder down.
Teacher observations		Working scientifically

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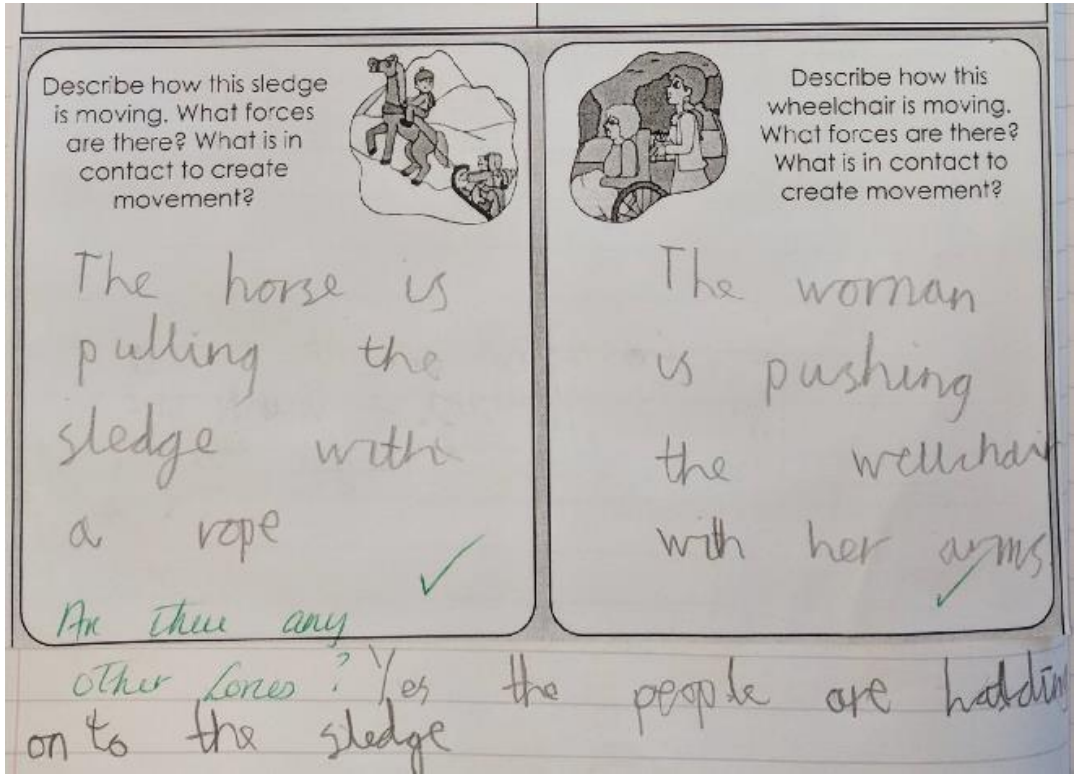
Year	3	Topic	Forces and magnets

Focus of assessment (National Curriculum statements)

- Notice that some forces need contact between two objects, but magnetic forces can act at a distance.

Description of activity

The pupils were then given two further pictures to write about.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Max appropriately uses the terms 'push' and 'pull' and can identify the points of contact. This time he does not talk about the surface slowing the objects down.
Teacher observations		Working scientifically

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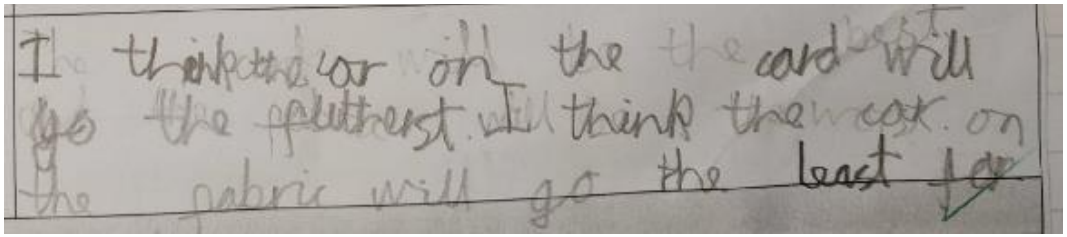
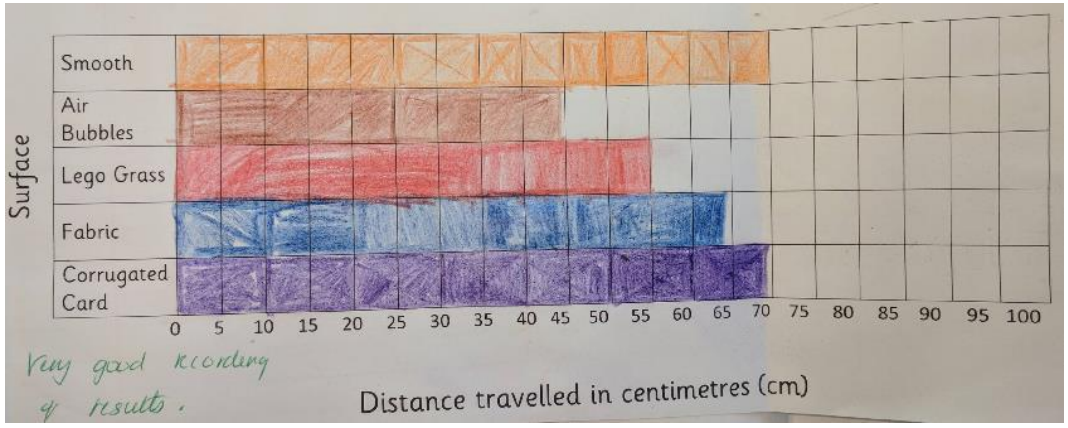
Year	3	Topic	Forces and magnets

Focus of assessment (National Curriculum statements)

- Compare how things move on different surfaces.

Description of activity

The pupils were given five different materials to cover the ramp and asked to rank them in order according to how far a toy car would travel when released from the ramp.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		
Teacher observations		Working scientifically
		Max takes precise measurements and records these on a prepared bar chart.

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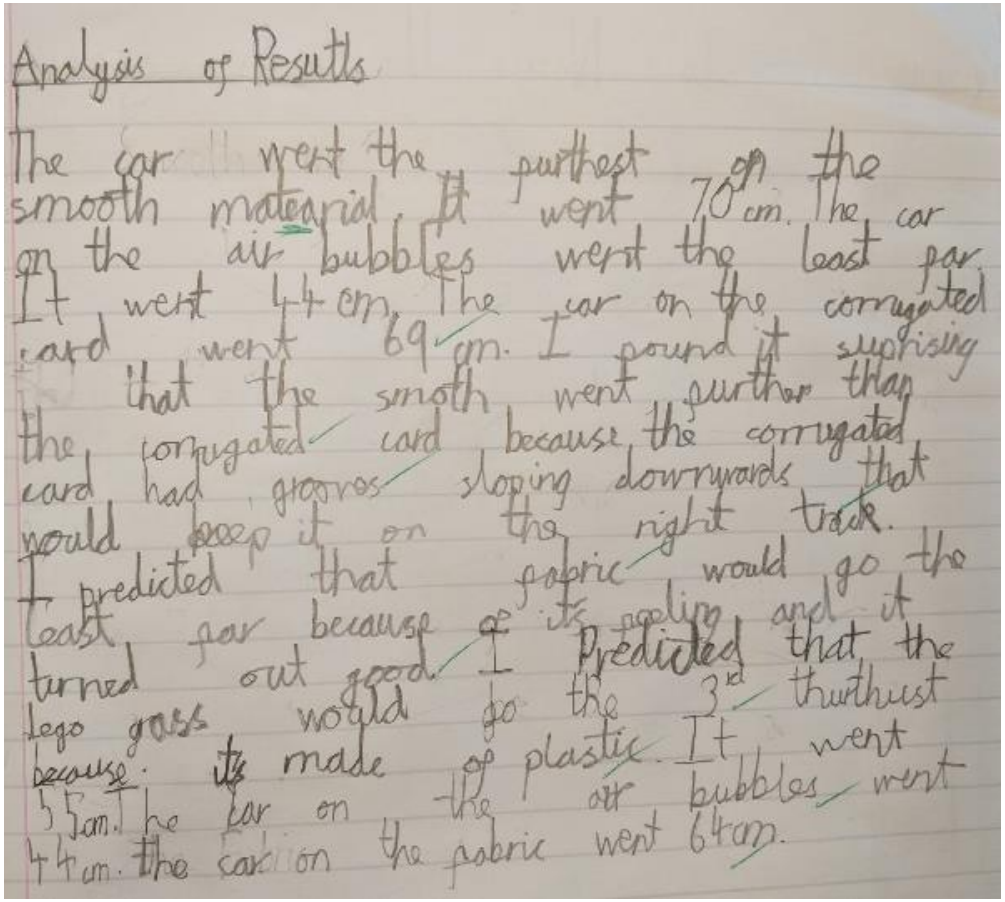
Year	3	Topic	Forces and magnets

Focus of assessment (National Curriculum statements)

- Compare how things move on different surfaces.

Description of activity

The pupils were asked to analyse their results.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Max recognises that things move differently on different surfaces, but is unclear as to why this is.
Teacher observations		Working scientifically
		Max analyses the results thoroughly, discussing each material and commenting on how the results differed from his prediction.

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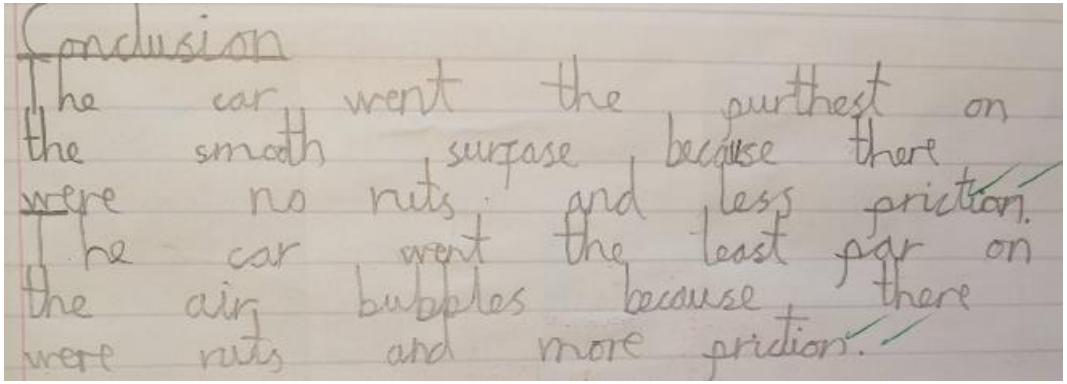
Year	3	Topic	Forces and magnets

Focus of assessment (National Curriculum statements)

- Compare how things move on different surfaces.

Description of activity

The pupils were asked to feel and describe each material. The teacher then highlighted that it is the texture of the surface that influences how the car moves and introduced the term 'friction'. The pupils were then asked to write a conclusion. After completing the test, the teacher then gave them some felt to feel and to predict how far their car would travel on it.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
"The card has grooves in it. The bubble wrap is bobbly. The grass is quite prickly." "I think it will go about 60cm, as it is rougher than the fabric but not as bumpy as the grass."		Max's conclusion shows a good understanding that things moved differently on different surfaces depending on their texture.
Teacher observations		Working scientifically
		Max uses his data to predict further results.

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	Year	3	Topic	Forces and magnets
	Focus of assessment (National Curriculum statements)			
	• Compare how things move on different surfaces.			
	The pupils explored rolling a ball down a ramp to knock skittles (bottles) over. They then covered the ramp in different types of fabric to see the effect of changing the ramp surface.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Max: "I don't think it will go very far because it's not very steep." Teacher: "Do you think your skittles are in the right place? Max: "They should be quite close but not too close. I predict probably most of them will fall over. We'll stick to this ball. Almost all of them went down. "Shall we try a different height? I think this time they'll probably all go down because it's steeper. But the top one will go further. "Oh. Only knocked two down. It was too fast. [Repeats with the same surface after some discussion about where to place the ball on the ramp.] Now I think more will fall down. Same as the first."		
Teacher observations		Working scientifically
		Max and his partner carry out some preliminary exploration to establish a suitable ramp height and ball position.

Year	3	Topic	Forces and magnets
Focus of assessment (National Curriculum statements)			
• Compare how things move on different surfaces.			
The pupils then used the ramps made of different materials.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Carpet "It won't go as well as on the plain ramp because it's quite rough and it's got friction." **Fabric** "It won't go as well as carpet because normally I find fabric isn't that good." **Bubble wrap** "Pretty bad. It's got a lot of friction because of all the bubbles and ruts."		Max talks confidently about how the surface affects how the ball moves and links this to the rougher surfaces causing more friction.
Teacher observations		Working scientifically
		Max makes predictions about how well the ball will knock the bottles over based on his data gathered during the car investigation.

Year	3	Topic	Forces and magnets

Focus of assessment (National Curriculum statements)

- Describe magnets as having two poles.

Description of activity

The teacher gave the pupils a compass and asked them to talk about its function. They discussed how the needle points to the north pole in the world and located this on a globe. The pupils were given instructions of how to make a magnet sling. They then compared what happened when they each held their slings up.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
"They all point the same way when they stop moving. You can use a magnet to show you where the north pole and south pole are in the world. A compass has a little magnet in it."		
Teacher observations		Working scientifically
The teacher then explained that the ends of the magnet are called poles and that the N is for the north pole and the S is for south pole.		

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Year	3	Topic	Forces and magnets

Focus of assessment (National Curriculum statements)

- Observe how magnets attract or repel each other and attract some materials and not others.
- Describe magnets as having two poles.
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

The pupils were then given two bar magnets so that they could explore what happened when the two ends are brought together.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
"When I'm pushing together the north and north poles and I'm letting go of one of the magnets, it squiggles around and the south pole sticks to the north pole. South and north poles stick together. Also, the same poles want to swivel round."		Max now confidently talks about the north and south pole of the magnets.
Teacher observations		Working scientifically
The teacher then introduced the terms 'attract' and 'repel'.		Max systematically tests the different ends of the magnets to see the effect.

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Year	3	Topic	Forces and magnets

Focus of assessment (National Curriculum statements)

- Observe how magnets attract or repel each other and attract some materials and not others.
- Describe magnets as having two poles.
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Description of activity

The pupils were then asked to consolidate their knowledge by completing the worksheet.

EVIDENCE OF LEARNING

Oral evidence

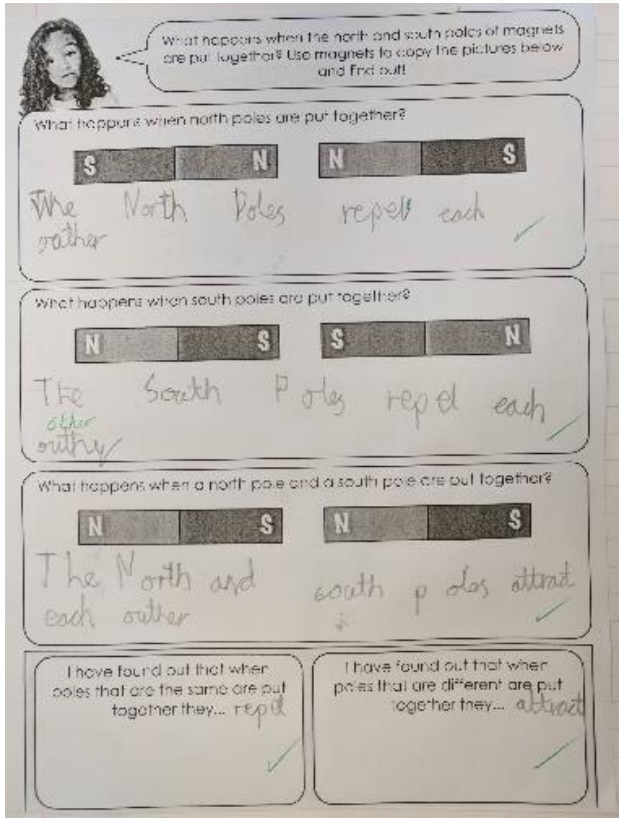
"If the poles are the same, they repel. If they are different, they attract."

Teacher observations

Max was given a doughnut magnet and asked to find the north and south pole.

"The north pole is on the top and the south pole is on the bottom. Look." (He shows how he used the bar magnet to find this out.)

Examples of work



ASSESSMENT

Knowledge

Max confidently talks about attraction and repulsion between the poles of magnets.

Working scientifically

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	Year	3	Topic	Forces and magnets
	Focus of assessment (National Curriculum statements)			
	• Notice that some forces need contact between two objects, but magnetic forces can act at a distance.			
	Description of activity			
	The pupils were given three magnets to look at and to consider which they felt was the odd one out.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Max: "This one, [Max picks up the round magnet] because it hasn't got a north and south pole. [He starts to play with the magnet.] Actually, I'm not sure. I'll try a different round one. It does have a north pole. I got that totally wrong! [Then Max picks up the horseshoe magnet.] You can't see it but if you bend this one it looks like a horseshoe. I really can't tell." Teacher: "What puzzles you?" Max: "They all seem the same. Well initially I was focusing on the north and south but that didn't work because they all seem to have a north and south pole. Maybe I can sort by colour. That one because it is all red. [Points to the round magnet.] That's got grey and red. [Picks up the horseshoe magnet.] That's got blue and red. [Points to the bar magnet. Max then plays with the round magnet again.] That's a south pole and that's a north pole." Teacher: "How do you know?" Max: "Well, that one is being repelled and now when I turn it round, they are attracted."		Max is now confidently using the terms attract and repel.
Teacher observations		Working scientifically

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	Year	3	Topic	Forces and magnets
	Focus of assessment (National Curriculum statements)			
	• Notice that some forces need contact between two objects, but magnetic forces can act at a distance.			
	The pupils were given a paperclip and asked to think about how they can make it move without touching it.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Max: "Well that's impossible. [Pauses] Maybe you could blow it. [Teacher gave Max a magnet.] I could hold a magnet above it and oh it jumps up. [Max did this several times.] Teacher: Can you make the paperclip move but not let it touch the magnet? Max: [Max started to try different magnets from the tray on the table and talks to himself as he experiments.] "Do any of these magnets repel it? No, they keep attracting it and then it sticks. What about if I use two magnets? How about if I use north and north around it? [Max continues to try various combinations of magnets and again says.] This is impossible. It keeps sticking. Hold on, I know a trick. Max puts the magnet under the table. Oh yeah, I've done it. I can move it without touching it."		
Teacher observations		Working scientifically
Max showed and explained to the class how he made the paperclip move without touching it.		Max reports orally on how he solved the problem.

Year	3	Topic	Forces and magnets

Focus of assessment (National Curriculum statements)

- Observe how magnets attract or repel each other and attract some materials and not others.
- Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet and identify some magnetic materials.

The pupils were given a group of objects all made of one material and asked to sort them in a number of ways. They were then given a magnet to test if the objects were attracted or repelled by the magnet.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
"We sorted the materials by what they were made of – metal, plastic, wood, paper. We sorted by flexible and rigid as well. Some objects were attracted. Nothing was repelled. Some did nothing – not attracted or repelled.		Max continues to use the words 'attract' and 'repel'.
Teacher observations		Working scientifically
		Max classifies the materials according to how they respond to the magnet.

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Year	3	Topic	Forces and magnets

Focus of assessment (National Curriculum statements)

- Observe how magnets attract or repel each other and attract some materials and not others.
- Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet and identify some magnetic materials.

The pupils were asked to find their own objects from around the classroom and, based on their learning from the previous activity, to predict whether they would be magnetic or not.

EVIDENCE OF LEARNING

Oral evidence

Teacher: "Why do you think the 2p coin is not magnetic but the 10p coin is?"

Max: "Because they are made of different materials like steel and copper."

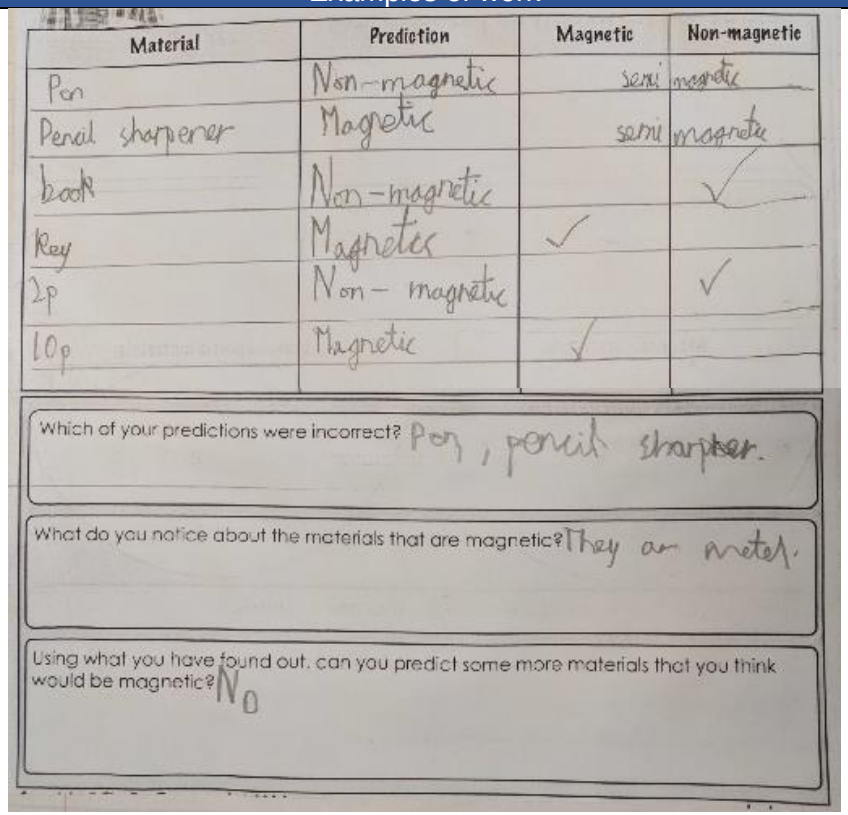
Teacher: "Can you predict whether something is magnetic?"

Max: "Only if you know what material it is made from. Some metals are magnetic, like the key and some money, but not all, like the 2p."

Teacher observations

Max records the first two objects as semi-magnetic as they are made of two materials – one magnetic and one not magnetic.

Examples of work



Material	Prediction	Magnetic	Non-magnetic
Pen	Non-magnetic	semi	magnetic
Pencil sharpener	Magnetic	semi	magnetic
book	Non-magnetic		✓
Key	Magnetic	✓	
2p	Non-magnetic		✓
10p	Magnetic	✓	

Which of your predictions were incorrect? Pen, pencil sharpener.

What do you notice about the materials that are magnetic? They are metal.

Using what you have found out, can you predict some more materials that you think would be magnetic? No

ASSESSMENT

Knowledge

Max identifies magnetic and non-magnetic materials. He knows that not all metals are magnetic.

Working scientifically

Max uses his learning from the previous activities to make predictions.

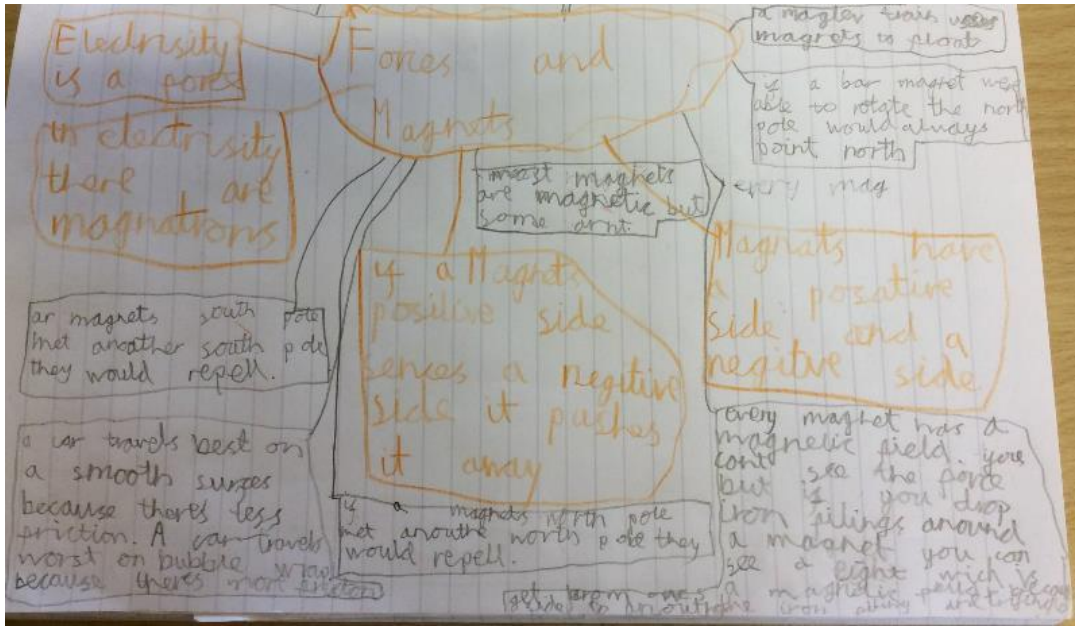
Year	3	Topic	Forces and magnets

Focus of assessment (National Curriculum statements)

- Compare how things move on different surfaces.
- Describe magnets as having two poles.
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Description of activity

The pupils went back to their mind map from the start of the topic and added in what they had learnt about forces and magnets.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Max recalls how objects move differently on different surfaces and discusses how the poles of two magnets respond to each other.
Teacher observations		Working scientifically

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	Overall summary
	Secure

Max has explored how objects move on different surfaces using balls and cars. He can make predictions about how well an object will move based on the texture of the surface. He has explored making objects move using contact forces and those that act at a distance (magnetic forces). He can talk about the poles of magnets and how these can attract or repel according to their orientation. He knows that some materials are magnetic and that others are not. He knows that some but not all metals are magnetic.

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