



# Help Sheet

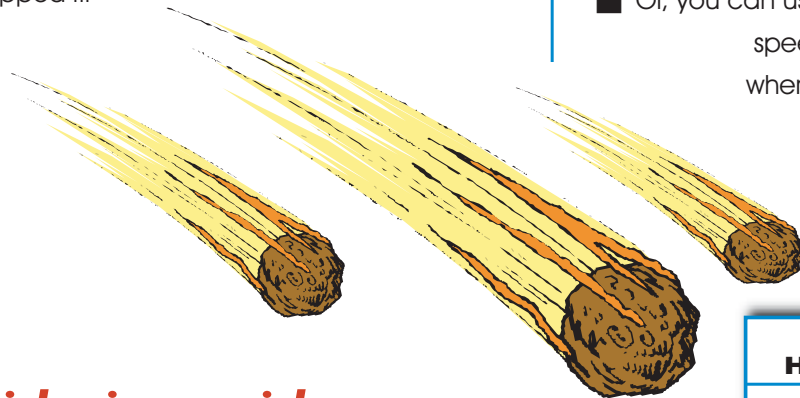
## Planning

### Think about:

- Doing a trial run to see how well your experiment works.
- How you will vary the speed or mass of the asteroid.
- What variables you need to keep the same to make it a fair test.
- Making a prediction, from what you know about energy (and the information below).
- Explain your prediction. Use what you have learnt about kinetic energy.

### Useful information about energy:

- The more kinetic energy the object has:
  - a) the bigger the crater is, and
  - b) the further the debris travels.
- The kinetic energy the object has on impact = the (gravitational) potential energy it started with when you dropped it.



## Considering evidence

### Think about:

- How you will present your results: in a table, chart or graph?
- How you will draw a conclusion from your results.
- Your conclusion must be based on your results.
- Whether your conclusion agrees with the prediction you made.

## Evaluation

### Think about:

- Are the repeats of your results close enough together to show that they are reliable?
- How could you improve either the method you used or the accuracy of your measurements?

## Making observations

### Think about:

- What range of measurements you will need to make to give reliable results.
- How you will measure speed, mass and distance accurately.
- How you can reduce the errors in your experiment.
- How many times you need to repeat your measurements so your results are more accurate.

### Useful information about speed and height:

- The impact speed of the asteroid is related to the height you drop it from.
- It is much easier to measure the drop height than the impact speed.
- You can use the table below to convert your drop heights to impact speed.
- Or, you can use the formula:

speed,  $v = \sqrt{20 \times \text{height}}$ ,  
where the height is in metres.

Drop Height (m)	Impact Speed (m/s)
0.2	2.0
0.4	2.83
0.6	3.46
0.8	4.00
1.0	4.47
1.2	4.90
1.4	5.29
1.6	5.66