

Slippery Surfaces Investigation Lesson Plan



Resources Needed:

Box lids (such as A4 copier paper lids)/sheets of stiff card/wooden ramps/hardback books
Sliding objects e.g. wooden blocks/bricks; 100g masses; coins
A4 sheets of other materials e.g. paper, felt, sandpaper, J cloth
Rulers (or protractors for extension or older children)
(Grid paper for plotting bar charts)

Printing/copying:

Class set of the pupil worksheet (for older pupils)
Class set of sports ball results sheet (for younger pupils)

Starter:

Display photographs from the Presentation Document to discuss useful and nuisance friction examples. Suggest/discuss occupations and situations where friction is useful or a nuisance using examples from the Support Information section below.

Method:

- Hand out the pupil worksheets if required to older pupils
- Pupils follow instructions on the Presentation slide
- Older pupils follow the worksheet, including analysis and conclusions
- Younger pupils can draw and label pictures, write down what they found out, use age appropriate skills
- An alternative investigation for younger pupils is to classify the surfaces of a range of sports balls by smoothness, as outlined in the optional Presentation slide

Outcomes:

All pupils should be able to:

- Discuss results using verbal discussion, measurements and charts - why was one material more or less slippery than another?
- Use the word 'friction' accurately in the correct context as a force resulting from two surfaces in contact being pulled past each other

Challenge and next steps:

- Write a report or design a wall poster to display your findings
- Study the photographs of friction testing machines on the Presentation document - create and test if possible an alternative design for a friction testing machine (e.g. with a pulley system to lift it or using Newton meters if available etc.)
- Carry out a 'Slipping Hazard' survey around the school or at home
- Test a range of shoes to find out which are most slippery and why

Support Information for Teachers

Who needs a friction testing machine?

- **Architects** – to choose materials for new buildings
- **Engineers** – to use the right materials in buildings, vehicles, factories, power stations (saves energy, money, repairs...)
- **Lawyers** – investigating accidents and claims when people slip
- **Health and Safety Officers**
- **Think of all the places it would be important NOT to slip e.g. hospitals, ships, supermarkets, pavements ...**
- **Think of all the places where it would HELP to be more slippery e.g. ice rink, skis, wheels, sledges, loading ramps, playground slides, helter skelter, water slides...**

TYPICAL APPLICATIONS FIELDS

Cosmetics industry

Packaging industry

Paper and carton
manufacturing

Lab substrate measurement

Packaging control

Homework Projects:

Look for the slipperiest places around your home. Make a report for your family to help them make it safer.

Find out who has the slipperiest shoes in your family. Design a way to test this and tell your family what you find out.