

Teaching About Racial Equity in Introductory Physics Courses

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PNACP
April 20, 2018
Bothell, WA



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Together, we designed and studied the effectiveness of teaching an equity unit in a college physics course.

You want to teach
WHAT?!?
in a physics class?



But there is a perception that physics is above all that...

- We're a culture with no culture!
- We're objective and bias-free!



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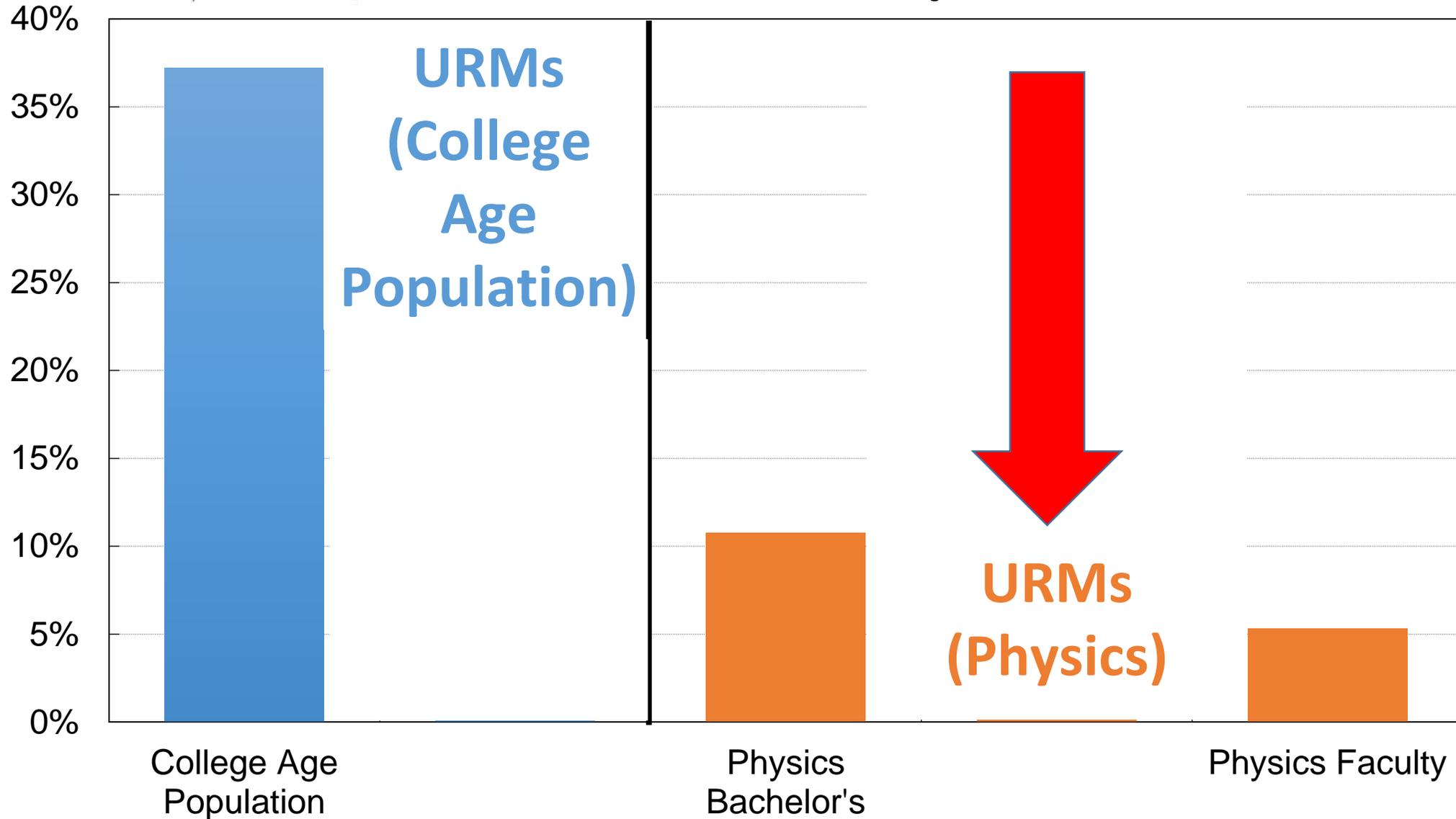
Let's say we buy this argument
...and look at who does physics.



If physics is unbiased,
we should see a representative
(*or an equitable*) distribution of
races doing it...



Retention of Underrepresented Minorities



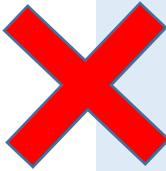
Underrepresentation in Physics

- Physics community does not accurately represent the racial distribution of the general population
- Ethnic/racial minorities are systematically reduced at every educational level



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YES



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- Is this *our* fault?
- Is this *their* fault?

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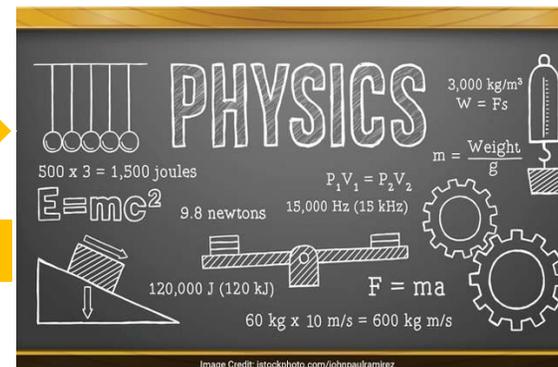
*As an instructor and researcher,
what can I do?*



What can I do? – Talk about Equity!

Enter: Moses Rifkin

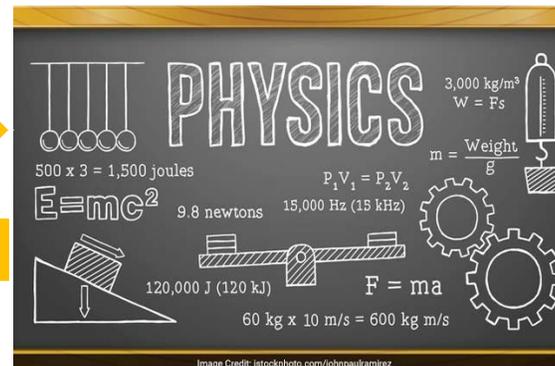
Physics Instructor @ University Prep
Seattle, WA



What can I do? – Talk about Equity!

Motivation:

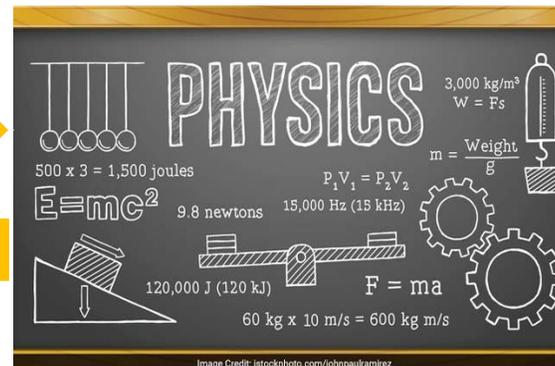
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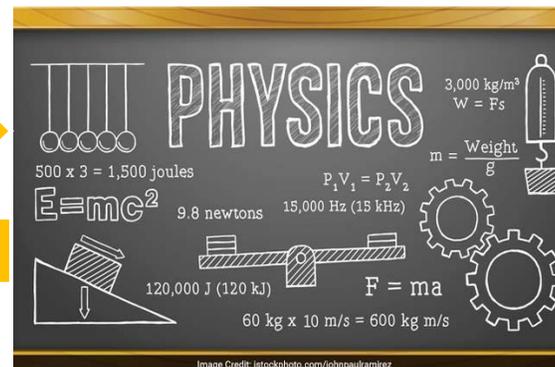
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- We believe that increased awareness will motivate people to become agents of change



What can I do? – Talk about Equity!

Motivation:

- Explicit discussions of human influence & inequity are rare in physics
- We believe that increased awareness will motivate people to become agents of change
- To start these explicit discussions, I designed and taught an equity unit in college physics courses



Equity Unit Context

Locations

Small private university & two-year college

Courses

Introductory, calculus-based physics course for STEM majors

Demographics

- University: 37.4% Students of Color
- TYC: 44% Students of Color (24% unreported/unknown)



Equity Unit Context

Learning Goals

By the end of the unit, students are expected to:

- 1) Identify areas of **subjectivity** in physics.
- 2) Analyze **statistics** about who participates in physics.
- 3) Justify the **need for racial equity** (inclusion and access) in physics.
- 4) Describe what and how **obstacles** such as implicit bias, stereotype threat, etc. can influence who participates in the physics field and classroom, creating inequity.
- 5) Feel empowered to **take action** towards creating a more equitable community.



Equity Unit Context

But WAIT! Before even mentioning race/equity/diversity in class....

- Create norms for brave spaces – where everyone can share
- Define physics and its inherent subjectivity, preparing students to speak about racial issues.



Equity Unit Context

When

- Mid-2nd quarter
- Intro Engineering Physics

Timeframe

- 3-4 days
- 220-300 instructional min.



Equity Unit Context

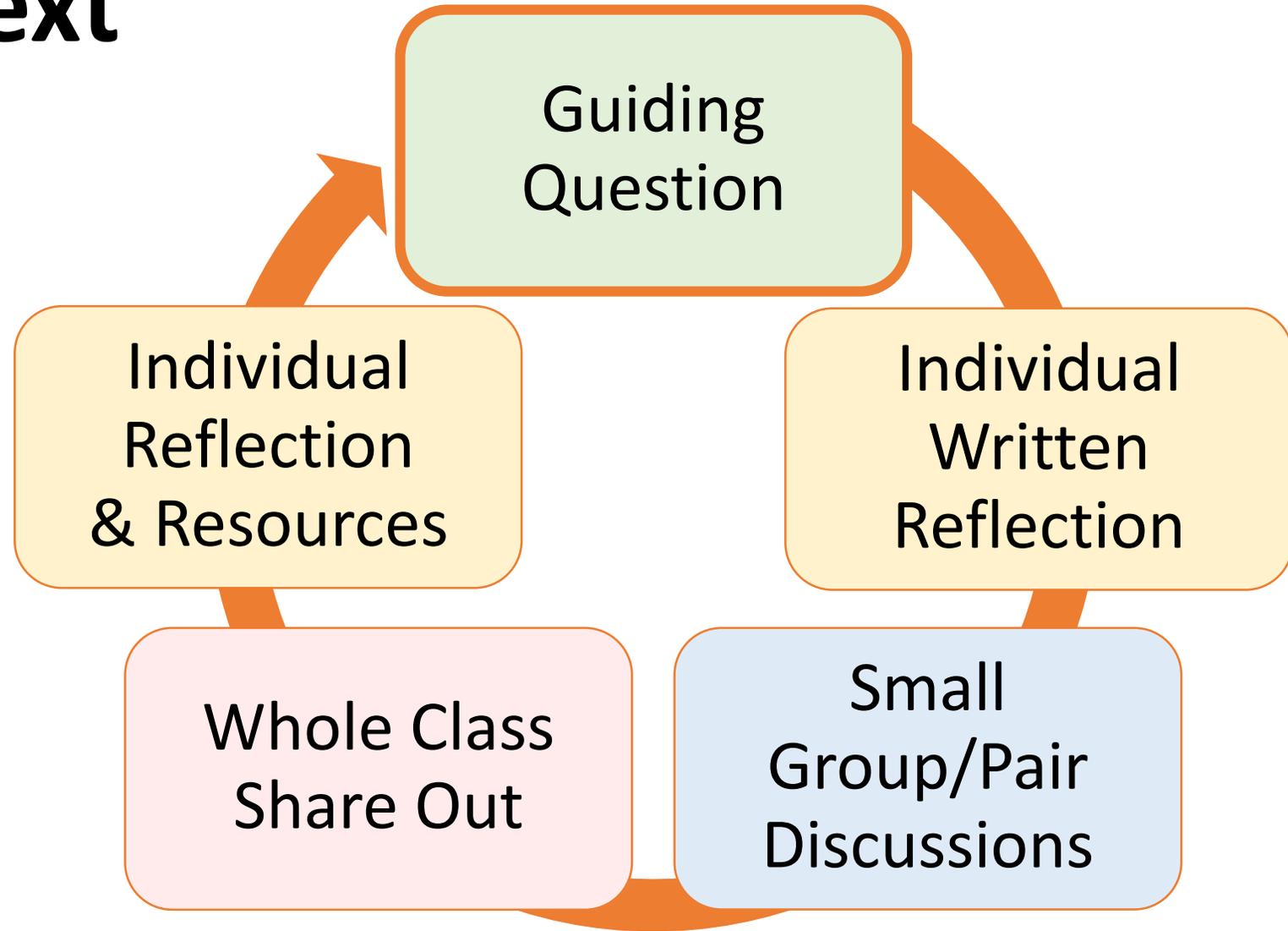
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Unit structure



Equity Unit Designed to Increase Awareness

Guiding Questions*

1. What is Physics?
2. Does (racial) diversity matter?
3. Who does physics?
4. What are the challenges to creating equity?
5. What can we do?

*Ideally
~50 min.
per question



Equity Unit Designed to Increase Awareness

Guiding Questions

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What is physics?

Individual Reading & Written Reflection

Individual Written Definition

Small Group Discussion

Small Group/Pair Discussions
Write definition on front board

Subjective or Objective Class Debate

Student responses to “What is physics?”



Student responses to “What is physics?”

Objective Perspective

Approximately $\frac{2}{3}$ of each class take a strong “physics is objective” stance and generally keep that view throughout the initial conversation.

Physics is objective. It is measurable, quantifiable, and does not depend upon emotions or personal feelings.

Student responses to “What is physics?”

Subjective Perspective

Physics is affected by people’s perspective and/or interpretation.

I think that physics is perceived as objective but is actually subjective. How do we know that the laws of physics hold true in every situation in the universe? We, as humans, are still learning about how the universe operates everyday.



Student responses to “What is physics?”

Most students think of physics as objective – that culture and bias does not affect physics!

We support them in changing that opinion:

- Nature of science reading (Hatton & Plouffe)
- Definition of physics as a “science” or “study” – involves *human activity*



Equity Unit Designed to Increase Awareness

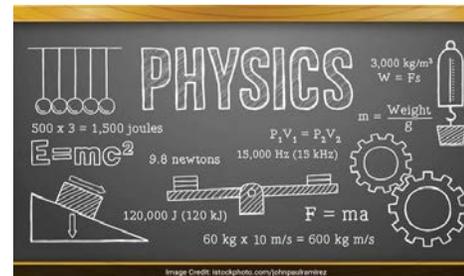
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Conclusion

- The status quo for our community isn't working.
- Talking about equity and race can be daunting – but it needs to happen! **Students will support you!**
- Students are generally appreciative of the unit and many articulated their growth spontaneously.
- You can do this in your classes *this year!*



Special Thanks:

Sierra Decker, Vashti Sawtelle, Moses Rifkin, Lane Seeley,
Elizabeth Schoene, Kara Gray, Eric Bolander, Rachel Scherr
SPU Department of Physics, SSC Faculty Learning Community,
and SPU SERVE grant

For more information about the unit:

Daane, A. R., Decker, S. R., & Sawtelle, V. (2017). “Teaching About Racial Equity in Introductory Physics Courses” in *The Physics Teacher*, 55(328).

<https://doi.org/10.1119/1.4999724>

