



ORANGE HIGH SCHOOL

ASSESSMENT TASK NOTIFICATION

Subject	Science: First-Hand Investigation - Friction Practical Task
Year	7
Weighting	35%
Teachers	Ms Loud, Ms Nicholson, Ms Williams, Mr Boardman
Head Teacher	Ms Huggett
Date given	Term 4 Week 1
Due Date	Friday, 27th October (Term 4 Week 3) 2023

Students are required to design and conduct a scientific investigation to determine how friction affects the distance travelled by a toy car.

Using the included scaffold as well as their preexisting knowledge students will:

- Make scientific predictions. (Page 2)
- Discuss how to design a *fair* investigation. (Page 2)
- Record results. (Page 4+5)
- Identify trends and patterns in the results. (Page 6)
- Draw a conclusion. (Page 6)
- Apply your understanding to a real-life situation. (Page 7)

Non-completion of Task:

If you know you are going to be away on the day that the task is due, you must make alternative arrangements with your classroom teacher and attempt to submit your task prior to this absence. If you are unable to submit your task on the due date you will need to complete illness/misadventure paperwork upon your return to school.

Failure to follow the above procedures may result in a zero award.

Outcomes Assessed

SC4-4WS Identifies questions and problems.

SC4-6WS Undertake a range of investigations.

SC4-7WS Process and analyse data from secondary sources.

SC4-9WS Present science ideas using appropriate text and representation.

SC4-PW1 Describe the action of unbalanced forces in everyday situations.

Section 1. Investigating friction

Friction is a force. If something is moving, friction opposes it. Friction is a force that exists whenever two things rub against each other.

You will conduct an investigation about how friction affects the distance a toy car travels.

In your investigation you will roll a toy car down a ramp on to different surfaces. You will measure how far the car travels along the different surfaces.

Question

What you are trying to find out by doing the investigation?

How does friction affect the distance a toy car will travel?

Prediction

What you think is going to happen in the investigation:

It is expected that the toy car will travel the greatest distance on the surface.

This is because

Materials and equipment

Things you will need to conduct your investigation:

a toy car

a ramp from which to launch the toy car

books (to raise the ramp)

3 different surfaces, e.g. concrete, carpet, linoleum, tiles, bench top

a one-metre measuring tape or ruler

Keeping the investigation fair

Getting the best results you can:

It is important to make sure that this investigation is a fair test.

Have a class discussion with your teacher and class members to complete the table below.

One thing that we will change each trial	What will be measured	Things that will be kept the same each trial

Method

Follow these steps to conduct your investigation:

Step 1:

- Set up the equipment using one surface, as shown in the photo below.
- Make sure that there is plenty of room at the end of the ramp for the toy car to roll on to the test surface as it leaves the ramp.



Step 2:

- Place the toy car at the top of the ramp so its back wheels are on the edge of the ramp.
- Hold it in position.



Step 3:

Repeat three times:

- Release the toy car and wait until it stops moving.
- Measure the distance from the end of the ramp to the back wheels of the car.
- Record the distance in centimetres in the results table.



Step 4:

- Repeat steps 1, 2 and 3 for the other two surfaces.

Results

A record of the data you collect during the investigation

1. Describe the appearance of each surface, e.g. rough, smooth, bumpy.
2. Record the distance the toy car travelled for each trial and each surface.

Table 1: Results data

Surface	Appearance	Distance travelled (cm)			
		Test 1	Test 2	Test 3	Average
Surface 1:					
Surface 2:					
Surface 3:					

3. Repeating an experiment more than once helps you to be sure that the data you collect is as accurate as possible. No experiment method is perfect, so by repeating it a number of times you can recognise any results that may be inaccurate and don't fit the pattern of the other measurements taken.

In this experiment you repeated the method for each surface three times, but when drawing a column graph from the data you collected you will use only one of the measurements for each surface.

We will assume that the most **accurate** measurement is the value that sits in the middle of the three measurements you took for each surface.

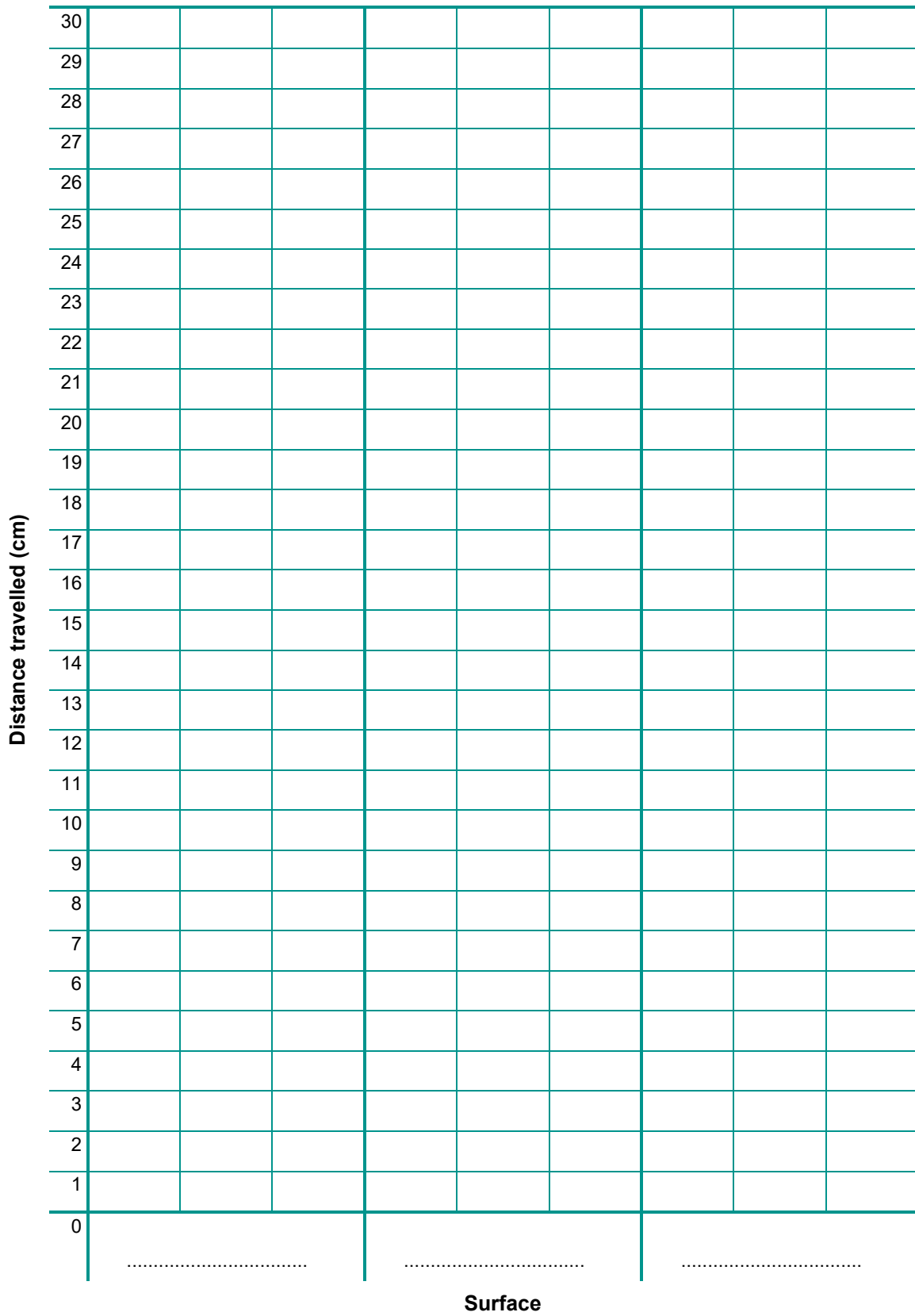
Complete the table below, using the average value for each surface from your table of results.

Table 2: Results summary

Surface	Distance travelled (cm)
Surface 1:	
Surface 2:	
Surface 3:	

4. Use the values from Table 2 in Question 3 to draw a column graph showing the distance the toy car travelled for each of the three surfaces.

Distance travelled over different surfaces



Discussion

Describe and explain your results using evidence from the investigation and your science knowledge.

5. Over which surface did the toy car travel the greatest distance?

Was friction high or low between this surface and the wheels of the toy car?

Use the evidence from the results table and the column graph and your observation of the surface to explain how you know this.

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6. Over which surface did the toy car to travel the smallest distance?

Was friction high or low between this surface and the wheels of the toy car?

Use the evidence from the results table and the column graph and your observation of the surface to explain how you know this.

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Conclusion

What did you find out?

7. Was the investigation question answered? (circle one) Yes / No

8. Was your prediction correct? (circle one) Yes / No

9. How does friction affect the distance a toy car will travel?

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Section 2. Applying your science knowledge

In Section 1, we investigated how friction affects the movement of objects. Sometimes friction can be an advantage, and sometimes it is a disadvantage. It depends on the situation.

Choose **one** of the photos below.

Slippery slide



Image: *Space savings*, kimubert, Creative Commons Attribution 2.0, www.flickr.com/photos/treevillage/8591237012/in/photostream

Running shoes



Image: *26 miles of rock and roll*, George Ruiz, Creative Commons Attribution 2.0, www.flickr.com/photos/29946035@N08/4735345767/in/photolist-8drTjx-cJMR5y-8EehNW

10. Is friction an advantage or disadvantage in this situation? advantage / disadvantage
(circle one)

11. Explain why friction is an advantage or disadvantage in this situation.

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Course Outcomes	Sections from assessment task	A	B	C	D	E	0	Total
		Has achieved a very high level of competence in the processes and skills and can apply these skills to new situations. (EXTENSIVE)	A high level of competence in the processes and skills. In addition, the student is able to apply these skills to most situations. (THOROUGH)	An adequate level of competence in the processes and skills. (SOUND)	A limited level of competence in the processes and skills. (BASIC)	Very limited competence in some of the processes and skills. (ELEMENTARY)	Not attempted	
PW1 Describe the action of unbalanced forces in everyday situations	Section 2: Applying your science knowledge. Application of knowledge about forces and friction to an everyday scenario.	Application of science knowledge to provide a reasoned explanation of why friction is an advantage or a disadvantage in the chosen situation. 5	Application of science knowledge to provide an informed explanation of why friction is an advantage or a disadvantage in the chosen situation. 4	Application of science knowledge to provide an explanation of why friction is an advantage or a disadvantage in the chosen situation. 3	Application of science knowledge to provide a partial explanation of why friction is an advantage or a disadvantage in the chosen situation. 2	Statement of isolated science facts about friction. 1.	0	PW1 / 5
WS4 Identifies questions and problems.	Section 1: Prediction Prediction about the effect of friction.	Reasoned prediction about the distance travelled by the toy car. 5	Informed prediction about the distance travelled by the toy car. 4	Plausible prediction about the distance travelled by the toy car. 3	Prediction about the distance travelled by the toy car. 2	Restatement of the investigation question. 1	0	WS4 / 8
	Section 1 : Keeping the investigation fair Identification of factors that need to be considered to make the investigation fair.	No opportunity in this assessment for students to demonstrate an A or B standard.	Identification of factors that make the investigation fair. 3	Identification of obvious factors that make the investigation fair. 2	Listing of given factors that make the investigation fair. 1	0		
SC4-6WS Undertake a range of investigations.	Section 1: Results Collection and recording of data in the results table and use of this data to draw a column graph.	Accurate collection and recording of reliable data in the table and use of this data to accurately draw a column graph to compare the distance travelled over different surfaces 5	Collection and recording of relevant data in the table and use of this data to draw a column graph to compare the distance travelled over different surfaces. 4	Collection and recording of data in the table and use of this data to draw a column graph to compare the distance travelled over different surfaces. 3	Collection and partial recording of data in the table and use of this data to draw a column graph to compare the distance travelled over different surfaces. 2	Listing of observations about friction and distance travelled. 1	0	WS6 / 5

SC4-7WS Process and analyse data from secondary sources.	Section 1: Discussion Use of the data in the results table and column graph to explain findings.	Use of the data in the results table and patterns in the column graph to explain with justification why the toy car travelled different distances over different surfaces. 5	Use of the data in the results table and patterns in the column graph to explain why the toy car travelled different distances over different surfaces. 4	Use of the data in the results table and patterns in the column graph to describe the distances travelled by the toy car over different surfaces. 3	Use of given data to identify obvious patterns about the distance travelled by the toy car over different surfaces. 2	Completion of the results tables. 1	0	WS7 / 5
SC4-9WS Present science ideas using appropriate text and representation.	Sections 1 and 2 Communication of ideas and findings in a variety of ways (short responses, tables, column graph).	Clear and purposeful communication of ideas and findings about the force of friction. 5	Clear communication of ideas and findings about the force of friction. 4	Communication of ideas and findings about the force of friction. 3	Narrow communication of ideas and findings about the force of friction. 2	Use of given representations to communicate ideas and findings about the force of friction. 1	0	WS9 / 5

PW1 /5	WS4 /8	WS6 /5	WS7 /5	WS9 /5	TOTAL /28
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Comments:
