Stage 1 Physics – Practical Investigation: Free Design

# Purpose

The aim of this task is to explore a physics principle or phenomenon by designing and conducting an experiment or building a device. Your investigation may involve measurable variables, but it doesn’t have to, you can also test ideas, demonstrate concepts, or explore how something works.  
  
This is a student-led investigation, so creativity and curiosity are encouraged. You’ll discuss your idea with your teacher before starting to make sure it’s appropriate and achievable.

# Planning and Design

## 1. Define Your Focus

What is the phenomenon or principle you’re investigating?

What is your main question or goal?

If applicable, identify:  
- Independent variable (what you’ll change)  
- Dependent variable (what you’ll observe or measure)

## 2. Explore Influencing Factors

For each factor that could affect your investigation:  
- Explain its effect using relevant physics.  
- Describe how it could be measured or observed.  
- Consider how well it can be controlled.  
- Decide whether it’s worth including in your design.

## 3. Hypothesis or Prediction

Write a hypothesis or prediction based on your understanding of the physics involved. Include reasoning and any initial research.

## 4. Design Your Approach

Describe at least two possible ways to carry out your investigation.

Discuss potential difficulties or limitations.

Choose your preferred method and justify your choice.

## 5. Equipment and Setup

List the equipment you’ll need.

Write a clear, step-by-step method.

Include a diagram of your setup.

Justify your method by comparing it to alternatives or explaining why it suits your goal.

## 6. Expected Outcomes

Describe what kind of results or observations you expect.

If applicable, prepare a results table or plan for how you’ll record data.

Explain how you’ll present your findings (e.g. graph, photos, written explanation).

# *Conducting the Investigation*

*Once your plan is approved by your teacher:  
- Carry out your experiment or build/test your device.  
- Record results, observations, and any changes to your method.*

# 7. Reporting Your Findings

## Method Implemented

Note any changes from your original plan and explain why.

## Results and Observations

Present your findings clearly.  
Include graphs, tables, photos, or diagrams as needed.

## Discussion

Reflect on reliability, accuracy, and validity.  
Identify sources of error or uncertainty.  
Evaluate how well your investigation explored the chosen principle or phenomenon.

## Conclusion

Summarise what you learned.  
Link back to your original question or hypothesis.  
Highlight key insights or unexpected outcomes.