The Virginia Instructors of Physics
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NEWTONS-AN ALTERNATE ASSESSMENT

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Va. SOL:

All Physics SOLs

National Standards:

In grades 9-12, design tasks should explore a range of contexts including both those immediately familiar in the homes, school, and community of the students and those from wider regional, national, or global contexts. The tasks should promote different ways to tackle the problems so that different design solutions can be implemented by different students. Successful completion of design problems requires that the students meet criteria while addressing conflicting constraints. Where constructions are involved, these might draw on technical skills and understandings developed within the science program, technical and craft skills developed in other school work, or require developing new skills.

Topic/Concept

The object of this concept is to allow students to grasp information using their own strengths. Many students do not perform well on typical assessments like tests, but do understand the material conceptually and can prove their knowledge of the material if given the chance to show their knowledge in some other way.

Materials

- Depends on individual student's choice of assignment

Safety Considerations

None

Presentation

Material is presented after return of the first test. Students then choose whether to use them or not.

Newtons – An Alternative Assessment

There is no such thing as extra credit in my physics classes, however, there is an alternative to living with bad grades. This alternative is called the **Newton**. **Newtons** are alternative tasks that you may choose to do as an replacement of a bad grade or as an alternative to an assignment. The number of Newton's per semester varies with level. For Honors Physics, each student gets 2.

The **Newton** allows you to choose how and what you are going to do to replace a graded assignment. You also choose which assignment you are going to replace. I will not tell you what you have to do to replace the assignment, other than the following stated rules:

1. **Newtons** cannot be used to correct the grades on multiple assignments. This means if you don't do your homework you can't do a **Newton** to replace all your homework grades in a quarter.
2. **Newtons** cannot be used to improve a final grade.
3. **Newtons** must be completed individually. This means there are no group **Newtons**. It is expected that you will abide by the honor policy which means you will work on a Newton as if it were a test or quiz or individual project..
4. **Newtons** should be typed. Answer keys to worksheets or other materials that require that problems be worked out may be hand written. Handwritten Newtons are appropriate for board games, etc. If you aren't sure, ask.
5. Your teacher must PREAPPROVE **Newtons** other than those types listed on the form.
6. From time to time, I use previously submitted **Newtons** for class work or help for other students.
7. A cover sheet must be attached with every Newton. The coversheet should have:
    - Your name
    - Class
    - Date
    - A handwritten pledge "On my honor, I have neither given nor received aid on this Newton." with your signature.
    - An indication if there are any materials submitted with the Newton that you would like returned, if you want your Newton returned in total or if you do not want your Newton shared with other students.
8. Some examples of appropriate Newtons are: Games (board or Jeopardy type games), worksheets or workbooks, models of physics concepts, PowerPoint presentations, web pages, computer programs, and experiments. You may mix and match these as you feel.
9. When choosing a format for your assignment, play to your strengths.

Newton Details:

1. Replacement assignments will completely replace a given assignment. Proposals for replacement assignments are due 2 day after the original assignment is returned to you. For example, if you bomb a test, you must turn in a **Newton** proposal within 2 days (not class periods).

2. Replacement assignments must be completed within 3-7 days of proposal acceptance. Depending on the type of Newton. Weekends count as 2 days. This means if your proposal is approved on a Friday and you have 3 days, you MUST complete the assignment by 8:45 on Tuesday.
3. Replacement assignments must be on the same subject matter being assessed by the original assignment. For example, if we are studying velocity and acceleration, your chosen replacement assignment must prove your understanding of velocity and acceleration. You must be able to answer oral questions about the subject matter when you turn in your assignment.
4. If you do not complete the replacement assignment on time, your original grade stands and you lost one of your **Newtons**.
5. In general the best you can get on a replacement Newton is a B. It is possible to get an A based on showing extreme understanding on the

Excess Newtons:

1. No Newtons can be used on exams. You don't use both of them. They are gone until next semester.

Example Newtons:

The following is a list of possible Newton Formats that can be used to replace or do in place of specific assignments. Each format has some suggestions that will help improve the grade you receive on the Newton. You may do one or multiple of these. If you do multiple, you do not have to complete all the suggestions for all the formats. You should, however, check with Your teacher before you turn the Newton in to make sure you have enough to ensure an appropriate grade.

Games:

1. Games should encompass all types of problems and concepts used in unit.
2. There should be at least 5 problems of each type.
3. The student MUST make up problems. You MAY use problems in your book, syllabus, etc. to ensure you have all the appropriate information.
4. Answers must be provided with all work shown.
5. Creativity counts. The more unique the better the grade.
6. You may create board games or jeopardy style games.
7. Board games do not have to be typed. Instructions and rules should be typed on a separate sheet of paper.
8. Be prepared to come in and play your game against Your teacher or another student in order to prove your knowledge.

Worksheets

1. There should be a worksheet for each type of problem. For example, don't mix tension problems and linear motion force problems on the same worksheet.
2. The first page should describe the type of problem and give an example. The example MAY be from an existing problem. Step by step instructions that show how to solve the problem and why you take each step is encouraged.
3. The second and other pages should have at least 5 problems that will be solved similarly to the example.
4. The problems should not all ask for the same information. In other words, if you are doing linear motion problems, your problems should not always solve for displacement.
5. The student MUST make up problems. You may use problems in your book, syllabus, etc., to ensure you have all the appropriate information.
6. On a separate sheet, show how you solve each problem.
7. Worksheets MUST BE TYPED. Answer keys do not have to be typed.
8. Be prepared to come in and solve a problem similar to those found on your worksheet.

Models

1. Find an interesting object that incorporates the fundamentals of the unit we are discussing and build it. For example, for energy or momentum create a Newton's cradle.
2. Type a 1-2 page paper describing the physics in the object. Include a sample problem related to the object. For a Newton's cradle, you could design a problem dealing with a collision between the balls.
3. In the sample problem, show all your work.
4. Write and solve at least 2 other problems about the model.
5. Be prepared to come in and discuss the material and work a problem similar to those created about your model.

PowerPoint Presentations

1. The PowerPoint presentation should incorporate information about the concept.
2. All vocabulary terms must be provided.
3. Research and new information will be rewarded.
4. At least 3 worked problem should be included.
5. Link to an Internet site or sites that provide more information about the concept.
6. If you can find a video clip on the topic, include it. Make sure you include some information about why you feel it is relevant.
7. Develop a 10-question quiz at the end of the PowerPoint presentation that will go over the material. At least one question must be a problem using the equations in the unit. Either later in the presentation or on a separate sheet of paper provide a set of answers to the quiz question.
8. Be prepared to take a quiz similar to that on your presentation.

Web Page

1. Develop a website that provides all the information about the concept.
2. Define all the key terms.
3. Create links to other accurate websites that discuss the same topic.
4. Show at least 2 worked example problems similar to those on the test, syllabus or homework.
5. Provide links to web applets that provide interactive displays of the material. Develop a set of instructions for how to use and how to set up specific examples using the applets.
6. Develop a 10 question quiz on the subject matter
7. Include on the website the answers for the worked problems.
8. Link to an appropriate video clip.
9. Be prepared to discuss the website contents in detail.

Computer Program

1. Create a C or JAVA computer program that will allow a user to pick types of example problems and enter data for specific variables.
2. Display how the problems would be solved using the entered data. Show all work. The display should show the problem with the specific entered values for variables should be capable of being printed.
3. Typed instructions on how to use the program
4. Typed description of the types of problems available in the program. This description should include a discussion of each problem and an example of how to solve them with real numbers.

Experiments

1. Choose a concept or law in the unit.
2. Develop a hypothesis about this concept or law.
3. Design an experiment to prove or disprove the experiment.
4. Run the experiment
5. Analyze the data associated with the experiment
6. Write a full lab report on the experiment.
7. The lab report will be graded as follows:
    a. 25 percent Introduction
    b. 10 percent Procedure or Plan of Action
    c. 10 percent Data
    d. 20 Percent Data Analysis
    e. 35 Percent Conclusion
8. Use your lab report write-up guidelines and lab report feedback from Your teacher to help you on your lab report.

Other Formats considered:

3-4 page typed “How things work” papers with mathematical examples included
3-4 page typed papers on the topic with mathematical examples included.
Other formats that will meet the requirements of the specific examples listed above.
Make sure you provide detailed descriptions of what is going to happen

Newton Proposal

Name:

Assignment:

Newton Format:

- ❑ Design and Build a Game (Board, Jeopardy, etc)
- ❑ Develop a worksheet
- ❑ Construct a model
- ❑ Design, perform and write up an experiment
- ❑ Design a PowerPoint presentation
- ❑ Design and build a website
- ❑ Design and develop a computer program
- ❑ Other

  Explain:

Description:

Teacher Tips Regarding Lab

Be strict on the proposal and project return dates.

Sources & References

None