5 Getting moving

The friction between surfaces on the move is less than the friction when they are still.

Have you ever noticed that it takes less effort to keep something going than to get it moving in the first place?

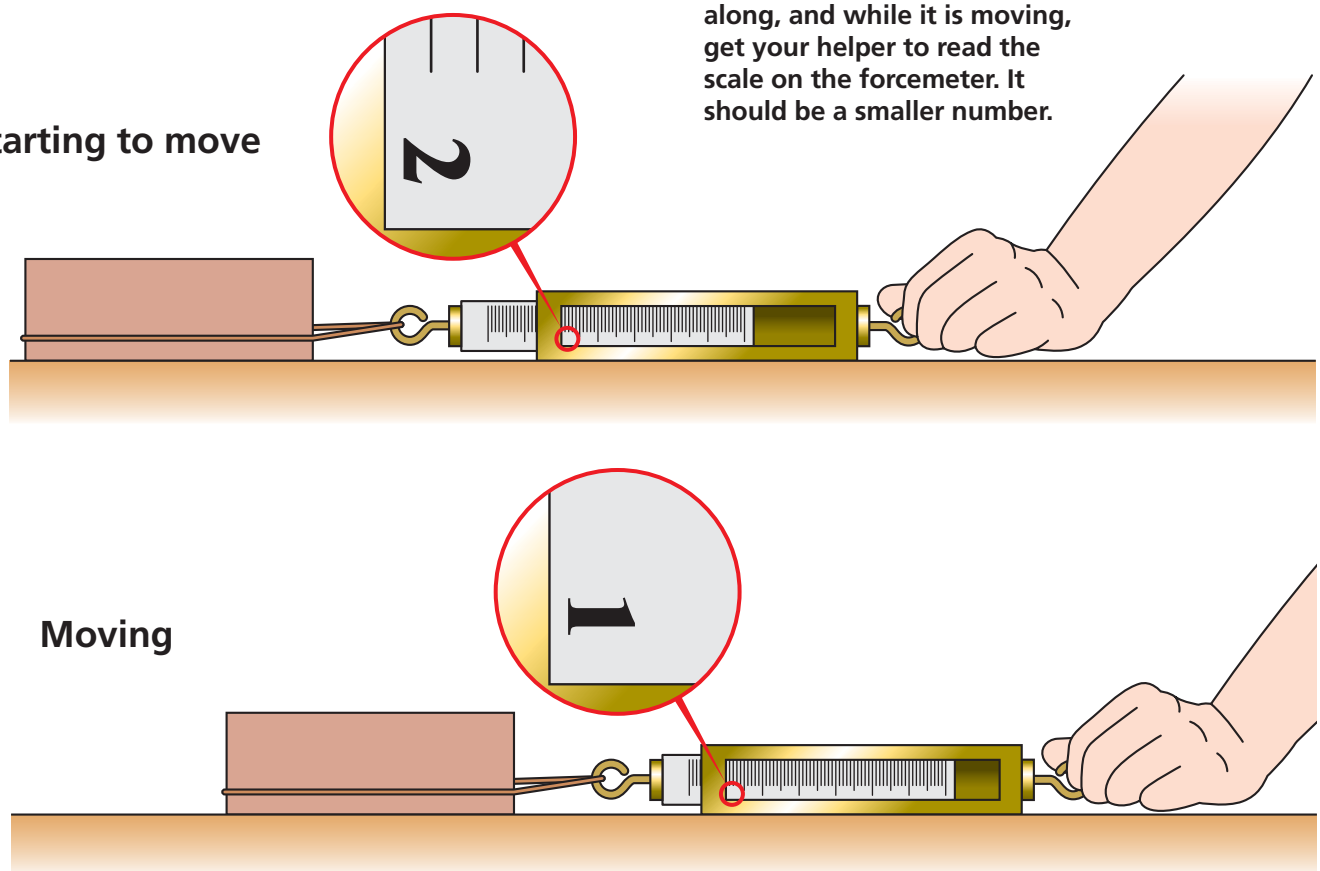
Why friction changes

To get something to move you have to lift the tiny bumps of one surface out of the tiny troughs of the other. Once this has happened, as long as the object keeps moving, the bumps will not have time to settle back into the troughs and so the friction will be lower.

Fair test

You can prove that the force needed to keep something moving is smaller than the force needed to get it moving by using a forcemeter (Picture 1). You need to find the largest amount of pulling force just before the block starts to move, and the amount of force that will keep it moving.

▼ (Picture 1) Pull gently on a forcemeter until the block just begins to move. Have a helper read the scale and record the highest value they observed. Now pull the block along, and while it is moving, get your helper to read the scale on the forcemeter. It should be a smaller number.



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▲ (Picture 2) An avalanche is a terrifying example of how much less friction there is when material is moving compared to when it is still.

The importance of moving friction

There are many places where the differences in moving and still friction are important. Here are just two examples to get you thinking.

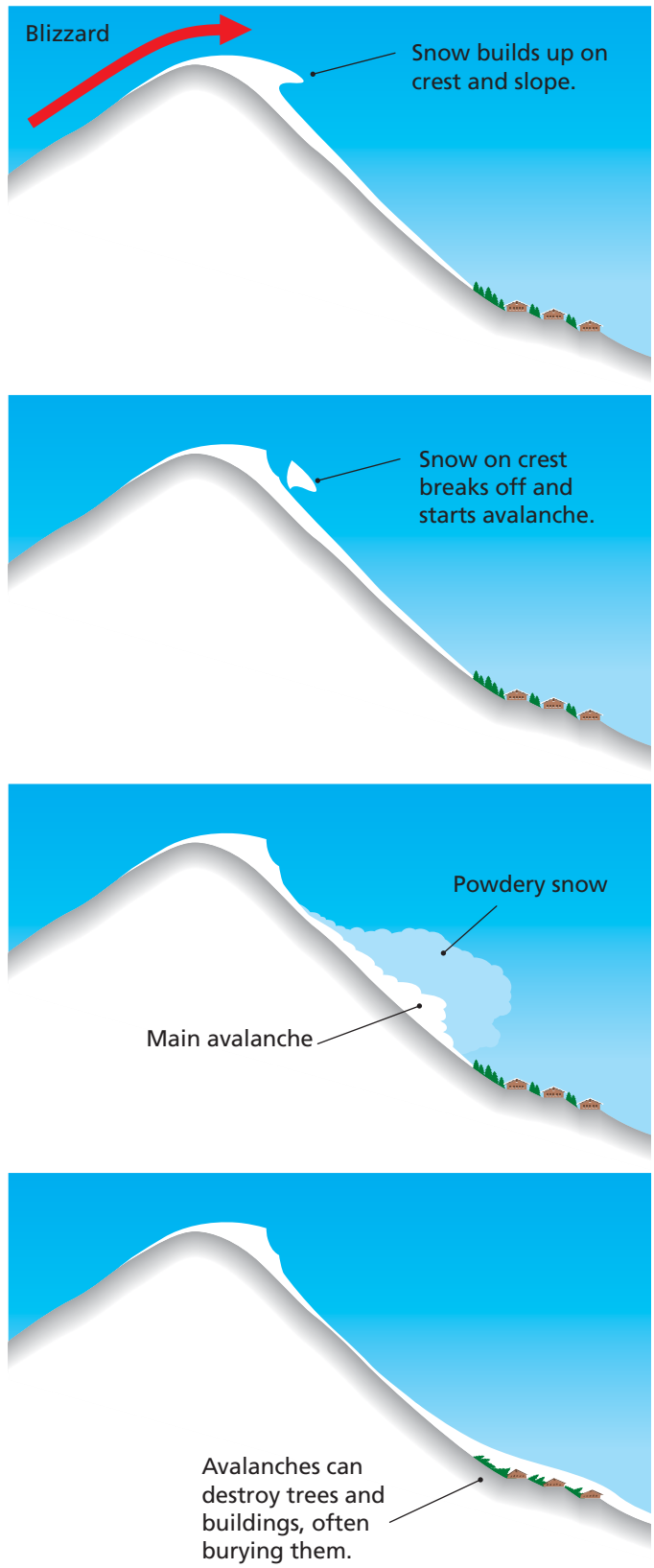
Since starting a car moving needs more force than keeping it going, more stops and starts use more fuel.

Snow is held on steep slopes by friction. But if some of the snow is disturbed and begins to move (for example, if a skier jumps on it) the friction is reduced and the snow will continue to move. This can lead to a huge movement of snow called an **AVALANCHE** (Pictures 2 and 3).

Summary

- **The amount of friction that builds up before an object moves is much higher than the friction needed to keep the object moving.**

▼ (Picture 3) How an avalanche starts and develops. Once an area of snow starts moving, the friction is much lower, so the snow begins to speed up as it slides, gathering enough energy to cause damage.



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