

19. Your teacher will give you two or three different types of ribbon, which you can use, one at a time, to cover the flat piece of track.
Feel each of the ribbons you have been given and predict what will happen when you launch the ball onto the track that has ribbon on it.

20. Carefully place one of your pieces of ribbon on the flat track, attaching it near the ends with masking tape or Blu Tack if needed.

Release the ball from the top of the launching track onto the track covered with ribbon and watch carefully to see what happens when the ball rolls on the ribbon. Measure how far it travelled and record in the table below.

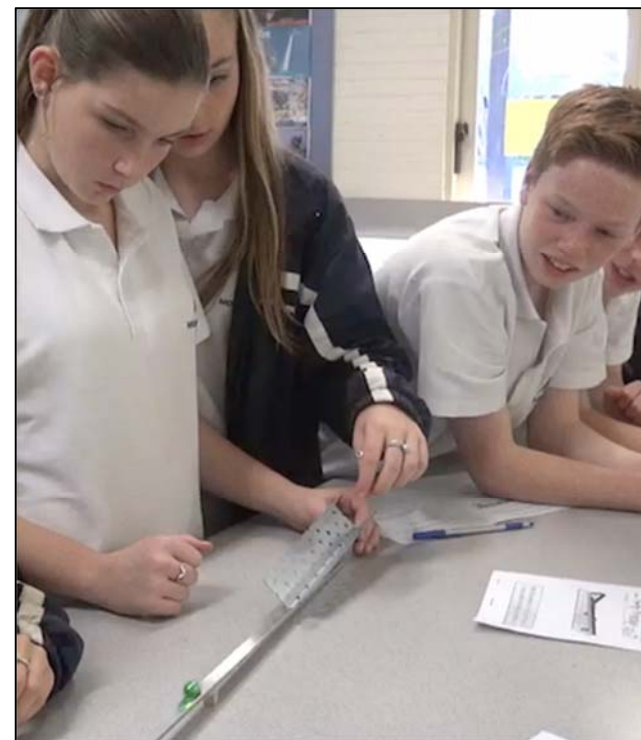
Type of ribbon	Distance travelled (cm)
<i>No ribbon</i>	

21. Which ribbon gave the shortest distance? Circle it in the table.
22. Explain *what* you think is happening to the speed of the ball and *how* you think the ribbon makes it happen. Discuss with your class.

23. Write down the main things you have learned in the last four lessons. Include one thing you have learned about using graphs to model motion.

Lesson 4: Rolling Uphill

Name: _____



What happens to the speed of a ball when it rolls uphill?

Setting up the sloping track

1. Set up a track on a thin book as you did in Lesson 2.

Fit the short launching track into the long track as shown in the picture.



Make sure it is connected as close as possible to the end of the long track.

Use a small piece of Blu Tack® under the launching track to fix it in place.

Rest the other end of the launching track on a book so that the end is slightly higher than the end of the long track.

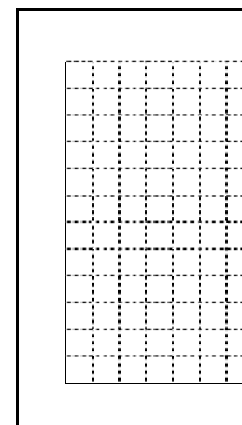
Blu Tack the launching track to the book.

Rolling the ball uphill

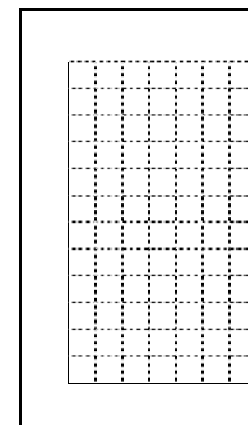
2. Predict what will happen when the ball rolls uphill after leaving the launching track.
3. Write your prediction in the space below.

4. Compare your prediction with the rest of your group.
5. Choose a person to be the Launcher. Watch carefully to see what happens when the ball rolls uphill on the upward sloping track after being released from the top of the launching track.
Today we are focussing on what happens to the uphill motion.
6. Is this what you expected to happen?
Yes ☐ No ☐
Discuss what you saw with the rest of your group.
7. Experiment with the heights of your books until the ball rolls as slowly as possible while stopping as near to the top end of the track as possible.

8. We will be making a Purple streamer graph, like those in Lessons 1 and 2. Predict what the Purple streamer graph will look like when the ball rolls uphill on upward sloping track. Draw your prediction in the space below.



Prediction for Purple Graph



Actual Purple Graph

9. The Launcher releases the ball from the top of the launching track, trying to have the ball at the bottom on a click of the metronome. You may need to practise this a few times.
10. Use blocks to mark the position of the ball at each second on the way up. Repeat until everyone is happy with the way the blocks have been placed.
11. Make a Purple streamer graph like the ones in Lessons 1 and 2 using butcher's paper and glue-sticks. Your streamer should start at the bottom of the track.
12. Add a title and label the axes on your Purple streamer graph.
13. Draw your Actual Purple Graph in the space above.
14. Put your Purple streamer graph on the board ready for a class discussion.

Rolling the ball on a flat track

15. Remove the book from under the uphill track so that it lies flat. You may need to use some Blu Tack to hold it in position.
16. Use the space below to write down your prediction for what will happen when the ball is released from the top of the launching track.



17. Compare your prediction with the rest of your group.
18. Release the ball from the top of the launching track. Measure and record how far it travelled along the flat track.