



Figure 1 shows the first two hills of the Big Dipper with the train about to go down the first drop.

1. Draw an arrow showing the direction the train will be travelling in when it speeds up.
2. Draw an arrow showing the direction the train will be travelling in when it slows down.
3. What type of energy does the train have at the top of the first drop?
4. What type of energy does the train have at the bottom of the first drop?

$$\text{Average Speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

5. Assuming the Big Dipper track is 1000 metres long and the train takes 3 minutes to complete the circuit, what is the average speed in metres per second?

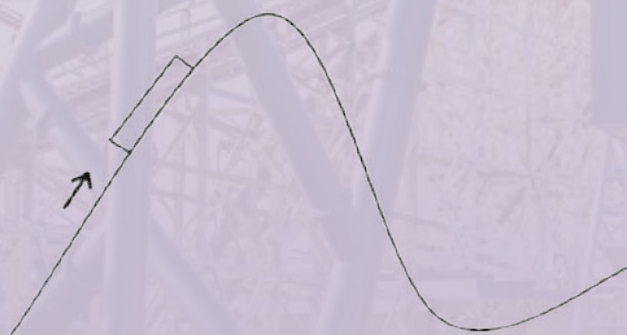


Figure 2 shows The Big One train being pulled up to the top of the first drop

6. Draw an X at the point where the train will be travelling at its fastest
7. As The Big One travels around the track, can you think of two things which will take energy away from the train and slow it down?

8. Why do you think The Big One train has round shiny surfaces?

$$\text{weight} = \text{mass} \times \text{gravitational field strength}$$

9. If The Big One train has a mass of 7,500 kg and we take the gravitational field strength of the earth to be 10 N/kg, what is the weight of The Big One train?

10. If the gravitational field strength of the moon is 1.6 N/kg, then what would the weight of the train be if the ride had been built on the moon?

ICON - Blackpool Pleasure Beach's newest ride, is the UK's first double launch coaster

$$\text{Acceleration} = \frac{\text{Change In Speed}}{\text{Time Taken}}$$

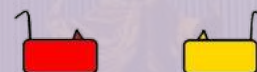
11. ICON's first launch section is 60m in length. From a standing start, the train takes 2 seconds to travel this distance. At the end of the launch, it is travelling at 22 metres per second. What is the acceleration of the train?

Dodgems

12. Electricity from the grid in the Dodgems roof travels down the pole mounted on each car. When the ride starts, what is that electrical energy converted into?

13. If the forces acting on a dodgem car are balanced, what will happen to the car?

14. The red and yellow dodgems are about to collide. They have exactly the same mass and are travelling towards each other at the same speed. Draw arrows to show which direction each dodgem will be travelling in after the collision.



$$\text{Kinetic Energy} = \frac{1}{2} mv^2$$

$$m = \text{mass}$$

$$v = \text{velocity}$$

15. A dodgem car with a mass of 300kg is being driven by 150kg rider. It is travelling at 2 metres per second, what kinetic energy does it have?