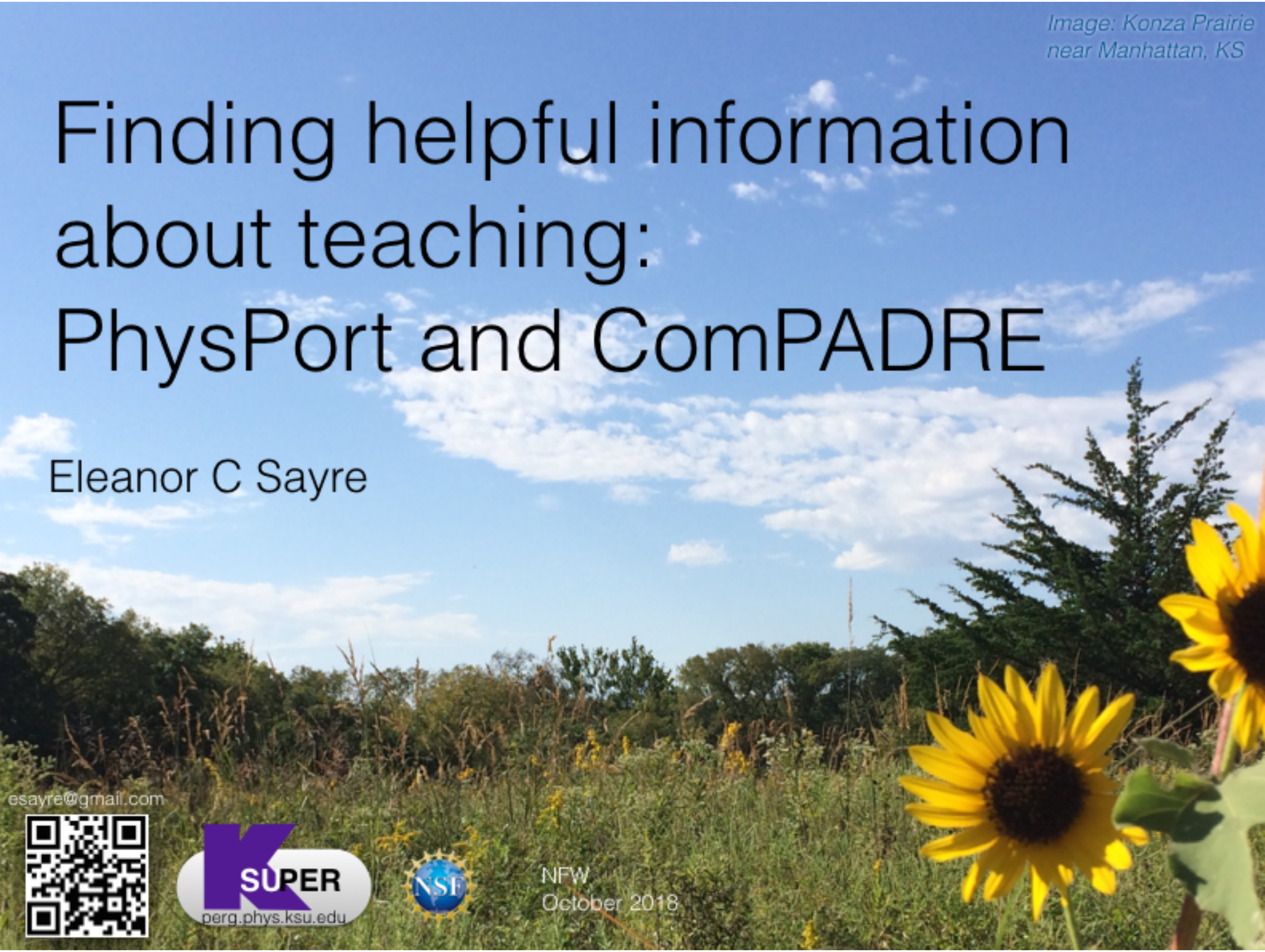



# Finding helpful information about teaching: PhysPort and ComPADRE

Eleanor C Sayre

esayre@gmail.com

perg.phys.ksu.edu

NFW
October 2018

# KSUPER

How do students learn physics?

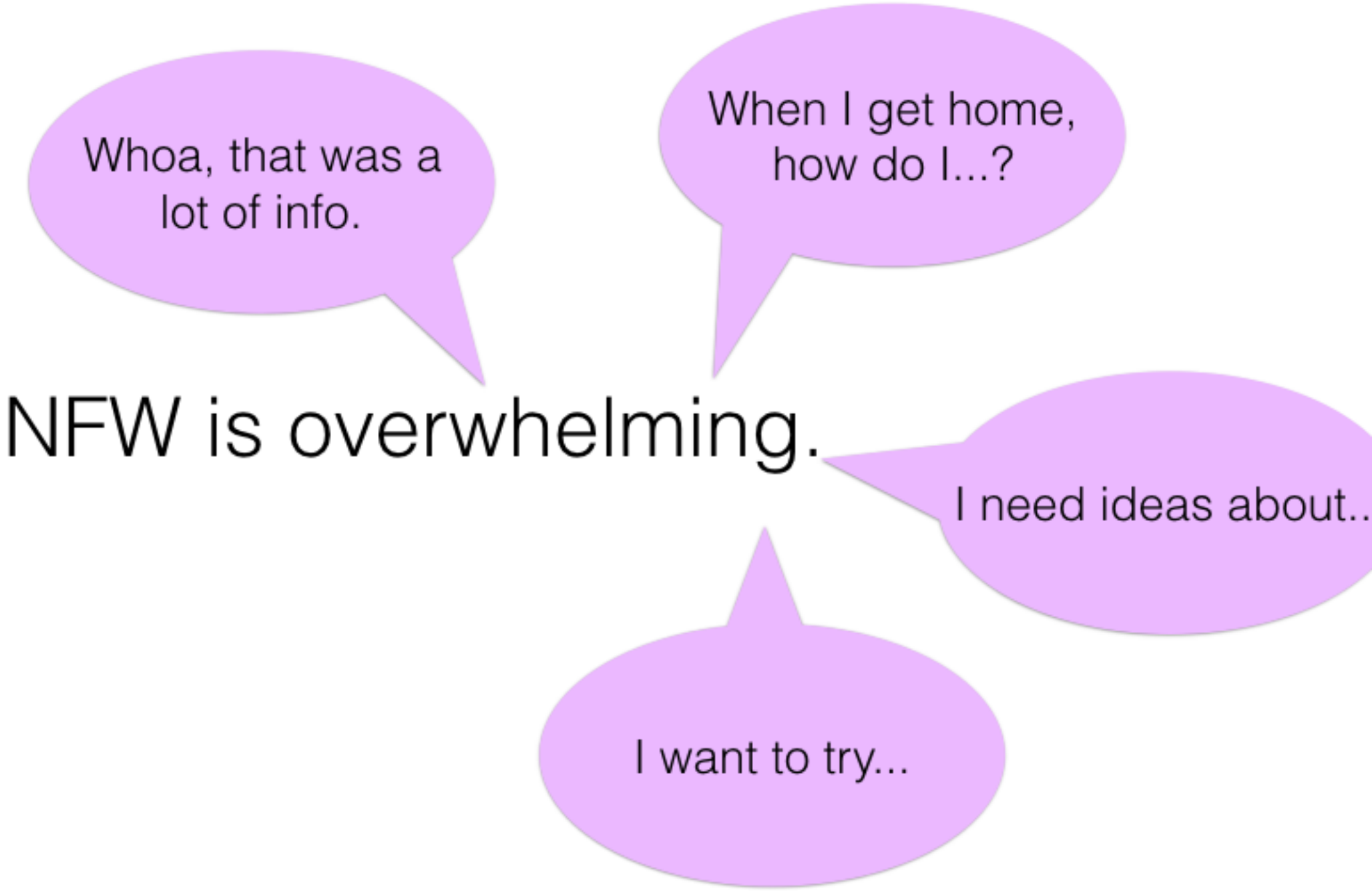
How to help faculty teach better?

PEER

How do people learn to research?

NSF

NFW is overwhelming.


Whoa, that was a lot of info.
When I get home, how do I...?
NFW is overwhelming.
I need ideas about..
I want to try...

# Good teaching is important.

How to help students learn more?

How do you know if students are learning?

# Good teaching is important.

How to help students learn more?

How do you know if students are learning?

# PhysPort can help.

Find information and advice

Change your teaching

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Change your teaching

free

friendly

powerful

research-based

# PhysPort

Supporting physics teaching with research-based resources

A web resource to support physics professors in using research-based teaching and assessment in their classes

## www.physport.org

Applied research into faculty needs
Synthesis research into best practices
Enable research into student learning

NSDL THE NATIONAL SCIENCE DIGITAL LIBRARY comPADRE SUPER AAPT

# www.physport.org

PhysPort
Supporting physics teaching with research-based resources

Admin | My Account | Logout
About Us | Contact Us

AAPT

Home | Expert Recommendations | Teaching Methods | Assessments | Workshops

Welcome to PhysPort (formerly known as the PER User's Guide), the go-to place for physics faculty to find resources based on physics education research (PER) to support your teaching. Learn more...

**Teaching**
*I want to...*
- find a new teaching method
- get implementation help
- learn more about research-based teaching

**Assessment**
*I want to...*
- interpret assessment results
- assess the impact of reforms
- assess advanced physics content or skills

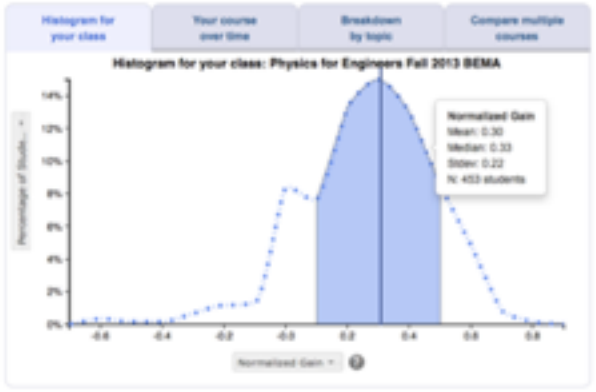
**Troubleshooting**
*I need help with...*
- covering enough material
- supporting group work
- arguments for skeptical colleagues

## Where can I find good questions to use with clickers or Peer Instruction?

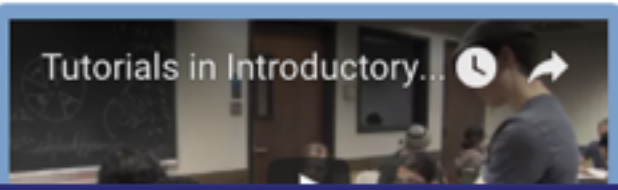
by Sam McKagan, PhysPort director — September 26, 2016

Many research-based teaching methods in physics, including Peer Instruction, CAE Think-Pair-Share, Technology Enhanced Formative Assessment, and teaching with clickers, involve having your students discuss and answer multiple-choice conceptual questions. A challenge of using these methods is finding and writing good questions. This recommendation helps you find and write questions for your class.

**NEW - PhysPort Data Explorer**

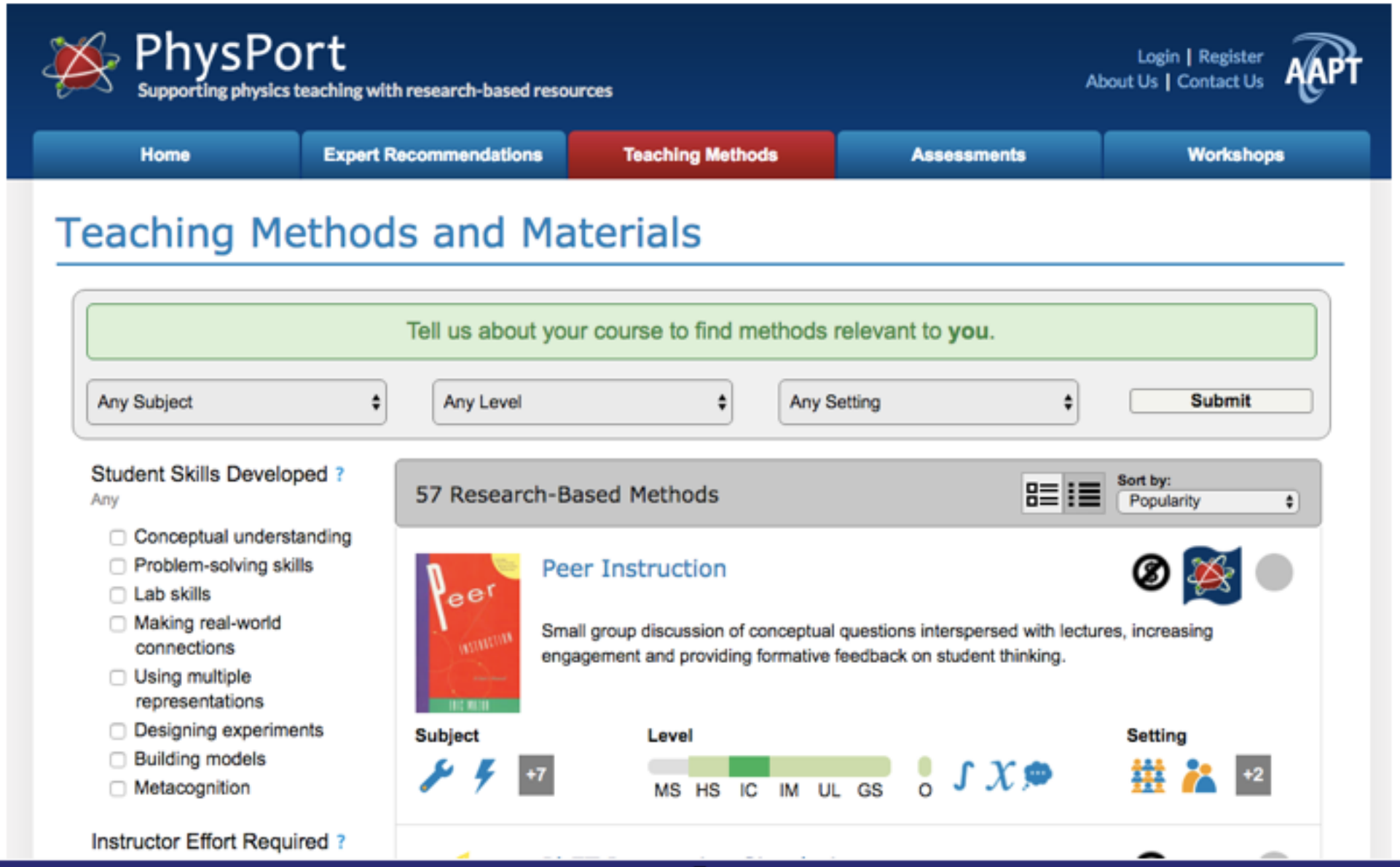



Explore assessment data



# Teaching methods

physport.org/methods



# Teaching methods

physport.org/methods

Which method should I choose?

57 methods available

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physport.org/methods

Which method should I choose?

57 methods available

**Student Skills Developed** ?

Any

- [ ] Conceptual understanding
- [ ] Problem-solving skills
- [ ] Lab skills
- [ ] Making real-world connections
- [ ] Using multiple representations
- [ ] Designing experiments
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**Instructor Effort Required** ?

Any

- [ ] Low
- [ ] Medium
- [ ] High

**Research Validation** ?

- ( ) ★ Gold star validation
- ( ) Silver validation
- ( ) Bronze validation
- (•) Research-based

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**Resources Needed** ?

Exclude methods requiring the following:

- [ ] TAs / LAs ?
- [ ] Clickers / polling method ?
- [ ] Projector
- [ ] Computers for students
- [ ] Lab equipment for demos ?
- [ ] Simple lab equipment ?
- [ ] Advanced lab equipment ?
- [ ] Cost for students
- [ ] Tables for group work
- [ ] Studio classroom ?
- [ ] Highly skilled instructors ?

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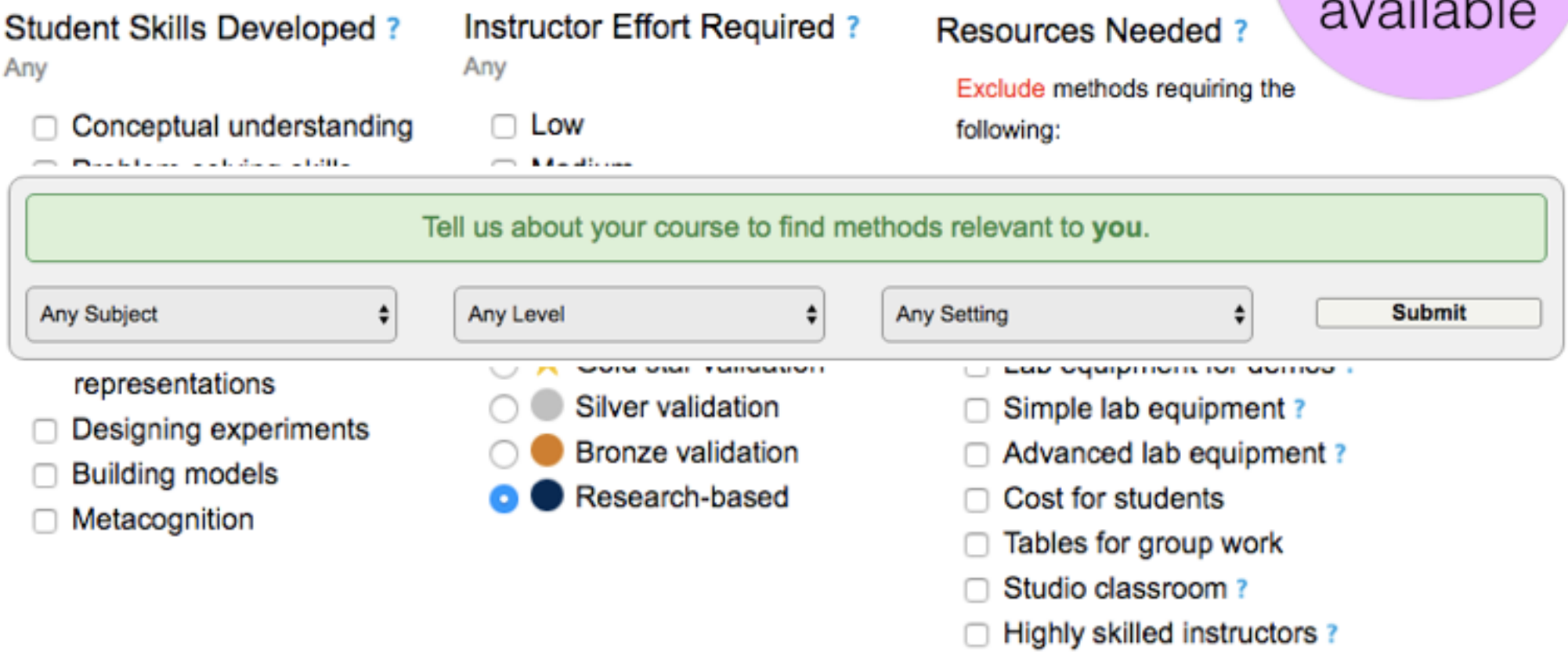

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# Teaching methods

physport.org/methods

Which method should I choose?


## PhET Interactive Simulations

developed by: PhET Interactive Simulations, University of Colorado - Boulder

# Teaching methods

physport.org/methods

Which method should I choose?

How does it work? Where can I get it?


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# Teaching methods

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## PhET Interactive Simulations

developed by: PhET Interactive Simulations, University of Colorado - Boulder

**Level**

middle school | high school | intro college | inter-mediate | upper level | grad school | other | calc based | alg based | conceptual

**Topics** +3

**Setting**

# Teaching methods

physport.org/methods

Which method should I choose?

How does it work? Where can I get it?

**Overview** | **Resources** | **Teaching Materials** | **Research**

**What?** Open-ended game-like simulations with an intuitive interface and minimal text appropriate for a variety of class settings. Includes expert visual models that make the invisible visible and provide multiple representations, enabling scientist-like exploration and real-world connections.

**Why?** They are free and easy to incorporate into nearly any teaching environment or style. They are based on research into how students learn in general, student understanding of specific science concepts, and user interface design. Effective use of PhET simulations can lead to improved conceptual learning over traditional lectures, demonstrations, and labs.

**Why not?** PhET simulations might not be the best approach if your goal is for your students to learn to use real lab equipment or to learn to program, or if you don't have access to computers.

**Example materials**


LAB #2: Fun with DC Circuits
Physics 2020, Fall 2004

**Classroom video**

# Teaching methods

physport.org/methods

Which method should I choose?

How does it work? Where can I get it?

Comparative overview

Overview | Resources | Teaching Materials | Research

**What?** Open-ended game-like sim… …d minimal text appropriate for a variety of class setting… …isible visible and provide multiple re… …rld connections.

**Why?** They are fr… …tyle. They are based on rese… …cific science concepts, and … …improved conceptual learn…

**Why not?** PhET simulations… …r your students to learn to use real lab equipment or to le… …ave access to computers.

**Example materials**


**Classroom video**

# Teaching methods

physport.org/methods

Which method should I choose?

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Overview | Resources | Teaching Materials | Research

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Resources

Research basis

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**Example materials**


**Classroom video**

# Teaching methods

physport.org/methods

Which method should I choose?

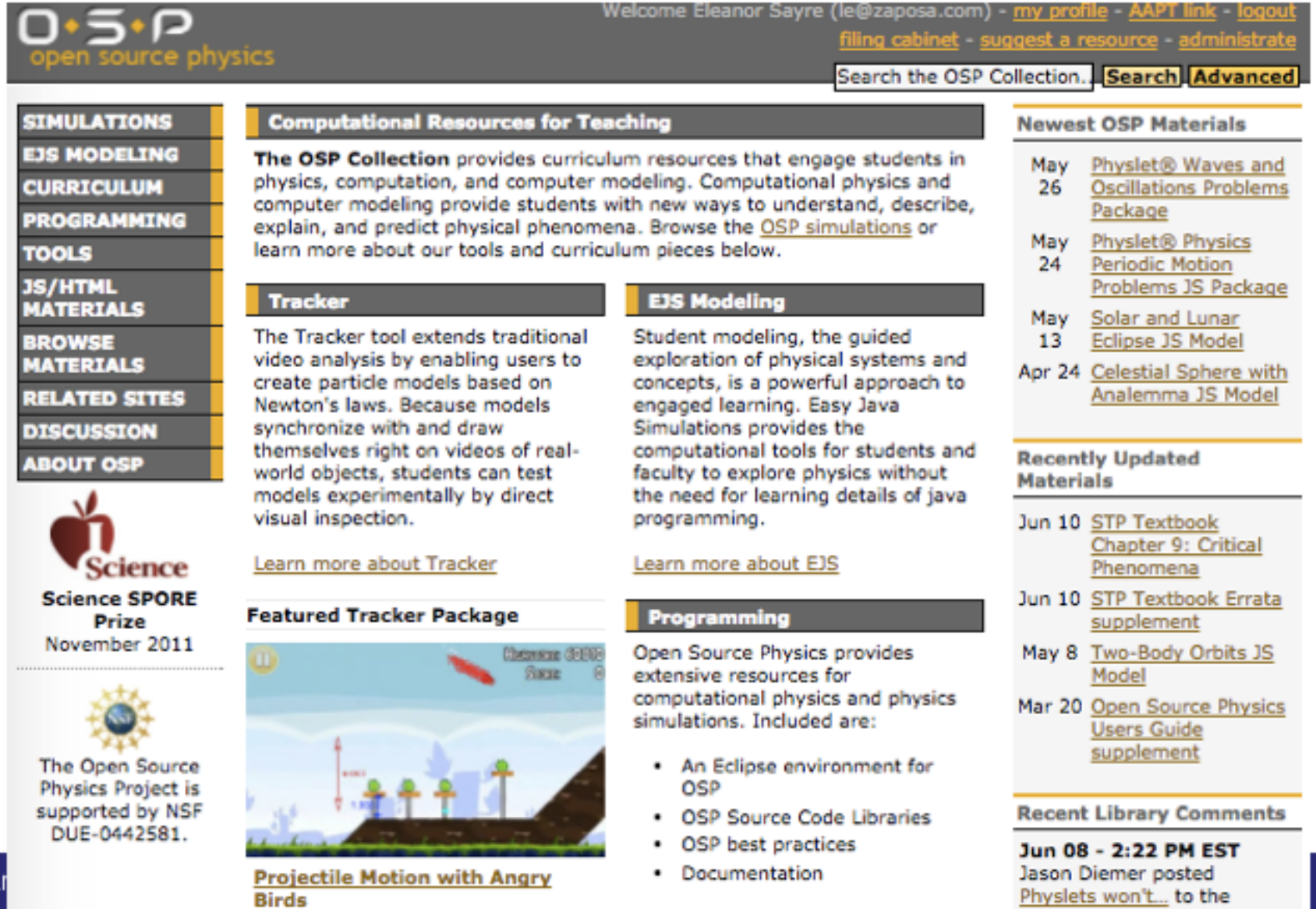
How does it work? Where can I get it?

Get it at compadre.org

- Collections of teaching materials
- Free.
- Intro, upper division, astro, IPLS.... etc
- Simulations, tutorials, clicker questions, ebooks.... etc

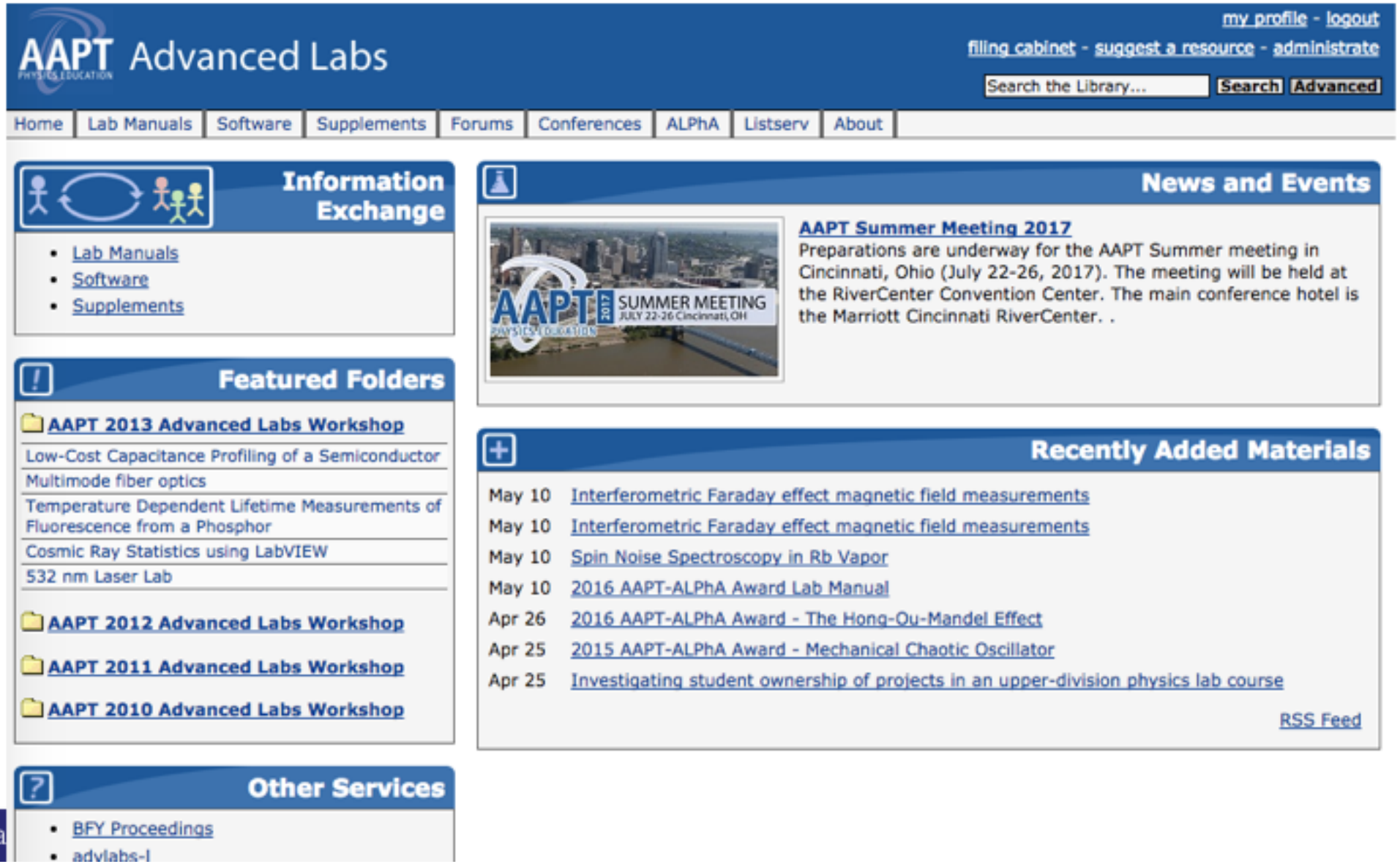
# Open Source Physics

www.compadre.org/osp/



# Advanced Labs

www.compadre.org/advlabs/



# Teaching methods

physport.org/methods

Which method should I choose?

How does it work? Where can I get it?

What else can I do?

**Compatible Methods**

- Peer Instruction
- Tutorials in Introductory Physics
- Just-in-Time Teaching
- +49 more...

**Similar Methods**

- Physlets
- Open Source Physics Collection
- CPU Computer Simulators

57 methods available

# Teaching methods

physport.org/methods

Which method should I choose?

How does it work? Where can I get it?

What else can I do?

I need more help

# Teaching methods

physport.org/methods

Which method should I choose?

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**Related Expert Recommendations**

**How do I use PhET simulations in my physics class?**

**How do I increase student interactivity when using PhET simulations in lecture?**

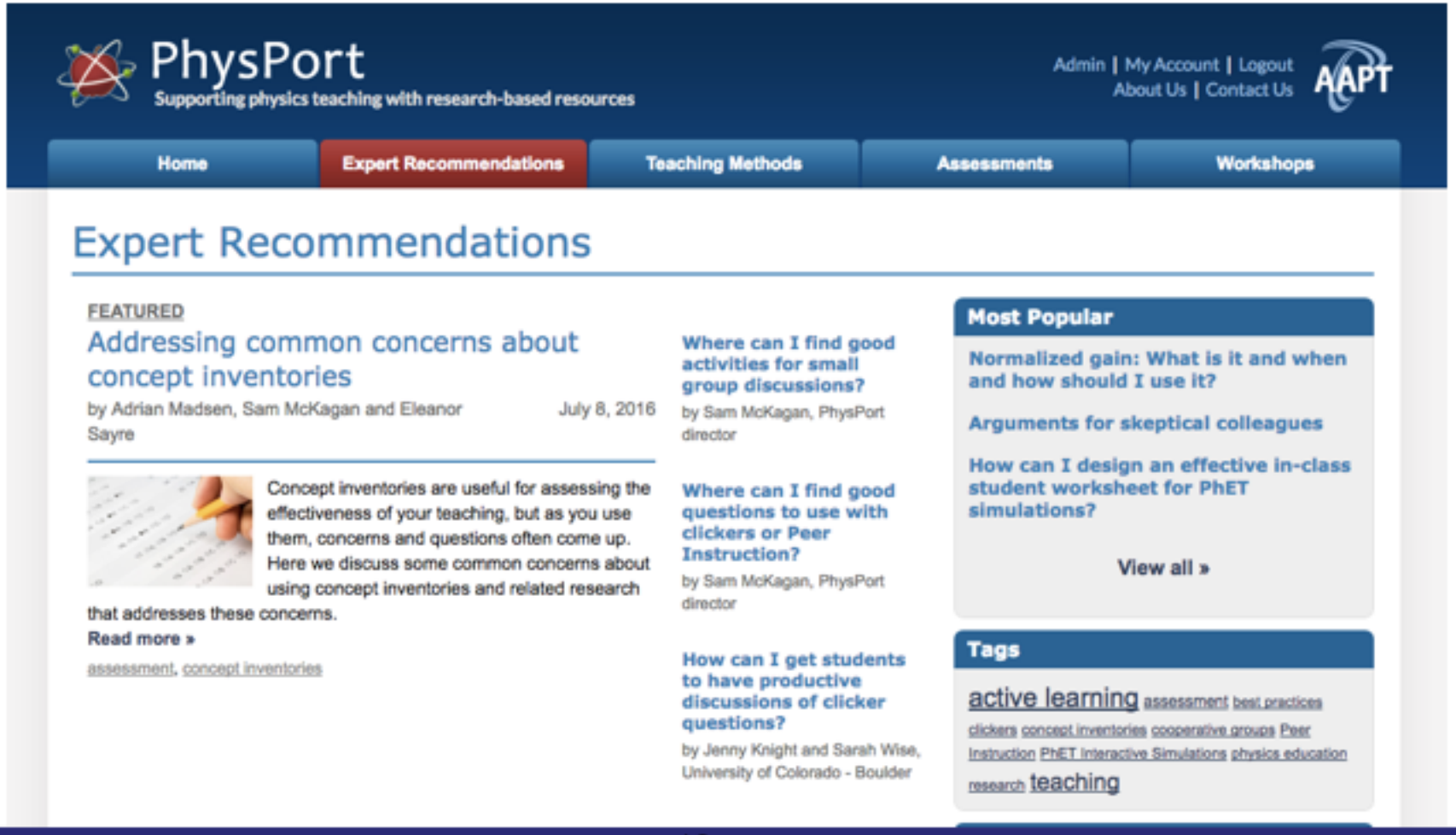
**How can I design an effective in-class student worksheet for PhET simulations?**

+3 more...

# Expert Recommendations

physport.org/recommendations

Friendly articles that interpret and synthesize PER results for physics faculty.



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Where can I find good questions to use with clickers or Peer Instruction?

42 available now!

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How can I set up an effective mentoring program to support students in my department?

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Normalized gain: What is it and when and how should I use it?

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Friendly articles that interpret and synthesize PER results for physics faculty.

**Related Expert Recommendations**

**How can I help students become more expert learners, so they engage in active learning?**

**How can I help students feel intrinsically and extrinsically motivated to engage in active learning?**

**How can I help students work well in small groups, so they are more likely to engage?**

+6 more...

How can I set up an effective mentoring program to support students in my department?

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**How can I help students work well in small groups, so they are more likely to engage?**

+6 more...

How can I set up an effective

active learning classroom?

Have a suggestion?

Want to contribute?

esayre@ksu.edu

smckagan@aapt.org

42 available now!

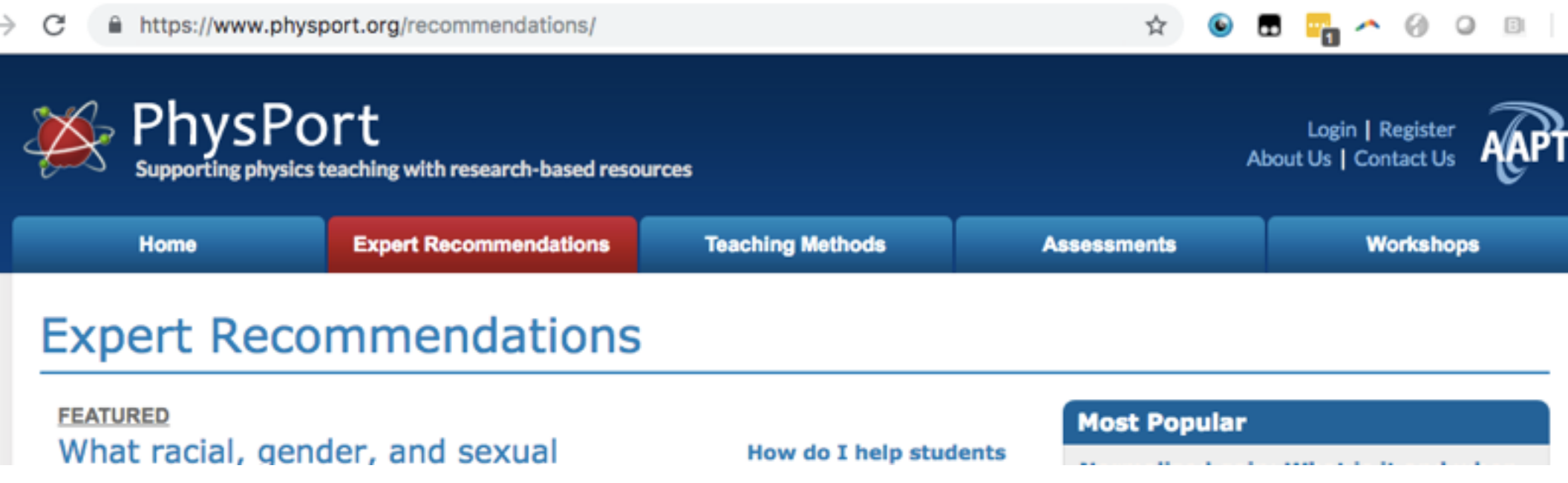
# Find expert recommendations

- Thinky-researchy alone time (5 mins)
- Make a triad (2 mins)
- Take turns to talk about the results of your investigation. (9 mins)

# Expert Recommendations

physport.org/
recommendations

- By yourself, on your phone or laptop
- Identify an expert recommendation that speaks to you
  - Helps with an issue in your teaching
  - Helps with a question sparked by NFW
  - Helps with your challenge from the last session
- Use the expert recommendation to better articulate your question (and start to solve it?) (5mins)



# Expert Recommendations

physport.org/recommendations

- Make a triad.  Longest hair goes first.
- Take turns and play "yes, and"
- Person 1 presents their new question
  - Persons 2&3 think about how they share that question
  - Everyone brainstorms around this topic: what do you want to know? which NFW presentations gave you ideas? how does this connect to your institution?
- Cycle to person 2 then person 3.
- 3 mins focus on each person.

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How to help students learn more?

How do you know if students are learning?

free

friendly

powerful

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Find information and advice

Change your teaching

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# Assessment Resources

physport.org/assessments


These are:

- Generally multiple-choice surveys
- Carefully crafted questions
- Conceptual topics across physics curriculum
- Additionally: beliefs, problem-solving skills, affect

project info

# Assessment

physport.org/
assessments

Which assessment should I choose?

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physport.org/assessments

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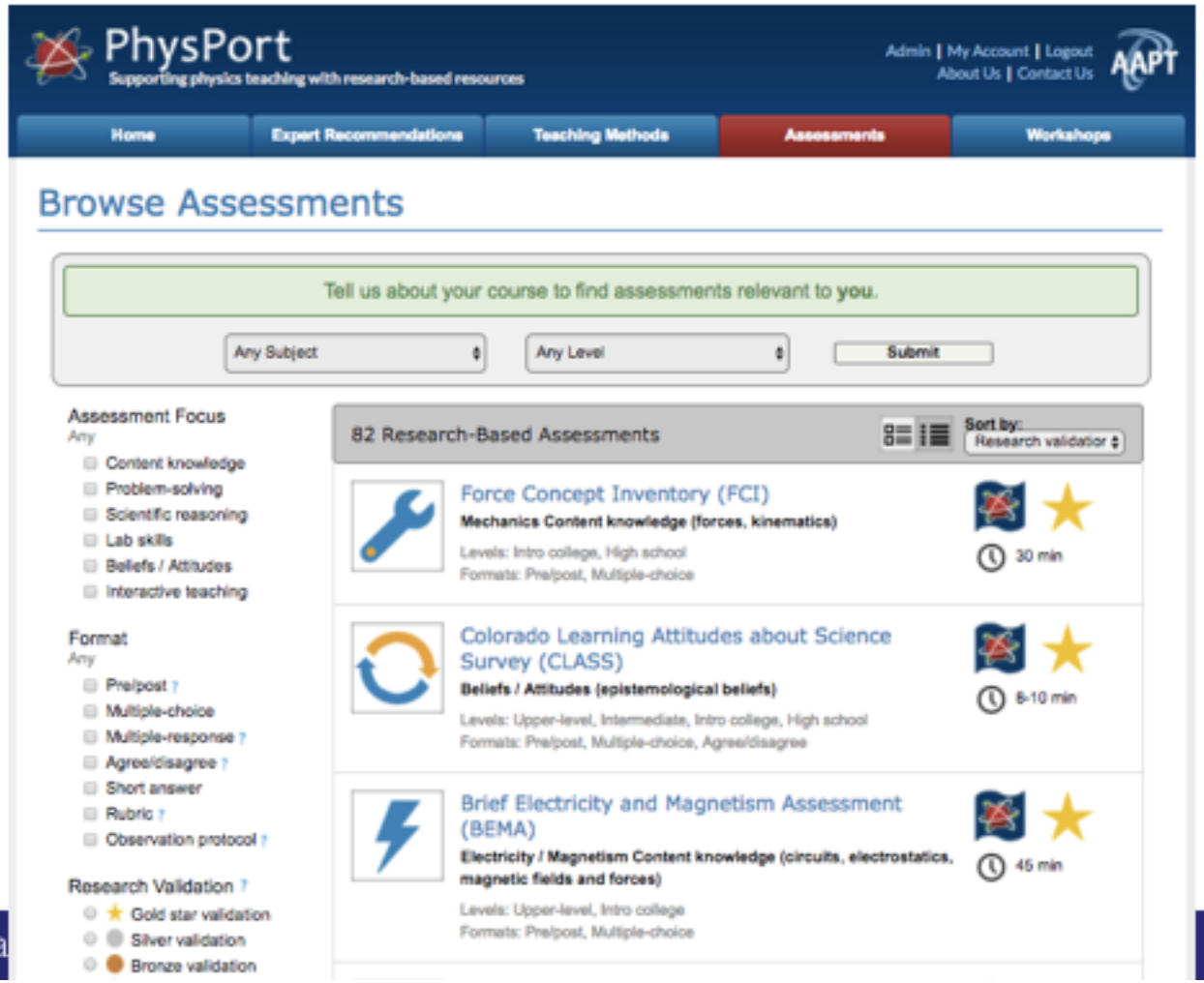


- Conceptual topics across physics curriculum
- Additionally: beliefs, problem-solving skills, affect
- Searchable by
  - kind & level of course
  - format & topic
  - research validation

80+ available

# Assessment

physport.org/
assessments

Which assessment should I choose?

## Force Concept Inventory (FCI)

Developed by David Hestenes, Malcolm Wells, Gregg Swackhamer, Ibrahim Halloun, Richard Hake, and Eugene Mosca

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physport.org/assessments

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| | |
|---|---|
| **Purpose** | To assess students' understanding of the most basic concepts in Newtonian physics using everyday language and common-sense distractors. |
| **Format** | Pre/post, Multiple-choice |
| **Duration** | 30 min |
| **Focus** | Mechanics Content knowledge (forces, kinematics) |
| **Level** | Intro college, High school |

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Typical results

Sample questions

Research overview

Translations

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physport.org/assessments

Which assessment should I choose?

How should I administer it?

Where do I get it?

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physport.org/assessments

Which assessment should I choose?

How should I administer it?

Where do I get it?

Verified educators!

For faculty and teaching staff

free, easy

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physport.org/assessments

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free, easy

Download test

Administration guide

Security instructions

# Assessment

physport.org/assessments

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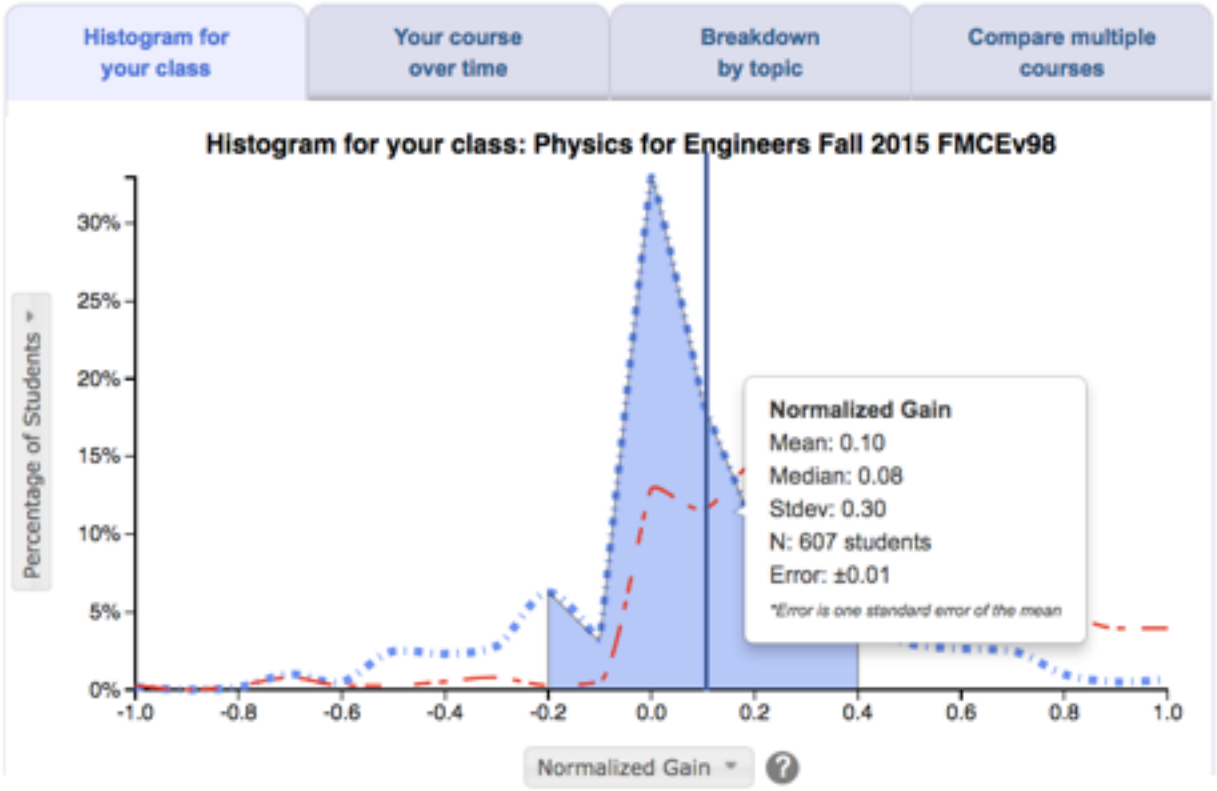
Where do I get it?

How should I interpret my results?

# Data Explorer

physport.org/
DataExplorer

Visualize and compare your students' performance on research-based assessment instruments.



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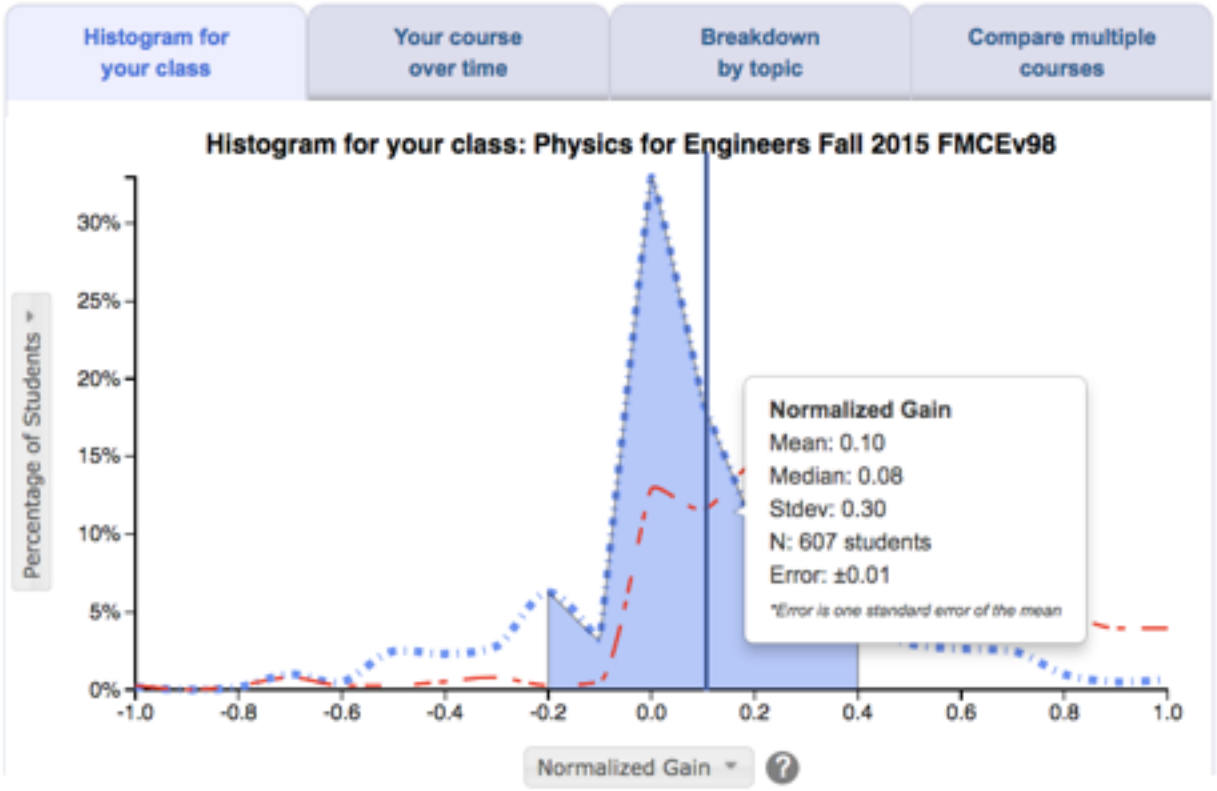


Upload your data

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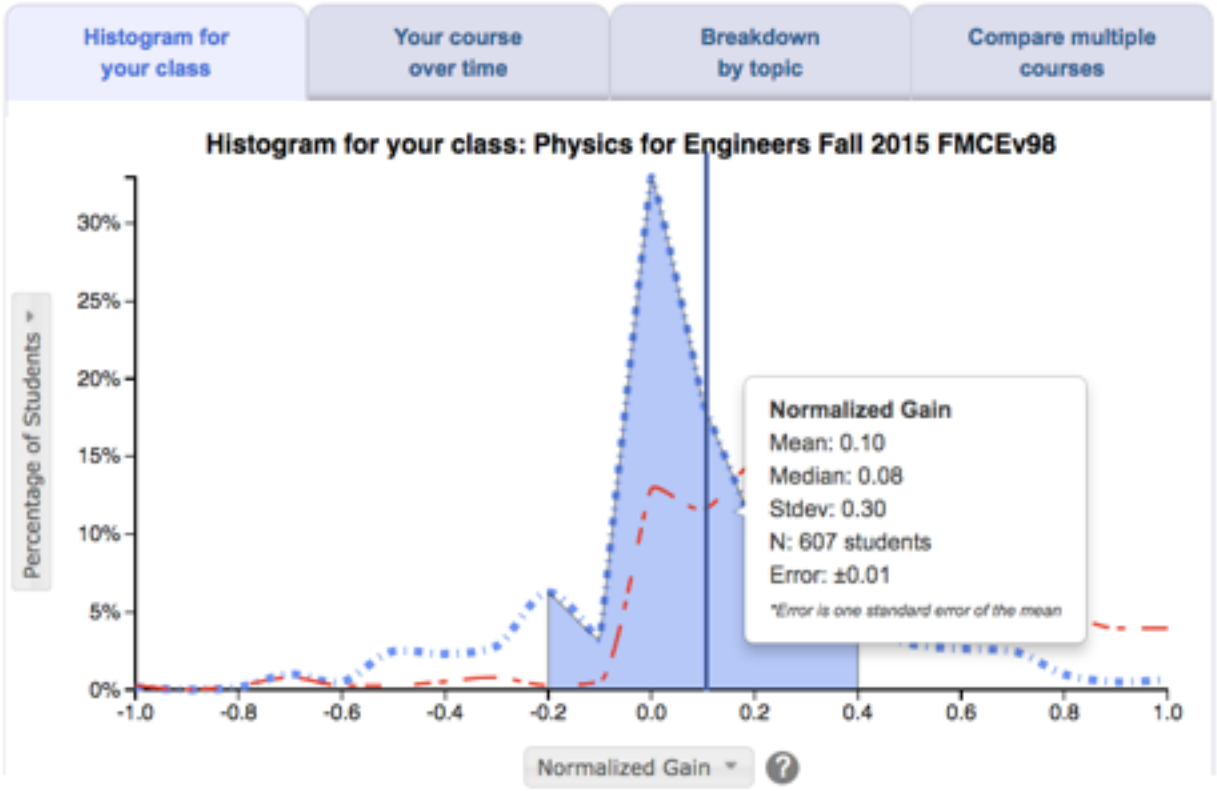


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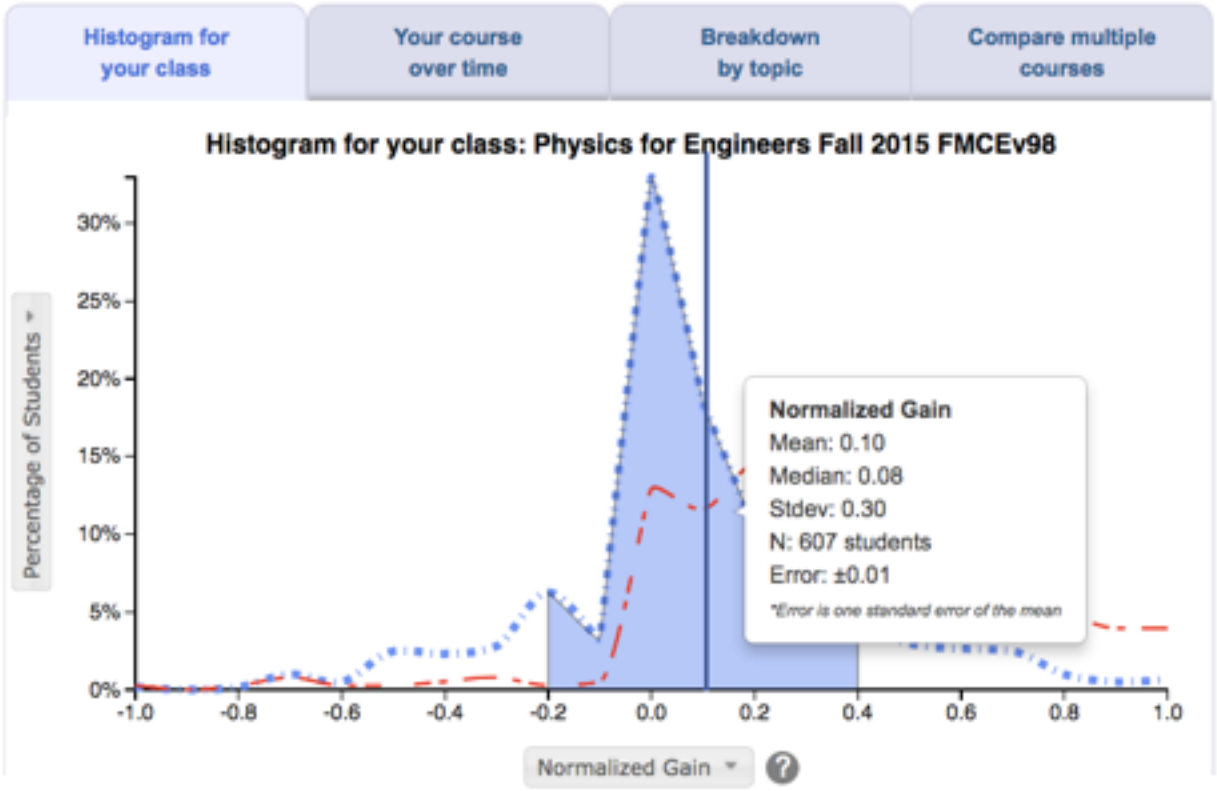


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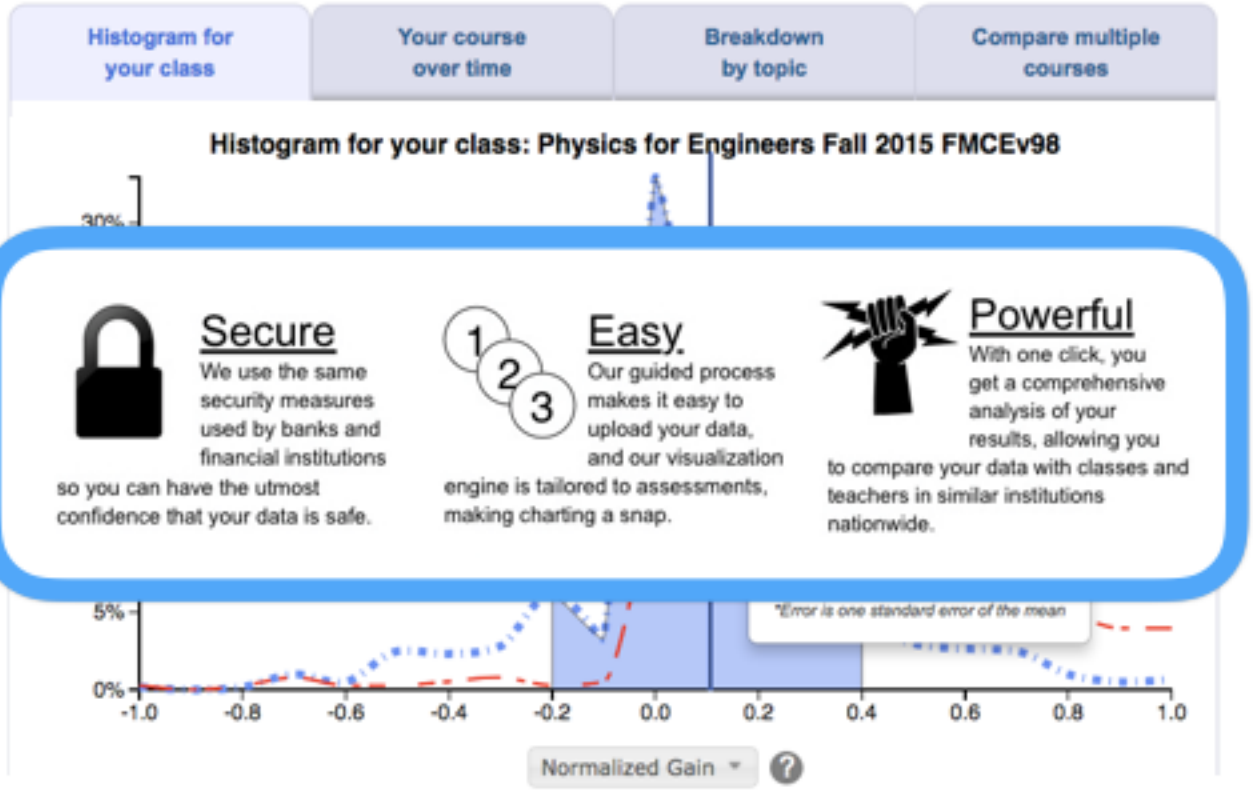


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free

friendly

powerful

research-based

Find information and advice

Change your teaching

# I want personalized help and advice.

FOLCs

www.aapt.org/Conferences/newfaculty/folc.cfm

Consultants

physport.org/consultants

Questions about research

esayre@ksu.edu

# PhysPort can help.

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Supporting physics teaching with research-based resources

physport.org

**Learn about better teaching!**

Search for teaching methods

Read recommendations from experts

**Be a PhysPort verified educator!**

Download assessments

Take online workshops

**Do Physics Education Research!**

Discover how students learn

Build better pedagogy

PEER field schools

**Email us to learn more**

smckagan@aapt.org

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