Bracket 1

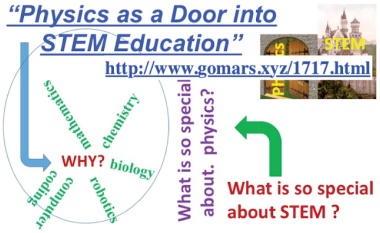
Entrant Information

I am submitting this entry as:
an individual entrant

Big Idea Information

Title of your Big Idea
New type science course for teachers

Upload an image to represent your Big Idea or your team.



https://skild-prod.s3.amazonaws.com/nsfideamachine/uploads/6132872808351-team140340-entry125719-section63687-phydoor.png

What are your scientific or engineering research interests or areas of expertise?
teacher education

What is the compelling question or challenge?
Science teachers do not know what science is and how to teach it

What do we know now about this Big Idea and what are the key research questions we need to address?
How to teach science as a science?
How to teach science in that way which would be the most effective for formation and development scientific way of thinking?
What should be the structure of a science course for science teachers to help teachers acquire scientific way of thinking?

Why does it matter? What scientific discoveries, innovations, and desired societal outcomes might result from investment in this area?
Currently sciences courses are being taught as a collection of disconnected facts, in the form: "This is what we know about the nature, fact 1, fact 2, etc.".
This form of education is solely based on rote memorization. This is the #1 reason students avoid taking science course and do not pursue a career in STEM related fields. This approach does not help forming scientific way of thinking about the nature and the world in general. This project aims to change that by developing an exemplary course for physics teachers, which can be used for the

further development of other science courses for teachers. The main feature of such a course is that it has to be taught in such a manner that teachers would be able to (a) acquire the content of the subject, and (b) reflect on the actions and mental processes involved into the acquiring the content of the subject, and (c) develop scientific way of thinking. The prototype of such a physics course has been developed and being taught to undergraduates (http://gomars.xyz/phy.html).

If we invest in this area, what would success look like?

1. The significant increase in the number of science teachers being able to teach subjects in the way fostering scientific thinking
2. The significant increase of students taking science courses
3. The significant increase of students pursuing a career in STEM related fields.

Why is this the right time to invest in this area?

BecauseUSAdoesnotwanttofallbehindChina.
Becausescience educationis thefundamental basis for the technological development of the country.

Please give us three key words describing the Big Idea.

Teacher education, science education

Publication/Citation References (optional)

In the boxes below, you may list up to 3 publication/citation references, either by text or link.

Reference #1

On the science of teaching science

Reference #1 URL

https://www.cognisity.how/2018/09/teach.html

Reference #2

Physics as a Door into STEM Education

Reference #2 URL

http://www.cognisity.how/2017/01/dorrSTEM.html

Reference #3

The complete physics course

Reference #3 URL

http://gomars.xyz/phy.html

Agreements and Validations

I consent to NSF's use and display of the submitted information and contestants' names and likenesses.
I agree

I confirm that all individual, teacher, and team entrants meet the age and citizenship/residence requirements, and agree to abide by all rules of the NSF 2026 Idea Machine as described in the
eligibility criteria and rules
.
I agree

Forms and Releases

All individual and team entrants must be at least 14 years of age as of September 1, 2018.

Individuals: If you are under 18 years of age, please upload a completed parental/guardian permission form (located in the Quick Links to your left) here.

Team leaders: Please collect the signed parental/guardian permission form for any team members younger than 18 years of age (including yourself) and combine them into one document to be uploaded here.

Teachers entering on behalf of high school classes are not required to submit parental/guardian forms on behalf of their classes.