ISEB Assessments
Year 3 and 4 Science Test 9
Forces and Motion

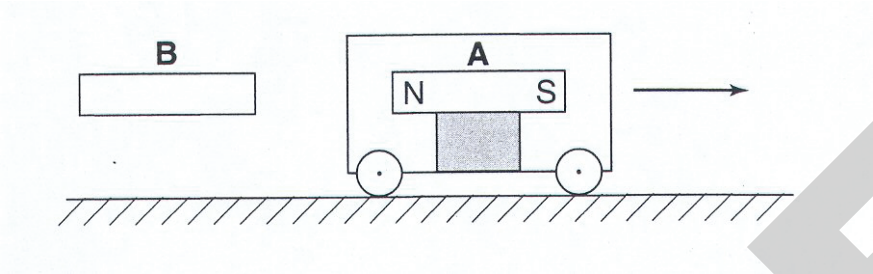
Author: ISEB

This test contains a selected set of 4 questions in a particular topic order.

- 40 marks are available in total.
- You should take no more than 30 minutes to complete the test.
- Write your answers in the spaces provided.
- Always write down your working, except when you are told not to.
- Calculators are allowed.

1. Ann wrote the following in her Science notebook:

'We made a toy car out of a matchbox and attached some wheels. Inside the matchbox we put magnet A. We then carried out an experiment with another magnet, B.'



(a) (i) Which pole of magnet **B** must you bring up close to the matchbox to move the car in the direction shown by the arrow?

Answer: …….. (1)

(ii) How could you make the toy car move in the opposite direction?

Answer: ……..

…….. (2)

(b) Which of the following objects could you pick up with magnet **B**? Write a tick (✓) if the magnet could pick the object up, and a cross (×) if it could not. (4)

object	will it be picked up by the magnet? (✓ or ×)
aluminium can	
pencil	
copper bracelet	
gold ring	
iron nail	
plastic ruler	
a rubber	
steel paper-clip	

(c) Give **two** other ways a magnet can be used at home or in school.

1: …….. (1)

2: …….. (1)

2. (a) In which of the following diagrams, **A** or **B**, would you expect there to be the greater amount of air resistance?

Answer: ..... (1)

A

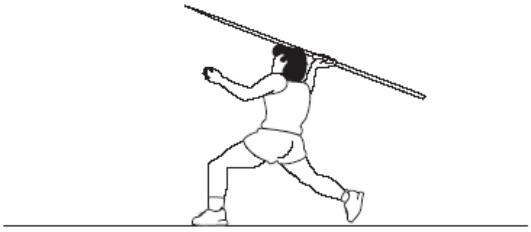
B

Explain your idea.

Answer: .....

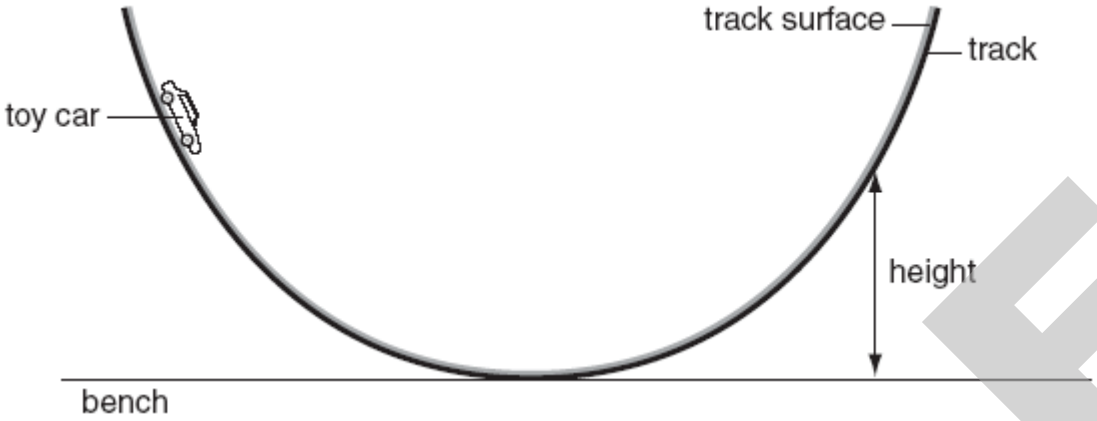
……..... (1)

(b) This athlete is throwing a javelin. Mark **two** places on the diagram where a large amount of friction is required. (2)



(c) Use labelled arrows to show the gravitational force and the frictional force (air resistance) acting on the skydiver. (2)

(d) Ben and Ann made a curved track and used it to test three different surfaces.



They used the same toy car and released it from the same place. Ann marked the position the car reached each time and then measured the height it reached from the bench. Here are their results.

track surface	height in cm			mean height in cm
wallpaper	30	32	34	
sandpaper	25	27	26	26
carpet	14	15	13	14

(i) Complete the table. (1)

(ii) Which surface provided the most friction?

Answer: ..... (2)

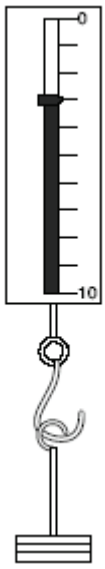
(iii) Why was it important that they repeated their measurements?

Answer: ..... (1)

(iv) Give one thing they did to try to make sure that this was a fair test.

Answer: ..... (1)

3. The diagram shows a force meter.



(a) Complete these sentences

(i) Forces are measured in: ..... (1)

(ii) What is the reading shown on the force meter above?

Answer: ..... (2)

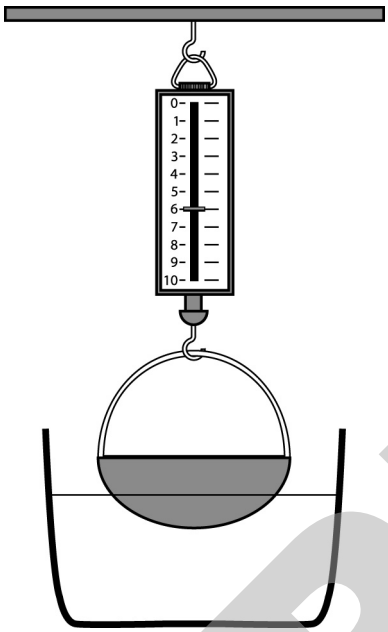
(iii) Draw two arrows on the diagram above to show the two forces acting on the hook at the bottom of the force meter. (2)

(iv) Inside the force meter is a spring. Give **one** other way that a spring can be used.

Answer: .....

..... (1)

(b) Ryan and Charlie made a shape from modelling clay and hung it from a force meter. They made a note of the reading on the force meter and then lowered the shape into a bowl of water.



Complete the table. (1)

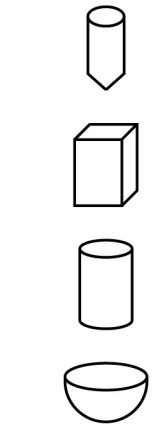
weight in air	weight in water
7 N	

Why did the weight change?

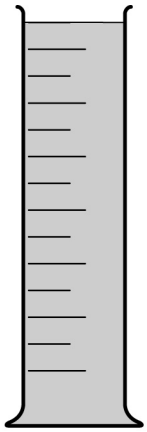
Answer: .....

..... (1)

(c) Flora and Lauren did another experiment. They used the following apparatus.



shapes made from modelling clay



cylinder filled with wallpaper paste

not to scale

timer

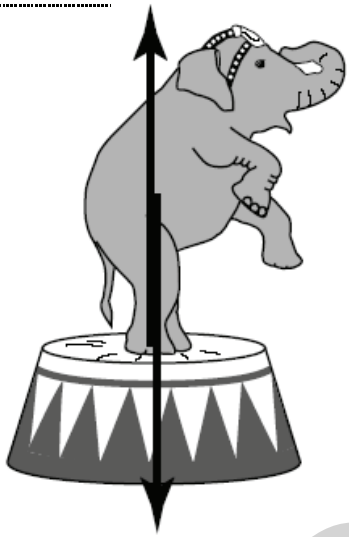
All the shapes weighed the same. They dropped the shapes into the wallpaper paste and timed how long each one took to sink to the bottom.

Draw a circle round the shape you think would sink most quickly. (1)

Explain your idea.

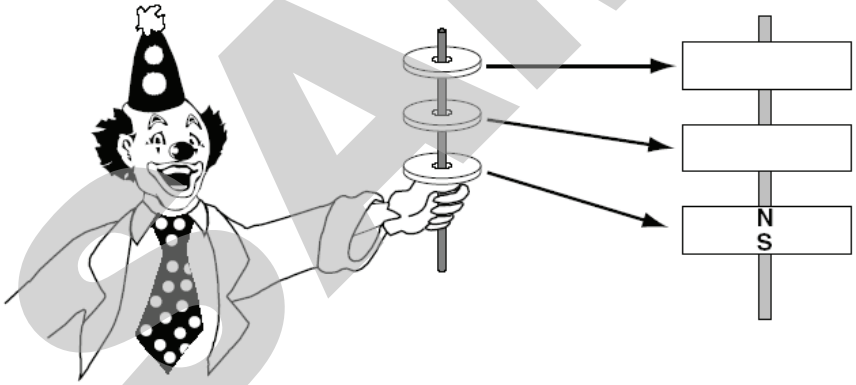
Answer: ..... (1)

4. (a) Nellie the circus elephant is doing some tricks. She can stand on a small platform.



Label the arrows to show the names of these two forces acting on Nellie. (2)

(b) A clown is making some rings float in the air. The lowest magnet has its north-seeking pole upwards and its south-seeking pole downwards as shown in the diagram.



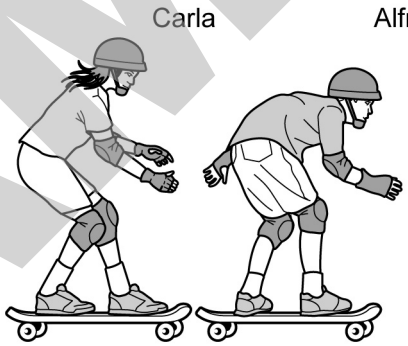
Show the arrangement of the poles on the magnets needed for this to happen. (2)

(c) The trapeze artist swings through the air on a rope. His sister is also swinging and she is holding a large flag. She finds that she swings more slowly than her brother.

Why does the flag make her move more slowly.

Answer: ..... (1)

(d) Two other circus performers enter the circus ring. They are riding on skateboards.



(i) The floor of the circus ring is level and to begin with the two performers are facing in the same direction and are not moving.

Carla gently pushes Alfredo on his skateboard. Both of them move as a result of this. In which direction do Alfredo and his skateboard move?

Answer: ..... (1)

In which direction do Carla and her skateboard move?

Answer: .....

..... (1)

(ii) Carla and Alfredo move round the ring and go back to their starting places. Carla gives Alfredo a bigger push this time. Give **two** ways in which the movement of Alfredo and his skateboard is different to the first time he was pushed.

1: ..... (1)

2: ..... (1)

(iii) Soon Carla and Alfredo stop moving again. What force stopped them from moving?

Answer: ..... (1)

ISEB Assessments
Year 3 and 4 Science Test 9
Forces and Motion
Answers

Author: ISEB

This document consists of a full set of answers to the questions in Year 3 and 4 Science Test 9.

Total marks: 40

These answers are part of *Year 3 and 4 Science Test 9.zip*, which also contains:

Year 3 and 4 Science Test 9.pdf	(the test)
Year 3 and 4 Science Test 9 Teacher's Document.pdf	(the teacher's document)

REQUIRED PRINT SETTINGS
This document must be printed with Page Scaling set to 'None'.

It can be printed on A4, or on A3 in booklet form, according to your preference.

Printer settings may vary, so refer to the documentation for your printer to locate its paper size option. Page scaling can be found in Adobe Acrobat under Page Handling in the print dialog. To reach the print dialog, go to File>Print.

Illustrations will not print to the correct scale if these settings are not applied.

Year 3 and 4 Science Test 9 Answers

1. (a) (i) the N pole (1)

(ii) bring the S pole close to the N pole, or move the magnet B so that the S pole is facing the S pole inside the toy car (2)

(b) ✓ for iron nail / steel paper clip; × for the others (4)

(c) as a fridge magnet / a catch on a cupboard door / for holding screws with a screwdriver tip (or any appropriate examples) (2)

2. (a) A (1)
sitting upright / thicker tyres (1)

(b) between shoes and ground / between hand and javelin (2)

(c) gravity downwards / air resistance upwards (2)

(d) (i) 32 (1)

(ii) carpet (2)

(iii) to give more reliable results (1)

(iv) always released car from the same place (1)

3. (a) (i) Newtons (1)

(ii) 3 N (only give 1 mark if no unit given) (2)

(iii) spring upwards / gravity and weight downwards (2)

(iv) to close a door (any appropriate example) (1)

(b) 6 N (1)
because of the upthrust / support from the water (1)

(c) the left hand / pointed one (1)
it is most like a streamlined shape / least surface to penetrate liquid (1)

4. (a) weight / gravity (2)

(b) N S S N (2)

(c) greater air resistance (1)

(d) (i) Alfredo moves to the right (1)
Carla moves to the left (1)

(ii) he goes further and faster (2)

(iii) friction (1)

ISEB Assessments
Year 3 and 4 Science Test 9
Teacher's Document

Author: ISEB

Independent Schools Examinations Board

This test contains a selected set of 4 questions aimed at Year 3 and 4 pupils. The questions are arranged in a particular topic order as follows:

Topic	Question	NC level
Magnetic forces/properties of materials	1	3
Forces and friction/air resistance/gravity	2	4
Measurement of force/gravity/upthrust	3	4
Gravity, upthrust/magnetic forces	4	3/4

Total marks: 40
Total time allocated: 30 minutes
Calculators are allowed.

Teachers should feel free to use this resource in whatever way is most appropriate for their scheme of work. The test can be attempted all at once and is designed to take a Year 3 or 4 pupil approximately thirty minutes to complete.

All tests in this range are designed to be used alongside the Science textbooks available from Galore Park Publishing. This test relates specifically to:

- Chapter 4 of Junior Science Book 1
- Chapter 7 of Junior Science Book 2
- Chapter 22 of So you really want to learn Science Book 1

Details of these and other Galore Park publications are available at www.galorepark.co.uk

Please refer to the printing instructions provided on the next page of this teacher's document before printing copies of the test or the accompanying answers.

This teacher's document is part of *Year 3 and 4 Science Test 9.zip,* which also contains:

Year 3 and 4 Science Test 9.pdf (the test)
Year 3 and 4 Science Test 9 Answers.pdf (the answers)

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