

# ADVANCED PLACEMENT PHYSICS INDEPENDENT PROJECTS GRADING CRITERIA - 300 POINTS

The function of an independent project is to enable students to pursue topics of special interest in Physics while at the same time fostering a number of other skills which are not otherwise specifically encouraged by normal classroom activities. As such, each project should meet each of the following criteria.

1. Each project should foster the development of **CREATIVITY AND ORIGINALITY**. This means that each student working on a project is expected to thoroughly investigate the theoretical background behind the selected topic and then to use that material in the development of the project in what is, hopefully, a new or innovative approach. [50 pts]
2. Each project should culminate in a significant, demonstrable **FINAL PROJECT**. This project is expected to demonstrate/illustrate the concepts behind the applicable project. The project will be evaluated on the quality, as well as the effort, involved in its development. [50 pts]
3. Each project will be concluded by an **ORAL REPORT**. This report is expected to involve all members of the group who worked on the project and will be presented to the entire class at the completion of the project. [50 pts]
4. Each project will finally culminate in a **WRITTEN REPORT**. Each member of the group will be expected to contribute to a final, written report which should encompass all aspects of the project. [50 pts]
5. **EVERY student** is expected to contribute significant **EFFORT** toward the completion of the final project. [50 pts]
6. Each project group is expected to maintain and submit a complete and up-to-date **DAILY LOG**. [50 pts]

**Creativity and originality** - This property of the project may involve some or all of the following:

- a. Does the choice of the project demonstrate original or creative thought?
- b. Does the approach to the project demonstrate original or creative thought?
- c. Does the use of materials and/or equipment demonstrate original or creative thought?
- d. Does the project involve the development of new equipment or the use of old equipment in a new or innovative way?

**Final project** - The final product is expected to include some or all of the following:

- a. A specific construct which demonstrates the concepts behind the project.
- b. Charts and/or graphs which explain, compare, contrast or illustrate the concepts behind the project.
- c. The quality and detail of the project will count very much toward the evaluation of the final product.

**Oral report** - The oral report is expected to be given by the group as a whole and it is expected that **ALL** members of the project group are full participants in the oral report. The oral report is expected to take between 5 and 10 minutes and is expected to include each of the following:

- a. A clear statement of the goal of the project.
- b. A clear explanation of the theory behind the project.
- c. An operational demonstration of the final project.
- d. An evaluation of the success or failure of the project to meet the stated goal.
- e. A statement regarding the possible future lines of research regarding the topic and relevant recommendations regarding potential improvements in the project.
- f. The oral report will be evaluated on organization, coordination and clarity as well as on the criteria listed above.

**Written report** - Each **group** is expected to submit a **written report** including each of the following:

- a. A clear statement of the goal of the project including the motivation behind the selection of the specific topic.
- b. A thorough analysis of the theory behind the project demonstrating significant research into the background of the topic.
- c. A clear description of the procedures used in the development of the project.
- d. A thorough analysis of the final produce and its relationship to the stated goal.
- e. A concluding statement regarding the success or failure of the project with relevant recommendations regarding future projects of a similar nature.
- f. The written report will be evaluated on content, organization, language and neatness.

**Effort** - This property of the project may involve some or all of the following:

- a. Does the student make full use of the available class time?
- b. Does the student demonstrate the use of outside time in the completion of the project?
- c. Does the student work cooperatively with his/her partners on the project?
- d. Are the written documents done with care and with an obvious investment of time?
- e. Are all required materials submitted in a timely manner?

**Project log** -Each project group is expected to keep a complete daily log which should include:

- a. A clear statement of the objectives for each day.
- b. Research done in the library including bibliographies and notes.
- c. Descriptions of any and all plans, proposals etc.
- d. A clear and complete record of what each group has done each day.
- e. The daily log will be evaluated on content, organization, language and neatness as well on the items listed above.

**Proposed time schedule** - The following schedule is tentative only.

- a. Project assignment - May 10
- b. Research phase - May 10-13
- b. Final topic selection - May 13
- d. Principle project phase - May 13 - June 9
- e. Interim report due - May 26
- f. Schedule of final reports will be issued - June 9
- g. Final Written reports due - June 9
- h. Final Oral Reports due - June 10, 13, 14, & 16

**Questions that each project participant should ask him or herself.**

1. Does the project demonstrate creativity or originality?
2. Is the goal of the project stated clearly and unambiguously?
3. Is each member of the group pulling his or her weight?
4. Is the project sufficiently limited so as to fit into the allotted time?
5. Is the approach to the project carefully organized?
6. Are you keeping a daily record of what you have achieved?
7. Have you succeeded in bringing the project to completion?
8. Were the results repeated or did the conclusion rest upon a single trial?
9. Did you carefully research the project before proceeding?
10. Are your data presented in a well organized, clear manner?
11. Were all of your data/results clearly labeled?
12. Are your procedures carefully described and explained?
13. Are you aware of the limitations of your data and the corresponding conclusions?
14. Did you carefully connect your goal, data and conclusions?
15. Are you overlooking something important?
16. Did you account for all relevant variables?

# **SAMPLE TOPICS FROM PREVIOUS YEARS**

1. WING AERODYNAMICS
2. REFLECTING TELESCOPE
3. RUBE GOLDBERG MACHINE
4. MILLIKAN OIL DROP
5. LASER HOLOGRAPHY
6. LINEAR INDUCTION MOTOR
7. WING AERODYMANICS
8. KALEIDOSCOPE
9. SPEAKER CROSSOVER NETWORK
10. HOVER BOARD
11. HIGH SPEED PHOTOGRAPHY
12. SUPER SNOOPER
13. LASER COMMUNICATIONS
14. LASER LIGHT SHOW
15. HOT AIR BALLOON
16. RADAR DETECTION
17. ELECTROMAGNETIC COIL GUN
18. LIE DETECTOR
19. COMPUTER SIMULATION
20. BUILDING AND FLYING A KITE
21. MAGNETIC LEVITATION AND PROPULSION
22. WATER FLOW AMUSEMENT RIDES
23. MAGNETIC ROBOTIC HAND
24. LIGHT POWERED INTRUSION ALARM