



Developed by: Ben Zwickl and Heather Lewandowski

Amharic translation by: Yohanes Wolde-Senbet

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

Duration: 15 minutes

Focus: Beliefs / Attitudes (affect, confidence, math-physics-data connection, physics community, uncertainty, troubleshooting, argumentation, experimental design, modeling)

Level: Upper-level, Intermediate, Intro college

How to give the test

- Administer it online through the developers' website: tinyurl.com/ECLASS-physics. The developers will ask you to complete a Course Information Survey and then will set up and score the test for you.
- Give it as both a pre- and post-test. This measures student learning.
 - Give the pre-test before you cover relevant course material.
 - 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 E-CLASS implementation guide** (www.physport.org/implementation/ECLASS)
 - **PhysPort Expert Recommendation on Best Practices for Administering Belief Surveys** (www.physport.org/expert/AdministeringBeliefSurveys/)

How to score the test

- The overall E-CLASS 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. Student responses to individual items are coded simply as favorable (+1), neutral (0), or unfavorable (-1).
- Students' overall E-CLASS score is given by the sum of their scores on the individual items on the 3-point scale described above. This results in a range of possible scores from -30 to 30 points.
- Students' numerical E-CLASS scores are determined only by their responses to the prompt targeting their personal beliefs, rather than their prediction of what an experimental physicist would say.
- Score the E-CLASS through the developers' website (tinyurl.com/ECLASS-physics). Their system will score the test and prepare a report summarizing the results for your course and comparing them to other courses. You can see a sample report here: http://jilawwww.colorado.edu/~eclass/-CU%20Boulder_2015_12/report.html
- Use the **PhysPort Assessment Data Explorer** for analysis and visualization of your students' responses (www.physport.org/explore/E-CLASS)

E-CLASS Questions (ሙከራዊ ፊዚክስ መጠይቆች)
 Colorado Learning Attitudes about Science Survey for Experimental Physics
 ሙከራዊ ፊዚክስን አስመልክቶ የኮሎራዶ የሃይንስ ትምህርት ዝንባሌ ቅኝት

Developed by Ben Zwickl and Heather Lewandowski E-CLASS, 2013, version 2.
 ©Translation version of E-CLASS Questions List in Amharic.
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Each of the prompts in the list below is followed by the following two questions and response options:

	Strongly disagree	1	2	3	4	5	Strongly agree
What do YOU think when doing experiments for class?		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
What would an experimental physicist say about their research?		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

ከዚህ በታች የተዘረዘሩት መጠይቆች የሚከተሉትን ሁለት የጥያቄዎችና መልስ አማራጮች የሚከተሉ ናቸው።

	በጣም አልሰማም	1	2	3	4	5	በጣም እስማማለሁ
ለክፍል ሙከራ ስትሰራ/ሪ ምን ይሰማሃል/ሻል?		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
የሙከራዊ ፊዚክስ ሙያተኞች ስለምርምርቻቸው ምን ይላሉ?		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

E-CLASS prompts (ሙከራዊ ፊዚክስ ጥያቄዎች)

No. ተ. ቁ	Statements አረፍተ ሀሳብ	1	2	3	4	5
Q1 ጥ1	When doing an experiment, I try to understand how the experimental setup works. የሃይንስ ሙከራ በምስራብት ጊዜ የሙከራው ዝግጅት/setup/ እንዴት እንደሚሰራ ለመረዳት እሞክራለሁ።	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q2 ጥ2	If I wanted to, I think I could be good at research. ፍላጎቱ ካለኝ በምርምር ጥሩ እንደምሆን አስባለሁ።	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q3 ጥ3	When doing a physics experiment, I don't think much about sources of systematic error. የፊዚክስ ሙከራ በማከናወንበት ጊዜ ስለሥርዓታዊ /systematic/ ስህተቶች ምንጮች እምብዛም አልጨነቀም።	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q4 ጥ4	If I am communicating results from an experiment, my main goal is to create a report with the correct sections and formatting. ከአንድ ሙከራ ውጤቶችን በማገናኘት ጊዜ የኔ ዋና ግብ ሪፖርቱን በትክክለኛ ክፍሎቹና አቀራረቦቹ ማዘጋጀት ነው።	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q5 ጥ5	Calculating uncertainties usually helps me understand my results better. እርግጠኛነትን ከወዲሁ ማስላት ሁሌም ስለማገኘው ውጤት ጥሩ ግንዛቤ እንዲኖረኝ ይረዳኛል።	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

No. ተ. ቁ	Statements አረፍተ ሀሳብ	1	2	3	4	5
Q6 ጥ6	Scientific journal articles are helpful for answering my own questions and designing experiments. የሳይንስ ህትመቶች በአዕምሮዬ ውስጥ የሚብላሉ ጥያቄዎችን በመመለስና የማከናወኑን ምርመር በመንደፍ ረገድ ጠቃሚ ናቸው።	0	0	0	0	0
Q7 ጥ7	I don't enjoy physics experiments. የፊዚክስ ሙከራዎች አያስደስቱኝም።	0	0	0	0	0
Q8 ጥ8	When doing an experiment, I try to understand the relevant equations. ሙከራዎችን በማከናወኑት ጊዜ ጠቃሚ እኩልታዎችን/equations/ ለመረዳት ጥረት አደርጋለሁ።	0	0	0	0	0
Q9 ጥ9	When I approach a new piece of lab equipment, I feel confident I can learn how to use it well enough for my purposes. አንድ አዲስ የቤተሙከራ ቁሳቁስ ሲያጋጥመኝ ይህንን ዕቃ ለምድልገው አገልግሎት በሚገባ በማዋል ረገድ ስለአጠቃቀሙ መረዳት እችላለሁ የሚል የራስ የመተማመን ስሜት አሳድራለሁ።	0	0	0	0	0
Q10 ጥ10	Whenever I use a new measurement tool, I try to understand its performance limitations. አዲስ የልኬት መሣሪያ በምጠቀምበት ጊዜ የከንዋኔ ውሰንነቶቹን/limitations/ ለመረዳት እሞክራለሁ።	0	0	0	0	0
Q11 ጥ11	Computers are helpful for plotting and analyzing data. ጭብጦችን በማቀነባበር በመተንተንና በስዕል በማቅረብ ረገድ ኮምፒዩተሮች ጠቃሚ ናቸው።	0	0	0	0	0
Q12 ጥ12	I don't need to understand how the measurement tools and sensors work in order to carry out an experiment. ሙከራ በማከናወን ረገድ የልኬት መሣሪያዎችና መከታተያዎች/sensor/ እንዴት እንደሚሰሩ መረዳት አይጠበቅብኝም።	0	0	0	0	0
Q13 ጥ13	If I try hard enough, I can succeed at doing physics experiments. ተገቢውን ጥረት ካደረግሁ የፊዚክስ ሙከራዎችን በማከናወን ረገድ ውጤታማ መሆን እችላለሁ።	0	0	0	0	0
Q14 ጥ14	When doing an experiment, I usually think up my own questions to investigate. ሙከራ በማከናወኑበት ጊዜ ሁሌም የራሴን ጥያቄዎች በመከታተል ላይ አተኩራለሁ።	0	0	0	0	0
Q15 ጥ15	Designing and building things is an important part of doing physics experiments. የፊዚክስ ሙከራ ለማከናወን ንድፍ ማውጣትና ነገሮችን ማደራጀት ጠቃሚ ክፍሎች ናቸው።	0	0	0	0	0
Q16 ጥ16	The primary purpose of doing physics experiments is to confirm previously known results. የፊዚክስ ሙከራ ጠቀሜታ ከዚህ ቀደም የታወቁ ውጤቶችን ለማረጋገጥ ነው።	0	0	0	0	0
Q17 ጥ17	When I encounter difficulties in the lab, my first step is to ask an expert, like the instructor. ቤተሙከራ ውስጥ አስቸጋሪ ሁኔታዎች ሲያጋጥሙኝ በመጀመሪያ ደረጃ እንደ መምህር የመሳሰሉ ባለሙያዎችን እጠይቃለሁ።	0	0	0	0	0
Q18 ጥ18	Communicating scientific results to peers is a valuable part of doing physics experiments. ጠቃሚ የፊዚክስ ሙከራን በመሥራት ረገድ የተገኙትን ሳይንሳዊ ውጤቶች ለአቻ መግለፅ አንዱ ጠቃሚ ክፍል ነው።	0	0	0	0	0
Q19 ጥ19	Working in a group is an important part of doing physics experiments. የፊዚክስ ሙከራ ሲከናወን የቡድን ሥራ የሰራው አስፈላጊ ታሳቢ ነው።	0	0	0	0	0
Q20 ጥ20	I enjoy building things and working with my hands. ነገሮችን ሳደራጅና ሳከናውን በእጄ መሥራቱ ያስደስተኛል።	0	0	0	0	0

No. ተ. ቁ	Statements አረፍተ ሀሳብ	1	2	3	4	5
Q21 ጥ21	I am usually able to complete an experiment without understanding the equations and physics ideas that describe the system I am investigating. ሁሌም አንድን ሥርዓት የሚገልጽ እኩልታዎችን/equations/ የፊዚክስ ሃሳቦችን ሳልረዳ ሙከራዎችን ማጠናቀቅ አችላለሁ።	0	0	0	0	0
Q22 ጥ22	If I am communicating the results from an experiment, my main goal is to make conclusions based on my data using scientific reasoning. ከአንድ ሙከራ ላይ ውጤቶችን በምገልጽበት ጊዜ የኔ ዋና ግብ በጭብጦቹ ላይ በመመርኮዝ በሳይንሳዊው አመክንዮ ማጠቃለያውን መሥራት ነው።	0	0	0	0	0
Q23 ጥ23	When doing an experiment, I try to make predictions to see if my results are reasonable. ምርምርን በማከናወንበት ጊዜ ውጤቶቹ ምክንያታዊ ስለመሆናቸው ለመረዳት ትንበያ ለማድረግ እሞክራለሁ።	0	0	0	0	0
Q24 ጥ24	Nearly all students are capable of doing physics experiments if they work at it. በፊዚክስ ምርምር ላይ ካተኮሩበት ከሞላ ጎደል ሁሉም ተማሪዎች መሥራት አይሳናቸውም።	0	0	0	0	0
Q25 ጥ25	A common approach for fixing a problem with an experiment is to randomly change things until the problem goes away. ችግሮችን በሙከራ ለማስወገድ/fixing/ የተለመደው አገባብ ችግሩ አስኪወገድ ድረስ ነገሮችን በዘፈቀደ ማቀያየር ነው።	0	0	0	0	0
Q26 ጥ26	It is helpful to understand the assumptions that go into making predictions. ትንበያዎችን ለመስጠት እሳቤዎችን መረዳት ጠቃሚ ነው።	0	0	0	0	0
Q27 ጥ27	When doing an experiment, I just follow the instructions without thinking about their purpose. አንድን ሙከራ በማከናወንበት ጊዜ ጠቃሚነቱን ባለማገናዘብ የተቀመጡትን መመሪያዎች እከተላለሁ።	0	0	0	0	0
Q28 ጥ28	I do not expect doing an experiment to help my understanding of physics. የፊዚክስ ዕውቀቴን በተመለከተ ሙከራ ማከናወን ይረዳኛል ብዬ አልጠብቅም።	0	0	0	0	0
Q29 ጥ29	If I don't have clear directions for analyzing data, I am not sure how to choose an appropriate analysis method. ጭብጦችን ለመተንተን ግልጽ አቅጣጫ ከሌለኝ ተገቢውን የትንተና ዘዴ በመምረጥ ረገድ እርግጠኛ አልሆንም።	0	0	0	0	0
Q30 ጥ30	Physics experiments contribute to the growth of scientific knowledge. ሳይንስ ዕውቀት ማደግ የፊዚክስ ሙከራዎች አስተዋፅዖ አላቸው።	0	0	0	0	0