

# Friction and Drag

KS3 Physics · Follows the national curriculum

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

## 1. Worked example

**Which way does friction act on a sledge sliding down a hill?**

Step 1 · Rule

Friction always acts against the motion (or attempted motion).

Step 2 · Apply

The sledge moves down the slope, so friction acts up the slope.

**Answer: Up the slope, opposite to the motion**

Check: Friction never pushes things along on its own.

## 2. Now try one with the steps

**A block is pulled along at a steady speed with a 6 N force. How big is the friction?**

Step 1 · Steady speed

Step 2 · So

**Answer:**

## 3. Practice

Show your working. The marks tell you how much is expected.

1. In which direction does friction act? [1]

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2. What is the name for friction caused by moving through air? [1]

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3. Give one example where friction is useful. [1]

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4. Give one example where friction is a problem. [1]

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5. Name one way to reduce friction between moving parts. [1]
- \_\_\_\_\_
- \_\_\_\_\_
6. A box is pulled across a carpet at a steady speed with 6 N. What is the friction force, in newtons? [1]
- \_\_\_\_\_
- \_\_\_\_\_
7. The pull on the same box is increased to 9 N while friction stays at 6 N. What is the resultant force, in newtons? [1]
- \_\_\_\_\_
- \_\_\_\_\_
8. What happens to air resistance object moves faster? [1]
- \_\_\_\_\_
- \_\_\_\_\_
9. Why are racing cars and fish streamlined? [2]
- \_\_\_\_\_
- \_\_\_\_\_
10. A student repeats a friction reading three times: 3.2 N, 3.0 N and 3.4 N. What is the mean, in newtons? [1]
- \_\_\_\_\_
- \_\_\_\_\_
11. On polished wood, a 10 N block needs 3 N and a 20 N block needs 6 N to pull at steady speed. Predict the force for a 30 N block, in newtons. [2]
- \_\_\_\_\_
- \_\_\_\_\_
12. A car's engine is at full power and the car stops getting faster. Explain why, in terms of forces. [2]
- \_\_\_\_\_
- \_\_\_\_\_
13. In a friction investigation, name the independent variable, the dependent variable and one control variable. [3]
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
14. A spacecraft gets very hot comes back into the atmosphere. Explain why. [2]
- \_\_\_\_\_
- \_\_\_\_\_

## 4. Before you hand it in

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**"Friction only happens when things are moving."**

Friction acts against attempted motion too — that is why a heavy box is hard to start pushing.

**"Friction is always bad."**

Friction is useful for grip and braking, unwanted where parts rub and wear.

**"Air resistance stays the same."**

Air resistance gets bigger increases.