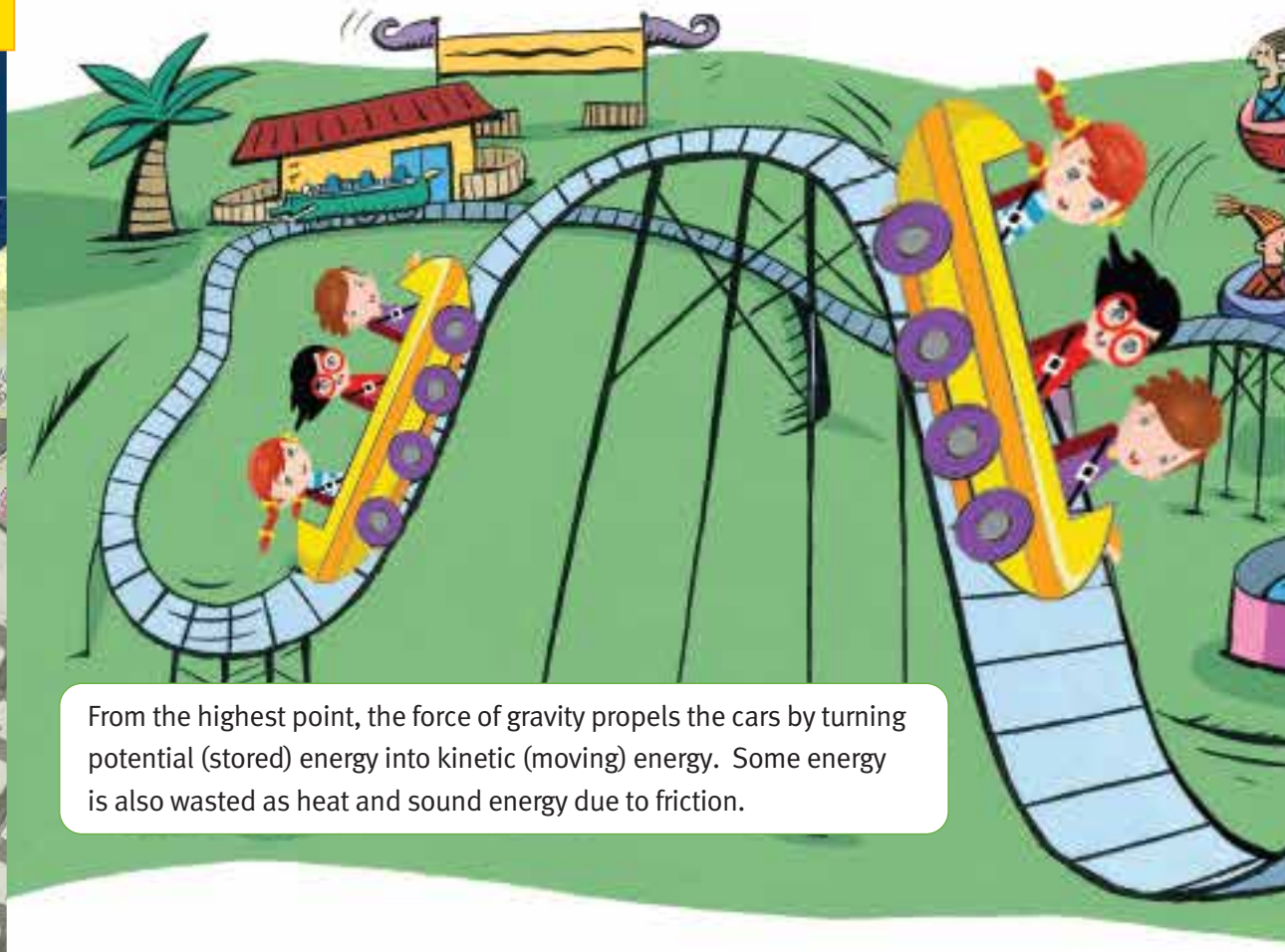
Roller Coasting

You need: a computer spreadsheet (optional)

ACTIVITY

Jim, Wiremu, and Toline are investigating how roller coasters work. They find out that the only time a motor is used is at the start, to pull the cars to the highest point.



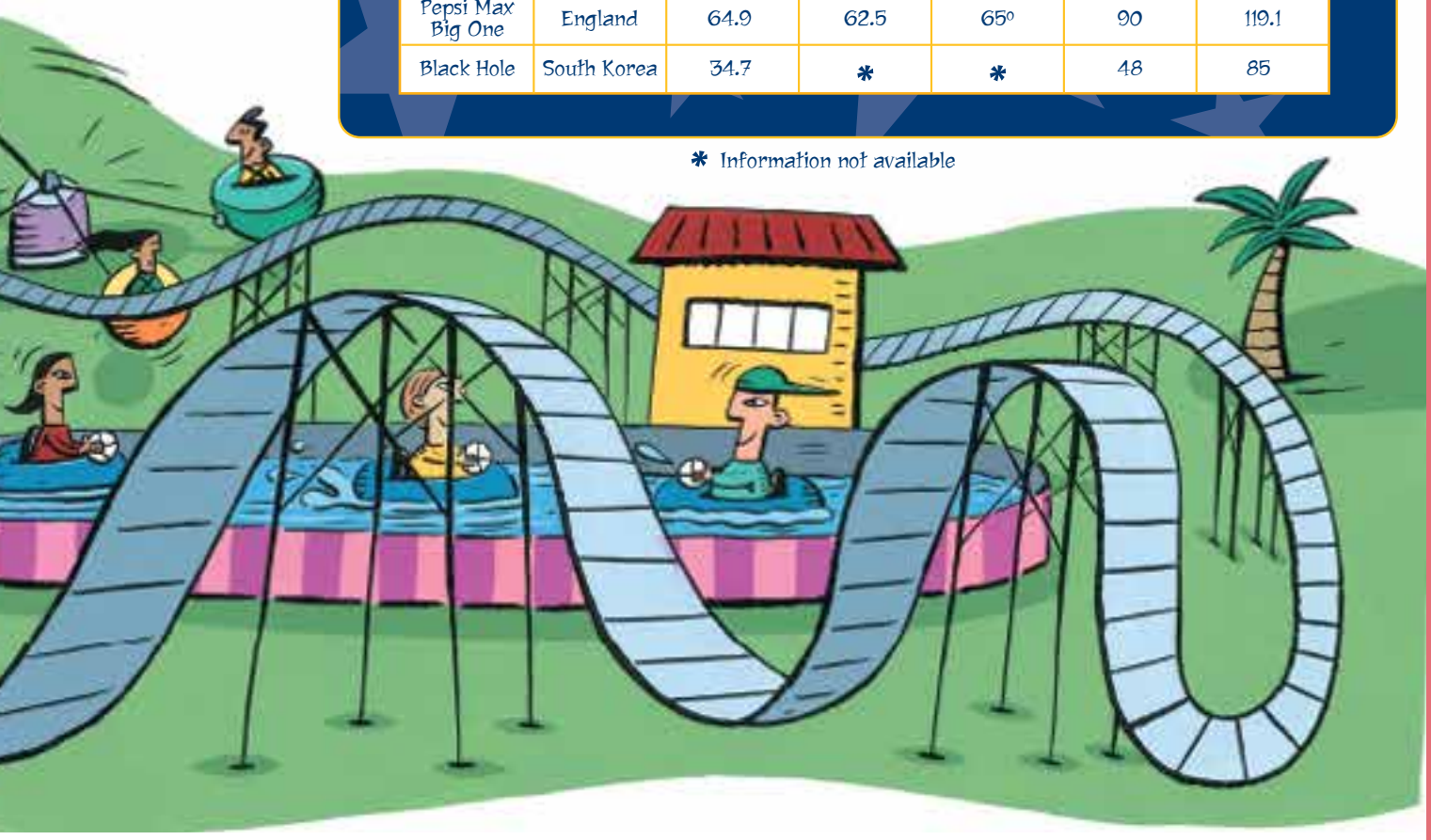
From the highest point, the force of gravity propels the cars by turning potential (stored) energy into kinetic (moving) energy. Some energy is also wasted as heat and sound energy due to friction.

Jim, Toline, and Wiremu have some ideas about what makes roller coasters go fast.

They find some data about roller coasters on the Internet and use it to test their ideas:

Name of roller coaster	Location	Height of rise (m)	Length of drop (m)	Angle of drop	Number of people	Maximum speed (km/h)
Desperado	USA	63.7	68.6	60°	90	128.7
Winjas	Germany	17.4	16	50°	*	65.6
Top Thrill Dragster	USA	128	122	90°	96	193.1
Dodonpa	Japan	52	*	90°	32	172
Pepsi Max Big One	England	64.9	62.5	65°	90	119.1
Black Hole	South Korea	34.7	*	*	48	85

* Information not available



1. Draw a diagram to show what "angle of drop" means.

2. Based on the data above, who is right? You could use the graphing function on a spreadsheet to help you. For example, you could compare rise and speed or length of drop and speed.

3. Here is some data on two roller coasters in New Zealand and Australia:

   a. Estimate how fast you think the top speed on the Coca Cola ride might be.
   b. Estimate the length of drop on the Lethal Weapon.
   c. Explain how you worked out your answers.