



NWO Inquiry Series 2014 – 2015

Evaluation Report

July 2015

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INTRODUCTION AND BACKGROUND

This report summarizes the activities and findings related to the evaluation of the 2014 – 2015 NWO Inquiry Series. This year, the Inquiry Series was broken down into two “Mini Series”—one focused on mathematics content (in the fall), and another focused on science content (in the winter/spring). This format differs from past years, in which Inquiry Series events were held once a month from October to April. The NWO staff decided to use the “Mini Series” format based on two major factors:

1. **A lack of consistent attendance.** In past years, consistent attendance (at multiple sessions) has been low. While some teachers attended most or all Inquiry Series sessions, most attended only one or two sessions in a given year. The Inquiry Series was always meant to provide *sustained* professional development for teachers, but the lack of consistent attendance had changed the Inquiry Series into a series of one-time events. It was thought that teachers would be more likely to attend all of the sessions within each Mini Series because they only needed to commit to two months instead of nine (as in past years), especially since the Mini Series offered the same amount of contact hours as previous Inquiry Series.
2. **The need for professional development about different content areas.** This need has historically been addressed in several different ways. In past years, the Inquiry Series was comprised of several breakout sessions, each addressing a different topic (i.e., science, technology, math). In other years, each Inquiry Series event addressed a different topic. In still other years, the Inquiry Series was developed around one theme (e.g., technology integration), and each event targeted a certain topic within that theme. The Mini Series allowed for NWO to thoroughly address two different content areas during an academic year instead of choosing only one.

The table below includes general information (including attendance) about the Inquiry Series.

Mini Series	Title	Dates	Contact Hours	Attendance
Math	Connecting the Standards to Best Mathematics Teaching Practice	October 29, 2014	16	34
		November 12, 2014		
		November 19, 2014		
		December 3, 2014		
Science	From Science Activity to Supercharged Inquiry	January 8, 2015	12	29
		January 15, 2015		
		February 3, 2015		
		February 12, 2015		

Evaluation Strategy

Three surveys were developed to evaluate the quality and impact of the Mini Series. After the first session, teachers in each Mini Series were asked to complete a pre-survey about their teaching practices. (The “pre” survey asked teachers to respond retrospectively as a way to measure baseline attitudes and behavior. Data were collected this way to avoid teachers over estimating their attitudes and behavior before the workshops.) After the third session, teachers were asked to complete a survey about the implementation and quality of the workshop. After the fourth session, teachers were asked to complete a post-survey almost identical to the pre-survey.

The content of the surveys for each Mini Series was different to accommodate for the different content that would be addressed during the workshops. The Math Mini Series surveys are included in Appendix A, and the Science Mini Series surveys are included in Appendix B.

The response rates (percentage of attendees who completed a survey) for the evaluation surveys were generally high, especially since no incentive was offered to complete the surveys. The table below includes the response rates for each of the three surveys for each Mini Series.

Mini Series	Survey 1	Survey 2	Survey 3
Math	79%	82%	76%
Science	93%	83%	79%

MATH MINI-SERIES

Participating Teachers

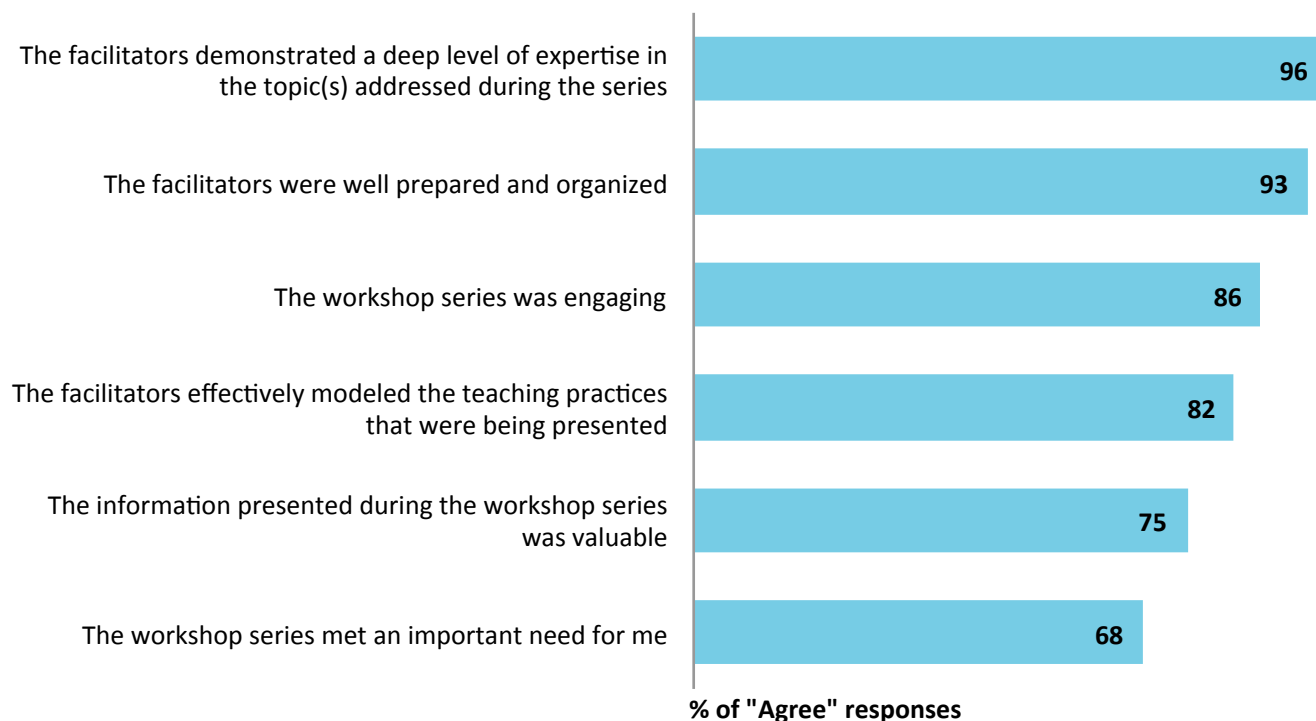
The 34 teachers who attended the math mini-series participated in one of two groups depending on their grade level: 16 teachers participated in the grades K-5 group, and 18 participated in the grades 6-12 group. The teachers represented 20 school districts around northwest Ohio, both public and private. Most of the participating teachers had a great deal of teaching experience. In fact, 40% of the teachers who completed the first evaluation survey (27) reported having 20 or more years of teaching experience. Almost a third of the teachers had been teaching for more than 10 years. The average experience for the group was 17 years.

Quality of the Mini-Series

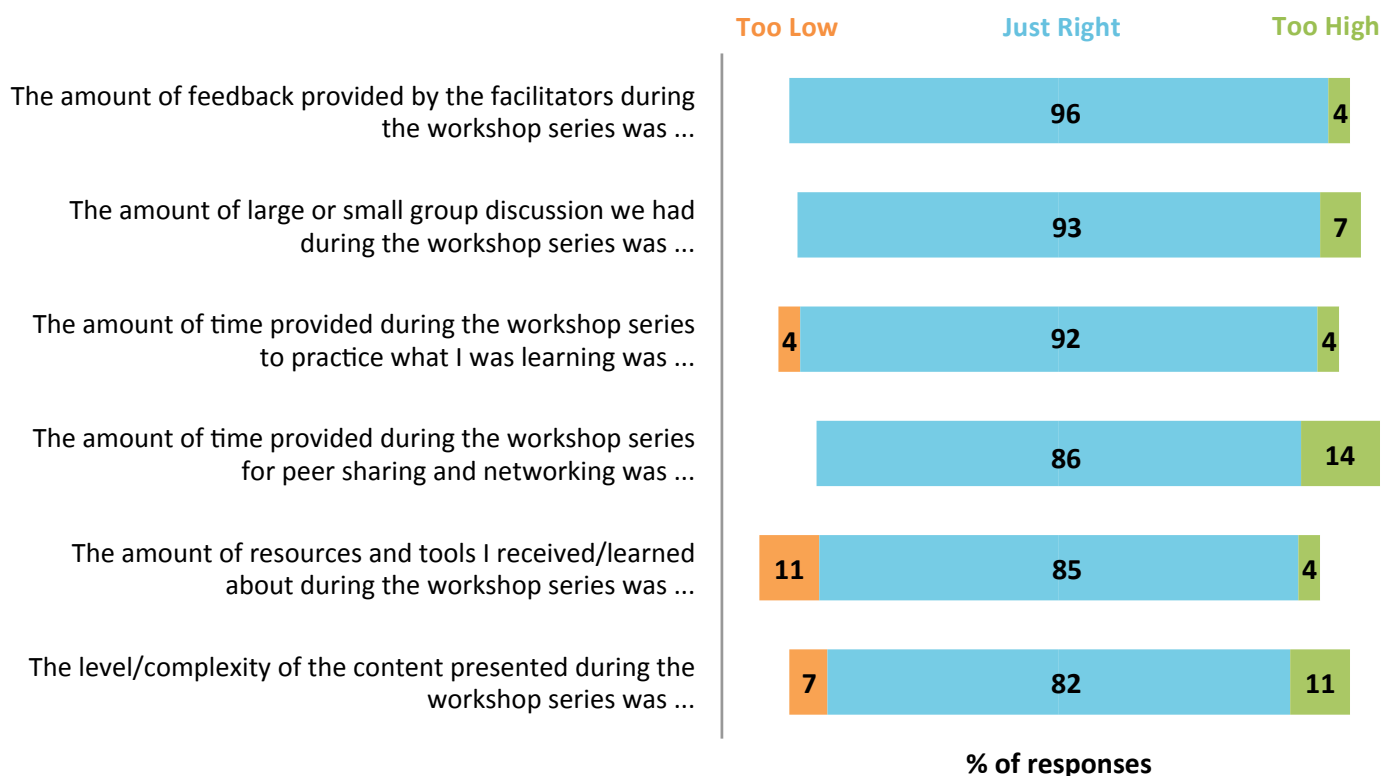
Participants were very positive about the quality of the professional development. The findings are illustrated in the figures below. (Twenty-eight teachers completed the survey.)

Almost 100% of the teachers agreed with survey items regarding workshop quality.

Participants were especially positive about the facilitators.



Learning strategies and resources were generally facilitated in the right amount.



Teachers generally perceived the math mini-series to be more valuable than other professional development activities. This perception seemed to be related mostly to two aspects of the series: **active learning and collaboration**. Teachers appreciated the time provided to work “as students” and discuss the workshop topics with other teachers in similar grades. Some teachers wrote:

Compared to other PD workshops I've attended, I feel this one shed the most light on how to teach children mathematics. It was also wonderful because we actually had time to discuss topics and share ideas with other K-5 math teachers from other districts.

I like that we are experiencing the tasks just like our students would and there is time to talk about how it directly applies to my classroom.

I like the practicality of this workshop and the opportunity to collaborate with professionals.

This workshop is more engaging because we work on problem solving skills similar to ones we may ask our students to complete.

This workshop in comparison to others provided more time to network with other teachers of mathematics.

Impact of the Mini-Series

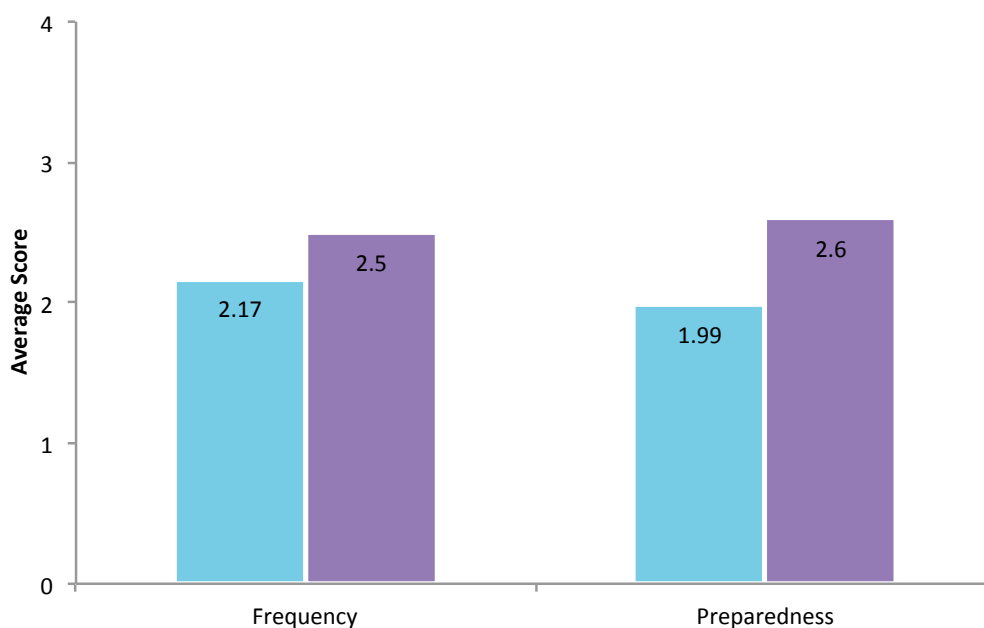
The survey items intended to measure workshop impact were based on the eight Common Core Standards for Mathematical Practice (SMP). The survey included sixteen teaching practices—two for each standard—and teachers reported how often they use the practice in their classroom, and how prepared they feel to use the practice in their classroom.

The Eight Standards of Mathematical Practice

Make sense of problems and persevere in solving them	Model with mathematics
Attend to precision	Use appropriate tools strategically
Reason abstractly and quantitatively	Look for and make use of structure
Construct viable arguments and critique the reasoning of others	Look for express regularity in repeated reasoning

Paired t-tests demonstrated that teachers significantly increased how often they implemented effective math teaching practices in the classroom, as well as their preparation to implement such practices¹. The figure below illustrates the changes observed during the mini-series.

Teachers significantly increased their preparation and use of effective mathematics teaching practices

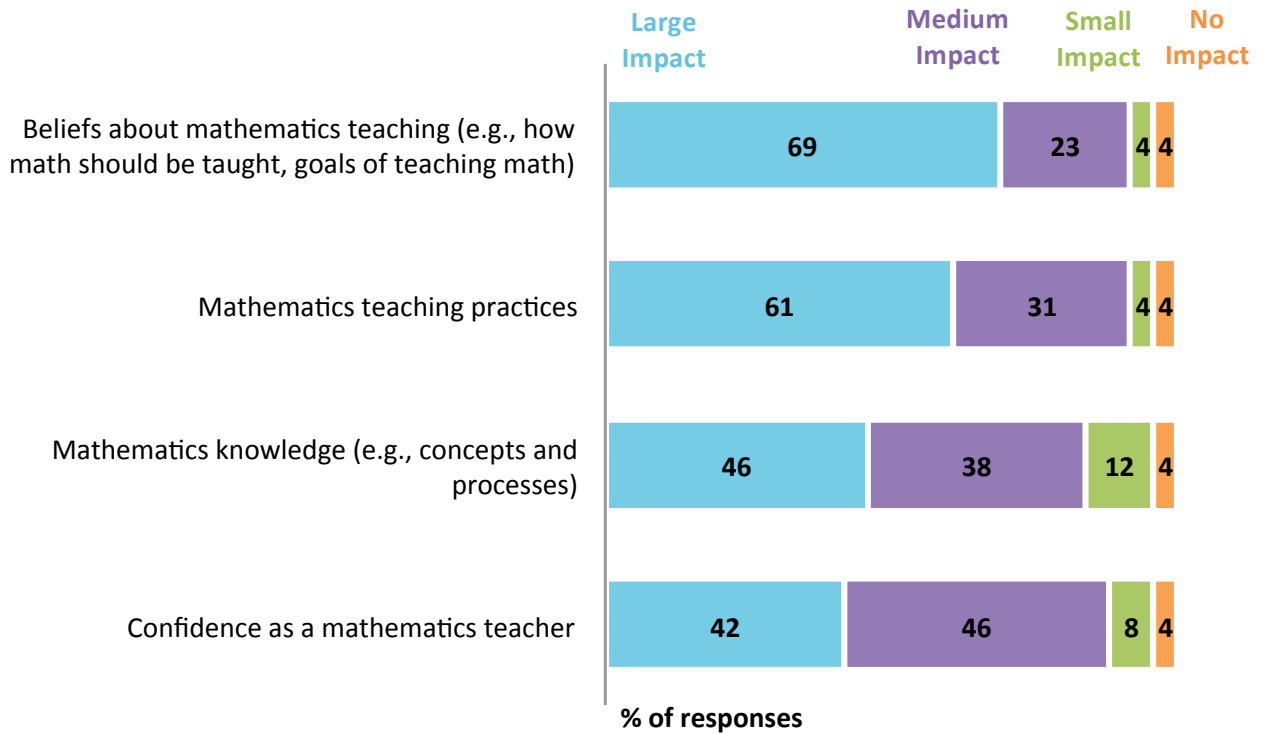


¹ For frequency, $t(22) = 4.11$, $p < .001$, effect size = .86 (large)

For preparedness, $t(22) = 4.72$, $p < .001$, effect size = .98 (large)

Teachers also rated the impact of the mini-series on four aspects of mathematics teaching.

Teachers believed the mini-series had the largest impact on math teaching beliefs and practices



SCIENCE MINI-SERIES

Participating Teachers

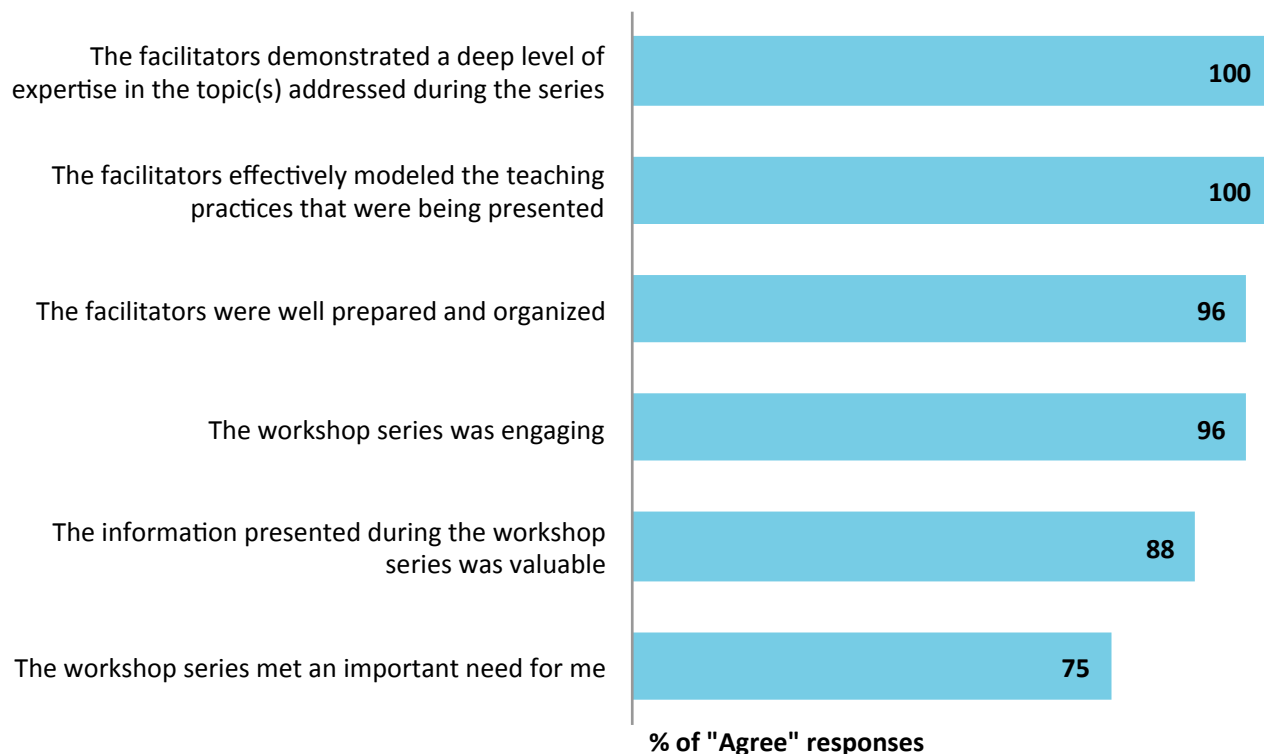
Most of the 29 teachers (83%) who attended the science mini-series taught one or more grades from 5 to 8. The other teachers taught one or more grades from PreK to 4. The teachers represented 20 school districts in northwest Ohio (and one from Fort Wayne, IN), both public and private. Almost three quarters of the teachers who completed the first evaluation survey (22) reported having 10 or more years of teaching experience. The average experience for the group was 14 years.

Quality of the Mini-Series

Participants were very positive about the quality of the professional development. The findings are illustrated in the figures below. (Twenty-four teachers completed the survey.)

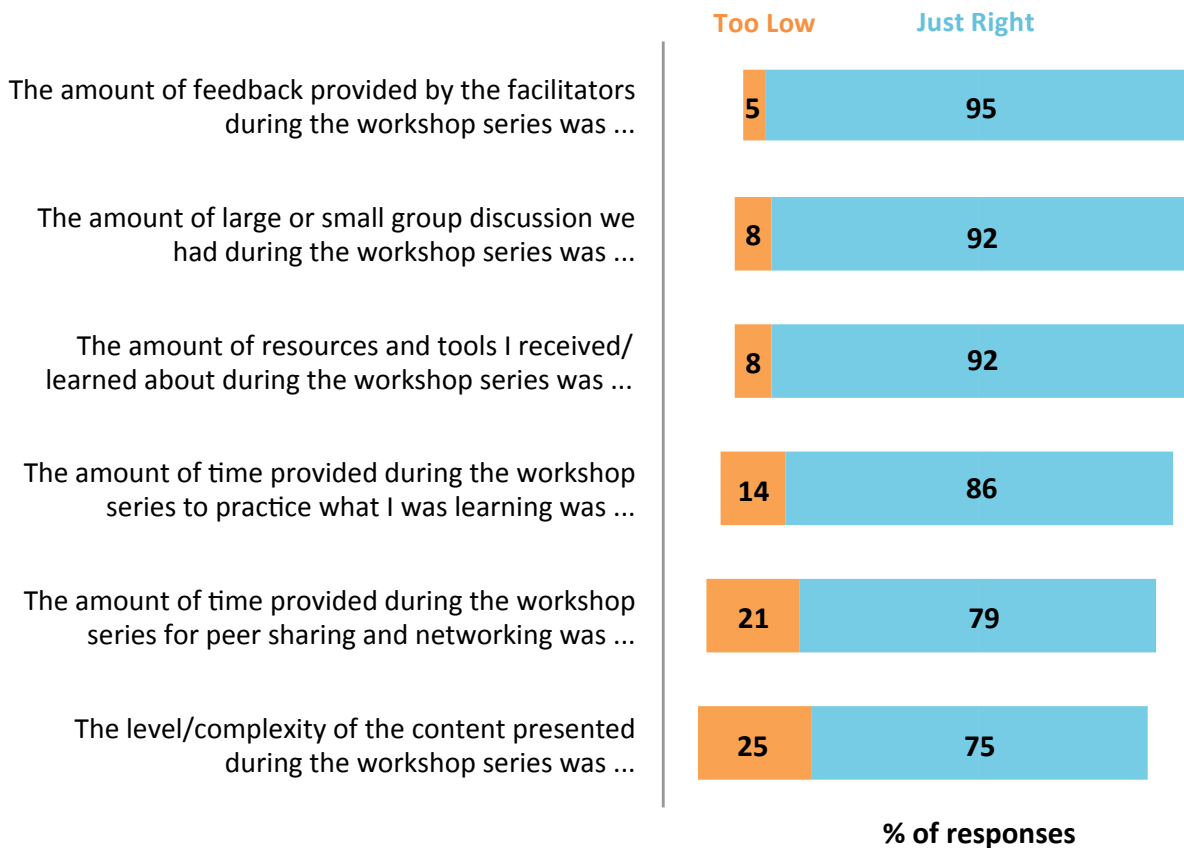
Almost 100% of the teachers agreed with survey items regarding workshop quality.

All other responses were "Somewhat Agree"



Learning strategies and resources were generally facilitated in the right amount.

Content complexity as well as time for practice and peer sharing could be increased



According to the participating teachers, the science mini-series stood out among other professional development experiences due to its **hands-on nature and applicability to the classroom**. Some of the teachers wrote:

This was the BEST hands-on workshop I have been to in a long time. It provided USEFUL activities that can be applied to the classroom immediately.

More hands-on activities and lessons that are classroom ready make this a good workshop.

It was not a sit and get - we actually got to DO science experiments. I like that aspect of it.

It was good, I liked the hands on and then time to process, much how I would do it in my classroom. :)

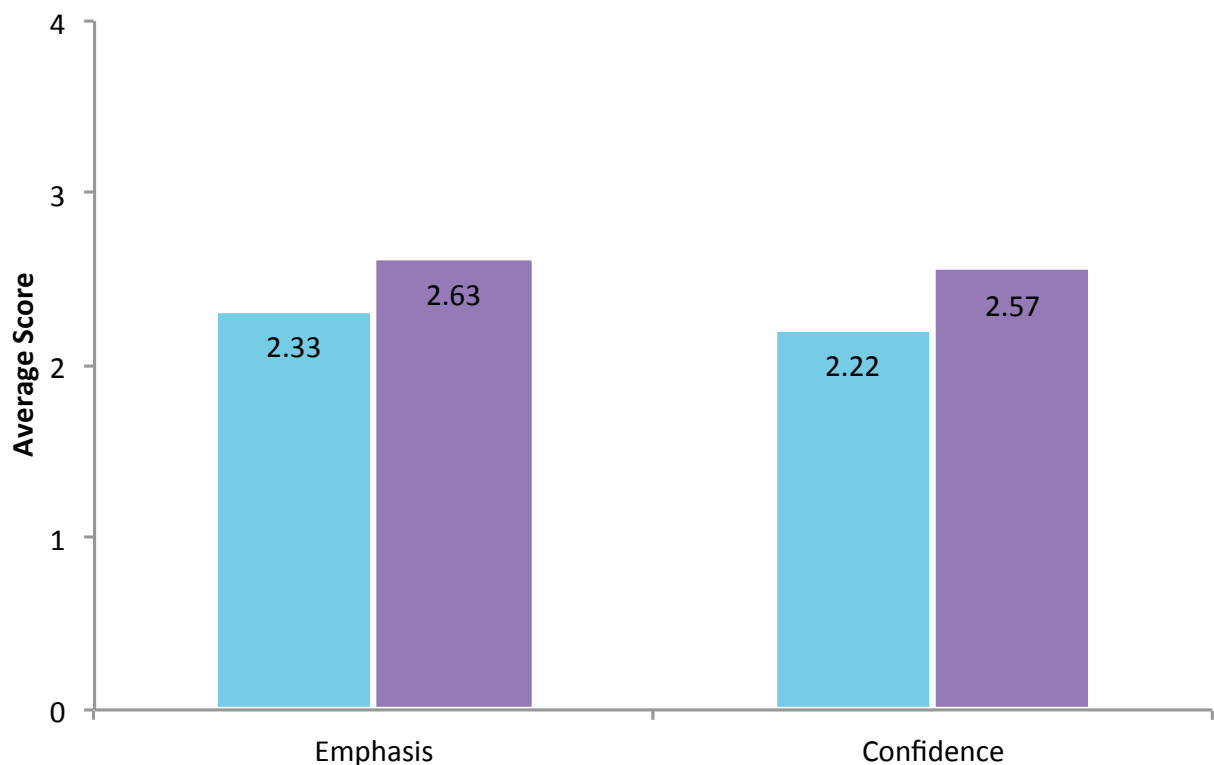
This workshop has been comparable to the better PDs I have been engaged in. The hands on structure blended with relevant content has been very helpful.

Impact of the Mini-Series

The impact survey measured teachers' self-efficacy for teaching science as well as their use of effective science teaching practices. The survey included 13 items about self-efficacy, such as "I am continually finding better ways to teach science" and "I find it difficult to explain to students why science investigations turn out as they do." The survey also included 27 science teaching best-practices (e.g., Having students explore a concept before explaining it to them, Providing opportunities for students to evaluate their own thinking throughout the lesson), and teachers reported how confident they felt using the practices in their classroom, and how much emphasis they place on the practice in their classroom.

A series of paired t-tests demonstrated that teachers significantly increased their emphasis and confidence in using effective science teaching practices². Teachers' self-efficacy beliefs about teaching science did not change during the mini-series. The figure below illustrates the changes observed in teachers' emphasis and confidence.

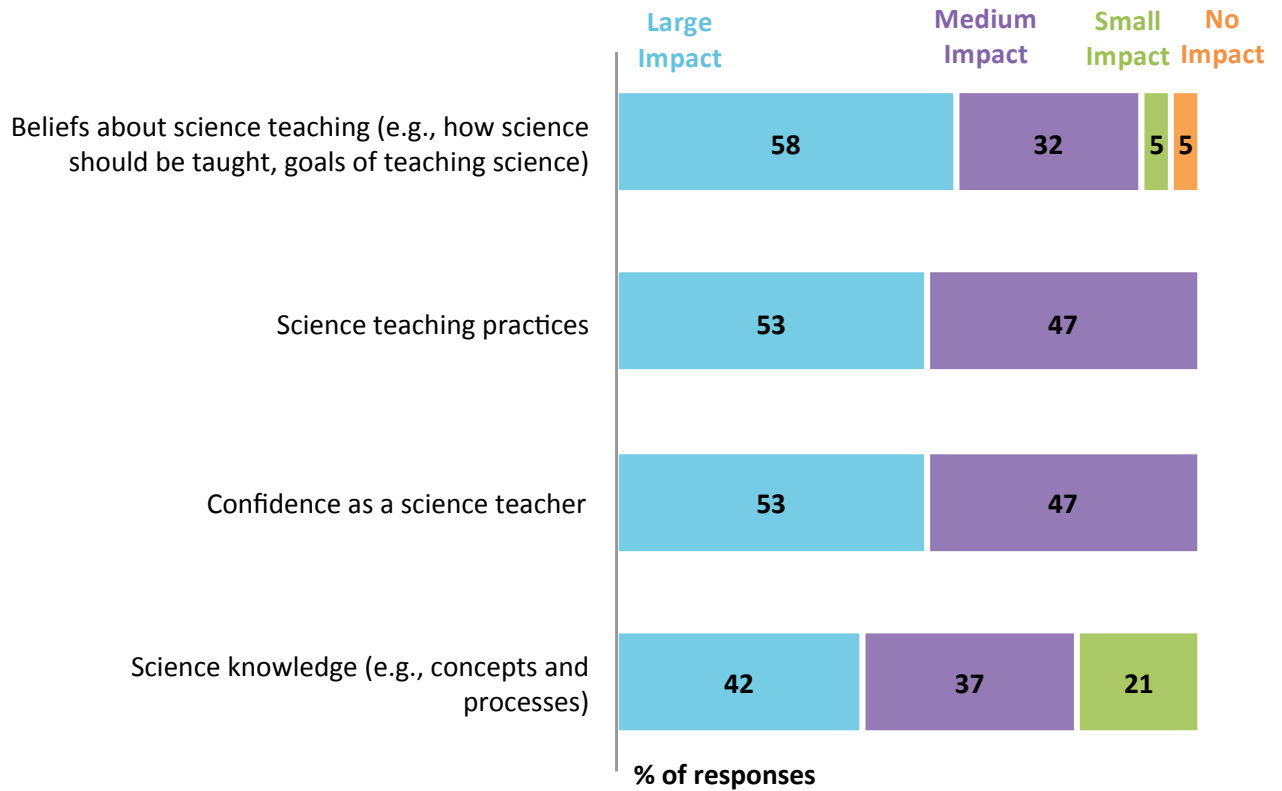
Teachers significantly increased their confidence and emphasis in using effective science teaching practices.



² For emphasis, $t(15) = 3.81$, $p = .002$, effect size = .95 (large)
For confidence, $t(15) = 3.06$, $p = .008$, effect size = .76 (medium)

Teachers also rated the impact of the mini-series on four aspects of science teaching.

Teachers believed the mini-series had the largest impact on teaching beliefs and practices as well as their confidence as a teacher.



GENERAL CONCLUSIONS

The evaluation findings demonstrate that both mini-series were successful in delivering high-quality and impactful professional development to teachers.

For **BOTH** mini-series, teachers:

- Were highly satisfied with the facilitators
- Were satisfied with the mix of learning strategies and resources
- Frequently commented about the active, hands-on nature of the instruction
- Improved their confidence/preparation for using effective teaching practices
- Improved their use of effective teaching practices
- Saw the greatest impact in their beliefs about teaching and their teaching practices (which supports the two previous conclusions)

Teachers were asked to provide feedback about the format/timing of the professional development since the mini-series was a new format for the Inquiry Series. For the most part, teachers liked the format of the mini-series better than a full-year of professional development. Many teachers described the format as a good balance between intensive and interspersed. Some of the teachers wrote:

I think the timing is ideal. Close enough to make the connection between evenings but spaced far apart to not be overwhelming with the other aspects of our lives.

I also liked that it was spread out enough to not feel like you had something every night, but not so far apart that you couldn't remember what you did last time.

They were close enough that you couldn't forget you had it coming up, but left some flexibility in our calendars.

This gives time to work on the material, but not so long as to forget what it's about.

The science teachers seemed to provide more positive feedback about the format than the mathematics teachers. This seemed to be due to one major difference between the two groups: the length of the sessions. The science sessions were three hours, and the math sessions were four hours. Many teachers felt that four hours was too long to “sit through” after a full day of teaching.

If the mini-series format is continued in the future, each mini-series should consist of four or five three-hour sessions with one or two weeks between sessions. This format seems to offer the most benefits for teachers. Also, science teachers reported they would be most interested in attending professional development about project-based learning, formative assessment in science, and interactive note booking.

NWO Math Mini-Series Survey 2

Hello Mathematics Teachers!

As part of your participation in the NWO Math Mini-Series, we are asking you to complete three evaluation surveys to help us understand the quality and impact of the series from your perspective. One survey will be completed after the first workshop, another survey will be completed after the third workshop, and the last survey will be completed after the last workshop.

This survey will include questions about your experience so far in the workshop series, and your perceptions of the quality and impact of the workshops.

The surveys you will take during this mini-series are in no way an evaluation of YOU--they are meant to serve as a tool for US to better understand and improve our programs. You will be asked to provide a unique code that will be used to track your evaluation responses throughout the series. Your code will not be linked to your name, and so your responses will be completely anonymous.

Thank you for your cooperation and your effort in completing these surveys. If you have any questions at all, don't hesitate to contact Jake Burgoon, the NWO Project Evaluator, at 419-372-2802 or jburgoo@bgsu.edu.

NWO Math Mini-Series Survey 2

Please read the statements below, and choose the options that best represent your opinion. Please think about all three workshops in the series when responding to the statements.

	Disagree	Somewhat Disagree	Somewhat Agree	Agree
The workshop series was engaging.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The workshop series met an important need for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information presented during the workshop series was valuable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The facilitators demonstrated a deep level of expertise in the topic(s) addressed during the series.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The facilitators effectively modeled the teaching practices that were being presented.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The facilitators were well prepared and organized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Feel free to provide an explanation or supporting examples for any of your responses above.

NWO Math Mini-Series Survey 2

Please read the statements below, and choose the options that best represent your opinion. Please think about all three workshops in the series when responding to the statements.

	Too Low	Just Right	Too High	N/A
The amount of resources and tools I received/learned about during the workshop series was ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The level/complexity of the content presented during the workshop series was ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The amount of time provided during the workshop series for peer sharing and networking was ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The amount of time provided during the workshop series to practice what I was learning was ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The amount of large or small group discussion we had during the workshop series was ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The amount of feedback provided by the facilitators during the workshop series was ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Feel free to provide an explanation or supporting examples for any of your responses above.

What are your thoughts about the format and timing of the workshop series (i.e., spanned over the course of a month with four hours for each workshop)? For example, would it have been better to spread workshops over the school year to get the same number of hours?

How does this workshop series compare to other professional development workshops you've attended for mathematics? You can think about the way the workshops were structured, the information presented, and ways in which the information was presented.

NWO Math Mini-Series Survey 2

What other comments and suggestions do you have regarding the workshop series? Think about your experience during the workshop series, and please write about anything that you didn't get to share above. You can also share any suggestions you think would make the series better.

NWO Math Mini-Series Survey 2

Please answer the following questions about you and your teaching experience.

Which math mini-series session do you attend?

- Elementary (K - 5)
- Secondary (6 - 12)

Please answer the following prompts to complete your unique code that will be used to track your evaluation responses throughout the series.

What is the first letter
of your mother's
maiden name?

What is the second
letter of your mother's
maiden name?

What is your birth
month?

What is your birth
day?

Your Code

NWO Math Mini-Series Survey 3

Hello Mathematics Teachers!

As part of your participation in the NWO Math Mini-Series, we are asking you to complete three evaluation surveys to help us understand the quality and impact of the series from your perspective. One survey will be completed after the first workshop, another survey will be completed after the third workshop, and the last survey will be completed after the last workshop.

This survey will include several questions about your current knowledge and use of the Standards for Mathematical Practice, as well your perceptions about the general impact of the Math Mini-Series.

The surveys you will take during this mini-series are in no way an evaluation of YOU--they are meant to serve as a tool for US to better understand and improve our programs. You will be asked to provide a unique code that will be used to track your evaluation responses throughout the series. Your code will not be linked to your name, and so your responses will be completely anonymous.

Thank you for your cooperation and your effort in completing these surveys. If you have any questions at all, don't hesitate to contact Jake Burgoon, the NWO Project Evaluator, at 419-372-2802 or jburgoo@bgsu.edu.

NWO Math Mini-Series Survey 3

Standards for Mathematical Practice

Please select the options that represent your CURRENT state of knowledge and practice.

1. Rate your awareness of the standards for mathematical practices.

- Not at all aware
- Very slightly aware
- Somewhat aware
- More than somewhat aware
- Completely aware

NWO Math Mini-Series Survey 3

2. For each of the mathematics teaching practices below, please report how often you implement the practice in your classroom, and how prepared you feel to implement the practice in your classroom.

	How often do you implement the practice in your classroom?	How prepared do you feel to implement the practice in your classroom?
Involve students in rich problem-based tasks that encourage them to persevere in order to reach a solution	<input type="text"/>	<input type="text"/>
Provide opportunities for students to solve problems that have multiple solutions	<input type="text"/>	<input type="text"/>
Emphasize the importance of precise communication by encouraging students to focus on clarity of the definitions, notation, and vocabulary used to convey their reasoning	<input type="text"/>	<input type="text"/>
Encourage accuracy and efficiency in computation and problem-based solutions, expressing numerical answers, data and/or measurements with a degree of precision appropriate for the context of the problem	<input type="text"/>	<input type="text"/>
Facilitate opportunities for students to discuss or use representations to make sense of quantities and their relationships	<input type="text"/>	<input type="text"/>
Encourage the flexible use of properties of operations, objects, and solution strategies when solving problems	<input type="text"/>	<input type="text"/>
Provide and orchestrate opportunities for students to listen to the solution strategies of others, discuss alternative solutions, and defend their ideas	<input type="text"/>	<input type="text"/>
Ask higher-order questions which encourage students to defend their ideas	<input type="text"/>	<input type="text"/>
Use mathematical models appropriate for the focus of the lesson	<input type="text"/>	<input type="text"/>
Encourage student use of developmentally and content-appropriate mathematical models (e.g., variables, equations, coordinate grids)	<input type="text"/>	<input type="text"/>
Use appropriate physical and/or digital tools to represent, explore and deepen student understanding	<input type="text"/>	<input type="text"/>
Provide access to materials, models, tools, and/or technology-based resources that assist students in making conjectures necessary for solving problems	<input type="text"/>	<input type="text"/>
Engage students in discussions emphasizing relationships between particular topics within a content domain or across content domains	<input type="text"/>	<input type="text"/>
Provide activities in which students demonstrate their	<input type="text"/>	<input type="text"/>

NWO Math Mini-Series Survey 3

flexibility in representing mathematics in a number of ways
e.g., $76 = (7 \times 10) + 6$; discussing types of quadrilaterals,
etc.

Engage students in discussion related to repeated
reasoning that may occur in a problem's solution

Draw attention to the prerequisite steps necessary to
consider when solving a problem

NWO Math Mini-Series Survey 3

3. Please rate the impact of the Math Mini-Series on your:

	None	Small	Medium	Large
Mathematics knowledge (e.g., concepts and processes)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beliefs about mathematics teaching (e.g., how math should be taught, goals of teaching math)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confidence as a mathematics teacher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mathematics teaching practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please explain your responses. Be specific if you can.

NWO Math Mini-Series Survey 3

4. Which math mini-series sessions did you attend?

- Elementary (K - 5)
- Secondary (6 - 12)

5. Would you be interested in attending a continuation of this series?

- No
- Maybe
- Yes

If you are (possibly) interested, when would be the best time to offer another series? Spring? Next fall? Some other time?

6. Please answer the following prompts to complete your unique code that will be used to track your evaluation responses throughout the series.

What is the first letter
of your mother's
maiden name?

What is the second
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What is your birth
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Your Code

NWO Science Mini-Series Survey 2

Hello Science Teachers!

As part of your participation in the NWO Science Mini-Series, we are asking you to complete three evaluation surveys to help us understand the quality and impact of the series from your perspective. One survey will be completed after the first workshop, another survey will be completed after the third workshop, and the last survey will be completed after the last workshop.

This survey will include questions about your experience so far in the workshop series, and your perceptions of the quality and impact of the workshops.

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Thank you for your cooperation and your effort in completing these surveys. If you have any questions at all, don't hesitate to contact Jake Burgoon, the NWO Project Evaluator, at 419-372-2802 or jburgoo@bgsu.edu.

NWO Science Mini-Series Survey 2

Please read the statements below, and choose the options that best represent your opinion. Please think about all three workshops in the series when responding to the statements.

	Disagree	Somewhat Disagree	Somewhat Agree	Agree
The workshop series was engaging.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The workshop series met an important need for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information presented during the workshop series was valuable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The facilitators demonstrated a deep level of expertise in the topic(s) addressed during the series.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The facilitators effectively modeled the teaching practices that were being presented.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The facilitators were well prepared and organized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Feel free to provide an explanation or supporting examples for any of your responses above.

NWO Science Mini-Series Survey 2

Please read the statements below, and choose the options that best represent your opinion. Please think about all three workshops in the series when responding to the statements.

	Too Low	Just Right	Too High	N/A
The amount of resources and tools I received/learned about during the workshop series was ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The level/complexity of the content presented during the workshop series was ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The amount of time provided during the workshop series for peer sharing and networking was ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The amount of time provided during the workshop series to practice what I was learning was ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The amount of large or small group discussion we had during the workshop series was ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The amount of feedback provided by the facilitators during the workshop series was ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Feel free to provide an explanation or supporting examples for any of your responses above.

What are your thoughts about the format and timing of the workshop series (i.e., spanned over the course of a month with three hours for each workshop)? For example, would it have been better to spread workshops over the school year to get the same number of hours?

How does this workshop series compare to other professional development workshops you've attended for science? You can think about the way the workshops were structured, the information presented, and ways in which the information was presented.

NWO Science Mini-Series Survey 2

What other comments and suggestions do you have regarding the workshop series? Think about your experience during the workshop series, and please write about anything that you didn't get to share above. You can also share any suggestions you think would make the series better.

NWO Science Mini-Series Survey 2

Please answer the following questions about you and your teaching experience.

Please answer the following prompts to complete your unique code that will be used to track your evaluation responses throughout the series.

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of your mother's
maiden name?

What is the second
letter of your mother's
maiden name?

What is your birth
month?

What is your birth
day?

Your Code

NWO Science Mini Series Survey 3

Greetings Teachers!

Hello Science Teachers!

As part of your participation in the NWO Science Mini-Series, we are asking you to complete three evaluation surveys to help us understand the quality and impact of the series from your perspective.

This survey will include several questions about your current use of various instructional practices, as well your perceptions about the general impact of the Science Mini-Series.

The surveys you will take during this mini-series are in no way an evaluation of YOU--they are meant to serve as a tool for US to better understand and improve our programs. You will be asked to provide a unique code that will be used to track your evaluation responses throughout the series. Your code will not be linked to your name, and so your responses will be completely anonymous.

Thank you for your cooperation and your effort in completing these surveys. If you have any questions at all, don't hesitate to contact Jake Burgoon, the NWO Project Evaluator, at 419-372-2802 or jburgoo@bgsu.edu.

NWO Science Mini Series Survey 3

Self-Efficacy Beliefs About Teaching Science (modified from Enochs & Ri...)

Directions: Please indicate the degree to which you agree or disagree with each statement below by checking the appropriate category for each statement.

Please select the options that represent your **CURRENT** beliefs.

1. I am continually finding better ways to teach science.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Choose an option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Even when I try very hard, I do not teach science as well as I do most subjects.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Choose an option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. I know the steps necessary to teach science concepts effectively.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Choose an option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. I am not very effective in monitoring science experiences.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Choose an option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. I generally teach science topics ineffectively.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Choose an option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. I understand science concepts well enough to be an effective science teacher.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Choose an option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. I find it difficult to explain to students why science investigations turn out as they do.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Choose an option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. I am typically able to answer students' science questions.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Choose an option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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9. I wonder if I have the necessary skills to teach science.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Choose an option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Given a choice, I would not invite the principal (or other) to evaluate my science teaching.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Choose an option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. When a student has difficulty understanding a science concept, I am usually at a loss as to how to help the student understand the concept better.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Choose an option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. When teaching science, I usually welcome student questions.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Choose an option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. I do not know what to do to turn students on to science.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Choose an option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Science Teaching Practices (modified from Haney et al, 2006 © & Ellett & Mo...)

Directions: For each of the science teaching practices below, we would like to know:

1. How much emphasis do you place on the use of the practice during your science lessons?
2. How confident do you feel to use the practice during your science lessons?

Remember, it is not expected or necessarily desirable that you would emphasize the use of all these practices for every science lesson. Also, it is not expected for you to be highly confident in the use of every practice.

Please select the options that best represent your CURRENT practice

14. Having students investigate real-world problems

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

15. Having students make connections between science and other disciplines

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

16. Challenging students to provide evidence to support their claims or explain their reasoning when giving an answer

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

17. Encouraging students to discuss alternative conclusions or consider alternative methods for solutions

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

18. Engaging the whole class in discussions based on science concepts

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

19. Providing opportunities for students to explain concepts to one another

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

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20. Differentiating classroom instruction to meet students' learning needs

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

21. Requiring students to use a variety of means (models, drawings, graphs, concrete materials, manipulatives, etc.) to represent phenomena

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

22. Providing opportunities for students to pursue issues/ideas/topics of personal interest

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

23. Assessing student learning via performances and projects (performance-based assessments)

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

24. Using the community setting, or local environment, as a context for learning

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

25. Providing opportunities for students to construct their own understandings of science concepts

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

26. Having students explore a concept before explaining it to them

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

27. Having students work in cooperative/collaborative learning groups

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

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28. Providing opportunities for students to use educational technology (e.g., whiteboards, electronic probes, student response systems) to learn or explain a concept

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

29. Reviewing and processing students' prior knowledge, ideas, and preconceptions before implementing new lessons

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

30. Asking students to demonstrate more than one way to solve a problem

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

31. Having students think of examples and non-examples of science concepts

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

32. Teaching students how to collect, organize, analyze, present, and evaluate data/information

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

33. Providing opportunities for students to making predictions, estimations, and/or hypotheses

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

34. Providing opportunities for students to devise means for testing their predictions, estimations, and/or hypotheses

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

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35. Providing opportunities for students to evaluate their own thinking throughout the lesson

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

36. Asking open-ended questions that foster divergent modes of thinking

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

37. Providing opportunities for students to influence the direction of the lesson

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

38. Using a variety of hands-on activities

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

39. Encouraging students to question and critique knowledge claims made by other students

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

40. Encouraging students to examine their personal thinking processes

How much **emphasis** do you place on the use of this practice during your science lessons?

How **confident** do you feel to use this practice during your science lessons?

Please answer the following questions.

NWO Science Mini Series Survey 3

Please rate the impact of the Science Mini-Series on your:

	None	Small	Medium	Large
Science knowledge (e.g., concepts and processes)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beliefs about science teaching (e.g., how science should be taught, goals of teaching science)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confidence as a science teacher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Science teaching practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please explain your responses. Be specific if you can.

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Please use the drop-down menus to enter your unique code, which will be used to keep track of your responses during the analysis of these evaluation data.

	First letter of your mother's maiden name	Second letter of your mother's maiden name	Your Birth Month	Your Birth Day
My Unique Code	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Did your school/district cover the cost or reimburse you for this PD experience?

- Yes
- No

If you participated in this type of PD again, what would be your preference for how it is delivered? Rank the following choices, with 1 representing your most preferred choice, and 5 representing your least preferred choice.

<input type="text"/>	Two full 5.5 hour consecutive days during the summer
<input type="text"/>	Two full 5.5 hour consecutive days during the school day (release required)
<input type="text"/>	Two full 5.5 hour days held on two Saturdays
<input type="text"/>	Three 3.5 hour consecutive evening sessions after school
<input type="text"/>	Three 3.5 hour evening sessions spread out throughout a six week period

Which of the following professional development topics are YOU most interested in attending?

- interactive note booking (K-12)
- citizen science (K-12)
- formative assessment in science (K-12)
- project based learning (K-12)
- using argumentation in science (6-12)
- from science activity to supercharged inquiry via Picture Perfect Science (3-8)
- from science activity to supercharged inquiry via Picture Perfect Science (K-4)

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Which of the following professional development topics do you think YOUR COLLEAGUES would be most interested in attending?

- interactive note booking (K-12)
- citizen science (K-12)
- formative assessment in science (K-12)
- project based learning (K-12)
- using argumentation in science (6-12)
- from science activity to supercharged inquiry via Picture Perfect Science (3-8)
- from science activity to supercharged inquiry via Picture Perfect Science (K-4)