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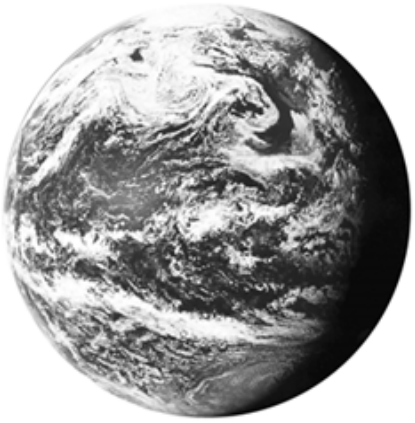
Global Changes/Educational Challenges



The challenges facing science teachers have never been greater.

Tell us how you are meeting them in your classroom.

Your name was selected from a database of middle and high school science teachers from all 50 states and the District of Columbia. Your participation is voluntary, but your answers are very important to the success of this Penn State research study. Our random sample has been generated scientifically and without your participation we will not be able to accurately describe the opinions and experiences of teachers in schools and communities such as yours.

Please use a blue or black ink pen to answer the questions and mail your completed questionnaire back to us in the postage-paid envelope provided.

The 2019 Survey of American Science Teachers

PennState

A confidential survey
Conducted by Penn State University

The 2019 National Survey of Science Teachers

Thank you for participating in this survey! By participating, you are affirming that you are 18 years old or more, and that you understand that the survey is voluntary.

Of all the classes you are currently teaching, which of the following has the largest total enrollment?

Middle or Junior High level:

- ○ Life Science
- ○ Earth Science
- ○ Physical Science
- ○ Integrated Science
- ○ Introductory Biology
- ○ Other _____

High School level:

- ○ Introductory Biology or Life Science
- ○ Advanced Biology or Life Science
- ○ AP or IB Biology
- ○ Advanced Topics (e.g., Genetics)
- ○ Environmental Science (including AP)
- ○ Other _____

In answering the remaining questions in the survey, please refer to the class you selected.

Thinking about how you lay out your class for the year, please indicate how many class hours (40-50 minutes) you typically spend on each of the following broad topic areas.

	Not covered	Hours					
		1-2	3-5	6-10	11-15	15-20	20 or more
Cell biology	○	○	○	○	○	○	○
Ecology	○	○	○	○	○	○	○
Human health and disease	○	○	○	○	○	○	○
Human evolution	○	○	○	○	○	○	○
General evolutionary processes	○	○	○	○	○	○	○
Recent global warming (last 150 years)	○	○	○	○	○	○	○
Pollution and human impact on ecosystems	○	○	○	○	○	○	○
Intelligent design or creationism	○	○	○	○	○	○	○
Biodiversity	○	○	○	○	○	○	○

We now have four sets of questions about the teaching of evolution.

Please indicate your level of agreement with each of the following statements if they apply to your class.

When I teach about the origins of biological diversity (including answering student questions)...	Strongly Agree	Agree	Disagree	Strongly Disagree	Not applicable
I emphasize the broad scientific consensus that evolution is fact.	○	○	○	○	○
I emphasize that intelligent design is a valid, scientific alternative to Darwinian explanations for the origin of species.	○	○	○	○	○
Evolution serves as the unifying theme for the content of my course.	○	○	○	○	○
I emphasize that many reputable scientists view creationism or intelligent design as valid alternatives to Darwinian theory.	○	○	○	○	○
I believe it is possible to offer an excellent course that includes no mention of Darwin or evolutionary theory.	○	○	○	○	○
My choices of what topics to emphasize are heavily constrained by my state's content standards.	○	○	○	○	○

Some teachers tell us that they acknowledge that evolution is controversial and adopt particular strategies in teaching it. Tell us about your approach to each of the following:

	I have done this	I have not done this, but I might if the situation were to arise	I would not do this
Give equal time to perspectives that raise doubt about evolution.	○	○	○
Allow students to discuss the controversy without me taking a position.	○	○	○
Discuss the controversy in the context of the nature of science.	○	○	○
Discourage debate because I believe most doubts about evolution are not based on sound science.	○	○	○
Offer to meet with students after class.	○	○	○
Send an explanatory letter to parents.	○	○	○
Allow students to opt out of portions of the class.	○	○	○
Adhere strictly to standards and not allow discussion that might become controversial.	○	○	○
Avoid all discussion of evolution.	○	○	○

Imagine that you were asked to teach a *2-week unit on evolution*. What priority would you give to including each of the following possible topics?

	A high priority	A medium priority	It is not necessary to cover this topic	This topic <u>should not</u> be covered	No opinion
The nature of science	○	○	○	○	○
Sexual selection	○	○	○	○	○
The completely random nature of evolution	○	○	○	○	○
The common ancestry of all life	○	○	○	○	○
Genetic drift and gene flow	○	○	○	○	○
Embryology	○	○	○	○	○
Natural selection's ability to explain all traits of	○	○	○	○	○
Scientific research on the origin of life	○	○	○	○	○
The shared ancestry of humans with the rest of life	○	○	○	○	○
Biblical perspectives on the history of life	○	○	○	○	○
The intrinsic direction of evolution toward progress or perfection	○	○	○	○	○

For each of the following, select all that apply.

	No one	School admin-istrator	Local religious leader	Parent	School board member	Other
I have received pressure to teach evolution from:	○	○	○	○	○	○
I have received pressure to teach creationism or intelligent design from:	○	○	○	○	○	○
I have received pressure to NOT teach evolution from:	○	○	○	○	○	○
I have received pressure to NOT teach creationism or intelligent design from:	○	○	○	○	○	○

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We now have four sets of questions about the teaching of climate change and recent global warming.

Please indicate your level of agreement with each of the following statements if they apply to your class.

When I teach about climate change (including answering student questions)...	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**	**Not Applicable**
I emphasize that average global temperatures have risen in the last 150 years.	○	○	○	○	○
I emphasize that natural cycles have produced warming events throughout Earth's history.	○	○	○	○	○
I emphasize the scientific consensus that recent global warming is primarily being caused by human release of greenhouse gases from fossil fuels.	○	○	○	○	○
I emphasize that many scientists believe that recent increases in temperature is likely due to *natural* causes.	○	○	○	○	○
I encourage students to debate the likely causes of global warming.	○	○	○	○	○
I encourage students to come to their own conclusions about the causes of global warming.	○	○	○	○	○

Some teachers tell us that they acknowledge that climate change is controversial and adopt particular strategies in teaching it. Tell us about your approach to each of the following.

	I have done this	**I have not done this, but I might if the situation were to arise**	**I would not do this**
Give equal time to perspectives that raise doubt that humans are causing climate change.	○	○	○
Allow students to discuss controversy without me taking a position.	○	○	○
Discuss the controversy in the context of the nature of science.	○	○	○
Discourage debate because I believe most climate skepticism is not based on sound science.	○	○	○
Offer to meet with students after class.	○	○	○
Send an explanatory letter to parents.	○	○	○
Allow students to opt out of portions of the class.	○	○	○
Adhere strictly to standards and not allow discussion that might become controversial.	○	○	○
Avoid all discussion of climate change.	○	○	○

Imagine that you were asked to teach a *2-week unit on greenhouse gases and recent global warming*. What priority would you give to including each of the following possible topics?

	A high priority	A medium priority	It is not necessary to cover this topic	This topic <u>should not</u> be covered	No opinion
Destruction of forests	○	○	○	○	○
Carbon dioxide trapping heat in the atmosphere	○	○	○	○	○
Ocean acidification	○	○	○	○	○
People heating and cooling their homes	○	○	○	○	○
Depletion of ozone in the upper atmosphere	○	○	○	○	○
Use of coal and oil by utility and electric companies	○	○	○	○	○
Use of chemicals to destroy insect pests	○	○	○	○	○
Incoming shortwave and outgoing longwave energy	○	○	○	○	○
Emissions from industry	○	○	○	○	○
Biblical perspectives on climate change	○	○	○	○	○
Coastal flooding and sea level rise	○	○	○	○	○

For each of the following, select all that apply.

	No one	School admin-istrator	Local religious leader	Parent	School board member	Other
I have received pressure to teach about human causes of global warming from:	○	○	○	○	○	○
I have received pressure to NOT teach about human causes of global warming from:	○	○	○	○	○	○

Think about the citizens who live in your school district. If we polled them, which of the following would be supported by the most people?

- ○ Schools in the district should teach more about evolution
- ○ Schools in the district should teach less about evolution
- ○ The amount of teaching of evolution is about right
- ○ I don't think they would really care one way or the other
- ○ I don't know

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Think again about the citizens who live in your school district. If we polled them, which of the following would be supported by the most people?

- ○ Schools in the district should teach more about climate change
- ○ Schools in the district should teach less about climate change
- ○ The amount of teaching of climate change is about right
- ○ I don't think they would really care one way or the other
- ○ I don't know

Now we have some questions on your state's standards and assessments, and the textbooks you use.

So far as you know, do your state's science standards include evolution?

- ○ Yes, but not human evolution
- ○ Yes, including human evolution
- ○ No
- ○ I am not sure

Does your state currently have an assessment test covering high school biology?

- ○ No
- ○ Yes, a test where scores are reported for school districts but not individual schools
- ○ Yes, a test where scores are reported for individual schools
- ○ Yes, a high-stakes test students must pass to graduate
- ○ I am not sure

Again, thinking about the class with the highest enrollment this year, what is the primary textbook or other resource you use for your class?

- ○ Title: _____
- ○ Publisher or organization: _____
- ○ Author: _____

The textbook selection is made by (select all that apply):

- ○ State board of education or state textbook selection committee
- ○ School district
- ○ School
- ○ Instructor
- ○ Other (please specify): _____

Now, regardless of what you do in the classroom, we would like to ask you about your own personal views.

Which of the following statements comes closest to your views on the origin and development of human beings?

- ○ Human beings have developed over millions of years from less advanced forms of life, but God guided this process.
- ○ Human beings have developed over millions of years from less advanced forms of life, but God had no part in this process.
- ○ God created human beings pretty much in their present form at one time within the last 10,000 years or so.

To the best of your knowledge, what proportion of scientists think that humans and other living things have evolved over time?

○ 0-20% ○ 21-40% ○ 41-60% ○ 61-80% ○ 81-100%

Which of the following comes closest to your view?

- ○ Global warming is caused mostly by human activities.
- ○ Global warming is caused mostly by natural changes in the environment.
- ○ Global warming is not happening.
- ○ I am not sure.

To the best of your knowledge, what proportion of climate scientists think that global warming is caused mostly by human activities?

○ 0-20% ○ 21-40% ○ 41-60% ○ 61-80% ○ 81-100%

Where would you place yourself on the following 7-point scales?

It's not the government's business to try to protect people from themselves.						Sometimes government needs to make laws that keep people from harming themselves.
○ **1**	○ **2**	○ **3**	○ **4**	○ **5**	○ **6**	○ **7**

Government regulation of business is necessary to protect the public interest.						Government regulation of business usually does more harm than good.
○ **1**	○ **2**	○ **3**	○ **4**	○ **5**	○ **6**	○ **7**

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Now, we have some background questions, starting with your education.

Please tell us about your formal education background. Select all that apply.

	Select all that apply	Your major	Name of college or university
Bachelor of Arts	○		
Bachelor of Science	○		
Master's Degree in Education	○		
Master's Degree in Science	○		
D.Ed. or Ph.D. in Education	○		
Ph.D. in Science	○		

What is the *total number of years* you have been teaching? ☐☐ **years**

What type(s) of teaching certificate(s) do you hold? (Select all that apply.)

- ○ Regular or standard state certificate
- ○ Certificate issued after satisfying all requirements except the completion of a probationary period.
- ○ Certificate that requires some additional college course work, student teaching, or passage of a test before regular certification can be obtained.
- ○ Certificate issued to persons who must complete a regular certification program in order to continue teaching
- ○ Advanced professional certificate (specify): _____
- ○ Other (specify): _____

Which of the following best describes you? (Select one or more.)

- ○ Hispanic heritage
- ○ White
- ○ Black/African American
- ○ East Asian
- ○ American Indian or Alaska Native
- ○ Pacific Islander
- ○ South Asian
- ○ Other (specify): _____

How much student teaching experience did you have before completing your teaching certification?

- ○ at least 1 year through a undergraduate teaching certification program
- ○ at least 1 year through a post-baccalaureate program not in a master's degree program
- ○ at least 1 year through a master's degree program
- ○ some, but less than 1 year
- ○ none

Please tell us about your coursework and continuing education in the sciences. Select "4" for four or more courses.

	Total Number of Semester/Quarter Length College Classes					**Total Number of Continuing Ed Course or Workshops**				
	0	**1**	**2**	**3**	**4**	**0**	**1**	**2**	**3**	**4**
Biological and life sciences	○	○	○	○	○	○	○	○	○	○
Earth and space sciences	○	○	○	○	○	○	○	○	○	○
Chemistry and physics	○	○	○	○	○	○	○	○	○	○
Courses devoted to methods of science teaching	○	○	○	○	○	○	○	○	○	○

Please tell us about courses covering specific topics (you can double-count classes counted in the previous question): Select "4" for four or more courses.

	Total Number of Semester/Quarter Length College Classes					**Total Number of Continuing Ed Course or Workshops**				
	0	**1**	**2**	**3**	**4**	**0**	**1**	**2**	**3**	**4**
Courses entirely focused on evolution	○	○	○	○	○	○	○	○	○	○
Other courses that devoted one or more class sessions to evolution	○	○	○	○	○	○	○	○	○	○
Courses entirely focused on climate change	○	○	○	○	○	○	○	○	○	○
Other courses that devoted one or more class sessions to climate change	○	○	○	○	○	○	○	○	○	○
Courses that devoted one or more class sessions to Problem-based Learning (PBL)	○	○	○	○	○	○	○	○	○	○
Courses that devoted one or more class sessions to the challenges of teaching controversial topics	○	○	○	○	○	○	○	○	○	○

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Some teachers report that there are obstacles to their pursuing continuing education specifically in evolution and climate change.

Thinking first just about continuing education about EVOLUTION, check all that apply:

- ○ My school/district does not allow me enough time to pursue continuing education.
- ○ My school/district does not allow me enough funds to pursue continuing education.
- ○ There are not enough suitable opportunities to pursue continuing education near me.
- ○ I am not interested in pursuing continuing education.
- ○ I have access to all the continuing education I want/need.

Now, thinking just about continuing education about CLIMATE CHANGE, check all that apply:

- ○ My school/district does not allow me enough time to pursue continuing education.
- ○ My school/district does not allow me enough funds to pursue continuing education.
- ○ There are not enough suitable opportunities to pursue continuing education near me.
- ○ I am not interested in pursuing continuing education.
- ○ I have access to all the continuing education I want/need.

Finally, here are some questions about you.

I identify as a

- ○ Male
- ○ Female
- ○ Other

Politically, how do you usually identify yourself? As a:

- ○ Democrat
- ○ Independent
- ○ Republican
- ○ Green Party
- ○ Tea Party
- ○ Libertarian
- ○ Other (please specify): _____

What is your present religion?

- ○ Protestant
- ○ Roman Catholic
- ○ Mormon
- ○ Orthodox (Greek or Russian)
- ○ Other Christian
- ○ Jewish
- ○ Muslim
- ○ Hindu
- ○ Buddhist
- ○ Atheist
- ○ Agnostic
- ○ Spiritual, but not religious
- ○ Nothing in particular
- ○ Other (specify): _____

Which of these statements comes closest to describing your feelings about the Bible?

- ○ The Bible is the actual word of God and is to be taken literally, word-for-word.
- ○ The Bible is the inspired word of God, but not everything should be taken literally, word-for-word.
- ○ The Bible is an ancient book of fables, legends, history, and moral precepts recorded by man.

If you would like to receive a report of the survey results, please send a request to: Surveyprogram@psu.edu.

Thank you for completing this survey.

If you would like to add anything, please use the space provided below. We are very interested in any comments, suggestions, or anecdotes that you would like to share.

To ensure confidentiality, please do not include identifiable information such as names, the name of your school, or community.

2D

Please return the survey in the envelope provided.