Year 8 Science Independent Learning Project

Bend it Like Beckham!

Start date:	Due date:	My target level:

Aims/Learning Outcomes:	**Success Criteria:**	
Use and evaluate a model leg Plan an experiment to collect data on speed Process and evaluate data collected	**L4** Link model to human movement, select appropriate equipment. **L5** Collect reliable data using suitable variables. Draw a graph of results and perform appropriate calculations. Explain how the model works using scientific knowledge **L6** Evaluate the model leg and justify choices made during planning **L7** Use error bars to check precision, suggest improvements to collect more reliable data (QWC)	
What you need to do	**Extension Task**	**Useful Keywords**
Guidelines: You are going to learn how the leg muscles work to apply a force on a football. You will use your knowledge of forces to design an experiment to collect data on the motion of a football. **You Must:** Use a model to explain how a leg works Design and carry out an experiment Use correct spelling, punctuation and grammar. **You Should:** Evaluate the model Make supported conclusions based on your data	**You Could:** Critically analyse your results and method, suggesting ways to improve using a higher level of scientific vocabulary. Use advanced processing techniques.	Antagonistic muscle Effort Pivot Lever Load Skeleton Speed Velocity Acceleration Balanced force Decelerate Force Independent Variable Dependent Variable Control Variable Precision Accuracy Reliability

These steps will be helpful when completing the project. Your teacher will mark your work at these checkpoints.

Checkpoint 1, due:

Construct the model leg, explain how it works, link the motion in the model to the motion in human muscles and evaluate the model.

Extension
Suggest an alternative model that could illustrate the same movement and compare the effectiveness of this model to the original.

Checkpoint 2, due:

Completed plan including equipment, method, variables, data range, risk assessment and blank table of results.

Extension
Justify choices made during planning

Checkpoint 3, due:

Results and graph – your teacher will check that the results are valid and the graph is drawn correctly.

Extension
Use error bars to check precision, suggest improvements to collect more reliable data

My notes

Teacher notes

Lesson 1
Body machine

Lesson 2
Build model leg
Homework – evaluate

Checkpoint 1

Lesson 3
Speedy sums

Lesson 4
Practical intro
Homework – write the plan in full

Checkpoint 2

Lesson 5
Distance time graphs

Lesson 6
Carry out prac,

Lesson 7
Draw graph – **checkpoint 3**
Conclusion
Homework – evaluation

Level	Description
3	• Can identify how model is similar/different to actual human leg • **Identify** a variable • **Select equipment** • Collect data
4	• Can link model action to movement in human leg and muscle action • Include a **fair test** • **Select appropriate equipment** • Collect a suitable number and range of data points and plot a graph
5	• Can explain the model using detailed knowledge of above and identify strengths and weaknesses. • Select the **most suitable variable** for the test (e.g. m or cm or km or miles) • **Explain why** certain pieces of equipment are needed for this investigate (e.g. stop watch) • Reliable data plotted correctly on a suitable graph.
6	• As above and can propose other models with supporting arguments for and against each one • **Apply scientific knowledge** in the planning (e.g. could refer to the formula for speed) • Recognise which variables are **independent** and **dependent** • **Justify your choices** of data collection method and propose numbers of observations and measurements • As above and use more than one mathematical operation to process data (e.g. calculate speed)
7 (based on practical only)	• Advanced mathematical operations (e.g. error bars) • Higher level of written communication • Suggestions given to improve the data collection to provide accurate and reliable results.