If the Shoe Fits – Worksheet

By Louise Lopes, based on the workshop investigation by Karen Daniels

Introduction

Many people play sport. Some are played inside, some outside. Some are played on courts; some are played on grassed ovals. Some sports need shoes with lots of friction; some want only a small amount of friction. This has led to a wide variety of shoes being developed by manufacturers to suit a range of conditions.

Shoes worn by students in the gym during an exercise at Deakin University, Melbourne Burwood Campus. Photograph © Deakin University.

We have three different types of “shoes”, all of which need a person inside which acts as a weight that pushes downwards onto the sole. There are:
- Spiked shoes, commonly used in athletics, and various codes of football;
- Rubber soled shoes, commonly used in jogging, basketball, netball, tennis, etc.
- Leather soled shoes, commonly used in fashion, competition dancing, etc.

We also have three different types of surfaces that these shoes might be worn on:
- Carpet “grass”, used for tennis courts, hockey pitches, indoor cricket, etc.
- Sandpaper “track”, which is a model for the rough surfaces on athletics tracks, etc.
- Wooden “flooring”, used for indoor basketball, netball, competition dancing, etc.

You will need to choose one of the “shoes” to test on the three surfaces or one of the surfaces to test the three “shoes” on.

Questions

You will set your own question for this investigation. Carefully consider the information presented in the Introduction and refer to the below section (Plan) for a materials list.

Scientific Questions: When scientists and engineers ask a scientific question, they make a prediction: if **this thing** is changed, then **that** is expected to happen. In testing that prediction, they try to keep all other factors unchanged.

Suggest a couple of scientific questions that you could ask using your experimental equipment and materials:

Some scientific questions will be more suitable for investigation in a classroom setting. Your teacher will lead a discussion to decide which scientific questions will be investigated. Your group will then decide how to investigate that question.

The **scientific question** that my group will investigate is:

Scientific Report: A scientific report is a standard way of reporting what has been done in a scientific investigation. Here, you are given prompts to complete the various sections of a scientific report:

- Aim
- Hypothesis
- Method
- Results
- Discussion
- Conclusion
- List of references

Aim: You will need to write an aim that reflects both your independent and dependent variables. Remember the aim usually starts with a "To …"

To...

Hypothesis: You will also need to use your independent and dependent variables to write a **hypothesis**, which usually has the format, "If the **independent variable** has <*a specific change*>, then the **dependent variable** will …"

Our hypothesis is:

Plan

These are the **materials** you will be using:

- spiked shoe
- rubber-soled shoe
- leather-soled shoe
- carpet "grass" lined board
- sandpaper "track" lined board
- wooden "flooring" board
- spring balances
- sandbag weights

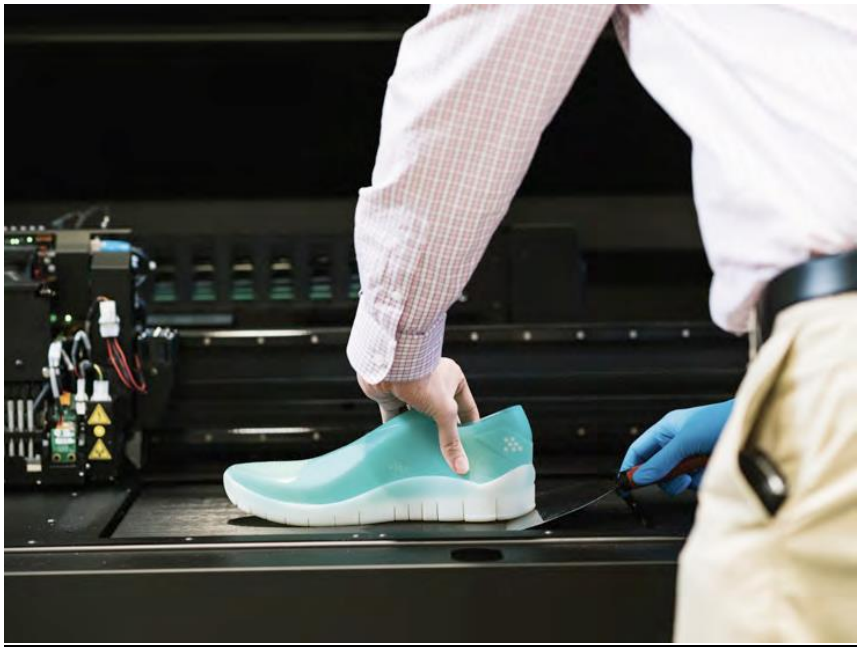
Shoe(s) chosen:

Surface(s) chosen:

What is the **independent variable** that you will be changing?

What is the **dependent variable** that you will be changing?

What are some of the variables that you will need to control while you do this experiment? (These are your **controlled variables**.)



The model of a shoe is perfected in research at Deakin University, Geelong Waurn Ponds Campus.
Photograph © Deakin University.

Method: What **experimental method** will you need to take to test your hypothesis? Remember that this needs to be written in numbered step format and not include anything personal. If you need to repeat a number of steps, then say “repeat steps 5 to 7 with …. changed" rather than rewriting it all again. Make sure that you specifically say how you will be keeping the controlled variable consistent and what to record as results.

Conduct

Carry out your plan with your lab group and record your results below. Ensure to record both qualitative and quantitative observations along the way.

Results: Qualitative results are observations and information that cannot easily be measured. **Quantitative results** are numerical measurements, obtained through a measuring instrument which can give accurate results.

You might use written text, pictures or tables:

Analysis

Use graphs or diagrams to record, represent and describe patterns or relationships in your observations and data.

Problem-Solving

This section consists of what you think is the meaning of your **results**. Here you might compare **results** with predictions (in the **hypothesis**) and develop explanations for what you have observed or measured.

Conclusion

The word "**conclusions**" has two different meanings:

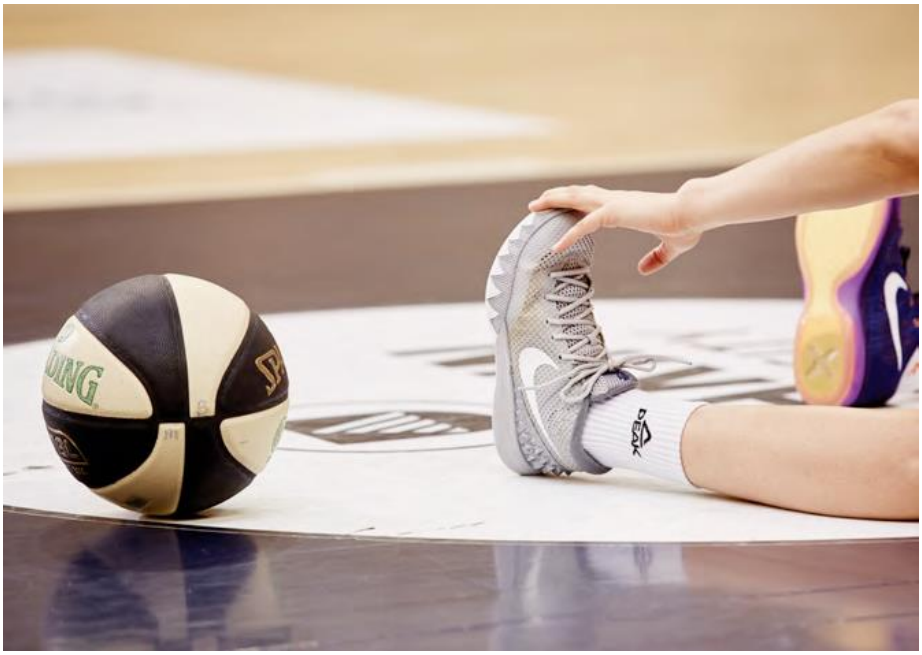
1. the **end** or **closing statement** (**summary**) of a piece of writing. This is what is intended for the **conclusion(s)** of a scientific report;

2. **judgement** or **finding(s)** reached by analyses or thinking about the **results**. Any deductions, inferences, interpretations, and judgements about the **results** should be in the **discussion** section.

The **conclusion(s)** has (have) a very brief summary of the hypothesis, method, main results and major findings of the investigation.

References

Normally, you would list the books, websites, and other sources of information that have been used in thinking about this investigation. A list of references will not be required for this report.



Feet of Boomers players while stretching, showing specialised basketball shoes. Deakin University, Melbourne Burwood Campus. Photograph © Deakin University.