2015-2016 GLOBE Teacher Survey Results

Report Presented by the GLOBE Evaluation Working Group

October 24, 2016

Sponsored by: NASA NSF Supported by: NOAA Implemented by: UCAR

Dear friends,

The Evaluation Working Group is happy to share with you the results of the survey that was sent to the teachers who participate in the GLOBE Program. The survey was first sent in 2015, to the regional offices and the teachers directly. It was re-sent again in 2016, with a total of 339 responses collected.

The survey was translated into four languages to make it easier for teachers to participate (English, French, Spanish and Arabic). The members of the group worked on the translations in French and Spanish, and our colleagues Eslam Khair and Mohamed Elwan helped us with the translation in Arabic.

The Group's purpose when preparing and sending out this survey was to to find out how the Program actually works in schools, from teachers that use GLOBE in their classrooms. You will find information in this report regarding:

- Fit of the Program in the curriculum
- Incorporation in the instruction process
- Evaluation tools used
- Outcomes teachers want to be able to document
- Outcomes that teachers have seen from implementing the Program
- Types of support needed to better implement the Program
- Types of support needed to better assess the effectiveness of the Program
- Demographic data about the teachers

Our main goal in reaching out to the community is to gain from the knowledge, experience and ideas of the people directly involved in the Program. So, this is a document that can provide useful information to you and, at the same time, it is a document to promote dialogue. We welcome your input and feedback, particularly on how we can better support data gathering and evaluation on the effectiveness of GLOBE.

We encourage you all to contact us with additional information, questions or feedback. As a committee, we are still analyzing the data further and there will be follow-up communication in the near future.

Please, get in touch with the representative for your region and let us know about:

- Existing student assessment and program evaluation tools that can be shared with other members of the GLOBE community.

- Existing data that partners have from their studies on Program effectiveness, including both short-term results (for example, student gains in learning, interests, motivation, and social-emotional development, or teacher outcomes) and longitudinal studies (for example, related to improved graduation rates, entry to postsecondary education, and career-related outcomes.)

If you would like to see our survey, you can go to this url (link) or refer to Appendix 2 of this document.

Please, share any other information that you feel is relevant and important to the community.

We would like to thank all the teachers that took the time to participate in the survey. We look forward to receiving comments and input from you all!

Thank you for your support!

The Evaluation Working Group

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(*) Rogeline Brettenny will be replaced by another member of the Community for her region. Announcements will be made when the processes are completed.

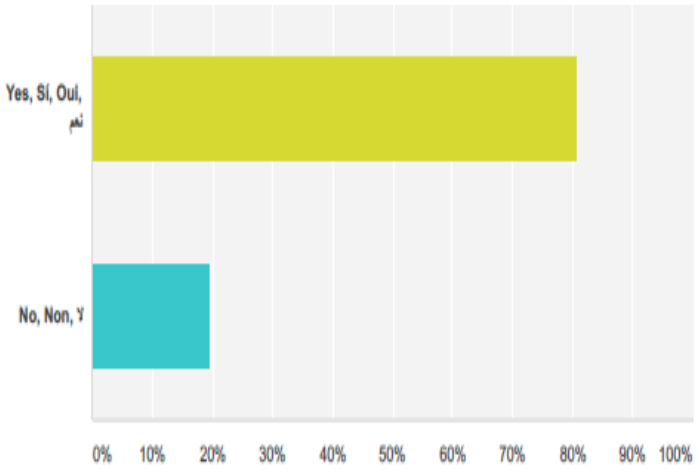
SURVEY RESPONSES

Question 1

Have you identified successful practices using the material that GLOBE provides in your school?

The question was answered by 335 respondents and skipped by 4.

The majority of the respondents (81%) responded YES to identifying successful practices using GLOBE materials in their school. Significantly less (19%) responded NO.



Question 2
If yes, please briefly describe those practices.

The question was answered by 243 respondents and skipped by 96.

The Majority of the responses read like a laundry list of activities (ex: #157-Atmosphere - Air Temperature, Clouds, Precipitation, and Relative Humidity; Biosphere - Green-Up / Green-Down). There is minimal information provided on "how" they are able to determine the practices are successful. This may not be specific to the question yet it is still important. This may be a consideration for next questionnaire- "*How do you know they are successful?*"

We have organized the responses into 5 themes:

1. *Skills/ Attitudes/ Engagement*
2. *Data Collection-Analysis/ Research*
3. *Cross-Curricular*
4. *Project-based*
5. *Supporting Reference*

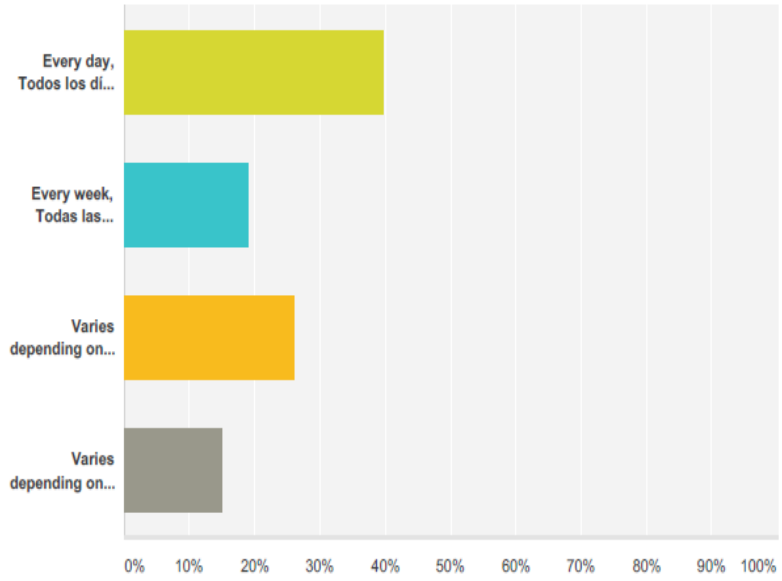
*Please see APPENDIX I for list of responses organized into 5 themes.

- *Data Collection-Analysis and Research* theme seems to be the most highly referenced area of perceived success.
- Some repeated references to "Citizen Science" and "Real-life Science".

Some other responses of interest:
#197- **We determined soil and plant pollution with heavy metals by measuring** conductivity (confirmed by chemical analysis) and air pollution with Sulphur dioxide by measuring pH and conductivity.
#195- We use GLOBE Protocols to study our local environment. Our students have a study site as part of an **outdoor classroom.** about the implementation and impact of GLOBE related activities.

Question 3:
How frequently do your students collect data?

A total of 325 teachers answered this question and only 14 skipped it.

Most of the respondents stated that students collect data every day (39.69%) and the second choice most voted is that data collection varies depending on the season (26.15%).	

Question 4
Please explain further if needed.

From 339 surveys, 165 teachers specified the frequency and conditions of data collection, and 174 skipped the question.

The responses were grouped according to the similarity of frequency and conditions, and most of the teachers stated that they collected data daily (41 responses) although some of them did not report data with the same frequency (4). In this case, the teachers reported the measurements related to atmosphere, especially temperature and humidity. There are also some teachers who take measurements 5 days a week (5 responses), which is highly frequent.

The second most popular selection represents teachers who say that measurements are being taken for specific projects of local interest or related to the school curriculum, or students' campaigns, contests and field campaigns (34 responses).

Then, follow teachers that collect data weekly (17 responses), monthly (13 responses), or according to the season (11 responses).

There are also institutions that provide training but do not collect any data (museums, government agencies, environmental centers) (3) and schools that have not taken any measurements yet or are re-starting measurements (10 responses).

It should be highlighted that only 7 teachers say they collect data according to GLOBE protocol recommendations.

Some teachers point out that do not need to take the data themselves because have Davis stations that work that automatically (4).

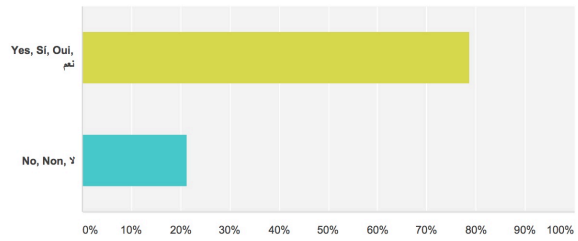
Some interesting answers:

- *"Every day at 10.00, we "Wondered about the Weather"*
- *"Hydrology rather in the summer, half year spring: green up, green down, late winter: GLOBE at Night, winter: freeze-up, break-up, frost-tube, snow, ice December, surface temperature campaign, every month: SIMB (seasons in my biome)"*
- *"Each day special student is responsible for record data. The students are divided into groups doing certain protocol."*
- *"We have been unable to submit data for max/min temperatures, despite calling the help desk several times. Also, we have data stuck in the new app that is preventing us from submitting more data. This has curtailed our efforts to collect more data. We take rainfall and cloud observations just about every day and hydrology data every two weeks from a nearby stream as the weather allows."*

Question 5

Do your students use the data they collect for science projects/studies during the school year?

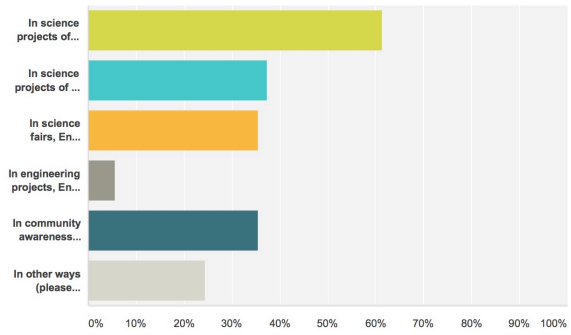
The question was answered by 325 teachers and skipped by 14.

79 percent of the respondents said their students collect data for science projects and studies.	

Question 6

If yes, how do students use the data? (Check all that apply)

The question was answered by 270 people and skipped by 69.

With 279 teachers responding to the question, "If yes, how did students use the data?", teachers reported that students use the data as follows: 61 percent use data in science projects of short duration; 37 percent use data for science projects lasting 6 months or longer; 36 percent in community awareness events; and 35 percent use data in science fairs. Only 6 percent use data in engineering projects, suggesting that the link to engineering practices may not be clear or relevant for many GLOBE teachers. Twenty-four percent (24%) used GLOBE data in "other" ways, in some cases elaborating on their prior response selections.	

About 70 teachers responded that they also used data in "other" ways. These clustered into seven categories.

1) Supporting the understanding of basic science concepts and practices

2) Presentation, including sharing of information with the Ministry of the Environment, daily weather reports to the school community, and EU presentations

3) Use in projects, including "real world" projects, such as monitoring water quality at the school

4) As a means to strengthen students' sensitivity to environmental issues. Examples included understanding pollution and the connection to aerosols, or the effect of climate change on cultures

5) In promoting understanding in disciplines throughout the curriculum. Most frequently mentioned was Mathematics (5 responses). Geography was mentioned by two responded; also cited were, Art, Biology, Physics, Chemistry and "Personal and Social Development"

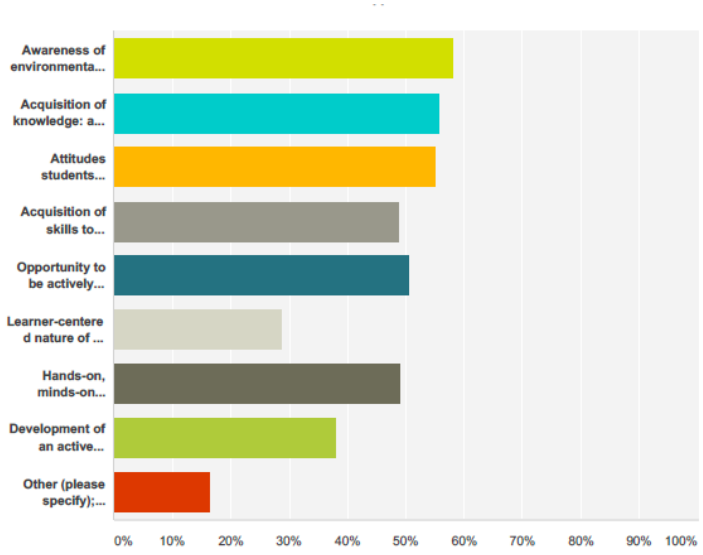
6) To promote better understanding of data, for example in comparisons with weather forecasts, understanding how to display data; data analysis and development of conclusions, graphing

7) Use of GLOBE in various settings:
   - Peer tutoring
   - Labs
   - Field trips
   - Exchanges with other schools
   - Environmental festivals
   - Investigation
   - GLOBE at Night

Question 7

What are in your opinion and from your experience the most valuable aspects of GLOBE?

This question was answered by 326 and Skipped by 13

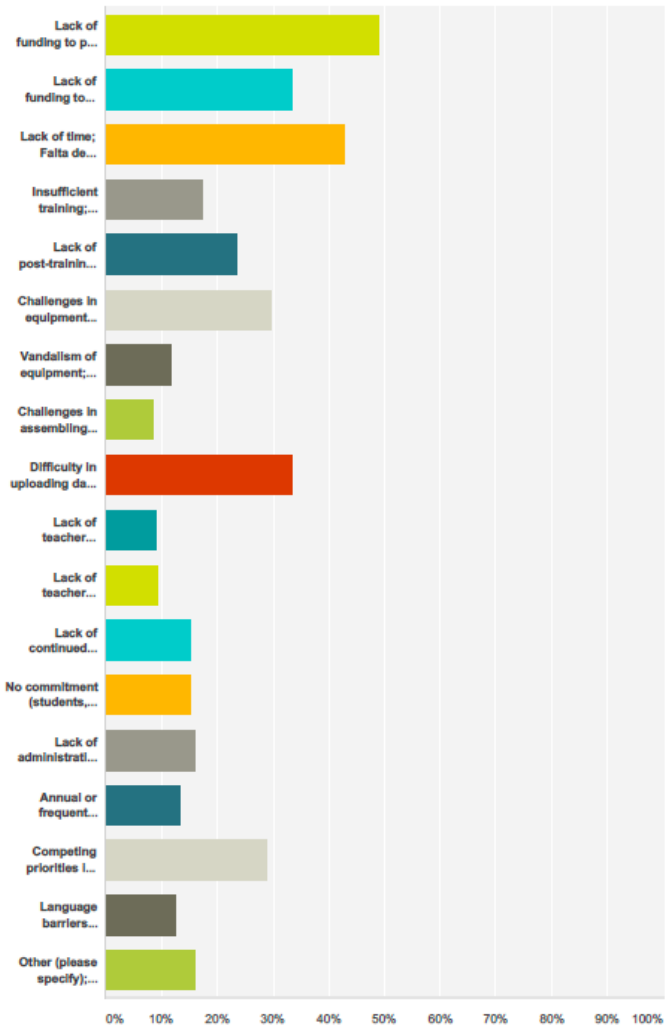
1) awareness of environmental issues, 2) acquisition of knowledge and 3) positive attitudes students develop. Were above 50% 5) opportunity to be actively involved, 7) hands-on and minds-on, and 4) acquisition of skills followed.	 If possible we must try to make the aspects or impact of the Globe program more visible to everybody.

Other: The Globe Program prepares responsible tolerant sociable students.

Develop high thinking active learning.
Students are able to work in teams/ independent.
Globe improves language usage.
It is hands on, informative, practical
Students understand better and can overcome a low self-esteem.
Empowered, students make a difference with their data.
Globe students are better leaders

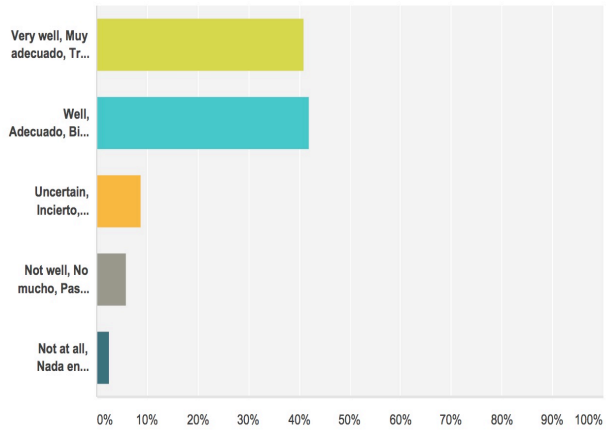
Question 8
What barriers/challenges do you experience in implementing GLOBE?

This question was answered by 330 and skipped by 9.

The teachers primarily stated insufficient funding for equipment and materials (49%) along with insufficient amount of time (43%). They also prioritized the difficulty in uploading data (33%)	 I find the lack of funding for teacher time interesting.

Q9. How well does GLOBE fit into your curriculum? (for example, do the content and practices match what you need to teach?)

The question was answered by 327 teachers and skipped by 12.

To the question, "How well does GLOBE fit into your curriculum? (for example, do the content and practices match what you need to teach?), as large majority — 83 percent — reported that GLOBE fit very well or well into their curriculum, as follows: 41 percent of teachers reported that GLOBE fit "very well"; 42 percent reported that it fit "well"; 9 percent were uncertain; 6 percent responded "not well" and 2 percent reported "not at all".	

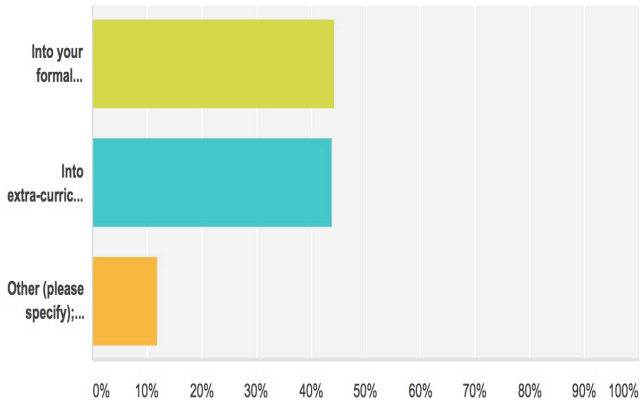
Numerous comments were provided to explain the responses.

- Seven respondents asserted that they used GLOBE throughout the curriculum, including in projects and to support interdisciplinary themes.
- Five claimed that GLOBE assisted in active learning, for example, in marine biology and "made science real".
- Teachers said GLOBE helped in a number of discrete disciplines, for example, core science curriculum and understanding of the scientific method (4), chemistry (4), Earth and Environment Science or Environmental research (4); math (2), physics (2), biology (1), geography (1), social studies and civics (1), and Latin and Greek. ("I teach Latin and Ancient Greek, and the inquiry-based approach with investigation and a lot of practical work, analysis, rethinking…are fundamental for success in those subjects.")
- One respondent highlighted GLOBE as a means to complement indigenous ways of knowing.
- One mentioned "to help students understand climate change" and 4 made comments related to environmental awareness: "explaining environmental issues", skills to address environmental issues, fostering commitment to addressing environmental issues, and preparing for a degree in Environmental Education.
- Six mentioned the development of specific skills, such as understanding data, including reading and charting, math skills; working as a scientist, or supporting the skills necessary to become a meteorological technician.
- Other explanations included "authenticating other data" (2), serving as an additional classroom resources (2); use of protocols and the GLOBE website to help students "meet and exceed standards", though one also mentioned that they wished to see more alignment with NGSS.
- A number mentioned specific populations with which GLOBE was successful, including Middle SchooL

- 8th grade, 5th grade (for understanding data), for Freshmen, for Juniors studying environmental science, in after school programs, and for teachers as well as students.

Question 10
How do you incorporate GLOBE into your instruction?

The question was answered by 319 and skipped by 20.

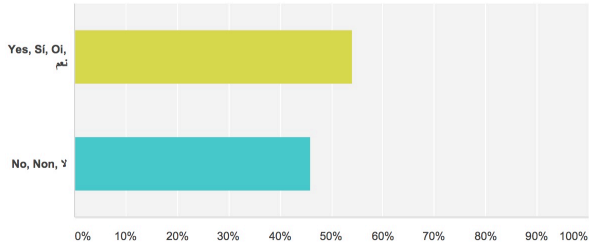
When asked how they incorporate GLOBE into instruction, GLOBE teachers responded in almost equal measure that they incorporated GLOBE into their formal classroom curriculum (44.20 percent) and in extracurricular activities, for example, after-school projects or science clubs (43.89 percent). Twelve percent (12%) incorporate GLOBE in "other ways". [Note, I do not have a list of "other" responses.] This suggests that GLOBE is conducive to implementation in informal settings and that outreach to after-school coordinators and club coordinators, as well as teachers, may be a fruitful strategy for expanding the reach of GLOBE. Such a strategy may pose its own challenges, however, such as lack of science training among after-school and club staff.	

Those responding "Other" offered a number of ways they incorporated GLOBE into instruction.

- Eight implemented GLOBE in enrichment classes and extracurricular activities.
- Six reiterated that they incorporated GLOBE into their curriculum and into projects.
- Five more specifically mentioned using it with Earth Science students or in special symposia such as "Week of Biology" or "Fieldwork Fridays".
- Two mentioned specific environmental research projects, such as a dolphin research program or a wetlands project in New York City, NY, United States.
- Two used GLOBE on field trips.
- One used GLOBE to support "observations and inquiry".
- One used GLOBE as "a ritual", three times per week
- One mentioned using GLOBE in Social Studies.
- One mentioned its value in instructing teachers as well as students.

Question 11

Do you use evaluation tools to assess student learning and GLOBE implementation in your school?

Only ten respondents of out of all responses (337 in survey) have not responded to Q. 11. Over 50% (52.5%) responded positively, which means they have used some evaluation tool.	

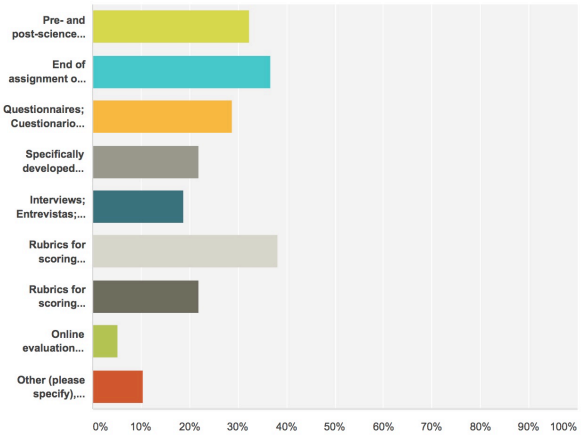
Question12

If yes, which types? (Choose all that apply)

Since respondents can choose more than one choices for the types of evaluation tool they use, there are 391 responses, from the ones that answered said "yes" in Q11. Except from the last response (Online evaluation tool) the response rate for all other responses varies between 10% - 20%. Nearly equal rates have been recorded for evaluation tools "End of assignment or unit assessments of learning and Rubrics for scoring projects or performance tasks- scored by teacher".

The numbers of responses are as follows:

- Pre- and post-science tests – 62
- End of assignment or unit assessments of learning – 70
- Questionnaires – 55
- Specifically developed evaluation tools – 42
- Interviews -37
- Rubrics for scoring projects or performance tasks- scored by teacher – 73
- Rubrics for scoring projects or performance tasks- - scored by outside professionals (as in juried science fairs or community presentations) – 42
- Online evaluation tool, such as simulations or other; please specify – 10



'Other' types of evaluation tools

Only 19 out of 177 those who responded as “yes” in Question 11 have given different 19 statements regarding other types of evaluation tools which they use. But similarities for all responses could be observed since, they are formal and being done on systematic manner. And it’s interesting to say that the last three statements also have shown tendency of showing their interest to use evaluation tools.

The response provided:

Other responses:

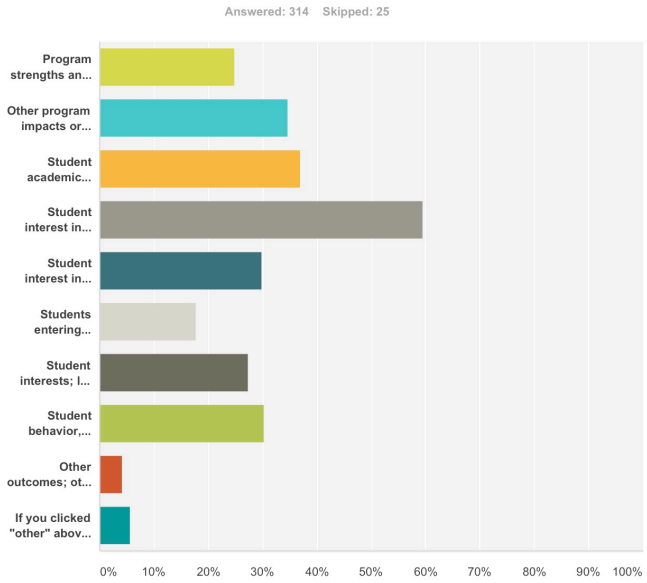
- We in Croatia have an annual review of our GLOBE schools’ achievements, their projects and a competition in orientation with several practical skills testing
- Interest children, to arouse interest
- Performance assessments
- My students have presented their finding before school and environmental boards. This is the best way to evaluate how well they understand what they did
- They are assessed on their use of the scientific method and knowledge of the local environment.
- Observation of the students' understanding and performance when completing a lab
- Possible audio and video recording for class media instruction
- In class competition where students challenge each other on environmental questions while their teachers are present.
- We are planning to use pre and post science test, however the intention is to develop rubrics for some assignments. If there are any available rubrics for the Hydrology unit, please share.
- To defend their research in the presence of an auditorium (Science Fair)
- We coordinate with the students’ science teacher to give them marks for attending marks for attending extra hours to help for GLOBE lessons.
- Presentations and filming protocols with the students when they do field work
- Know how to identify clouds, use the photometer and upload the data on the GLOBE web site.
- Evaluation of group work
- How they apply theoretical concepts learnt before each field work. Work in the laboratory
- Not yet, but hope to soon
- Actually, I didn't know there were so many types of GLOBE evaluations and assessments. I'd love to learn more about them.
- What are these? I think I need to look for these forms!

Question 13

What kinds of outcomes do you want to be able to measure or document? (Choose all that apply).

The question was answered by 314 respondents and skipped by 25.

The majority of the respondents (59.55%) stated that they would like to be able to report outcomes that are related to students' interest in science. This percentage is significantly higher compared to the percentage of teachers that chose students' academic outcomes (36.94%) or other outcomes such as impacts on school culture, results from students' projects, new collaborations etc. (34.71%). Students' behavior, attendance, social and emotional skills was the next more popular answer (30.25%).



Students' interests in science careers (29.94%) and students' interests (27.39%) were the next more populated categories in the set of options that were provided in this question. A smaller percentage of the respondents (24.84%) stated they would like to be able to measure the strengths and challenges of the program.
Last, some of the respondents (4.14%) did not select any of the given options and chose 'other'*

It is interesting that teachers who responded to this question prioritized students' interest in science over academic achievements, while they did not prioritize significantly students' choices of science oriented careers. Another interesting element is that a small percentage of teachers who responded to this question expressed their interest in being able to measure or document the Program's strengths and challenges.

*Other responses

- Acquire knowledge with respect to clouds, awareness for the protection of the planet.
- The value of indigenous knowledge and experiences in the formation of theoretical ideas and moreover in the affirmation that indigenous knowledge IS a key element when research is involved.
- Student learning of scientific habits of mind. Citizen science observation contributions.

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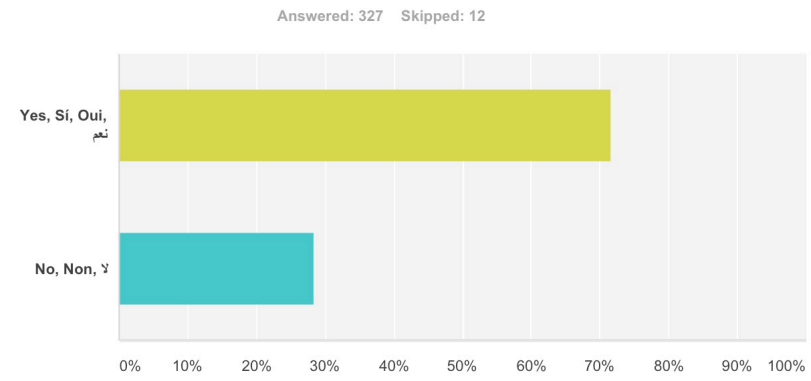
- Results regarding the climate, the weekly, monthly and even yearly trends.
- Student and public interest in concern for the environment.
- Students being responsible citizens who take care of the planet.
- Global awareness on climate change.
- GLOBE has been a way to put indigenous observations and data into a scientific explanation, both supporting each other.
- To complete the secondary level looking at another alternative for study: meteorologist.
- Acquire skills for observation, measurements and posing of questions.
- GPM Field Campaign Evaluation
- CULTURAL impact. Does GLOBE help especially indigenous cultures understand the importance of climatology data gathering?

Question 14
Do you report- or want to report- any information about your work to any individuals or organizations?

The question was answered by 327 respondents and skipped by 12.

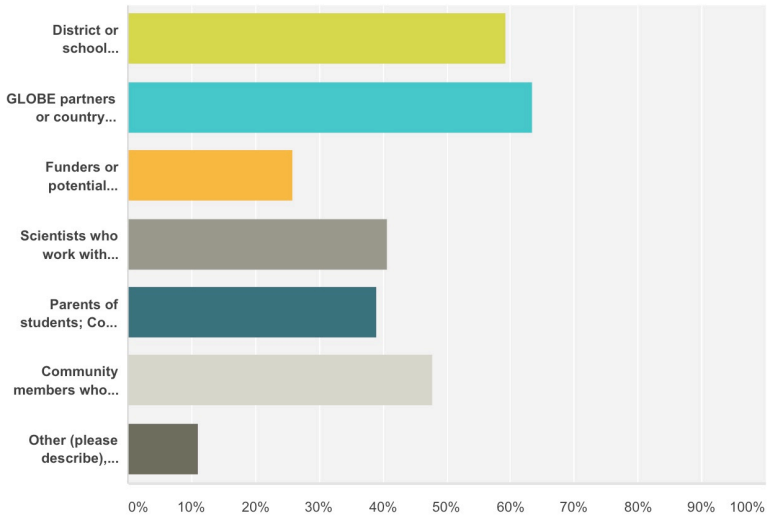
The majority of the teachers who responded to this question report or want to report information about their work that relates to GLOBE to individuals or organizations (71.56% who choose 'yes' over 28.44% who choose 'no').	

This majority reflects the importance of having evaluation information that can allow the teachers to share information about the implementation and impact of GLOBE related activities.

Question 15

If yes, what kinds of individuals or organizations do you share information with? (Choose all that apply)

This question was answered by 243 respondents and skipped by 96.

The majority of the teachers who responded yes to the previous question (71.56%) would like to report information about their work to the GLOBE partners or Country Coordinators (63.37%) or at district or school administrations (59.26%). A significant percentage of teachers would like to report about their work to community members who would be interested in it (47.74%), to scientists who work with them (40.74%), or to the parents of their students (39.09%). A smaller percentage of teachers stated that they would be interested to share information about their work to funders or potential funders (25.93%). A percentage of 11.11% did not select any of the provided options and chose 'other'*.	

These responses reflect the desire of the teachers to share the results of their work with a broad audience involved directly or indirectly in GLOBE, such as GLOBE partners, Country Coordinators, scientists, administrators of schools and districts and parents. This in turn shows the importance of having data about how GLOBE works in the classroom. It is interesting however, that reporting to funders or potential funders seemed to be comparatively low in the teachers' priorities.

*Other responses

- Awareness at the community level, association of young people interested in environmental science. CNES

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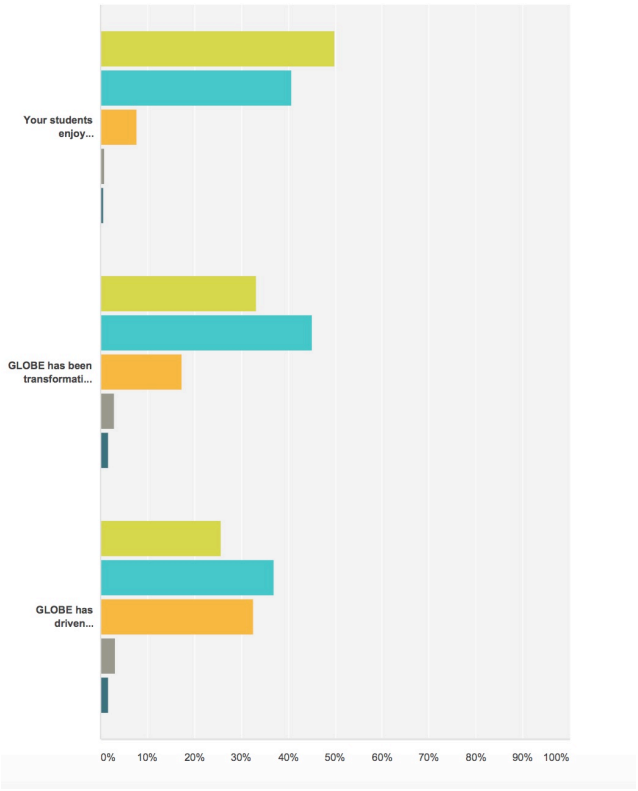
- Native Alaskan Tribal entities that area in our area.
- If possible everybody.... globally, science is us and we are science...that the human race. Including politicians and policy makers on issues of environment.
- Local authorities.
- Sharing weather information with local NGOs/organizations those are working on environmental rehabilitation or conservation.
- In national events, contests, as dissemination of successful experiences
- Other GLOBE teachers.
- GLOBE Alumni.
- We report directly to the Town of Dover conservation commission once a year before November 30. We let them know our findings and how we are using it in our science curriculum.
- Governmental agencies such as the Department of Environmental Conservation, the Department of Environmental Protection and the Soil and Water Conservation District.
- Journals/newsletters/magazines.
- Our school will be the first to implement, however we would like this to be a springboard to encourage and train teachers in other schools.
- Our Tribal council.
- If the results show a community problem it is important to get in touch with the people involved, that can be part of a possible solution and local governments or municipalities.
- Non-Government Organizations NGOs
- Other students
- Saudi Environmental Society
- Have previously shared with local newspapers.
- Our local Met office.
- NGOs, government and non-government organizations, civil associations
- To my colleagues who also teach science but are not a part of the GLOBE program.
- University studies, citizen scientist and local organizations that deal with nature.
- County Health Department gets our GLOBE data as well as our E. coli data. We also share our data with the local watershed association.
- Our Deg Hitan Tribal Council in Shageluk.
- International Collaboration, India and Croatia.
- Other teachers from other Schools to get them involved as well.

Question 16
How strongly do you agree or disagree with the following statements?

The question was answered by 323 respondents and skipped by 16.

Teachers affirmed that GLOBE has benefits for students. With 323 teachers responding, over 90 percent of teachers strongly agreed (50%) or agreed (41%) that their students "enjoy participating in GLOBE and demonstrate interest and motivation." Nearly 80 percent either strongly agreed (33%) or agreed (45%) that GLOBE "has been transformative with respect to students' attitudes toward science. The majority of teachers (63%) also strongly agreed or agreed that "GLOBE has driven participating students to pursue science-oriented future studies or careers," though 33 percent were uncertain on this question.

The uncertainty about whether GLOBE results in students' pursuit of science-related future studies or careers may simply be due to lack of data, and suggests that some follow-up studies may be warranted to ascertain students' pursuits beyond secondary school, if long-term impact on student careers is a goal. Follow-up studies may also seek to learn other ways that students may have incorporated their learning through GLOBE — other than education or careers in science — for example, applying measurement, inquiry, or critical thinking skills, their sense of agency or other social emotional skills, or their understanding of environmental issues, in any variety of academic, career, or civic pursuits.



Question 17: What other outcomes have you seen? Please describe.

From 339 surveys, 153 teachers answered the question and 186 skipped it.
The answers can be grouped into the following categories:

- Greater commitment, responsibility and awareness of students with GLOBE and environmental problems (*27 responses*)
- A positive change of attitude towards sciences (*17 responses*)
- More group and collaborative work among students, among teachers and between them, improves teacher-student relationship (*19 responses*)
- Development of a greater understanding and knowledge of nature and environment (*15 responses*) and the students observe weather conditions for themselves (*7 responses*)
- Strengthens the formulation of questions (pre and post investigation), the research capacity and develops critical thinking (*17 responses*)
- Improvement in communication and presentation skills (13 responses)
- Scientific method to learn sciences (*11 responses*)
- Importance of doing measurements correctly, collect and report data (*9 responses*)
- Better results in the curricular subjects, especially in science ones (*9 responses*)
- Students enjoy and have fun in class applying the GLOBE program and go outside to the field trips (*13 responses*)
- Fostering student collaboration and exchange with people from all over the world (*8 responses*)
- Family support and involvement in extra and curricular GLOBE activities (*4 responses*)
- Preference for science careers or continue their subsequent studies in science (*3 responses*)
- Students like to use (and learn to use) scientific instruments (*3 responses*)
- Hands on activities of the program (*3 answers*)
- A better subsequent curricular performance of those students who went through GLOBE training (*2 answers*)
- Interest in continuing its later involvement in GLOBE projects in the institution or being alumni to keep in touch with the program (*2 answers*)
- Ability to infer and connect data to real issues (*1 answer*)
- It contributes to improving the technical vocabulary (*1 answer*)

Most of the responses are very positive ones, teachers evidence a great variety of outcomes they have seen in class and can clearly identify and that possibly encourage them to go on applying GLOBE methodology as they see students feel comfortable with the program and like it. Other responses mentioned teachers are just starting in the program, they need time to assess the outcomes or would like to participate, need for time to disseminate and knowledge of the program, no time enough to report data or no solid data to report, need to increase the number of schools joining GLOBE in the school area (*10 responses*).
Only a few negative comments arise from the survey that are also valuable from the point of view they identify problems to apply the program.

- No motivation or rewards for teachers nor students from the program (*1 response*)
- The teacher can't use it in class (*1 response*)

Some interesting responses:

- Parents are now interested in environmental issues. Students naturally protect the planet and organized their lives in a way that nature is preserved. All the GLOBE alumni have a GLOBE mark in their hearts and they are Earth lovers, followers, and choose options in life that benefit the planet not their comfort.
- Unproductive students in class become leaders during field experiences.

- GLOBE bring my students to collaborate with people from all around the world, and use the universal language of science as PEACE attitude.

- Some students have chosen to stay in school because of the science programs that we do.

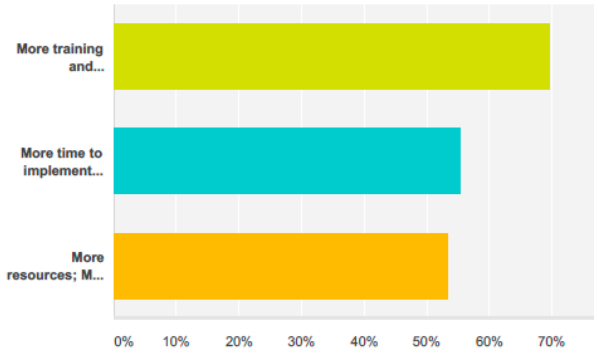
- GLOBE is the most popular program in my school, I have 50 students and every day I have more. Everyone knows about the GLOBE publish news, accomplishments, trips to the web site school and daily newspapers. Everyone wants to be part of GLOBE. Students are responsible and carry out measurements a day, remind the teacher that should be done a certain measurement.

- Students have observed the environment much more than before, they observe things they didn't notice before they learn about topics that wouldn't have appeared without GLOBE, they feel that this is all real and not only schoolbook stuff, they get to know scientists and other people they never would have met without GLOBE. They respect the teacher in a different way because he/she does more than the standard school program, teachers are confirmed in their (not only scientific) work, teachers get more feedback than before, teachers as well as students are learning and understanding our environment better.

Question 18

Please select the types of support that would be useful to better implement GLOBE.

This question was answered by 313 and skipped by 26.

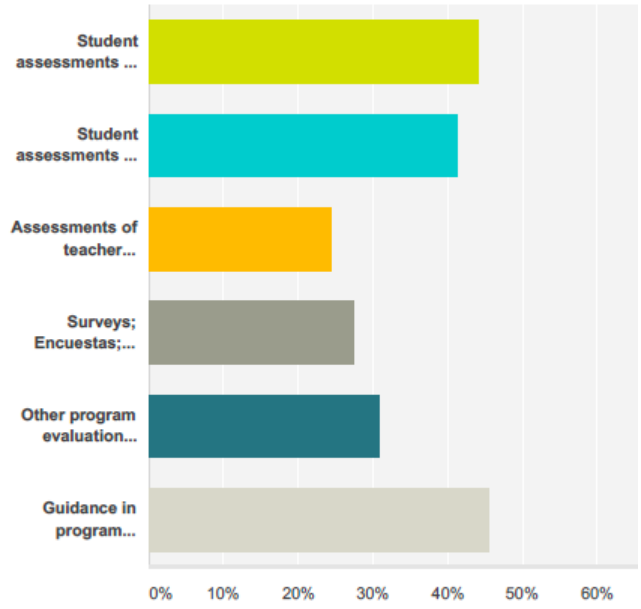
Teachers would like to receive more training professional development (70%) more time to implement GLOBE (56%) More resources (52%)	

Other: greater awareness

Question 19

Please select the types of support that would be useful to assess your program's effectiveness

This question was answered by 304 and skipped by 31.

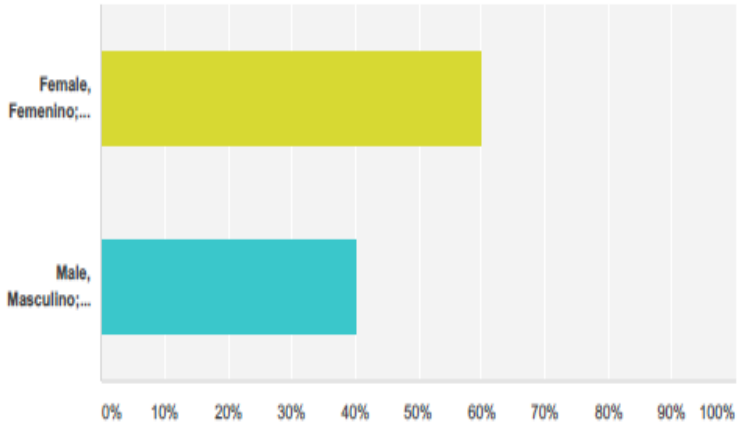
Teacher's role/responsibility. teachers wanted support and guidance in program evaluation. (45%) Student assessments of learning (44%): teachers designated that they needed support in assessing student interest in science and science careers(41%)	 Seems teachers want to get more involved in program evaluation? Which evaluation are they talking about?

Other responses: none.

Question 21
What is your Gender?

The question was answered by 335 respondents and skipped by 4.

The majority of the respondents (60%) were **Female** as compared to the number of **Male** respondent**s** (40%).



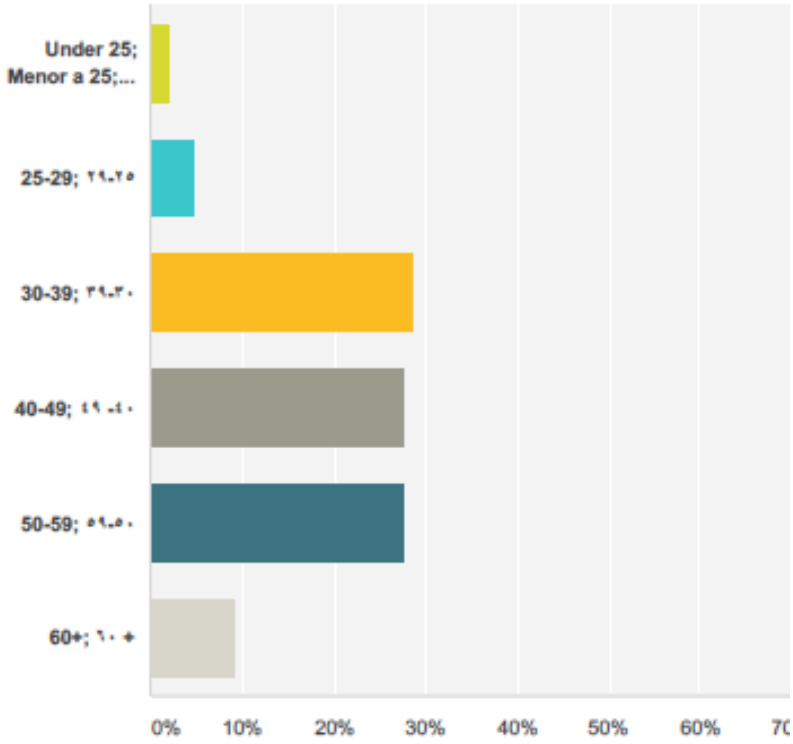
Question 22
What is your age group?

The question was answered by 329 respondents and skipped by 10.

Answer Choices: *(329 responses)*

- **Under 25: 2%** *(7)*
- **25-29: 5%** *(16)*
- **30-39: 29%** *(94)*
- **40-49: 27.5%** *(91)*
- **50-59: 27.5%** *(91)*
- **60+: 9%** *(30)*

The majority of the respondents were in the 30-59 age brackets (84%). The highest age bracket being 30-39 years (28%). The least represented age group is 29 years and under (7%), specifically 'Under 25' (2%). This is marginally lower than respondents in '60+' age bracket (9%).



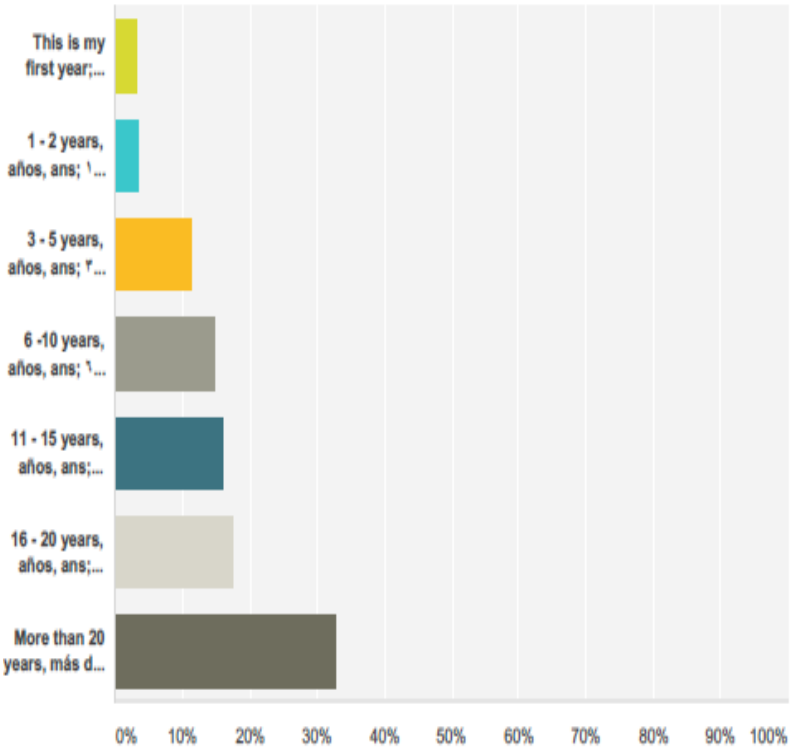
Question 23
How long have you been working as a teacher?

The question was answered by 329 respondents and skipped by 10.

Answer Choices: *(329 responses)*

- **This is my first year: 3%** *(11)*
- **1-2 years: 3.5%** *(12)*
- **3-5 years: 11.5%** *(38)*
- **6-10 years: 15%** *(49)*
- **11-15 years: 16%** *(53)*
- **16-20 years: 18%** *(58)*
- **More than 20 years: 33%** *(108)*

The majority of the respondents were in the 'more than 20 years' brackets (33%). There was a relatively even spread of respondents from 3-20 years (60.5%). There were few respondents in the 'first year-2 years' bracket (6.5%). This speaks GLOBE popularity with more experienced teachers and also reflects a possible gap in the use of GLOBE in teacher education programs.

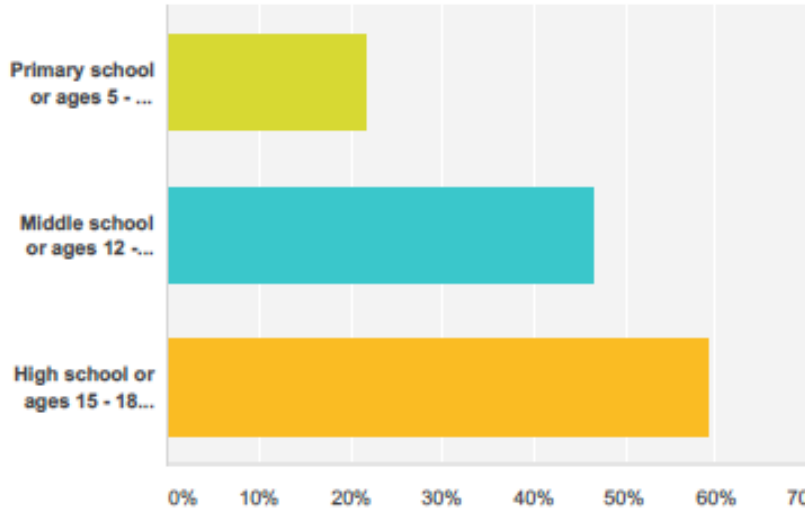


Question 24
What age groups of students do you teach?

The question was answered by 326 respondents and skipped by 13.

Answer Choices: *(326 responses)*

- **Primary school or ages 5-11: 22%** *(71)*
- **Middle school or ages 12-14: 47%** *(152)*
- **High school or ages 15-18: 60%** *(193)*



The majority of the respondents teach 'High school or ages 15-18' (60%). Primary school or ages 5-11 is the lowest reported age group (22%). It seems there is an overall preference for GLOBE at the older grades and the use of GLOBE seems to increase as the age of students' increase (e.g. Primary 22%-Middle 47%-High school 60%).

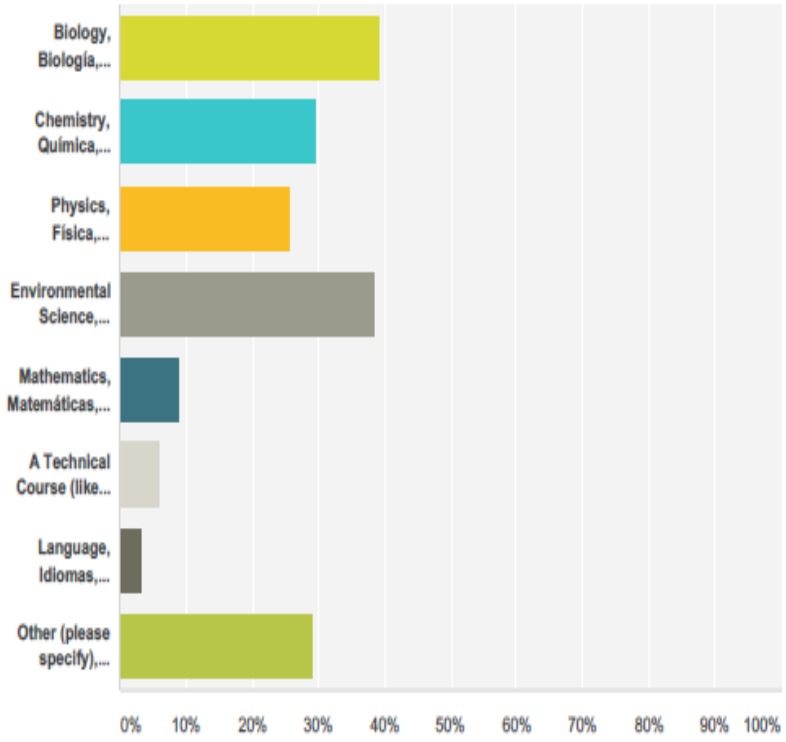
Question 25

For Middle and High School teachers, what subject do you teach? (Select all that apply)

The question was answered by 291 respondents and skipped by 48.

Answer Choices: *(291 responses)*

- **Biology: 39%** *(114)*
- **Chemistry: 30%** *(86)*
- **Physics: 26%** *(75)*
- **Environmental Science: 38%** *(112)*
- **Mathematics: 9%** *(26)*
- **A Technical Course (like Engineering, Agriculture, Health, or Construction): 6%** *(17)*
- **Language: 3%** *(9)*
- **Other (please specify): 29%** *(85)*



The majority of the respondents teach 'Biology' (39%) and 'Environmental Science' (38%). In addition, a significant number of respondents reported teaching 'Chemistry' (30%), 'Physics' (6%) and 'Other' subjects (29%). Very few respondents taught 'Languages' (3%) and 'Technical course' (6%). Probably the most surprising result is that a minimal amount of respondents taught 'Mathematics' (9%).

Question 26
In what country do you teach?

The question was answered by 196 respondents and skipped by 143.

From a total of 337 surveys, only 196 teachers mentioned the country where they teach (representing the 58% of the responses), the rest of them (141) did not answer the question.
The country with most responses was the United States of America with 52, the second was Saudi Arabia with 21 and the third Costa Rica with 17 responses.
The region with most responses was Europe-Eurasia (60), the second was North America (although only United States teachers answered the survey) and the third was Asia-Pacific with 38 responses. The region with fewest responses was Near East and North Africa with a total of 3 answers.
In relation to the number of countries mentioned in the responses, 41 countries were mentioned as the country where teachers teach. They were listed in a graph in the order from the most mentioned to the least mentioned, and they were also ordered by region in order to analyze which countries from which region did answer the survey.
Data and graphs are presented below in order to better visualizing them.

Responses by country (41 countries in total)	
United States	**52**
Saudi Arabia	**21**
Costa Rica	**17**
Ukraine	**15**
Croatia	**12**
Israel	**11**
Oman	**9**
France	**4**
Kenya	**4**
Thailand	**4**
Italy	**3**
Madagascar	**3**
Uruguay	**3**
Argentina	**2**
Cyprus	**2**
Greece	**2**
Jordanian	**2**
México	**2**

The Netherlands	**2**
Perú	**2**
Spain	**2**
Suriname	**2**
Taiwan	**2**
Australia	**1**
Benin	**1**
Bermuda	**1**
Czech Republic	**1**
Chile	**1**
Dominican Republic	**1**
Estonia	**1**
Latvia	**1**
Macedonia	**1**
Nigeria	**1**
Norway	**1**
Pakistan	**1**
Poland	**1**
Russia	**1**
Senegal	**1**
South Africa	**1**
Sri Lanka	**1**
Trinidad and Tobago	**1**

Data per region.

EUROPE - EURASIA

Country	**No. of responses**
Ukraine	**15**
Croatia	**12**
Israel	**11**
France	**4**
Italy	**3**
Cyprus	**2**
Greece	**2**
The Netherlands	**2**
Spain	**2**
Czech Republic	**1**
Estonia	**1**

Latvia	**1**
Macedonia	**1**
Norway	**1**
Poland	**1**
Russia	**1**
TOTAL	**60**

NORTH AMERICA

Country	No. of responses
United States	**52**
TOTAL	**52**

ASIA AND PACIFIC

Country	No. of responses
Saudi Arabia	**21**
Oman	**9**
Thailand	**4**
Taiwan	**2**
Australia	**1**
Sri Lanka	**1**
TOTAL	**38**

LATIN AMERICA-CARIBBEAN

Country	No. of responses
Costa Rica	**17**
Uruguay	**3**
Argentina	**2**
México	**2**
Perú	**2**
Suriname	**2**
Bermuda	**1**
Chile	**1**
Dominican Republic	**1**
Trinidad and Tobago	**1**
TOTAL	**32**

AFRICA

Country	No. of responses
Kenya	4
Madagascar	3
Benin	1
Nigeria	1
Senegal	1
South Africa	1
TOTAL	**11**

NEAR EAST AND NORTH AFRICA

Country	No. of responses
Jordan	2
Pakistan	1
TOTAL	**3**

EUROPE-EURASIA: 60

NORTH AMERICA: 52

ASIA-PACIFIC: 38
LATIN-AMERICA-CARIBBEAN: 32

AFRICA: 11
NEAR EAST-NORTH AFRICA: 3

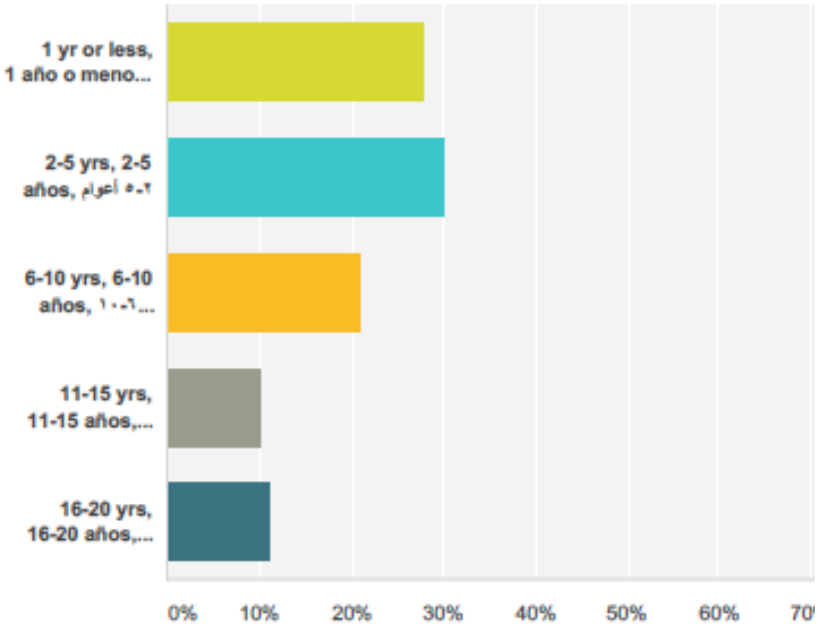
Question 27
How long have you been using GLOBE?

The question was answered by 209 respondents and skipped by 130.

Answer Choices: *(209 responses)*

- **1 yr. or less: 28%** *(58)*
- **2-5 yrs.: 30%** *(63)*
- **6-10 yrs.: 21%** *(44)*
- **11-15 yrs.: 10%** *(21)*
- **16-20 yrs.: 11%** *(23)*

The majority of the respondents have been using GLOBE 10 years or less (79%). There was a significant of experienced GLOBE educators who have used GLOBE for 11-20 years (21%). The largest group of respondents using GLOBE are from the '2-5 years' bracket.



Appendix 1

SKILLS/ ATTITUDE/ ENGAGEMENT

#236- science process skills - data collection - instrument authentication - communication and collaboration - hands-on active science - skill development – math

#231- I have been able to do inquiry, constructivist, hand-on, local, environmental and citizen science data gathering practices.

#212- Improve student's skills in using a lot of data with excel and awareness of global warming by using local data.

#174- improving of critical thinking, observing, analyzing, describing, solving problems, finding more than one solution, team working skills, presentation skills, using IT devices, learning skills...

#166- working cooperatively. Interdisciplinary learning. Further developing skills in science, math and technology.

#142- Student engagement; Real world application

#106- inquiry, hands-on, constructivist, discovery

#101- Outstanding real-data collection. The students get really engaged. Addressing environmental issues is of high interest for us.

#74-Using the GLOBE protocols for collecting data, interpreting the data - this makes science real and hands-on - stimulating more interest in science - creating positive strides in developing science process skills

#31- I have seen students actively collecting about their environment and interpreting the data to help solve problems. I
have seen an increase in environmental awareness along with the integration of science.

#25- it works best if used prior to introduction of content, it gives the students the "explorative advantage"

#22- Inquiry, critical thinking, innovation

DATA COLLECTION-ANALYSIS/ RESEARCH

#242- Data collection and analysis.

#227- The students are now making associations when analyzing raw data in the field.

#221- We enter data every day.

#216- We collect, and input data, use the GLOBE website to make tables and graphs to analyze and make conclusions based on our data. We also compare our data to data elsewhere.

#211- Measuring, analyzing, interpreting, and reporting data

#204- We use GLOBE to teach good data collection and how to analyze data

#199- Learning the scientific method by performing protocols for cloud observation, rainfall observation, air and soil temperatures, and hydrology measurements.

#150- To be very conscientious with the data collections

#101- Using data to look at trends in weather. Learning how to graph data writing summaries. Using scientific instruments and measurements,

#84- Analysis of data from atmospheric measurements for the normal development of some crops, such as olives in my region

#81- long term data collection, using satellite data

#80- Ability to gather data regarding atmosphere and utilize this data in multiple formats for interpretation and analysis.

#79-1. NPK levels of soil 2. Macro invertebrate study for pond water quality 3. Bud burst of pin oaks 4. Earth systems in a bottle

#78- Authentic longitudinal research based on local issues

#76- Students learn about accuracy in reading instruments, trends, cause and effects, how to create data tables

and graphs
& interpret them.
#75- We have established a wetland area on our campus and are using it with our grade 3-8 students exploring hydrology of a vernal pool, tree identification and finding the DBH, we also use it for soil testing; NPK.
#61- We collect data
#53- Data acquisition and recording. Field sampling.
#52- The practices that we use a lot are data collection and learning to analyze the data.
#42- Regular monitoring of freshwaters, characterization of soils
#39- Data collection and research
#35- students learn the importance of good science practices and being careful when making observations and recording them.
#26- Learning about the components of the environment and the weather. The study is based on data collection.
#8- We have measured the physical and chemical of the sea, also we measured the precipitation and we watched the clouds. We also measured biometry, bud burst (green-up, green-down). We measured the temperature and moisture of the soil. We also were in a webinar for precipitation. We are also in the SMAP project.
#7- The GLOBE program provides a comprehensive experience and scientific approach to the researching of the environment
#6- We have learners collecting data, and teachers are utilizing the lesson plans to enhance their science units
#1-Practice in the study of the atmosphere and climate, hydrology, covering the soil and the phenology most of the students are able to use the instruments for every activity and they certainly like to do this and to observe and discover
#4- use of the protocols as a basis to collect data for scientific research on the local or regional level, some learning activity in furtherance of specific topics

CROSS-CURRICULAR
#109- Teaching students through project based learning and inquiry based science, cross curricular units using GLOBE learning activities, collaboration with students in other schools/countries. Getting help from scientists is also a great resource.
#68- The GPS protocol helps the students orient themselves. The use of the clinometer helps the assimilation of trigonometry and shows them how to apply those ideas in everyday life.
#55- After-school extension activities
#29- All the cross-cutting practices.
#10- In all the subjects I teach I used GLOBE protocols so they could connect the influences in the environment
#3-During science, economics, environmental science, earth science, physical science, and social studies classes. Preparing projects for Science Fair or organizing community projects with the school and the neighbors.

PROJECT-BASED
#206- Upland rice project, Holistic Camp, Monkey Research, Groundwater Guardian.
#191- GLOBE is run as an extra-curricular club that supports many activities of the school, such as recycling and outreach with other schools.
#188- Students projects
#186- I am using the material of GLOBE in biology and chemistry. My students explore and measure and they make projects for Croatian GLOBE competition.
#181- For least 2 years we are country champions without paperwork: 2014 - Sea temperatures in Zadar channel, Croatia
2015 - Influence of rain for drinking water in our school (Primary school Zadarski otoci, Zadar, Croatia)

#176- GLOBE in my school is extracurricular activity but some of protocols we use in geography, biology and informatics.
#149- pupils and students from all over Ukraine observe the appearance of buds and leaves on a sour cherry simultaneously measuring the daytime temperature. Results are participants in the form of standard tables and graphs which after processing will be created an interactive map of Ukraine with the locations of schools / educational institutions participating, their observations and photos. As a result, students will be able to compare the starting date of the growing season in different parts of Ukraine and to draw conclusions about the relationship of climatic factors and plant response to them.
#135- Doing scientific studies using Globe tools Taif Globe (local coordinator, two supervisors, one head mistress of Globe schools, 2 teachers of Globe program, 8 Globe students and their mothers), had a scientific round trip to Damascus Rose plantation in Al-Hada district. The main goal of the trip was to observe and know more about one of the most wonderful tree in Taif, that is Damascus Rose, to know about its life cycle and take a sample of the plantation soil. The sample was studied according to Globe Soil Protocol.
#127- We managed make new projects that created student awareness for science and research.
#115- The materials "GlOBE" were used while working at the campaign "Cherry Ukraine". This enabled us to perform successfully the program of campaign.
#65- My classes are more project-based with students using higher order thinking skills like analysis and evaluation. Collecting and reporting GLOBE data helps students understand the role of citizen scientists.
#36- project teaching in chemistry and biology
#18- Student's Science project measure cloud height by using dew point data. 2.Measuring weather data to insect's behavior observation.
#5- appropriate site for tree nurseries, airing clothing outside and when to do planting.
#2- Mini project in Holistic Science (Mutthayom 1), Upland Rice project and Rongrienthummahakin in Mutthayom 1-6

SUPPORTING REFERENCE
#165- lesson plan, relevant content application
#121- I like the way things are related to the NGSS standards.
#100- relevant & rigor has increased by doing real science
#87- I have additional materials for teaching, I have new ideas.
#83- GLOBE materials are good starting fundament for all lectures connected with practical measurements in natural sciences.
#37- I have used the materials as a vivid and colorful detailed reference.

Appendix 2
Teacher Questionnaire

Q1. Have you identified successful practices using the material that GLOBE provides in your school?
- Yes.
- No.

Q2 If yes, please briefly describe those practices.

Q3 How frequently do your students collect data?
- Every day
- Every week
- Varies depending on the season
- Varies depending on whether there is a special effort or campaign

Q4 Please explain further if needed.

Q5 Do your students use the data they collect for science projects/studies during the school year?
- Yes
- No

Q6 If yes, how do students use the data? (Check all that apply)
- In science projects of short duration
- In science projects of 6 month or longer duration
- In science fairs
- In engineering projects
- In community awareness events
- In other ways (please describe)

Q7 What are in your opinion and from your experience the most valuable aspects of GLOBE?
- Awareness of environmental issues
- Acquisition of knowledge: a basic understanding of the environment, its associated problems, and related science
- Attitudes students develop regarding science and the environment
- Acquisition of skills to identify and work for the solution of environmental problems
- Opportunity to be actively involved in a science program
- Learner-centered nature of the program
- Hands-on, minds-on investigations offered by the program
- Development of an active learning community
- Other (please specify)

Q8 What barriers/challenges do you experience in implementing GLOBE? (choose all that apply)
- Lack of funding to pay for equipment and material
- Lack of funding to cover teacher or staff time
- Lack of time
- Insufficient training
- Lack of post-training workshops
- Challenges in equipment acquisition, installation, and maintenance

- Vandalism of equipment
- Difficulty in uploading data and navigating the website
- Lack of teacher knowledge in science
- Lack of teacher familiarity with inquiry-based approaches to teaching and learning
- Lack of continued interest among students
- No commitment (students, community, school)
- Lack of administrative support
- Annual or frequent changes of teachers
- Competing priorities in the curriculum;
- Language barriers (Please explain below);
- Other (please specify)

Q9 How well does GLOBE fit into your curriculum? (for example, do the content and practices match what you need to teach?)

Q10 How do you incorporate GLOBE into your instruction?
- Into your formal classroom curriculum (example: during the formal school day in science class)
- Into extra-curricular activity (example: during an after-school project or science club

Q11 Do you use evaluation tools to assess student learning and GLOBE implementation in your school?
- Yes
- No

Q12 If yes, which types? (Choose all that apply)
- Pre- and post-science tests
- End of assignment or unit assessments of learning
- Questionnaires
- Specifically developed evaluation tools
- Interviews;
- Rubrics for scoring projects or performance tasks- scored by teacher
- Rubrics for scoring projects or performance tasks- scored by outside professionals (as in juried science fairs or community presentations)
- Online evaluation tool, such as simulations or other; please specify
- Other (please specify)

Q13 What kinds of outcomes do you want to be able to measure or document? (
- Program strengths and challenges
- Other program impacts or outcomes (e.g. impacts on school culture, results from student projects, new collaborations, etc.);
- Student academic outcomes
- Student interest in science
- Student interest in science careers
- Students entering science careers
- Student interests
- Student behavior, attendance, social/emotional skills
- Other outcomes
- If you clicked "other" above, please describe.

Q14 Do you report- or want to report- any information about your work to any individuals or organizations
- Yes
- No

Q15 If yes, what kinds of individuals or organizations do you share information with? (Choose all that apply؛
- District or school administrators
- GLOBE partners or country coordinators
- Funders or potential funders
- Scientists who work with students
- Parents of students;
- Community members who care about your work
- Other (please describe)

Q16 How strongly do you agree or disagree with the following statements?
- Strongly agree; Agree; Uncertain; Disagree; Strongly disagree;

Your students enjoy participating in GLOBE at your school and demonstrate interest and motivation.;
- GLOBE has been transformative with respect to the students' attitudes
- GLOBE has driven participating students to pursue science-orientated future studies or careers.

Q17 What other outcomes have you seen? Please describe.

Q18 Please select the types of support that would be useful to better implement GLOBE. (Choose all that apply.)
- More training and professional development
- More time to implement GLOBE
- More resources

Q19 Please select the types of support that would be useful to assess your program's effectiveness.;
- Student assessments of learning;
- Student assessments of interest in science and science careers
- Assessments of teacher learning;
- Surveys
- Other program evaluation tools such as teacher observation protocols, interview protocols
- Guidance in program evaluation (for example, how to identify desired outcomes, how to write measurable objectives, how to measure student progress, how to develop your own surveys, etc.);

Q20 Name (optional؛
Q21 What is your gender?
Q22 What is your age group?
Q23 How long have you been working as a teacher?
Q24 What age groups of students do you teach? (Select all that apply.)
Q25 For Middle and High School teachers, what subject do you teach?
- Biology, Chemistry, Physics, Env. Science, Mathematics, Technical course, Language, Other.

Q26 In what country do you teach?
Q27 How long have you been using GLOBE?