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Format: Pre/post, Multiple-choice, Agree/disagree

Duration: 8-10 minutes

Focus: Beliefs / Attitudes (epistemological beliefs)

Level: Upper-level, Intermediate, Intro college, High school

How to give the test

- Give it as both a pre- and post-test. This measures how your class shifts student thinking.
 - Give the pre-test at the beginning of the term.
 - Give the post-test at the end of the term.
- Use the whole test, with the original wording and question order. This makes comparisons with other classes meaningful.
- Make the test required, and give credit for completing the test (but not correctness). This ensures maximum participation from your students.
- Tell your students that the test is designed to evaluate the course (not them), and that knowing how they think will help you teach better. Tell them that correctness will not affect their grades (only participation). This helps alleviate student anxiety.
- For more details, read the **PhysPort Guides** on implementation:
 - **PhysPort CLASS implementation guide** (www.physport.org/implementation/CLASS)
 - **PhysPort Expert Recommendation on Best Practices for Administering Belief Surveys** (www.physport.org/expert/AdministeringBeliefSurveys/)

How to score the test

- Download the answer key from PhysPort (www.physport.org/key/CLASS)
- The “percent favorable score” is the percentage of questions where a student agrees with the expert response. (Dis)agree and strongly (dis)agree are counted as equivalent responses. Some questions do not have an expert response and are not counted. For instructions on scoring the CLASS, see the **PhysPort CLASS implementation Guide** (www.physport.org/implementation/CLASS)
- See the **PhysPort Expert Recommendation on Best Practices for Administering Belief Surveys** for instructions on calculating shift and effect size (www.physport.org/expert/AdministeringBeliefSurveys/)
- Use the **PhysPort Assessment Data Explorer** for analysis and visualization of your students' responses (www.physport.org/explore/CLASS)



CLASS

(Colorado Learning Attitudes about Science Survey)

Name: _____

Last 6 digits of your Student ID #: _____

Introduction

Here are a number of statements that may or may not describe your beliefs about learning physics. You are asked to rate each statement by circling a number between 1 and 5 where the numbers mean the following:

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

Choose one of the above five choices that best expresses your feeling about the statement. If you don't understand a statement, leave it blank. If you understand, but have no strong opinion, choose 3.

Survey

1. A significant problem in learning physics is being able to memorize all the information I need to know.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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2. When I am solving a physics problem, I try to decide what would be a reasonable value for the answer.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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3. I think about the physics I experience in everyday life.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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4. It is useful for me to do lots and lots of problems when learning physics.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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5. After I study a topic in physics and feel that I understand it, I have difficulty solving problems on the same topic.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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6. Knowledge in physics consists of many disconnected topics.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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7. As physicists learn more, most physics ideas we use today are likely to be proven wrong.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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8. When I solve a physics problem, I locate an equation that uses the variables given in the problem and plug in the values.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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9. I find that reading the text in detail is a good way for me to learn physics.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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10. There is usually only one correct approach to solving a physics problem.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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11. I am not satisfied until I understand why something works the way it does.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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12. I cannot learn physics if the teacher does not explain things well in class.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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13. I do not expect physics equations to help my understanding of the ideas; they are just for doing calculations.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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14. I study physics to learn knowledge that will be useful in my life outside of school.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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15. If I get stuck on a physics problem my first try, I usually try to figure out a different way that works.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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16. Nearly everyone is capable of understanding physics if they work at it.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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17. Understanding physics basically means being able to recall something you've read or been shown.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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18. There could be two different correct values to a physics problem if I use two different approaches.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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19. To understand physics I discuss it with friends and other students.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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20. I do not spend more than five minutes stuck on a physics problem before giving up or seeking help from someone else.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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21. If I don't remember a particular equation needed to solve a problem on an exam, there's nothing much I can do (legally!) to come up with it.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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22. If I want to apply a method used for solving one physics problem to another problem, the problems must involve very similar situations.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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23. In doing a physics problem, if my calculation gives a result very different from what I'd expect, I'd trust the calculation rather than going back through the problem.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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24. In physics, it is important for me to make sense out of formulas before I can use them correctly.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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25. I enjoy solving physics problems.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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26. In physics, mathematical formulas express meaningful relationships among measurable quantities.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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27. It is important for the government to approve new scientific ideas before they can be widely accepted.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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28. Learning physics changes my ideas about how the world works.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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29. To learn physics, I only need to memorize solutions to sample problems.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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30. Reasoning skills used to understand physics can be helpful to me in my everyday life.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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31. We use this statement to discard the survey of people who are not reading the questions. Please select agree-option 4 (not strongly agree) for this question to preserve your answers.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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32. Spending a lot of time understanding where formulas come from is a waste of time.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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33. I find carefully analyzing only a few problems in detail is a good way for me to learn physics.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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34. I can usually figure out a way to solve physics problems.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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35. The subject of physics has little relation to what I experience in the real world.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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36. There are times I solve a physics problem more than one way to help my understanding.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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37. To understand physics, I sometimes think about my personal experiences and relate them to the topic being analyzed.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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38. It is possible to explain physics ideas without mathematical formulas.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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39. When I solve a physics problem, I explicitly think about which physics ideas apply to the problem.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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40. If I get stuck on a physics problem, there is no chance I'll figure it out on my own.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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41. It is possible for physicists to carefully perform the same experiment and get two very different results that are both correct.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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42. When studying physics, I relate the important information to what I already know rather than just memorizing it the way it is presented.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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