

Science and Technology / Environment and Ecology Standards Stakeholder Sessions
Memo | 4-23-2020 | Updated 4-30-2020

Stakeholder Engagement¹ Final Summary: PDE engaged in a comprehensive stakeholder engagement strategy that included in-person, virtual, and survey data collection opportunities. In total the survey² engaged **over 600 Pennsylvanians** and the stakeholder session engaged over **960 people**.³ Across all three modalities educators, administrators, families, students, post-secondary, business and industry and families were represented in the discussions.

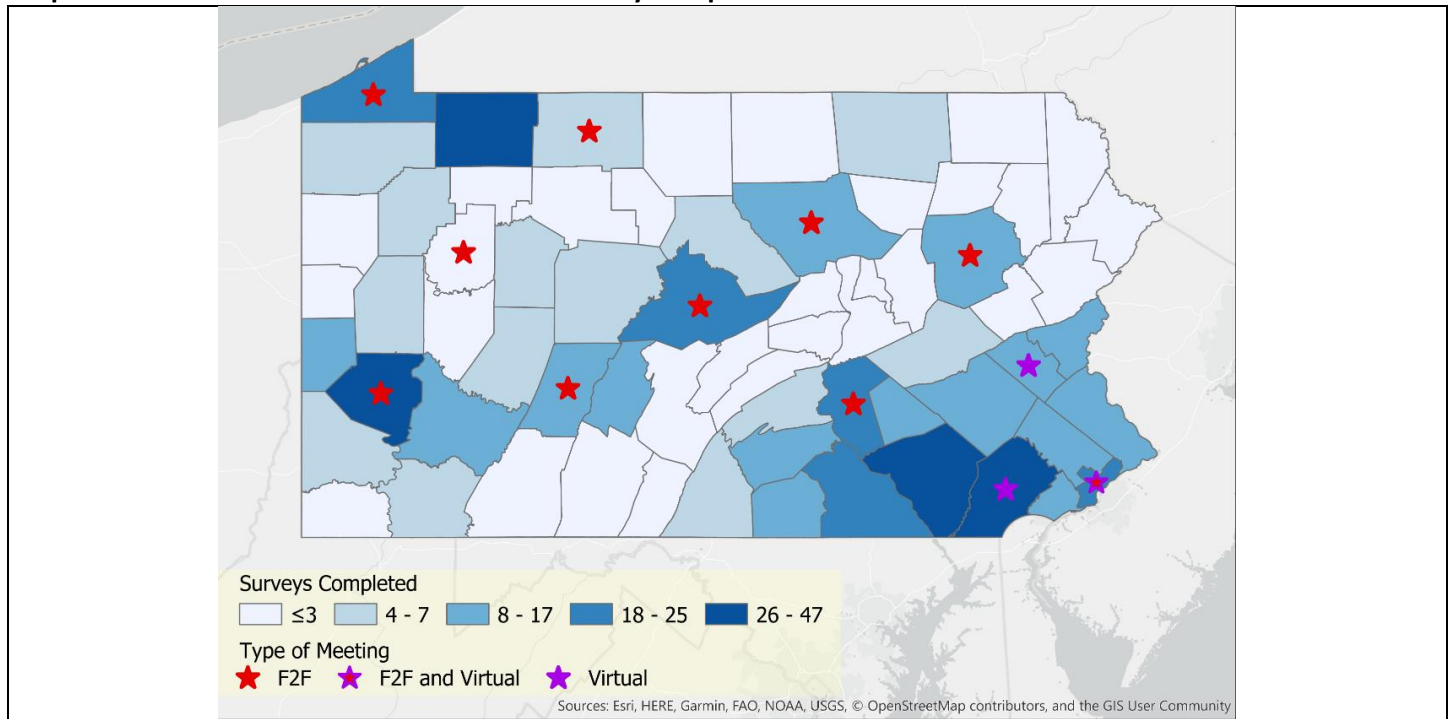
Table 1: Summary of Stakeholder Sessions:⁴

Session	Grades PK-2 Educator	Grades 3-5 Educator	Grades 6-8 Educator	Grades 9-12 Educator	Admin	Higher Ed	Business and Industry	IU	Students	Other
In-person sessions	24	49	99	106	65	30	30	7	14	17
Virtual sessions	11	28	58	108	99	58	101	20	2	25
Total	35	77	157	214	164	88	131	27	16	42

Table 2: Summary of Stakeholder Sessions

Number Face-to-Face Sessions	Number of Virtual Sessions	Total Cumulative Registered Participants
7	5	1000+

Graphic 1: Stakeholder Session Locations and Survey Completion



Committee Applications⁵: PDE engaged in a robust outreach strategy to garner the highest of quality applicants for the Science Standards Content and Steering Committees. PDE received:

- over **181 applications** for review.
- Applications from every [PiL region](#) and every PiL region was represented in the Committee Selection
- Applications from educators ranging from 2 to 42 years of experience

¹ PDE reviewed other data sources including survey's by PSTA and other Pennsylvania organizations

² Survey report: Appendix A

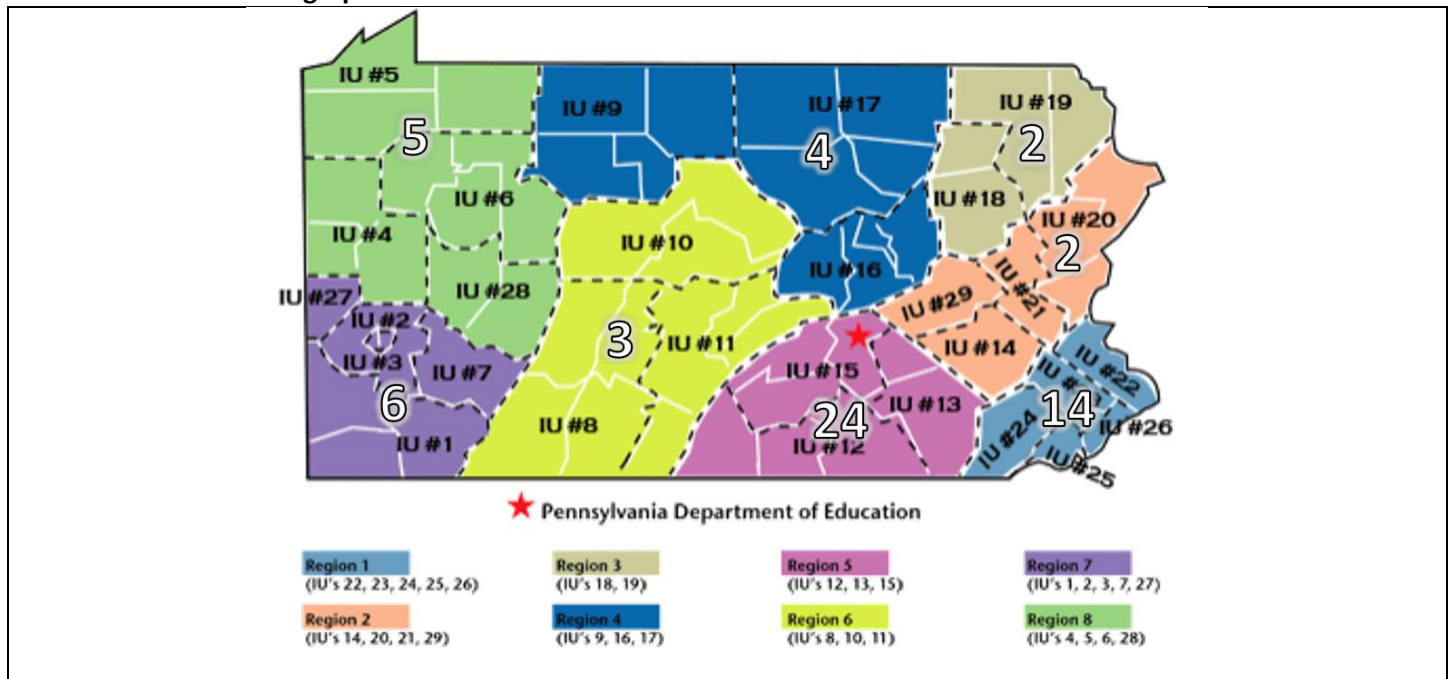
³ Over 5,600 coded pieces of stakeholder feedback data from the sessions

⁴ 441 participants at face-to-face session and 510 at the virtual session

⁵ An extensive list was created detailing the outreach channels and efforts

Internal applicant was completed with recommendations by **Monday April 27, 2020**. PDE reviewed recommendations April 29, 2020 – April 30, 2020 and selected 60 applicants for Content Committee, and 18 Applicants for the Steering Committee⁶. List of Committee Applicants will be presented to the **State Board on May 1, 2020**.

Content Committee Geographic Distribution:



Content Committee: Areas of subject matter expertise

Physics	Chemistry	Earth and Space	Environmental Science	Ecology	Engineering	Ag. Ed	Technology	Biology
18	14	22	32	28	20	9	22	28

Content Committee: Grade spans and current positions

PreK - 5	6 – 8	9 – 12	Out of School Time	IU	Curriculum Directors	Post-Secondary
10	10	12	6	3	8	10

Content Committee: Demographic details

Male	Female
24	35

Landscape Report: The Science Technology and Environment Ecology Landscape report was broken into two parts. Part 1 focused on the national, state and local contexts. This section of the report was used as a foundation for the presentations at all the stakeholder sessions. Part 2 of the report is focused on the results of PDE’s extensive stakeholder engagement.

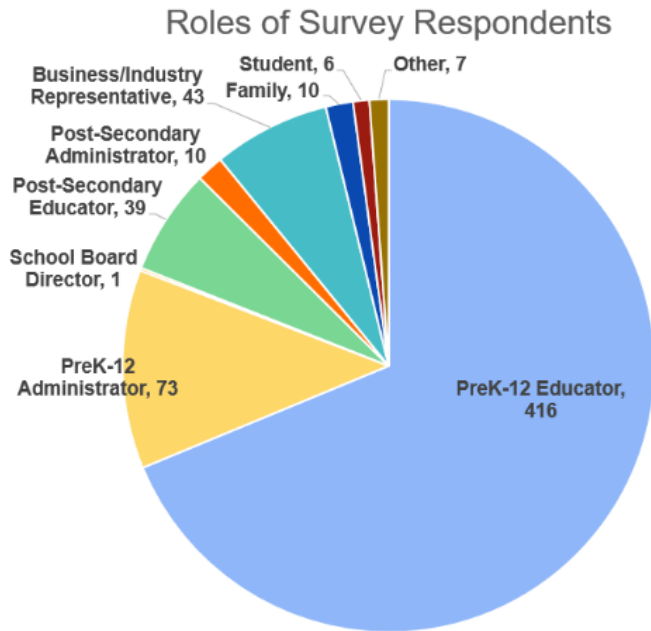
- Part 1 received, reviewed, and returned to AIR on April 22, 2020.
- Part 2 received and reviewed by May 1, 2020

⁶ [Link to data file for committee reviews](#)

Appendix A:

The Pennsylvania Department of Education conducted an online survey to inform the review and revision of Pennsylvania’s Science and Technology and Environment and Ecology Standards. Responses to the survey were collected from February 19 through April 13, 2020. The 605 total respondents came from varied backgrounds, perspectives, and regions of the Commonwealth. Respondents came from 62 of the 67 Pennsylvania counties and reported from 0 to 45 years of STEM experience in business, STEM education, or both with an average of 15 years of experience.

Role	Number
PreK-12 Educator	416
PreK-12 Administrator	73
School Board Director	1
Post-Secondary Educator	39
Post-Secondary Administrator	10
Business/Industry Representative	43
Family	10
Student	6
Other	7



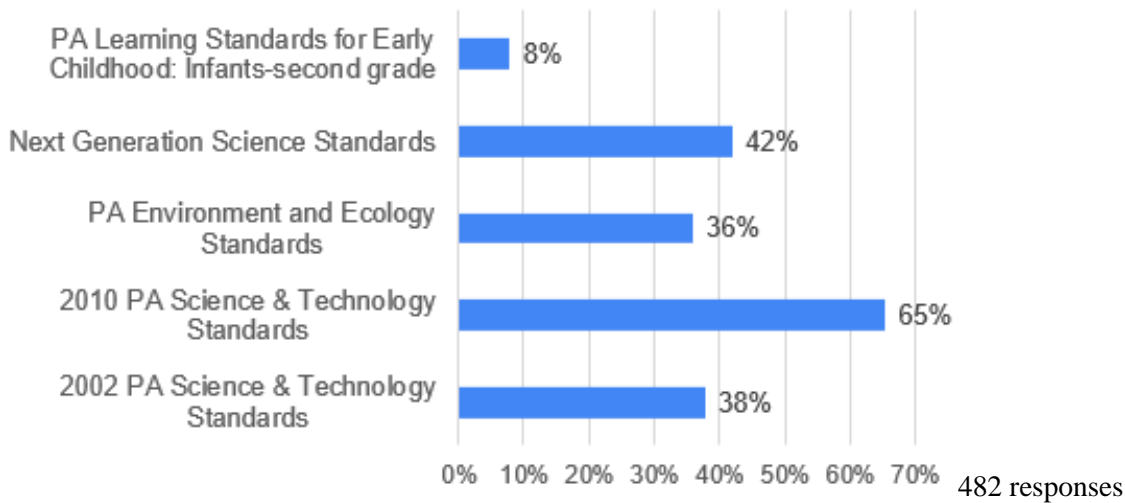
Respondent’s Self-reported Areas of STEM Professional Expertise (multiple selection possible)

Science Discipline Background	Total Number of Respondents
General Science	320
Biology	244
Environmental Science	235
Technology	178
Earth Sciences	130
Chemistry	125
Engineering	108
Physics	105
Space Sciences	65
Agriculture	52
Biotechnology	44
Materials Sciences	30
Nanotechnology	9
Architecture/Design	0
Other	0

When designing learning experiences for students, what current sets of standards are being used to align instruction?

Most educators reported using multiple sets of standards when designing lessons. The table below tracks the proportion of educators who reported using each set of standards. Subtracting these values from 100% shows the percentage of educators who are not using a set of standards.

Percentage of PK-12 Educator Respondents Who Use Each Set of Standards for Designing Learning Experiences



About 40% of Educators responding reported using a single set of standards. Percentages are of the total number of responses (482).

Standards	Percentage of PK-12 Respondents Using Only that Set of Standards
Only 2002 PA Science & Technology Standards	9%
Only 2010 PA Science & Technology Standards	20%
Only PA Environment and Ecology Standards	2%
Only Next Generation Science Standards	7%
Only PA Learning Standards for Early Childhood: Infants-second grade	2%

Post-secondary educators relied more on the Next Generation Science Standards than PK-12 educators, but the use of multiple standards was again the case for the majority of responders.

Standards	Percentage of Post-secondary Respondents Who Use that Set of Standards
2002 PA Science & Technology Standards	42%
2010 PA Science & Technology Standards	32%
PA Environment and Ecology Standards	44%
Next Generation Science Standards	85%
PA Learning Standards for Early Childhood: Infants-second grade	12%

Respondents also described the use of state and national frameworks by their districts. It should be noted that the results below include multiple responses from districts with more than one educator responding. Great variability within districts as to levels of alignment was observed so no district summary value can be determined. All PK-12 responses are included in these tables.

To what extent is your district or institution using Pennsylvania’s Science curricular frameworks including the K-12 Unifying Themes?

Level of Use	Not at all	Referred to in Curriculum but not formally aligned	Somewhat Aligned	Formally Aligned
Percentage of Respondents Answering the Question	15%	22%	46%	17%

409 responses from PK-12 Administrators and Educators

To what extent is your district or institution using Pennsylvania's Science curricular framework: K-12 Inquiry and Design?

Level of Use	Not at all	Referred to in Curriculum but not formally aligned	Somewhat Aligned	Formally Aligned
Percentage of Respondents Answering the Question	17%	22%	45%	15%

405 responses from PK-12 Administrators and Educators

To what extent is your district or institution using Pennsylvania's Science grade level curricular frameworks?

Level of Use	Not at all	Referred to in Curriculum but not formally aligned	Somewhat Aligned	Formally Aligned
Percentage of Respondents Answering the Question	10%	17%	45%	28%

407 responses from PK-12 Administrators and Educators

To what extent is your district or institution utilizing the National Academies Framework for K-12 Science Education?

Level of Use	Not at all	Referred to in Curriculum but not formally aligned	Somewhat Aligned	Formally Aligned
Percentage of Respondents Answering the Question	42%	21%	29%	8%

466 responses from PK-12 Administrators and Educators

To what extent is your district or institution utilizing the Next Generation Science Standards?

Level of Use	Not at all	Referred to in Curriculum but not formally aligned	Somewhat Aligned	Formally Aligned
Percentage of Respondents Answering the Question*	36%	29%	27%	8%

470 responses from PK-12 Administrators and Educators

* Results include multiple responses from some districts. Considerable variability within districts as to levels of alignment was observed so no responses at the district level could be reliably determined.

Levels of Knowledge for Specific Standards and Frameworks (all respondents)

Standards	Not at all Familiar	Somewhat Familiar	Very Familiar	Extremely Familiar
PA Environment & Ecology Standards	17%	23%	32%	27%
NRC <i>A Framework for K-12 Science Education</i>	29%	36%	21%	13%
Next Generation Science Standards	17%	33%	31%	20%
International Society for Technology in Education (ISTE) Standards	45%	28%	17%	10%
Standards for Agriculture education, such as the National AFNR	74%	17%	7%	2%
North American Association for Environmental Education (NAAEE) Standards	66%	20%	9%	5%
International Technology Engineering Education (ITEEA) Standards	64%	20%	8%	8%

Numbers may not sum to 100% due to rounded values.

Review and Revision Process Feedback

How important are each of the following factors for the review and revision of the Pennsylvania Science and Technology and Environment and Ecology standards?

Factors for Review and Revision of Pennsylvania Standards	Not important	Somewhat important	Important	Extremely Important	Important or Extremely Important
An inclusive, open, and transparent process for review and revisions	1%	6%	30%	64%	94%
Incorporation of educators' and administrators' thoughts and recommendations	0%	2%	14%	84%	98%
Incorporation of students' thoughts and recommendations	3%	18%	43%	36%	79%
Incorporation of community and family thoughts and recommendations	3%	25%	47%	25%	72%
Incorporation of business and industry thoughts and recommendations	1%	11%	35%	54%	88%
Incorporation of feedback and recommendations of diverse individuals with diverse perspectives, and experiences	1%	9%	29%	60%	90%
Incorporation of higher education's thoughts and recommendations	1%	11%	40%	48%	88%
Incorporation of public opinion through a public comment period	7%	34%	38%	21%	59%

Numbers may not sum to 100% due to rounded values.

Appendix B:

To: Ms. Karen Farmer White, Chair, Pennsylvania State Board of Education

From: Judd R. Pittman, Special Consultant to the Secretary of Education for STEM; Brian Gasper, Division Chief, Division of Instructional Quality; Erin Donohoe, Policy Specialist/William Penn Fellow, Pennsylvania Department of Education

Date: May 1, 2020

Subject: Proposed members of the committee to revise the Academic Standards for Science and Technology & Environment and Ecology

Enclosed is the list of proposed members of the Content and Steering Committees to develop recommended revisions to the Pennsylvania Academic Standards for Science and Technology & Environment and Ecology.

Recommendations

We recommend 60 education professionals to the Content Committee to develop revised recommendations to the current standards. We also recommend 18 individuals to serve on a Steering Committee to work in tandem with the Content Committee. The Steering Committee will receive the recommended updates and revisions to the standards from the content committee, provide critical feedback, and send the revisions to the content committee for adjustments in an ongoing cycle until the committee recommends that the revised standards be sent to the State Board of Education for approval.

Application process

Application development: An application to serve on the Content Committee was developed in keeping with a strategic plan of the revision process, which prioritizes committee diversity and representation across:

- grade spans
- geographic regions
- urban, rural, and suburban communities
- content area expertise
- institutions (intermediate units, out-of-school learning providers, colleges and universities, school districts, charter schools, career and technical centers, etc.)
- types of educators (school teachers, informal educators, school administrators, curriculum experts, postsecondary educators, professional learning providers, etc.)
- races, ethnicities, and genders reflective of the learners in the commonwealth

Application timeline: The application was made available as an online form on April 7, 2020 and closed on April 20, 2020.

Application outreach: The application was available on the PDE website at stem.pa.gov. PDE staff from the Office of the Secretary, the Office of Elementary and Secondary Education (including the content advisors for the content areas of all the standards under review), the Office of Commonwealth Libraries, the Office of Postsecondary and Higher Education, and the Office of Child Development and Early Learning conducted extensive outreach through their professional networks to make the application available. We reached out to the following organizations to ask them to disseminate the application information:

- schools noted for strong FFA programs
- Department of Agriculture

- State President of the NAACP
- President of the Urban League
- leadership in Pittsburgh Public Schools and School District of Philadelphia
- Center for Black Educator Development
- universities, HBCUs, and teaching colleges through OPHE
- Franklin Institute
- PSEA
- AFT
- PASA
- PSTA
- Intermediate Units
- STEM Points of Contact
- OESE Content Advisors' list serves and groups
- Department of Conservation and Natural Resources
- Department of Environmental Protection
- STEM Coalition
- STEM Ecosystems (8 statewide)
- Penn State University College of Education
- Pennsylvania Teachers Advisory Council

At two points during the open application period, we reviewed the application data we had received to identify gaps in priority areas of representation. We conducted targeted outreach to points of contact at organizations that could represent those areas. These included organizations representing agricultural education, technology education, Black educators, and rural educators. Applicants responding to these later outreach efforts were given an extended timeline to apply, and all who expressed interest were considered according to the same selection process.

Selection process

A consultant from the American Institutes for Research who is facilitating the process of standards revision conducted a training of application reviewers. There were fifteen application reviewers selected from PDE and Berks County Intermediate Unit because of their content area knowledge of the standards under review and/or familiarity with a standards revision process.

181 applications were received, and each was reviewed by a team of at least three reviewers. Reviewers evaluated applicants' depth and breadth of expertise in:

- overall education experience
- understanding of the existing standards and current research
- equity and access in education and meeting needs of diverse learners
- curriculum and standards development.

Each reviewer then made a recommendation for the candidate's inclusion in the Content Committee: *recommend*, *unsure*, or *do not recommend*. After an initial review, applicants were identified as either unanimously recommended by that team of reviewers, unanimously not recommended by that team of reviewers, or as having received mixed reviews. All fifteen reviewers had a second opportunity to give feedback on those lists by sharing with all reviewers their insight into why someone receiving mixed reviews might or might not be an essential voice on the committee. This process resulted in the addition of several candidates who had received mixed reviews to the Content and Steering Committees.

The Steering Committee was selected from the candidates for the Content Committee who demonstrated the greatest depth and breadth of expertise, taking into consideration the need for a fair representation of the categories listed in the strategic plan.

In all, 60 of the 181 applicants were chosen for the Content Committee, and 18 for the Steering Committee.

Committee composition:

Content Committee areas of subject matter expertise

Physics	Chemistry	Earth and Space	Environmental Science	Ecology	Engineering	Ag. Ed	Technology	Biology
18	14	22	32	28	20	9	22	28

Grade spans and current positions

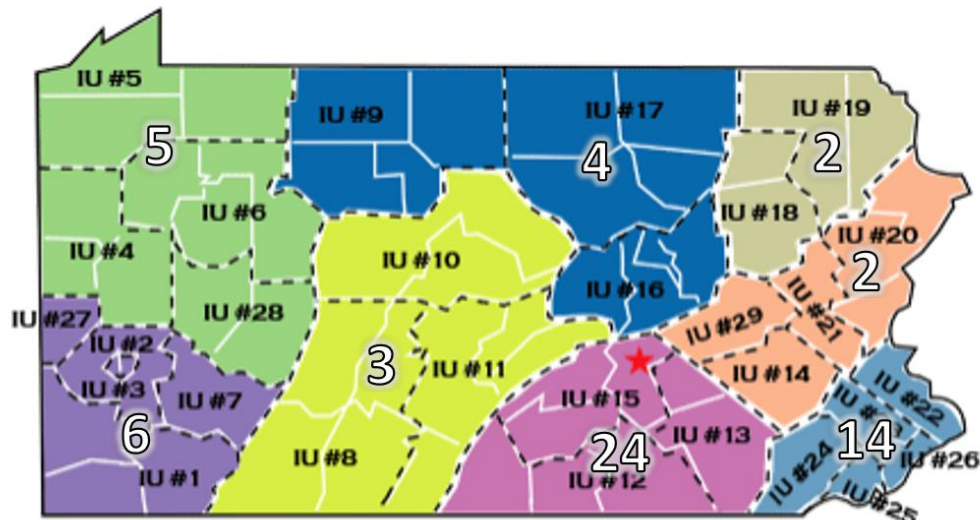
PreK - 5	6 – 8	9 – 12	Out of School Time	IU	Curriculum Directors	Post-Secondary
10	10	12	6	3	8	10

Demographic Details

Male	Female
24	35

Geographic distribution of Content Committee Members (based on PA Inspired Leadership Regions)

Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8
14	2	2	4	24	3	6	5



★ Pennsylvania Department of Education

Region 1
(IU's 22, 23, 24, 25, 26)

Region 3
(IU's 18, 19)

Region 5
(IU's 12, 13, 15)

Region 7
(IU's 1, 2, 3, 7, 27)

Region 2
(IU's 14, 20, 21, 29)

Region 4
(IU's 9, 16, 17)

Region 6
(IU's 8, 10, 11)

Region 8
(IU's 4, 5, 6, 28)

Content Committee recommended members

Member	Region*
Alison Francis	7
Charlene Crawford	1
Amy McDowell	8
Jason Karcheski	5
Carrie Lankford	5
Pat Woods	5
Lori Lauver	5
Dr. Carla Zembal-Saul**	6
Brienne May	7
Justin Ogline	8
Travis G. Martin	6
Timothy Dzurko	6
Rick Zilla	8
Jeff Remington**	5
Gina Mason	5
Katherine Engelhardt	5
Jacqueline Clymer	1
Joanne M Trombley	1
Michele Dubaich	5
Joshua Fuller	2
Darren Myzak	7
Shubhada Bhamre	7
Colleen Epler-Ruths	4
Douglas Vallette	1
Jason Ambler	5
Adam Serfass	2
Kara Olewiler	5
Molly Miller	5
Jessica Papariello	7
Pete Vreeland	1
Darla Romberger	3
Brian Pifer	4
Bobby Hughes	3
Steve Wasiesky	8
Kelly Kemmerle	1
Steve Kerlin, Ph.D.	4
Tarrea R Potter	5
Dr. Nancy Peter	1
Jeanmarie McGinley	1
Eric Wilson	5
Beth Zigmont	1
Lydia Hallman	1
David Johnson	1
Brian Suter	1
Jennifer Cleary	5
Jaunine Fouche	5
Diane McGaffic	4
Ben Smith**	5

Lauren Beal	5
Nancy Stahlschmidt	7
Tyler Love, Ph.D.	5
Dr. Peter R. Licon	5
Edith L Gallagher	5
Mike Ulderich	1
Jason Petula	5
Rebecca (Becky) Thomas	8
Sharon Brusic	5
Jane Dmochowski	1
Nanette Dietrich	5
Kathleen K. Blouch	5

*Applicants identified the Pennsylvania Inspired Leadership Region in which they primarily work / serve as educators.

**Selected to serve on both the Content and Steering Committees.

Steering Committee recommended members

Member	Region
Dr. Carla Zembal-Saul	6
Tanner Huffman	1
Jesse Maine	8
Daryll Williams	1
Gilbert Myers	5
Jolie Phillips	5
Andrew Walton	1
Jean M Devlin	5
Carl Richardson	5
Scott Sheely	3
Jeff Remington	5
Kathleen Hill	6
Ben Smith	5
Len Litowitz	5
Scott McDonald	6
Emily McGady	1
Christine Royce	3
Nikole Hollins-Sims	5