Mirrors, Lenses & Ray Diagrams

SNC2D | Student laboratory assignment | 1 of 4

Prepare for your investigation

Name: _____ Date: _____ Class: _____

Research question

How do optical element type, focal length and object distance influence image position, size and orientation?

Learning goal: use the virtual model to gather evidence, explain mirrors, lenses & ray diagrams 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.

• Predict image characteristics for a converging lens with object distance greater than twice the focal length.

• Select a converging lens, set f = 20 cm and test object distances of 60, 40, 30, 20 and 10 cm. Record each trial.

• Repeat with a diverging lens, a concave mirror and a convex mirror. Compare signs of d_i and m.

• Use plane-mirror mode to test the equal-distance image rule.

• Use reflection mode to change the incident angle and compare the reflected angle.

• Explain what happens when the object is at the focal point and why a finite image is not drawn.

• Safety: Do not direct sunlight through a converging lens onto eyes or flammable materials. This is a virtual experiment; no physical optical equipment is required.

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	Mode	d_o (cm)	f (cm)	θ (°)	d_i (cm)

Data table 1 — continued (2)

Trial / item	m	Image

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. Compare two contrasting observations from your investigation of Mirrors, Lenses & Ray Diagrams. Explain the difference using the background information. (K/U, A)

6. 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