KS3 SCIENCE

- Forces & Motion on Rides
- Energy & Electricity
- Environmental Science & Observation

ACTIVITY 1

RIDE VISITOR PERCENTAGES

SCENARIO- Adventure Island has several exciting rides that demonstrate forces and motion in action.

- Skydrop rises to a height of 20 m before dropping in 4 seconds.
- Vertigo has a 100 m drop completed in 25 seconds.
-Tidal Wave has a 10 m slope, and the water moves at 2 m/s.

You will investigate speed, forces and motion using the formulas below.

FORMULAS

Average speed = Distance ÷ Time
Acceleration = Change in velocity ÷ Time

QUESTIONS-

1. Calculate the average speed of: (4 marks)

a) Skydrop

Speed = _____ ÷ _____
Speed = _____ m/s

b) Vertigo

Speed = _____ ÷ _____
Speed = _____ m/s

2. Identify the forces acting on each ride. (5 marks)
Tick or label the correct forces:

Ride	Gravity	Friction	Push/ Pull
Skydrop			
Vertigo			
Tidal Wave			

(You may draw and label arrows on a separate diagram.)

ACTIVITY 1

RIDE VISITOR PERCENTAGES

QUESTIONS-

3. Which ride involves acceleration and deceleration? Explain why. (2 marks)

4. Draw a motion diagram for Tidal Wave. (3 marks) (Label forces clearly with arrows.)

5. Explain how friction affects ride safety. (3 marks) (Write in full sentences.)

Activity 2

Scenario-

Some rides are powered by electricity, such as the City Wheel and Carousel. Other rides, such as Skydrop and Vertigo, rely mainly on gravity. You will explore how energy is used and transformed.

Formulas

Potential Energy (PE) = $m \times g \times h$
Kinetic Energy (KE) = $\frac{1}{2} m v^2$
Electrical Energy (E) = Power × Time

Questions-

1. Identify the main type of energy used by each ride. (3 marks)

Ride	Energy Type
City Wheel	
Carousel	
Skydrop	
Vertigo	

2. Explain how energy is transformed on Skydrop. (3 marks)

ACTIVITY 2

QUESTIONS-

3. Draw a simple electrical circuit that could power a ride. (3 marks)
(Include a battery, switch and motor.)

4. Why is electrical energy important for ride operation? (2 marks)

5. Suggest two ways the park could save energy. (2 marks)
   1.
   2.

Activity 3

Energy Costs & Data Analysis

Scenario-

The park has collected the following visitor data:

Ride	Visitors
Time Machine	120
Vertigo	60
City Wheel	80
Carousel	90
Skydrop	50

The park estimates the following energy used per visitor:

- Time Machine: 3 kWh
- Vertigo: 5 kWh
- City Wheel: 2 kWh
- Carousel: 2 kWh
- Skydrop: 4 kWh

Energy costs £0.20 per kWh.

1. Complete the table below. (5 marks)

Ride	Visitors	Energy per Visitor (kWh)	Total Energy Used (kWh)	Cost (£)
Time Machine	120	3		
Vertigo	60	5		
City Wheel	80	2		
Carousel	90	2		
Skydrop	50	4		

Formula:

Total Energy = Visitors × Energy per Visitor

Cost = Total Energy × 0.20

Activity 3

Energy Costs & Data Analysis

2. Draw a bar chart comparing total energy usage of the rides. (4 marks)

(Include title, labelled axes and scale.)

Activity 3

Energy Costs & Data Analysis

3. Calculate: (3 marks)

a) Total number of visitors

Working: _____

Answer: _____

b) Average visitors per ride

Working: _____

Answer: _____

4. If energy use increases by 10% next week, calculate the new totals. (3 marks)

New Energy = Current Energy × 1.10

(Add a new column to your table.)

5. Suggest how analysing this data could help improve park efficiency. (2 marks)

_____

_____