Attitudes toward Problem Solving Survey (APSS)
Version 1

PhysPort
Supporting physics teaching
with research-based resources

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Format: Pre/post, Multiple-choice, Agree/disagree
Duration: 20 minutes
Focus: Beliefs / Attitudes (problem-solving)
Level: Intro college

How to give the assessment

- 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 APSS implementation guide** (www.physport.org/implementation/APSS)
    - **PhysPort Expert Recommendation on Best Practices for Administering Concept Inventories** (www.physport.org/expert/AdministeringConceptInventories/)

How to score the assessment

- Download the answer key from PhysPort (www.physport.org/key/APSS)
- 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.
- 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/)

To what extent do you agree with each of the following statements?
Answer with a single letter as follows:

A) Strongly Agree
B) Agree Somewhat
C) Neutral or Don't Know
D) Disagree Somewhat
E) Strongly Disagree

1. If I'm not sure about the right way to start a problem, I'm stuck. There is nothing I can do with that problem except to go see the teacher or a friend for help.

2. It is never alright to make approximations when solving textbook problems in introductory physics.

3. There are often several very different ways to correctly solve a given textbook problem in introductory physics.

4. In solving problems in physics, being able to handle the mathematics is the most important part of the process.

5. In solving textbook problems in introductory physics, identifying the physical principles involved in the problem is the most important part of the process.

6. "Problem solving" in physics basically means matching problems with the correct equations and then substituting values to get a number.

7. In solving textbook problems in introductory physics, I can often tell when my work and/or answer is wrong, even without looking at the answer in the back of the book or talking to someone else about it.

8. In solving textbook problems in introductory physics, I often find it helpful if I can look at the answer to the problem first, and then work backward.

9. To be able to use an equation in a problem (particularly in a problem that I haven't seen before), I need to know more than what each term in the equation represents.

10. There is usually only one correct way to solve a given textbook problem in introductory physics.

11. I have a general approach that I apply in solving all problems that are solvable using conservation of linear momentum.

12. I don't like it when I solve a textbook problem in introductory physics and the answer is not in the back of the book because then there is no way for me to evaluate whether my answer is incorrect.

13. I am comfortable trying to solving a problem even when I'm not sure whether or not the approach I'm using will lead to a solution.

14. Equations are not things that one understands in an intuitive sense; they are just givens that one can use to calculate numerical answers.

15. Solving problems in physics involves many pieces of information each of which applies primarily to a specific situation.

16. In doing a physics problem, if my calculation gives a result that differs significantly from what I expect, I'd have to trust the calculation.

17. If I came up with two different approaches to a problem and they gave different answers, I would not worry about it; I would just choose the answer that seemed most reasonable. (Assume the answer is not in the back of the book.)

18. When I solve most exam or homework problems, I explicitly think about the concepts that underlie the problem.

19. Suppose you are given two problems. One problem is about two masses attached by a string that passes over a pulley. One of the masses is sliding across a horizontal table and the other mass hangs off the end of the table, falling straight downward. The other problem is about a person swinging on a rope. You are told that both problems can be solved using the concepts of net force and acceleration (Newton's second law). Which of the following statements do you MOST agree with? Chose only one answer.

A) The two problems can be solved using very similar methods

B) The two problems can be solved using somewhat similar methods

C) The two problems must be solved using quite different methods

D) The two problems must be solved using very different methods

E) There is not enough information given to know how the problems will be solved.

20. Suppose you are given two problems. One is about a box sliding down an inclined plane. There is friction between the incline and the box. The other is about a person swinging on a rope. There is air resistance between the person and the air molecules. You are told that both problems can be solved using the concept of conservation of energy. Which of the following statements do you MOST agree with? Chose only one answer.

A) The two problems can be solved using very similar methods

B) The two problems can be solved using somewhat similar methods

C) The two problems must be solved using quite different methods

D) The two problems must be solved using very different methods

E) There is not enough information given to know how the problems will be solved.