

# Michigan Teacher Perceptions of their Classroom Practice and Preparedness to Teach Science and Mathematics:

**A Report of Findings from a Survey of Michigan K-12 Teachers Receiving  
Professional Development Services Fully or Partially Funded by the Michigan  
Eisenhower Professional Development Program**

March 2001

## SUMMARY OF MAJOR FINDINGS

**Background.** In fall 2000, a survey was conducted among teachers who were identified as having participated in professional development programs sponsored by Michigan Eisenhower higher education grantees and local grantees (including mathematics and science centers). This survey is part of a review and evaluation of the Michigan Eisenhower program being conducted by Science and Mathematics Program Improvement (SAMPI) at Western Michigan University. What follows is a summary of major findings from the survey. A full report of survey results follows this summary. This report is based on responses from 1284 teachers across Michigan.

Summary profile of respondents:

- Grade Levels Taught: PreK-2 = 18%, 3-5 = 19%, 6-8 = 21%, 9-12 = 14%, Elementary Mixed = 7%, Secondary Mixed = 4%, Mixed K-12 = 6%
- Percent who had participated in Eisenhower-funded activity in last three years: Yes = 70%, No = 10%, Don't Know = 20%
- Hours of PD in mathematics and science in the last three years (number in box is % of teachers indicating that number of hours)

	Math	Science	Math	Science
None	16%	11%	11-15 hours	9%      9%
1-5 hours	18%	18%	16-20 hours	9%      9%
6-10 hours	19%	19%	> 20 hours	19%     33%

47% of all respondents said they were very familiar with the Michigan mathematics curriculum content standards for their grade level; 5% said they were not familiar with them; the rest indicated some familiarity. There was no difference in responses between higher education project respondents and local grant respondents.

57% of all respondents said they were very familiar with the Michigan science curriculum content standards for their grade level; 4% said they were not familiar with them; the rest indicated some familiarity. There was no difference in responses between higher education project respondents and local grant respondents.

60% of all respondents said their school mathematics curriculum was well aligned with Michigan curriculum standards and benchmarks; 3% said there was no alignment; the rest said there was some alignment.

64% of all respondents said their school science curriculum was well aligned with Michigan curriculum standards and benchmarks; 2% said there was no alignment; the rest said there was some alignment.

Teachers were asked to rate their preparedness to implement teaching/learning strategies or tasks during mathematics and science lessons. Summary results for all respondents are shown in the chart below.

Teaching/Learning Strategies/Tasks	% Well Prepared in Mathematics	% Well Prepared in Science
Design a lesson incorporating inquiry-based activities	36%	45%
Lead a class of students using investigative approaches to learning	44%	52%
Manage a class of students engaged in hands-on work	71%	75%
Encourage students' interest in mathematics	66%	70%
Use questioning strategies that enhance development of student conceptual understanding and problem-solving	48%	49%
Implement your current school/district curriculum	65%	51%
Use student assessment data to change curriculum and instruction	36%	37%

A statistical analysis of differences between responses from teachers who have participated in programs sponsored by higher education grantees and those sponsored by local grantees (including mathematics and science centers) shows no differences in the area of preparedness in teaching/learning strategies/tasks.

Teachers were asked to rate their preparedness to conduct lessons in particular MATHEMATICS content areas related to curriculum standards. Summary results for all respondents are shown below.

Mathematics Content Area	% Well Prepared
Patterns, relationships, and functions	55%
Geometry and measurement	55%
Data analysis and statistics	32%
Numerical and algebraic operations and analytical thinking	43%
Probability and discrete mathematics	23%

A statistical analysis of differences between responses from teachers who have participated in programs sponsored by higher education grantees and those sponsored by local grantees (including mathematics and science centers) shows few differences in the area of preparedness in mathematics content areas. Two statistical differences were identified:

1. More respondents who participated in higher education grantee sponsored activities feel better prepared to in the area of data analysis and statistics than among those who participated in local grantee programs.
2. More respondents who participated in local grantee sponsored activities feel better prepared in the area of numerical and algebraic operations and analytical thinking than among those who participated in higher education grantee programs.

Teachers were asked to rate their preparedness to conduct lessons in particular SCIENCE content areas related to curriculum standards. Summary results for all respondents are shown below.

Science Content Area	% Well Prepared	Science Content Area	% Well Prepared
Cells	32%	Motion of Objects	32%
Organization of Living Things	46%	Waves and Vibrations	26%
Heredity	25%	Geosphere	26%
Evolution	19%	Hydrosphere	29%
Ecosystems	50%	Atmosphere and Weather	43%
Matter and Energy	45%	Solar System, Galaxy, and Universe	40%

A statistical analysis of differences between responses from teachers who have participated in programs sponsored by higher education grantees and those sponsored by local grantees (including mathematics and science centers) shows few differences in the area of preparedness in science content areas. There was only one item for which a statistical difference was identified:

1. More respondents who participated in local grantee-sponsored activities feel better prepared in the area of heredity than among those who participated in higher education grantee programs.

Teachers were asked how often their students take part in particular learning strategies during mathematics and science lessons. Summary results for all participants are shown below.

Student Learning Strategies During a Lesson	% Often and Always Combined in Mathematics	% Often and Always Combined in Science
Participate in discussion with the teacher to further understanding	86%	90%
Make formal presentations to the class	22%	31%
Read from a textbook in class	36%	34%
Answer textbook/worksheet questions	62%	39%
Share ideas or solve problems with each other in small groups	82%	85%
Engage in hands-on activities	78%	90%
Follow specific instructions in an activity or investigation	76%	80%
Design or implement their own investigations	22%	30%
Record, represent, and/or analyze data	63%	74%
Supply evidence to support their ideas	57%	64%
Use the computer to support learning	32%	32%
Use calculators to support learning	54%	

A statistical analysis of differences between responses from teachers who have participated in programs sponsored by higher education grantees and those sponsored by local grantees (including mathematics and science centers) shows few differences in the area of frequency of student participation in learning strategies during mathematics and science lessons. The following items show a statistical difference in responses:

1. More respondents who were enrolled in higher education grantee-sponsored activities indicate they have students participate in the following kinds of activities more often than those teachers who were part of local grantee-sponsored programs:
  - Students make formal presentations to the class in mathematics classrooms
  - Students make formal presentations to the class in science classrooms
  - Students share ideas or solve problems with each other in small groups in mathematics classrooms
  - Students design and implement their own investigations in mathematics classrooms
  - Students design and implement their own investigations in science classrooms
  - Students supply evidence to support their ideas in mathematics classrooms
  
2. More respondents who were enrolled in local grantee-sponsored activities indicate they have students participate in the following kinds of activities more often than those teachers who were part of higher education grantee programs:
  - Students participate in discussions with the teacher to further understanding in mathematics classes
  - Students supply evidence to support their ideas in science classes

□ The data were analyzed to determine if there were differences in responses based on grade levels (PreK-2, 3-5, 6-8, 9-12). Major findings follow:

- PreK-2 grade teachers indicated their district/school curriculum was more strongly aligned with the Michigan curriculum standards than from teachers in all other grade levels in both mathematics and science.
- More PreK-2 and 3-5 grade teachers said they were well prepared to manage a class of students engaged in hands-on work in mathematics than those in grades 6-8 and 9-12; however, in science more 6-8 and 9-12 teachers said they were well prepared to engage students in hands-on work than those in PreK-2 and 3-5.
- More PreK-2 and 3-5 grade teachers said they were well prepared to encourage students' interests in mathematics than those in grades 6-8 and 9-12.
- More 9-12 teachers indicated they were well prepared to use questioning strategies that enhance development of student conceptual understanding and problem-solving in both mathematics and science than those in all other grade levels.
- More 9-12 teachers said they were well prepared to use student assessment data to change curriculum and instruction in both mathematics and science than teachers from all other grade levels.
- More 9-12 teachers said they were well prepared to conduct lessons in the following mathematics subject areas than teachers from all other grade levels: Patterns, relationships, and functions; geometry and measurement; data analysis and statistics; numerical and algebraic operations and analytical thinking; and probability and discrete mathematics.
- More 9-12 teachers said they were well prepared to conduct lessons in the following science subject areas than teachers from all other grade levels: Cells, organization of living things, heredity, evolution, matter and energy, and motion of objects. More 6-8 teachers said they were well prepared to conduct lessons in the following science areas than teachers from other

grade levels: Geosphere and hydrosphere. More PreK-2 and 6-8 teachers said they were well prepared to conduct science lessons on the topic of atmosphere and weather than 3-5 and 9-12 teachers. More 6-8 teachers said they were well prepared to conduct science lesson on the topic of solar system, galaxy, and universe than teachers from all other grade levels.

- More 9-12 teachers said they had students answering textbook/worksheet questions in both mathematics and science than teachers from all other grade levels.
- More PreK-2 teachers said they had students engaged in hands-on activities in both mathematics and science than teachers from all other grade levels.

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**March 2001**  
Updated June 2001

**□ Background.** In Fall 1999, SAMPI at Western Michigan University began implementation of a review and evaluation of the Michigan Eisenhower program, working with staff at the Michigan Department of Education. A set of performance objectives was developed to address core issues to be addressed by the Eisenhower program. An evaluation plan was developed by SAMPI framed by the objectives. In addition to requiring participation of 1999-2000 higher education grantees, local grantees and mathematics and science centers (many of whom administer Eisenhower funds in their service areas) were also invited to participate. The purpose of the evaluation is to determine effects of the Eisenhower program, as well as to take a "snapshot" of the status of mathematics and science teaching and learning in Michigan.

A variety of data collection procedures were identified for use in the review and evaluation, including observation of mathematics and science lessons, interviews of program directors and staff, survey of teachers, observation of professional development sessions, and gathering of project reports and other documents.

This report is a compilation of responses to a survey of teachers and a summary of findings based on the responses. Teachers were identified as having participated in higher education and local grantee programs (including mathematics and science centers). The survey was conducted in Fall 2000. Findings from this report will be incorporated in a final report about the Michigan Eisenhower Program based on performance objectives.

**□ Organization of the Report.** This report is in two parts. Part I is a summary of findings interpreting the data from the survey (see above). Part II is a compilation of responses from teachers participating in higher education grantee programs and local grantee programs (including mathematics and science centers).

**□ Survey Method and Sample.** Higher education grantees for 1999-2000 were required to submit names of teachers who were participating in their programs. Local grantees and mathematics and science centers were invited (on a volunteer basis) to submit names of participating teachers. All names submitted by higher education grantees and local grantees were included in the survey population, along with a sample of names submitted by mathematics and science centers. The total sample for the survey was 4,730 teachers from geographically diverse areas across Michigan. One thousand two hundred eighty-four (27%) were returned at the time this report was prepared.

The survey was mailed from SAMPI at Western Michigan University in September 2000 and included a cover letter and a 51-item survey. There were three sections: 1) information about the teacher, 2) perceptions about their preparedness to teach mathematics and/or science, and 3) degree to which their students engage in particular learning strategies. A follow-up post card was mailed in November 2000. Data were compiled as they were received. Analysis for this report is based on frequencies of responses

**About the Respondents.** There were 1,284 teachers who responded to the survey.

Number of Years Teaching in Michigan and Grade Levels Taught

No. Years Teaching	%
Less than 1 to 5	17%
6 to 10	18%
11 to 15	15%
16 to 20	11%
More than 20	38%
Other or no response	1%

Grade(s) Taught	%
PreK-2	18%
3-5	29%
6-8	21%
9-12	14%
Elementary Mixed	7%
Secondary Mixed	4%
Mixed K-12	6%
No response	1%

Amount of class time devoted to science and mathematics (elementary) and subjects taught (middle and high school)

Elementary Teachers (n = 730)

Times/Week Teach *Science*

No. Times/Week	%
Once	1%
Twice	9%
3 Times	18%
Four Times	22%
Five Times	39%
More than 5 Times*	11%

Lengths of a *Science* Lesson

Length of Lesson in Minutes	%
1 to 29 minutes	10%
30-39 minutes	17%
40-49 minutes	36%
50-59 minutes	15%
60-89 minutes	18%
More than 90 min.	4%

\* This likely includes teachers who teach science to more than one class each week.

Elementary Teachers (n = 730)

Times/Week Teach *Mathematics*

No. Times/Week	%
Once	0%
Twice	1%
3 Times	2%
Four Times	5%
Five Times	79%
More than 5 Times*	13%

Lengths of a *Mathematics* Lesson

Length of Lesson in Minutes	%
1 to 29 minutes	6%
30-39 minutes	7%
40-49 minutes	30%
50-59 minutes	16%
60-89 minutes	38%
More than 90 min.	3%

\* This likely includes teachers who teach mathematics to more than one class each week.

Middle and High School Teachers

Primary Subject(s) Taught

Subject(s)	%
Mathematics	38%
Science	40%
Mathematics and Science	6%
Other	16%

Teachers were asked if they had participated in an Eisenhower-funded activity (workshop, conference, etc.) in the last three years.

Yes = 70%      No = 10%      Don't Know = 20%

Among respondents who were enrolled in Eisenhower higher education grant-funded programs, results were as follows:

Yes = 80%      No = 8%      Don't Know = 12%

Teachers who said they had participated in Eisenhower-funded activities were asked to indicate the number of sessions in which they had participated in the last three years. Of the 846 who said "yes," participation was as follows:

1-2 sessions = 26%	11-20 sessions = 6%
3-5 sessions = 33%	more than 20 sessions = 16%
6-10 sessions = 19%	

Teachers who said they had participated in Eisenhower-funded activities were asked to indicate the subjects covered in the sessions. Of the 846 who said "yes," responses were as follows:

Mathematics = 26%	Mathematics and Other Subjects = 1%
Mathematics and Science = 27%	Science = 31%
Mathematics, Science, and Other Subjects = 3%	Science and Other Subjects = 3%
	Other Subjects = 5%
	No Response = 4%

Teachers were asked how many hours of professional development (PD) they had received in the past three years in mathematics, science, and other subjects. Results follow:

Of the 840 respondents who indicated PD in mathematics:

None = 16%	11-15 hours = 9%
1-5 hours = 18%	16-20 hours = 9%
6-10 hours = 19%	more than 20 hours = 29%

Of the 899 who indicated PD in science:

None = 11%	11-15 hours = 9%
1-5 hours = 18%	16-20 hours = 10%
6-10 hours = 19%	more than 20 hours = 33%

Of the 732 who indicated PD in other subjects:

None = 10%	11-15 hours = 10%
1-5 hours = 18%	16-20 hours = 13%
6-10 hours = 21%	more than 20 hours = 28%

Teachers were asked about their participation in Michigan Council of Teachers of Mathematics (MCTM). Results:

Are you a member?

Yes = 14%      No = 81%      Don't Know = 5%

Attended an annual conference in last 5 years?

Yes = 17%      No = 75%      Don't Know = 8%

Received Eisenhower funds to support participation?

Yes = 11%      No = 42%      Don't Know = 47%

Teachers were asked about their participation in Michigan Science Teachers Association (MSTA).

Results:

Are you a member?

Yes = 15%      No = 81%      Don't Know = 4%

Attended an annual conference in last 5 years?

Yes = 22%      No = 69%      Don't Know = 9%

Received Eisenhower funds to support participation?

Yes = 13%      No = 43%      Don't Know = 42%

## **Teacher Perceptions about their Curriculum**

Familiarity with the Michigan curriculum content standards at their grade level:

Results are presented 1) by type of respondent (Table 1) and 2) by the grade level taught by respondents (Table 2).

*TABLE 1:*  
*Mathematics Standards*

TABLE 2  
In Mathematics

Rating	All Respondents	Higher Education Grant Respondents	Local Grant Respondents
Not Aligned	3%	2%	3%
Somewhat Aligned	37%	33%	37%
Well Aligned	60%	65%	60%

Rating	Grades PreK-2	Grades 3-5	Grades 6-8	Grades 9-12
Not Aligned	1%	3%	2%	5%
Somewhat Aligned	31%	37%	37%	39%
Well Aligned	68%	60%	61%	56%

In Science

Rating	All Respondents	Higher Education Grant Respondents	Local Grant Respondents
Not Aligned	2%	4%	3%
Somewhat Aligned	34%	35%	33%
Well Aligned	64%	61%	65%

Rating	Grades PreK-2	Grades 3-5	Grades 6-8	Grades 9-12
Not Aligned	1%	2%	4%	2%
Somewhat Aligned	26%	36%	34%	33%
Well Aligned	73%	62%	62%	65%

- Degree to which classroom-level assessment is aligned with district/school curriculum  
Results are presented 1) by type of respondent and 2) by the grade level taught by respondents.

TABLE 3  
In Mathematics

Rating	All Respondents	Higher Education Grant Respondents	Local Grant Respondents
Not Aligned	3%	2%	2%
Somewhat Aligned	37%	35%	38%
Well Aligned	60%	63%	60%

In Mathematics continued . . .

Rating	Grades PreK-2	Grades 3-5	Grades 6-8	Grades 9-12
Not Aligned	1%	2%	2%	6%
Somewhat Aligned	32%	36%	40%	39%

Well Aligned	67%	62%	58%	55%
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*In Science:*

Rating	All Respondents	Higher Education Grant Respondents	Local Grant Respondents
Not Aligned	2%	3%	2%
Somewhat Aligned	37%	40%	36%
Well Aligned	61%	57%	62%

Rating	Grades PreK-2	Grades 3-5	Grades 6-8	Grades 9-12
Not Aligned	2%	2%	2%	2%
Somewhat Aligned	35%	36%	37%	31%
Well Aligned	63%	62%	61%	67%

## **Teacher Perceptions about their Preparedness to Teach Science and/or Mathematics.**

Teachers were asked to rate their preparedness to implement teaching/learning strategies during their mathematics and/or science lessons. Responses from those who teach mathematics and those who teach science are shown in the tables below. Table 4, Part I shows results in each category by type of respondent; Table 4, Part II shows results in each category by grade level taught by respondents. Number in box is % of respondents in that category.

*TABLE 4, PART I*  
*In Mathematics*

Item	Rating	All Respondents	Higher Education Grant Respondents	Local Grant Respondents
Design a lesson incorporating inquiry-based activities	Not Prepared	3	1	4
	Somewhat	18	18	18
	Fairly Well	43	37	44
	Well Prepared	36	44	35
Lead a class of students using investigative approaches to learning	Not Prepared	3	1	2
	Somewhat	14	16	14
	Fairly Well	39	35	40
	Well Prepared	44	48	44
Manage a class of students engaged in hands-on work	Not Prepared	0	0	0
	Somewhat	5	4	5
	Fairly Well	24	25	24
	Well Prepared	71	71	71

*In Mathematics Continued . . .*

Encourage students' interest in mathematics	Not Prepared	0	0	0
	Somewhat	5	7	4
	Fairly Well	29	34	27
	Well Prepared	66	59	69
Use questioning strategies that enhance development of student conceptual understanding and	Not Prepared	1	1	1
	Somewhat	10	15	9
	Fairly Well	41	40	42

problem-solving	Well Prepared	48	44	48
Implement your current school/ district curriculum	Not Prepared	1	0	1
	Somewhat	6	9	6
	Fairly Well	31	31	31
	Well Prepared	62	60	62
Use student assessment data to change curriculum and instruction	Not Prepared	4	6	3
	Somewhat	17	17	16
	Fairly Well	43	42	44
	Well Prepared	36	35	37

*In Science*

Item	Rating	All Respondents	Higher Education Grant Respondents	Local Grant Respondents
Design a lesson incorporating inquiry-based activities	Not Prepared	3	1	3
	Somewhat	13	12	13
	Fairly Well	41	34	43
	Well Prepared	43	53	41
Lead a class of students using investigative approaches to learning	Not Prepared	2	1	2
	Somewhat	11	12	11
	Fairly Well	35	30	36
	Well Prepared	52	57	51
Manage a class of students engaged in hands-on work	Not Prepared	1	0	1
	Somewhat	4	5	4
	Fairly Well	20	21	19
	Well Prepared	75	74	76
Encourage students' interest in science	Not Prepared	1	0	1
	Somewhat	5	6	4
	Fairly Well	24	24	24
	Well Prepared	70	70	71
Use questioning strategies that enhance development of student conceptual understanding and problem-solving	Not Prepared	1	1	1
	Somewhat	9	12	9
	Fairly Well	41	41	41
	Well Prepared	49	46	49
Implement your current school/ district curriculum	Not Prepared	1	2	1
	Somewhat	5	7	6
	Fairly Well	22	32	28
	Well Prepared	51	59	65
Use student assessment data to change curriculum and instruction	Not Prepared	4	6	4
	Somewhat	17	17	17
	Fairly Well	42	41	43
	Well Prepared	37	36	36

*TABLE 4, PART II*  
*In Mathematics*

Item	Rating	Grades PreK-2	Grades 3-5	Grades 6-8	Grades 9-12
Design a lesson incorporating inquiry-based activities	Not Prepared	3	3	4	4
	Somewhat	16	17	15	21
	Fairly Well	41	48	45	35
	Well Prepared	40	32	36	40
Lead a class of students using	Not Prepared	2	1	2	3

investigative approaches to learning	Somewhat	12	15	14	19
	Fairly Well	39	40	39	33
	Well Prepared	47	44	45	45
Manage a class of students engaged in hands-on work	Not Prepared	0	0	1	1
	Somewhat	1	4	4	8
	Fairly Well	21	25	24	29
	Well Prepared	79	66	60	53
Encourage students' interest in mathematics	Not Prepared	0	0	3	1
	Somewhat	0	5	7	7
	Fairly Well	21	29	32	39
	Well Prepared	79	66	60	53
Use questioning strategies that enhance development of student conceptual understanding and problem-solving	Not Prepared	0	0	3	1
	Somewhat	11	8	12	11
	Fairly Well	40	45	38	27
	Well Prepared	49	47	47	61
Implement your current school/district curriculum	Not Prepared	0	1	2	1
	Somewhat	5	6	5	6
	Fairly Well	31	30	30	23
	Well Prepared	64	63	63	70
Use student assessment data to change curriculum and instruction	Not Prepared	3	2	4	2
	Somewhat	18	17	14	18
	Fairly Well	44	44	47	32
	Well Prepared	35	37	35	47

*In Science*

Item	Rating	Grades PreK-2	Grades 3-5	Grades 6-8	Grades 9-12
Design a lesson incorporating inquiry-based activities	Not Prepared	3	1	3	2
	Somewhat	16	15	9	7
	Fairly Well	43	42	42	38
	Well Prepared	38	42	46	53
Lead a class of students using investigative approaches to learning	Not Prepared	2	1	1	2
	Somewhat	13	13	7	9
	Fairly Well	41	33	32	33
	Well Prepared	44	53	60	56
Manage a class of students engaged in hands-on work	Not Prepared	0	0	1	2
	Somewhat	4	5	1	1
	Fairly Well	20	24	16	13
	Well Prepared	75	71	82	84

*In Science Continued . . .*

Encourage students' interest in science	Not Prepared	0	1	0	2
	Somewhat	2	5	5	3
	Fairly Well	22	24	23	24
	Well Prepared	76	70	72	71
Use questioning strategies that enhance development of student conceptual understanding and problem-solving	Not Prepared	0	1	1	2
	Somewhat	12	9	9	8
	Fairly Well	43	45	36	30
	Well Prepared	45	45	54	59
Implement your current school/	Not Prepared	1	1	2	2

district curriculum	Somewhat	5	7	5	3
	Fairly Well	34	28	23	22
	Well Prepared	60	64	70	72
Use student assessment data to change curriculum and instruction	Not Prepared	4	4	2	3
	Somewhat	19	18	17	14
	Fairly Well	44	44	43	35
	Well Prepared	32	34	38	47

☐ Teachers were asked to rate their preparedness to conduct lessons in particular **MATHEMATICS** content areas related to curriculum standards. Responses follow. TABLE 5, PART I shows results by types of respondents; TABLE 5, PART II shows results by grade level of respondents. Number in box is % of respondents in that category.

*TABLE 5, PART I*

Item	Rating	All Respondents	Higher Education Grant Respondents	Local Grant Respondents
Patterns, relationships, and functions	Not Prepared	1	0	0
	Somewhat	7	8	8
	Fairly Well	37	42	36
	Well Prepared	55	50	56
Geometry and measurement	Not Prepared	1	0	0
	Somewhat	9	14	8
	Fairly Well	35	33	36
	Well Prepared	55	53	55
Data analysis and statistics	Not Prepared	5	5	5
	Somewhat	23	15	25
	Fairly Well	40	40	28
	Well Prepared	32	40	30
Numerical and algebraic operations and analytical thinking	Not Prepared	4	2	4
	Somewhat	15	17	15
	Fairly Well	38	38	38
	Well Prepared	43	43	43
Probability and discrete mathematics	Not Prepared	7	7	7
	Somewhat	30	24	31
	Fairly Well	40	43	40
	Well Prepared	23	27	22

*TABLE 5, PART II*

Item	Rating	Grades PreK-2	Grades 3-5	Grades 6-8	Grade 9-12
Patterns, relationships, and functions	Not Prepared	0	1	0	2
	Somewhat	5	8	5	5
	Fairly Well	33	42	38	22
	Well Prepared	62	49	57	70
Geometry and measurement	Not Prepared	1	0	1	2
	Somewhat	11	7	6	8
	Fairly Well	40	40	28	22
	Well Prepared	48	53	65	67

Data analysis and statistics	Not Prepared	9	5	1	5
	Somewhat	30	25	15	13
	Fairly Well	36	46	37	33
	Well Prepared	25	24	47	49
Numerical and algebraic operations and analytical thinking	Not Prepared	7	4	2	2
	Somewhat	20	17	10	3
	Fairly Well	43	43	27	16
	Well Prepared	30	36	61	79
Probability and discrete mathematics	Not Prepared	12	7	4	6
	Somewhat	37	29	22	24
	Fairly Well	35	45	42	33
	Well Prepared	16	19	32	37

□ Teachers were asked to rate their preparedness to conduct lessons in particular **SCIENCE** content areas related to curriculum standards. Responses follow. TABLE 6, PART I shows results by types of respondents; TABLE 6, PART II shows results by grade level of respondents. Number in box is % of respondents in that category.

*TABLE 6, PART I*

Item	Rating	All Respondents	Higher Education Grant Respondents	Local Grant Respondents
Cells	Not Prepared	10	10	10
	Somewhat	28	27	28
	Fairly Well	30	30	30
	Well Prepared	32	33	32
Organization of living things	Not Prepared	3	4	2
	Somewhat	15	20	14
	Fairly Well	36	38	36
	Well Prepared	46	38	48
Heredity	Not Prepared	14	13	14
	Somewhat	32	33	31
	Fairly Well	29	33	29
	Well Prepared	25	21	26
Evolution	Not Prepared	19	17	20
	Somewhat	33	36	32
	Fairly Well	29	28	30
	Well Prepared	19	19	19

*TABLE 6, PART I Continued . . .*

Ecosystems	Not Prepared	3	4	2
	Somewhat	14	17	13
	Fairly Well	33	33	34
	Well Prepared	50	46	51
Matter and energy	Not Prepared	3	3	3
	Somewhat	16	18	16
	Fairly Well	36	34	36
	Well Prepared	45	45	45
Motion of objects	Not Prepared	5	7	4
	Somewhat	24	19	25
	Fairly Well	39	39	40

	Well Prepared	32	35	31
Waves and vibrations	Not Prepared	8	9	8
	Somewhat	27	23	28
	Fairly Well	39	41	38
	Well Prepared	26	27	26
Geosphere	Not Prepared	9	9	9
	Somewhat	27	24	27
	Fairly Well	38	41	38
	Well Prepared	26	26	26
Hydrosphere	Not Prepared	9	8	9
	Somewhat	24	19	24
	Fairly Well	38	43	38
	Well Prepared	29	30	29
Atmosphere and weather	Not Prepared	4	5	3
	Somewhat	14	14	14
	Fairly Well	39	36	39
	Well Prepared	43	45	44
Solar system, galaxy, and universe	Not Prepared	4	6	4
	Somewhat	17	20	16
	Fairly Well	39	38	39
	Well Prepared	40	36	41

*TABLE 6, PART II*

Item	Rating	Grades PreK-2	Grades 3-5	Grades 6-8	Grades 9-12
Cells	Not Prepared	25	11	3	7
	Somewhat	42	28	20	13
	Fairly Well	24	37	29	19
	Well Prepared	9	24	48	61
Organization of living things	Not Prepared	3	2	1	5
	Somewhat	17	14	18	12
	Fairly Well	24	37	29	19
	Well Prepared	39	45	50	58

*TABLE 6, PART II Continued . . .*

Heredity	Not Prepared	21	18	9	6
	Somewhat	34	38	22	16
	Fairly Well	30	33	27	20
	Well Prepared	15	11	42	58
Evolution	Not Prepared	29	25	12	8
	Somewhat	38	37	27	20
	Fairly Well	22	28	35	28
	Well Prepared	11	10	26	44
Ecosystems	Not Prepared	4	1	3	2
	Somewhat	15	12	14	18
	Fairly Well	46	35	25	28
	Well Prepared	35	52	58	52

Matter and energy	Not Prepared	7	1	1	2
	Somewhat	26	14	11	6
	Fairly Well	41	37	36	28
	Well Prepared	26	47	52	64
Motion of objects	Not Prepared	10	4	2	4
	Somewhat	31	23	20	16
	Fairly Well	40	42	46	35
	Well Prepared	19	31	32	45
Waves and vibrations	Not Prepared	15	6	8	4
	Somewhat	35	29	16	20
	Fairly Well	35	41	45	33
	Well Prepared	15	24	35	28
Geosphere	Not Prepared	17	8	5	5
	Somewhat	36	26	20	28
	Fairly Well	34	42	40	38
	Well Prepared	13	24	35	28
Hydrosphere	Not Prepared	18	8	5	5
	Somewhat	33	24	16	25
	Fairly Well	32	43	38	34
	Well Prepared	17	25	40	36
Atmosphere and weather	Not Prepared	2	3	5	8
	Somewhat	8	10	19	23
	Fairly Well	41	49	30	33
	Well Prepared	49	38	46	36
Solar system, galaxy, and universe	Not Prepared	5	3	3	12
	Somewhat	15	15	16	24
	Fairly Well	46	44	30	36
	Well Prepared	34	38	51	28

## Student Participation in Mathematics and/or Science Activities in the Classroom.

Teachers were asked to rate their perceptions about improvement in student accomplishments. Responses from those who teach mathematics and those who teach science are shown in the tables below. Table 8, Part I shows results in each category by type of respondent; Table 8, Part II shows results in each category by grade level taught by respondents. Number in box is % of respondents in each category.

*TABLE 8, PART I:  
In Mathematics*

Item	Rating	All Respondents	Higher Education Grant Respondents	Local Grant Respondents
I have seen an increase in	No improvement	5	6	5

student eagerness to learn in the past three years.	A little improvement	24	17	25
	Some improvement	54	56	54
	A lot of improvement	17	21	16
Student achievement scores were improved in the past three years.	No improvement	2	1	2
	A little improvement	15	20	15
	Some improvement	57	52	57
	A lot of improvement	26	27	26
Students who do not usually do well in school have improved academically in the past three years.	No improvement	5	5	5
	A little improvement	28	24	28
	Some improvement	57	55	57
	A lot of improvement	10	16	10

*In Science*

Item	Rating	All Respondents	Higher Education Grant Respondents	Local Grant Respondents
I have seen an increase in student eagerness to learn in the past three years.	No improvement	3	5	3
	A little improvement	20	18	21
	Some improvement	52	50	51
	A lot of improvement	25	28	25
Student achievement scores were improved in the past three years.	No improvement	3	4	3
	A little improvement	18	19	18
	Some improvement	57	49	58
	A lot of improvement	22	28	21
Students who do not usually do well in school have improved academically in the past three years.	No improvement	4	5	4
	A little improvement	28	24	29
	Some improvement	58	55	58
	A lot of improvement	10	16	9

*TABLE 8, PART II:  
In Mathematics*

Item	Rating	Grades PreK-2	Grades 3-5	Grades 6-8	Grades 9-12
I have seen an increase in student eagerness to learn in the past three years.	No improvement	2	6	5	11
	A little improvement	13	24	36	32
	Some improvement	61	54	48	51
	A lot of improvement	24	16	10	6
Student achievement scores were improved in the past three years.	No improvement	0	2	1	5
	A little improvement	12	13	17	17
	Some improvement	61	56	62	56
	A lot of improvement	27	29	20	22
Students who do not	No improvement	1	8	4	9

usually do well in school have improved academically in the past three years.	A little improvement	21	27	34	26
	Some improvement	66	54	52	59
	A lot of improvement	12	11	10	6

*In Science*

Item	Rating	Grades PreK-2	Grades 3-5	Grades 6-8	Grades 9-12
I have seen an increase in student eagerness to learn in the past three years.	No improvement	2	4	5	8
	A little improvement	11	16	24	37
	Some improvement	54	52	51	50
	A lot of improvement	33	28	20	5
Student achievement scores were improved in the past three years.	No improvement	1	4	4	5
	A little improvement	17	17	23	15
	Some improvement	62	54	54	62
	A lot of improvement	20	25	19	17
Students who do not usually do well in school have improved academically in the past three years.	No improvement	2	7	55	4
	A little improvement	21	27	33	38
	Some improvement	65	56	51	54
	A lot of improvement	12	10	11	4

☐ Teachers were asked how often their students take part in particular learning strategies during science and mathematics lessons. Responses from those who teach mathematics and those who teach science are shown in the tables below. Table 9, Part I shows results in each category by type of respondent; Table 9, Part II shows results in each category by grade level taught by respondents. Number in box is % of respondents in that category.

*TABLE 9, PART I:  
In Mathematics*

Item	Rating	All Respondents	Higher Education Grant Respondents	Local Grant Respondents
Participate in discussions with the teacher to further under- standing	Never	0	1	1
	Sometimes	14	20	13
	Often	51	41	52
	Always	35	38	34

*TABLE 9, PART I Mathematics Continued . . .*

Make formal presentations to the class	Never	23	20	23
	Sometimes	55	45	57
	Often	17	24	16
	Always	5	11	4
Read from a textbook in class	Never	26	32	25
	Sometimes	38	34	39
	Often	26	27	26
	Always	10	7	10
Answer textbook/worksheet questions	Never	8	10	7
	Sometimes	30	34	30
	Often	42	38	43
	Always	20	18	20
Share ideas or solve problems	Never	1	2	2

with each other in small groups	Sometimes	17	17	17
	Often	54	43	55
	Always	28	38	26
Engage in hands-on activities	Never	1	1	1
	Sometimes	21	22	21
	Often	49	43	50
	Always	29	34	28
Follow specific instructions in an activity or investigation	Never	1	1	1
	Sometimes	23	23	22
	Often	56	54	57
	Always	20	22	20
Design or implement their own investigations	Never	21	17	22
	Sometimes	57	49	58
	Often	19	27	18
	Always	3	7	2
Record, represent, and/or analyze data	Never	3	2	3
	Sometimes	34	25	35
	Often	49	56	48
	Always	14	17	14
Supply evidence to support their ideas	Never	5	2	6
	Sometimes	38	36	38
	Often	43	39	44
	Always	14	23	12
Use the computer to support learning	Never	20	28	19
	Sometimes	48	50	48
	Often	26	17	27
	Always	6	5	6
Use calculators to support learning	Never	7	11	6
	Sometimes	39	37	39
	Often	38	37	38
	Always	16	15	17

*TABLE 9, PART I: In Science*

Item	Rating	All Respondents	Higher Education Grant Respondents	Local Grant Respondents
Participate in discussions with the teacher to further understanding	Never	0	0	1
	Sometimes	10	10	10
	Often	52	44	52
	Always	38	46	37
Make formal presentations to the class	Never	15	7	16
	Sometimes	54	47	54
	Often	25	33	25
	Always	6	13	5
Read from a textbook in class	Never	23	26	22
	Sometimes	43	48	42
	Often	25	21	26
	Always	9	5	10

Answer textbook/worksheet questions	Never	12	13	12
	Sometimes	49	54	48
	Often	29	25	30
	Always	10	8	10
Share ideas or solve problems with each other in small groups	Never	1	1	1
	Sometimes	14	14	14
	Often	56	50	57
	Always	29	35	26
Engage in hands-on activities	Never	1	0	0
	Sometimes	9	6	9
	Often	51	49	52
	Always	39	45	39
Follow specific instructions in an activity or investigation	Never	1	1	1
	Sometimes	19	18	19
	Often	56	51	57
	Always	24	30	23
Design or implement their own investigations	Never	12	9	13
	Sometimes	58	50	58
	Often	24	28	24
	Always	6	13	5
Record, represent, and/or analyze data	Never	2	1	2
	Sometimes	24	13	27
	Often	55	61	55
	Always	19	25	18
Supply evidence to support their ideas	Never	3	1	3
	Sometimes	33	22	35
	Often	47	55	46
	Always	17	22	16
Use the computer to support learning	Never	17	19	17
	Sometimes	50	49	51
	Often	26	26	26
	Always	6	6	6
Use calculators to support learning	Never	28	30	27
	Sometimes	45	40	46
	Often	20	21	20
	Always	7	9	7

*TABLE 9, PART II: In Mathematics*

Item	Rating	Grades PreK-2	Grades 3-5	Grades 6-8	Grades 9-12
Participate in discussions with the teacher to further understanding	Never	1	0	0	1
	Sometimes	10	11	12	16
	Often	50	53	60	51
	Always	39	36	28	32
Make formal presentations to the class	Never	40	17	16	23
	Sometimes	44	62	63	61
	Often	14	16	18	12
	Always	2	5	3	4
Read from a textbook in class	Never	56	15	10	29
	Sometimes	24	42	47	38
	Often	15	32	32	21
	Always	5	11	12	11
Answer textbook/worksheet	Never	21	4	3	1

questions	Sometimes	35	35	20	15
	Often	36	42	54	40
	Always	8	19	23	44
Share ideas or solve problems with each other in small groups	Never	2	1	1	2
	Sometimes	15	18	15	23
	Often	59	54	56	51
	Always	24	27	29	23
Engage in hands-on activities	Never	0	0	1	3
	Sometimes	2	22	35	44
	Often	45	57	52	38
	Always	53	21	12	15
Follow specific instructions in an activity or investigation	Never	1	0	1	4
	Sometimes	20	21	20	31
	Often	53	61	61	42
	Always	26	18	18	23
Design or implement their own investigations	Never	20	20	19	30
	Sometimes	55	62	59	54
	Often	21	16	20	14
	Always	4	2	2	1
Record, represent, and/or analyze data	Never	4	2	0	4
	Sometimes	33	35	33	43
	Often	46	53	53	36
	Always	17	10	14	17
Supply evidence to support their ideas	Never	6	4	3	7
	Sometimes	46	38	34	34
	Often	37	47	46	43
	Always	11	11	17	16
Use the computer to support learning	Never	14	17	30	31
	Sometimes	50	48	48	53
	Often	30	28	17	15
	Always	6	7	5	1
Use calculators to support learning	Never	15	5	1	3
	Sometimes	58	41	26	13
	Often	23	45	48	30
	Always	4	9	25	54

*TABLE 9, PART II: In Science*

Item	Rating	Grades PreK-2	Grades 3-5	Grades 6-8	Grades 9-12
Participate in discussions with the teacher to further understanding	Never	1	0	0	1
	Sometimes	9	7	12	13
	Often	47	51	55	60
	Always	43	42	33	26
Make formal presentations to the class	Never	35	7	4	11
	Sometimes	49	56	59	57
	Often	14	29	33	28
	Always	2	8	4	4
Read from a textbook in class	Never	49	11	7	32
	Sometimes	31	45	54	42
	Often	17	31	30	18
	Always	3	13	9	8
Answer textbook/worksheet questions	Never	25	7	7	5
	Sometimes	50	59	48	38

	Often	20	25	35	43
	Always	5	9	10	14
Share ideas or solve problems with each other in small groups	Never	1	0	1	1
	Sometimes	18	12	14	19
	Often	58	59	55	54
	Always	23	29	30	26
Engage in hands-on activities	Never	0	0	0	1
	Sometimes	5	9	12	10
	Often	44	59	55	55
	Always	51	32	33	34
Follow specific instructions in an activity or investigation	Never	1	0	0	3
	Sometimes	21	20	18	18
	Often	51	56	60	56
	Always	27	23	22	23
Design or implement their own investigations	Never	21	13	7	8
	Sometimes	60	57	58	55
	Often	15	26	27	32
	Always	4	4	8	5
Record, represent, and/or analyze data	Never	4	1	1	1
	Sometimes	33	23	20	17
	Often	49	58	56	62
	Always	14	18	23	21
Supply evidence to support their ideas	Never	6	2	0	1
	Sometimes	49	31	27	23
	Often	35	51	51	56
	Always	10	16	22	20
Use the computer to support learning	Never	25	17	16	8
	Sometimes	49	53	52	48
	Often	23	27	26	34
	Always	3	3	6	10
Use calculators to support learning	Never	55	30	12	13
	Sometimes	36	48	60	32
	Often	7	17	23	39
	Always	2	5	5	18

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