

East Renfrewshire Council: Education Department  
Practitioner Moderation Template

School Code	M
Practitioner Code	M10
Curriculum Area(s)	Science and Literacy and English
Level	Second
Stage(s)	Primary 5
Specific subject (if applicable)	

## Experiences and Outcomes:

By investigating how friction, including air resistance, affects motion, I can suggest ways to improve efficiency in moving objects.

**SCN 2-07a**

By considering the type of text I am creating, I can select ideas and relevant information, organise these in an appropriate way for my purpose and use suitable vocabulary for my audience.

**LIT 2-26a**

## Learning Intentions:

To contribute to investigations into friction and explain how it affects motion

To suggest ways of improving efficiency in moving objects

To organise information in a scientific report

## Success Criteria:

SC for first LI

I can describe what friction is

I can participate in a fair investigation and record findings

I can predict the effects of changing one thing(variable)

I can explain the effects of lubricants on the motion of objects

SC for second LI

I can sort when friction is helpful and unhelpful

I can participate in a fair investigation and record findings

I can predict the effects of changing one thing (variable)

I can explain which surface improves efficiency

**Literacy and English**

I can write a scientific report which includes aim, method, prediction, diagram, result and conclusion

I can organise my information under appropriate headings

I can remember and apply scientific vocabulary in my writing

Briefly outline the context and range of quality learning experiences that have been provided making reference to the chosen design principles.

Lesson 1

- Topic introduced and discussed using PPT and video clips (**Breadth** - learners exposed to broad range of texts to enhance learning )  
<http://www.bbc.co.uk/education/clips/z79rkqt>  
<https://www.twigonglow.com/film/friction-1499/>
- Pupils do investigation exploring lubricants and friction. Use a variety of lubricants on surface and measure how far the car can move in a given time. Discuss predictions (think, pair, share). Pupils record results on laminated grid.
- Discuss findings and complete exit pass for plenary

Lesson 2

- Starter - what's that word to revise scientific vocab. A child sits with back to whiteboard then a scientific vocab word will appear. Pupils in class have to define/describe the word for the person to guess.
- Introduce concept of scientific report with pupils showing them exemplars on whiteboard. Discuss different features in exemplars.
- Ask pupils to come up with own success criteria in their group. Share with class and decide on SC.
- Pupils use template to organise ideas and complete scientific report

Lesson 3

- Starter - Helpful and unhelpful friction card sort
- Use ppt to discuss when friction is helpful and not helpful. When friction is helpful it can improve efficiency. Discuss meaning of efficiency and provide relevant examples of when friction affects the efficiency of a moving object e.g. water in a slide, a bike cycling on a path rather than grass.
- Pupils take part in investigation to explore how to improve efficiency of car imagining they can choose race track surface. They have to decide which surface would improve efficiency.
- Pupils record results and predictions on sheet. (**Application** - pupils apply knowledge of friction to interpret evidence and draw conclusions)
- Self-assess according to SC at end.
- Plenary - multiple choice quiz using Active Expression devices choosing which option would improve efficiency
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Lesson 4

- Starter - memory board. Children study screen which has words associated with scientific reports and relevant scientific vocab for 2 mins. They then have 3 minutes to write down as much as they can remember on their whiteboards.
- Pupils write scientific report on lesson 3 without template. (**Challenge and enjoyment** - as learners produce a more complex piece of writing independently.)
- Peer assess using grid.

Record the range of assessment evidence that was gathered to meet the success criteria (Say, Write, Make, and Do) considering breadth, challenge and application.

**SAY**

- describe what friction is
- predict the effects of changing one thing(variable)
- explain the effects of lubricants on the motion of objects
- explain which surface improves efficiency

**WRITE**

- record findings
- write a scientific report organising information under appropriate headings
- apply scientific vocabulary in my writing

**DO**

- participate in a fair investigation
- sort when friction is helpful and unhelpful

Did the learner successfully attain the outcomes? YES/NO

Briefly outline the oral/written feedback given to the pupil on progress and next steps, referring to the learning intention and success criteria.

See teacher voice box for oral feedback and next steps.

We discussed where the learning would go next and talked about different types of friction. Next steps will be to investigate air resistance and then to design a parachute using what they have learned about air resistance.

**Pupil Voice:**

Taken from learning conversation with child. See also pupil voice box on evidence sheets.

**What have you learned?**

*"Friction is when two surfaces rub together. When something is smooth it has less friction and it makes it go faster. When something is rough it makes it have more friction and it makes it go slow. I know how to predict what it might be. I can write a scientific report when you write down the aim of it and you do a diagram of all of the things you used."*

**How did you learn?**

*"I learned from the experiment and the Power Points. I got information from the videos, I liked that they told you about friction. It helped me when I worked with other people because it was easier."*

**What skills have you developed?**

*"I know how to do experiments so if I'm a scientist I could measure something else. I can keep it the same because it wouldn't be a fair experiment if you didn't keep it the same."*

# Learner Evidence

**Experiences and Outcomes**

By investigating how friction, including air resistance, affects motion, I can suggest ways to improve efficiency in moving objects. **SCN 2-07a**

**Context for Learning**

At the beginning of the lesson pupils discussed what they knew about forces from P1/2 and discussed pushes and pulls. Pupils were introduced to the idea of friction as a kind of force using PPT and video clips. Children discussed where friction occurs in real life such as using studs on football boots to increase friction so you don't slip when you are running. Idea of fair test was revised from P4 and class mind map for all the things we would have to keep the same was created.

Early/First/Second Level		Lesson number 1	
Evidence of learning			
SAY	MAKE	WRITE	DO

**LI:** To contribute to investigations into friction and explain how it affects motion.



- Success criteria**
- I can describe what friction is
  - I can participate in a fair investigation and record findings
  - I can predict the effects of changing one thing (variable)
  - I can explain the effects of lubricants on the motion of objects

**Teacher Voice**

Pupil picked up idea of friction very quickly and discussed video clips excitedly. Pupil was able to discuss the effect of a lubricant by linking his learning to real life, giving an example of his Dad using oil to stop a door squeaking and open properly. Pupil was confident in the idea of making a test fair and even corrected another pupil who put the hair dryer on to the more powerful setting saying "No, keep it the same or it won't be fair!" Pupil predicted that the olive oil would make the car go further.

**Exit pass**  
 What is friction?  
 a force when two things rub together there is more friction when they rough there is less friction when they smooth  
 Explain how did the lubricant affect the MOTION (movement) of the car?  
 the water created less friction and it was the best and the hair conditioner was the worst because it was more sticky

**Pupil Voice**

<- See exit pass  
 In thumbs formative assessment at the end of the lesson pupil gave themselves a thumbs up for each of the success criteria.

**Experiences and Outcomes** By considering the type of text I am creating, I can select ideas and relevant information, organise these in an appropriate way for my purpose and use suitable vocabulary for my audience. **LIT 2-26a**

Early/First/Second Level		Lesson number 2	
Evidence of learning			
SAY	MAKE	WRITE	DO

**LI:** To organise information in a scientific report

**Context for Learning**

Starter - revise scientific vocab and previous investigation. Introduce concept of scientific report with pupils showing them exemplars on whiteboard. Discuss different features in exemplars. Ask pupils to come up with own success criteria in their group. Share with class and decide on SC. Pupils use template to organise ideas and complete scientific report

**Teacher Voice**

In the starter the pupils gave good clues to other children describing the scientific vocabulary. They included all of the correct information under the appropriate heading as the writing frame was a good support. They required prompts to remember what 'methods' and 'variables' meant. **NEXT STEP** given - to remember new scientific report vocabulary of method and variables so they could complete independently.

2-11-13 Jack **LI:** To organise information in a scientific report

**Scientific Report**

**Aim** We are trying to find out: If 5 lubricants have an effect on friction and change the motion of the cars

**Method** We will: we got the equipment then we put on the trolley. Then we measured out 1cm of each lubricant and put them on the table. We pushed the car with the force applied, and we measured how far it went.

**Variables** We will change: Type of lubricant  
 What we will keep the same: Amount of lubricant, time we used it, driver starts car in same place, same settings on hair dryer.

**Prediction** I think: The olive oil would have less friction and the conditioner would have more friction. I think the olive oil would make the car go further.

Lubricant	Speed - distance/cm
No lubricant	44
Water	72
Hair conditioner	13
Washing up liquid	52
Vegetable oil	52

**Diagram and apparatus**

**Conclusion** I learned/found out: Some lubricants made the car move further but conditioner was too thick and made the car not move further. Water made it go the furthest because it was slippery and smooth.

**Success criteria** SC agreed with pupils.

- I can write a scientific report which includes aim, method, prediction, diagram, result and conclusion
- I can organise my information under appropriate headings
- I can remember and apply scientific vocabulary in my writing

**Pupil Voice**

"I know all about these because I do experiments in my bedroom. I like to draw all of the stuff that I used."  
 "I think mine is good because I have lots of information."

# Practitioner Moderation Template

# Learner Evidence

### Experiences and Outcomes

By investigating how friction, including air resistance, affects motion, I can suggest ways to improve efficiency in moving objects. **SCN 2-07a**

Context for Learning See info for Lesson 3

Early/First/Second Level		Lesson number 3	
Evidence of learning			
SAY	MAKE	WRITE	DO

### Teacher Voice

Pupil was able to explain which surface improved efficiency in the investigation and explained that the wooden surface would make the car be more efficient even though it was a bit slower than the Styrofoam. They explained that the toy car slid on the Styrofoam so even though the car went further on it they couldn't win the race if their car was skidding around. They successfully answered questions in plenary quiz. **NEXT STEP** given to explain **EFFECTS** not just which one they think will be the best.

**Friction**  
Work together to sort the cards into the correct groups

**Useful**  
A lot of friction  
grooves on a screw top bottle  
a rope rubbing on a sharp rock  
trying to catch a wet muddy ball  
striking a match  
a landslide of wet mud and pecks

**Not useful**  
Bad useful  
roller skating  
using soap to get a tight ring  
slipping on a banana  
slipping on a wet road  
slipping on the polished floor  
a flat on punctured tyre  
slipping on a rug

**Friction Grand Prix**  
Factors that affect the efficiency (effectiveness) of moving objects. The aim of your investigation is to find out which surface would improve the efficiency of your moving car. You want to see the results, choose the surface carefully!

Which surface would decrease efficiency and make a toy sledge travel the least distance?  
A. Carpet  
B. Polished wood  
C. Ice  
D. Tile

Surface	Time (s)
Carpet	11.0m
tile	6.2m
yellow sand paper	6.2m
Styrofoam	6.6m
rug	7.0m

Which surface improved efficiency and why?  
tile seemed to make the car go further but it's better than Styrofoam because Styrofoam is too slippery and made the car skid.

**LI:** To suggest ways of improving efficiency in moving objects  
**SC:** I can sort when friction is helpful and unhelpful  
I can participate in a fair investigation and record findings  
I can predict the effects of changing one thing (variable)  
I can explain which surface improves efficiency

**Pupil Voice**  
LI: To suggest ways to improve efficiency in moving objects.

Success criteria	Self - Assess
I can sort when friction is helpful and unhelpful	😊
I can participate in an investigation and record findings	😊
I can predict the effects of changing one thing (variable)	😊
I can explain which surface improves efficiency	😊

Experiences and Outcomes By considering the type of text I am creating, I can select ideas and relevant information, organise these in an appropriate way for my purpose and use suitable vocabulary for my audience. **LIT 2-26a**

Context for Learning See info for Lesson 4

Early/First/Second Level		Lesson number 4	
Evidence of learning			
SAY	MAKE	WRITE	DO

### Teacher Voice

Pupil was able to organise their information under the correct heading but had to be prompted to remember some headings including variables. We went over this as a class and put on whiteboard. Pupil was then able to organise information independently. Pupil applied scientific vocabulary in report and was one of the only pupils to remember the word 'efficient'.

**Diagram and apparatus**  
Hair dryer, car, motor with, table

**Conclusion**  
Styrofoam is better because it is the fastest and most slipy

4-11-15 Scientific Task

**Aim**  
The aim of our investigation is to find out what makes the car most efficient

**Method**  
First we set the equipment up then we set the car on the surface. Next we put the car at the start and put the hair dryer on then we counted how long it took to go.

**variables**  
I changed the surface but kept the car, the hair dryer, setting the same.

**prediction**  
I thought that tile would be the best because it is smooth and I thought that Styrofoam would not be good.

**Results**

Surface	Results
tile	11 cm
carpet	6.2 cm
yellow sand paper	6.2 cm
Styrofoam	6.6 cm
rug	7 cm

**LI:** To organise information in a scientific report

**Success criteria** SC agreed with pupils in previous lesson.  
I can write a scientific report which includes aim, method, prediction, diagram, result and conclusion  
I can organise my information under appropriate headings  
I can remember and apply scientific vocabulary in my writing

**Pupil Voice**  
Pupil gave himself a green traffic light for everything except the first SC as he found it hard to remember all of the parts of the report.  
**Peer assessment** - green traffic light against SC.

Fab work, you can organise your information under headings and have used lots of scientific words 😊  
Next time try to remember all of the parts of the report on your own.