

Views About Science Survey

Form P 20

Thank you for taking this survey which is intended to identify factors that affect people's understanding of physics, and to assist in the design of instructional material.

The survey is designed by Prof. Ibrahim A. Halloun in collaboration with Lebanese and U.S. researchers. For any information, please call Prof. Halloun at: 01-680382, or visit his web page at: <http://www.inco.com.lb/halloun..>

*All data are **confidential**. Your identity will not be disclosed to any party.*

Please:

*Do **not** write anything on this questionnaire.*

Mark your answers on the computer sheet.

*Use a **No. 2 pencil** only, and follow marking instructions on the computer sheet.*

*Make **only one** mark per item.*

*Do **not** skip any question.*

*Avoid guessing. Your answers should reflect what **you** actually and honestly think.*

Plan to finish the survey in 30 minutes.

Section I

Please answer each of the following 5 questions by choosing one of the provided alternatives.

1. By comparison to the rest of the class, how well can you understand the material presented in your current physics textbook when you read it on your own?
A: Excellent; B: Good; C: Average; D: Weak; E: Extremely Poor
2. By comparison to the rest of the class, how good are you in solving homework physics problems on your own?
A: Excellent; B: Good; C: Average; D: Weak; E: Extremely Poor
3. By comparison to the rest of the class, how well do you normally do in your current physics course exams?
A: Excellent; B: Good; C: Average; D: Weak; E: Extremely Poor
4. How often do you read about science in newspapers, magazines, or books other than your current school textbooks?
A: More than once a week; B: About once a week; C: About once a month;
D: Seldom; E: Never
5. How often do you watch science documentaries on TV?
A: More than once a week; B: About once a week; C: About once a month;
D: Seldom; E: Never

Section II

In each of the following 10 questions, the two options labelled (a) and (b) are mutually exclusive. Please answer each question by choosing *only one* of the corresponding two options, (a) *or* (b).

6. For me, reading my physics textbook is often:
 - (a) an enjoyable experience.
 - (b) a frustrating experience.

7. If I had a choice:
 - (a) I would never take any physics course.
 - (b) I would still take physics for my own benefit.

8. If we want to apply a method used for solving one physics problem to another problem, the objects involved in the two problems must be:
 - (a) identical in all respects.
 - (b) similar in some respects.

9. Different branches of physics, like mechanics and electricity:
 - (a) are related to each other by common principles.
 - (b) are separate and independent of each other.

10. Knowledge in chemistry is:
 - (a) related to knowledge in physics.
 - (b) independent of knowledge in physics.

11. Physicists say that electrons and protons exist in an atom because:
 - (a) they have seen these particles in their actual form with some instruments.
 - (b) they have made observations that can be explained by such particles.

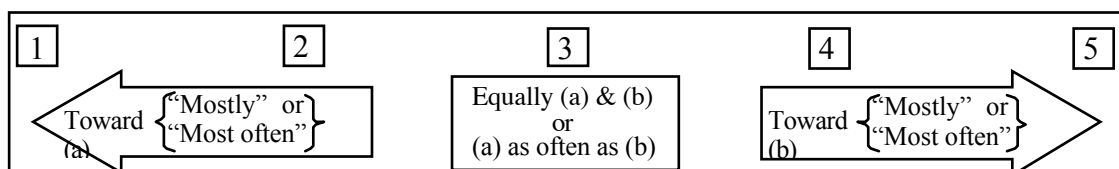
12. Physicists' current ideas about particles that make up the atom apply to:
 - (a) physical objects that could be anywhere in the universe.
 - (b) some physical objects in the universe but not others.

13. Newton's laws of motion (like his second law expressed in the form $\mathbf{F} = m\mathbf{a}$) apply to:
 - (a) physical objects that could be anywhere in the universe.
 - (b) some physical objects in the universe but not others.

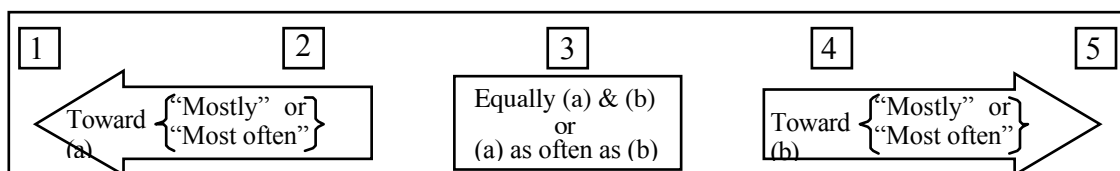
14. Physicists' current ideas about particles that make up the atom:
 - (a) will always be maintained as they are.
 - (b) may eventually be modified in some respects.

15. Newton's laws of motion:
 - (a) will always be used in their present form.

20. For me, doing well in physics courses depends on:
- how much effort I put into studying.
 - how well the teacher explains things in class.
21. In my opinion, for any question asked in class, a good physics teacher should be able to:
- provide the correct answer.
 - show how or where one may get the answer.
22. When I experience a difficulty while studying physics:
- I seek help, or give up trying.
 - I try to figure it out on my own.
23. When studying physics in a textbook or in course materials:
- I find the important information and memorize it the way it is presented.
 - I organize the material in my own way so that I can understand it.
24. For me, the relationship of physics courses to everyday life is:
- easy to recognize.
 - hard to recognize.
25. In physics, it is important for me to:
- memorize technical terms and mathematical formulas.
 - learn ways to organize information and use it.
26. In physics, mathematical formulas:
- express meaningful relationships among variables.
 - provide ways to get numerical answers to problems.
27. After I go through a physics text or course materials and feel that I understand them:
- I can solve related problems on my own.
 - I have difficulty solving related problems.
28. The first thing I do when solving a physics problem is:
- represent the situation with sketches and drawings.
 - search for formulas that relate givens to unknowns.
29. In order to solve a physics problem, I need to:
- have seen the solution to a similar problem before.
 - know how to apply general problem solving techniques.



30. For me, solving a physics problem more than one way:
- (a) is a waste of time.
 - (b) helps develop my reasoning skills.
31. After I have answered all questions in a homework physics problem:
- (a) I stop working on the problem.
 - (b) I check my answers and the way I obtained them.
32. After the teacher solves a physics problem for which I got a wrong solution:
- (a) I discard my solution and learn the one presented by the teacher.
 - (b) I try to figure out how the teacher's solution differs from mine.
33. How well I do on physics exams depends on how well I can:
- (a) recall material in the way it was presented in class.
 - (b) solve problems that are somewhat different from ones I have seen before.
34. To me, physics is important as a source of:
- (a) factual information about the natural world.
 - (b) ways of thinking about the natural world.
35. The laws of physics are:
- (a) inherent in the nature of things and independent of how humans think.
 - (b) invented by physicists to organize their knowledge about the natural world.
36. The laws of physics portray the real world:
- (a) exactly the way it is.
 - (b) by approximation.
37. Physicists use mathematics as:
- (a) a tool for analyzing and communicating their ideas.
 - (b) a source of factual knowledge about the natural world.
38. Scientific findings about the natural world are:
- (a) dependent on current scientific knowledge.
 - (b) accidental, depending on scientists' luck.
39. I answered the questions in this survey:
- (a) to the best of my ability.
 - (b) without thinking seriously about them.



Views About Science Survey

Form P 20 – Answer Sheet

ID No: _____

Gender: Male Female

Class: _____

Birthdate: 19__

Date: _____

Please mark the answer of your choice with an "X" as follows: A B C D E

- 1. A B C D E
- 2. A B C D E
- 3. A B C D E
- 4. A B C D E
- 5. A B C D E

- 6. a b
- 7. a b
- 8. a b
- 9. a b
- 10. a b
- 11. a b
- 12. a b
- 13. a b
- 14. a b
- 15. a b

- 16. 1 2 3 4 5
- 17. 1 2 3 4 5
- 18. 1 2 3 4 5
- 19. 1 2 3 4 5

- 20. 1 2 3 4 5
- 21. 1 2 3 4 5
- 22. 1 2 3 4 5
- 23. 1 2 3 4 5
- 24. 1 2 3 4 5
- 25. 1 2 3 4 5
- 26. 1 2 3 4 5
- 27. 1 2 3 4 5
- 28. 1 2 3 4 5
- 29. 1 2 3 4 5
- 30. 1 2 3 4 5
- 31. 1 2 3 4 5
- 32. 1 2 3 4 5
- 33. 1 2 3 4 5
- 34. 1 2 3 4 5
- 35. 1 2 3 4 5
- 36. 1 2 3 4 5
- 37. 1 2 3 4 5
- 38. 1 2 3 4 5
- 39. 1 2 3 4 5
- 40. 1 2 3 4 5

Answer options for items 16-39	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
	Toward {“Mostly” or “Most often”} (a)		Equally (a) & (b) or (a) as often as (b)	Toward {“Mostly” or “Most often”} (b)	

Taxonomy of Contrasting Views about Science (Form P20)

Scientific dimensions	Items
<p>1. Structure: Science is a <i>coherent body of knowledge</i> about <i>patterns</i> in nature revealed by <i>careful investigation</i></p> <p>- rather than a loose collection of directly perceived facts.</p>	9, 10, 11, 12, 13
<p>2. Methodology: The methods of science are <i>theory-laden, systematic</i> and <i>generic</i></p> <p>- rather than idiosyncratic and situation specific.</p> <p>Mathematics is a <i>tool</i> used by scientists for describing, connecting and analyzing ideas</p> <p>- rather than a source of factual knowledge.</p> <p>Mathematical modeling for problem solving involves <i>more</i></p> <p>- than selecting mathematical formulas for number crunching.</p>	8, 38 26, 37 26, 28
<p>3. Validity: Scientific knowledge is <i>approximate, tentative, and refutable</i></p> <p>- rather than exact, absolute and final.</p>	14, 15, 35, 36
<i>Cognitive dimensions</i>	
<p>4. Learnability: Science is <i>learnable by anyone</i> willing to make the effort</p> <p>- not just by a few talented people.</p> <p>Achievement depends more on <i>personal effort</i> and <i>perseverance</i></p> <p>- than on the influence of teacher, peers or textbook.</p>	16 20, 22
<p>5. Reflective thinking: For meaningful understanding of science, one needs to:</p> <p>(a) concentrate more on the development of <i>generic methods</i> for <i>construction</i> and <i>application</i> of scientific ideas</p> <p>- than on memorizing facts and procedures;</p> <p>(b) examine situations in <i>many ways</i></p> <p>- instead of following a single approach;</p> <p>(c) continuously <i>evaluate</i> one's own work for <i>consistency</i> and <i>effectiveness</i></p> <p>- instead of just accumulating new information from presumed authorities;</p> <p>(d) <i>reconstruct</i> new subject knowledge in one's own way</p> <p>- instead of memorizing it as given.</p>	25, 27, 29, 34, 19, 33 30 31, 32 21 23
<p>6. Personal relevance: Science is <i>relevant to everyone's life</i>.</p> <p>- It is not of exclusive concern to scientists.</p> <p>Science should be <i>enjoyed</i> and studied more for <i>personal benefit</i></p> <p>- than for fulfilling curriculum requirements.</p>	18, 24 6,7, 17