Design an Experiment Project: Student Planning Guide

Driving Question:
How can I use commonly-found lab equipment and materials to design and execute an experiment that demonstrates a fundamental chemistry topic that we have not already covered?

🗓️ Project Timeline & Deadlines

Task	Description	Due Date
Brainstorm	Record topic ideas and questions	___
Experiment Proposal Draft	Include concept, materials, and procedure	___
Peer Feedback & Revision	Review 1 peer project and revise your own	___
Experiment Execution	Perform your experiment and record data	___
Analyze Results	Organize data and write conclusions	___
Final Presentation	Create your poster, video, or demo	___
Public Showcase	Present your experiment to the audience	___
Final Reflection	Write about what you learned	___

This project was created using ChatGPT and a highly specific prompt that I have summarized in the citation below. I read the materials that were generated and edited them to better match the goals for this class. It's a bit of an experiment on my part, and I'll be interested in your feedback. – Megan

"... generate a project-based learning plan … to answer the driving question: how can I use commonly-found lab equipment and materials to design and execute an experiment that demonstrates a fundamental chemistry topic …" prompt. ChatGPT, version GPT-4-turbo, OpenAI, 27 April 2025, chat.openai.com.

💡 Step 1: Brainstorm & Planning

Possible Chemistry Topics We Have Not Yet Studied:

Experiment Idea(s):

What materials might you use? They must be safe and easily accessible (preferably something we already have in the lab).

What question will your experiment help answer or what concept will you demonstrate?

🧪 Step 2: Experiment Proposal Planner

Use this to help draft your experiment before peer review.

- **Title of Experiment: _____**
- **Hypothesis or Concept Demonstrated:**

- **Materials Needed:**

1. _____
2. _____
3. _____

- **Procedure (write in steps):**

1. _____
2. _____
3. _____
4. _____
5. _____

- **Safety Considerations**

🔁 Step 3: Feedback & Revision

Who gave you feedback? _____

What was their suggestion?

What will you change?

📊 Step 4: Conduct the Experiment

Record any observations, notes, and data on a separate page and attach it.

📣 Step 5: Prepare Your Presentation

What format will you use?
⬜ Poster board ⬜ Video demo ⬜ Slideshow ⬜ Live demonstration

What to include:

- Title of Experiment
- Chemistry Concept Explained
- Materials & Procedure
- Data/Results
- Conclusion & What You Learned

✍️ Final Reflection

What was the biggest challenge, and how did you solve it?

What did you learn about chemistry through this project?

If you did this project again, what would you change or improve?

This project was worth doing:

Disagree 1 2 3 4 5 Agree

I found this project interesting:

Disagree 1 2 3 4 5 Agree

I thought this project was fun:

Disagree 1 2 3 4 5 Agree

🎓 Project Rubric

Criteria	4 - Exemplary	3 - Proficient	2 - Developing	1 - Beginning
1. Scientific Understanding (Chemistry Concept)	Demonstrates a deep, accurate understanding of the chosen chemistry concept; explains its relevance clearly in both the procedure and presentation	Demonstrates a clear and mostly accurate understanding of the chemistry concept; relevance is explained	Shows a partial or somewhat inaccurate understanding of the concept; explanation is vague or unclear	Shows minimal understanding or significant misconceptions about the chemistry concept
2. Experimental Design & Execution	Procedure is clear, detailed, and replicable; variables are controlled appropriately; experiment is executed safely and successfully	Procedure is mostly clear; most variables are controlled; experiment is executed with few issues	Procedure is incomplete or unclear; some variables are not addressed; issues in execution	Procedure is unclear or missing; unsafe practices or major issues in execution
3. Data Collection & Analysis	Data is well-organized, accurate, and analyzed thoughtfully; conclusions are supported by evidence	Data is mostly organized and accurate; analysis supports basic conclusions	Data is incomplete or inconsistently recorded; limited or weak analysis	Little to no data recorded; no analysis or unsupported conclusions
4. Communication & Presentation	Presentation is creative, clear, and engaging; information is scientifically accurate; visuals/media enhance understanding	Presentation is clear and organized; most information is accurate; visuals are present	Presentation lacks clarity or engagement; some inaccuracies or missing visuals	Presentation is confusing, incomplete, or largely inaccurate
5. Reflection & Revision	Reflects deeply on successes and challenges; shows evidence of multiple meaningful revisions and learning growth	Reflects on key aspects of the project; evidence of at least one revision based on feedback	Limited reflection; revision is minimal or superficial	Little to no reflection; no evidence of revision