Biomechanical Analysis of a Sport Skill

PSK4U | Student laboratory assignment | 1 of 4

Prepare for your investigation

Name: _____ Date: _____ Class: _____

Research question

How do release angle and release speed affect the horizontal distance of a ball thrown from a constant height?

Learning goal: use the virtual model to gather evidence, explain biomechanical analysis of a sport skill and communicate a supported conclusion.

Materials: WorksheetGalaxy virtual laboratory, this assignment, calculator or spreadsheet if needed. Virtual observations only; do not recreate hazardous procedures or perform physical fitness tests without teacher approval.

1. Define two relevant scientific terms from the Background Information tab. (K/U)

2. Write a prediction or hypothesis with a scientific reason. (K/U, T/I)

3. Identify the variable or feature compared, the measured outcome and constants or consistent observation criteria. (T/I)

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Perform the virtual laboratory

Open the corresponding virtual lab and read Background Information. Follow the investigation instructions below. Record authentic simulated results; do not invent data.

• Write a hypothesis identifying the independent, dependent and controlled variables.

• Set release height to 1.8 m and speed to 15 m/s. Run throws at 20°, 30°, 40°, 45°, 50° and 60°. Record each trial.

• Keep angle at 40° and height at 1.8 m. Compare release speeds of 10, 15 and 20 m/s.

• Compare the plotted trajectories and graph the recorded trials.

• Identify the longest throw in your trials and explain the result using projectile motion.

• Discuss at least two reasons why a real athlete might not reproduce the simulated result.

Record each completed observation using the simulator’s record control when available. Use Data & Graphs to review results. Export CSV if available; attach additional rows or screenshots when needed.

Record the exact settings and any changes to the method.

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Observations & results

Enter the actual results. Keep trial IDs consistent between continued tables. Attach the full exported data or extra sheets when the procedure requires more rows. Include units as displayed.

Data table 1

Trial / item	Angle (°)	Speed (m/s)	Height (m)	Range (m)	Flight (s)

Data table 1 — continued (2)

Trial / item	Peak (m)

Qualitative observations / sample calculation (show units where applicable)

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Analysis, conclusion & assessment

4. Present a labelled graph of a measured relationship, or an annotated diagram / comparison chart for qualitative investigations. Attach it separately. Explain the pattern using recorded evidence. (C, T/I)

5. Analysis: Why did some throws travel farther? (K/U, A)

6. Compare two contrasting observations from your investigation of Biomechanical Analysis of a Sport Skill. Explain the difference using the background information. (K/U, A)

7. Use a specific recorded result to answer the research question. Explain the scientific reasoning behind it. (K/U, A)

Conclusion and evaluation: answer the research question, revisit the prediction using evidence, identify a model limitation and propose an improvement. (T/I, A)

Submit this assignment plus your completed Lab Report (printed or saved as PDF from the lab) and any supporting data/figures.

K/U: accurate concepts /10	T/I: method, data, reasoning /12	C: clear tables, units, report /8	A: explanation, conclusion, transfer /10

Total: /40