

Loess Hills AEA 13

Alignment Study:
Iowa Collaborative Assessment Modules (ICAM)
Grade 11 Mathematics

Mathematics Cooperative Curriculum Project

June, 2003



Review Team

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Document is available on the AEA 13 Assessment Resources Web Page (as a pdf or Word document):

<http://www.aea13.org/assessment>

Other documents associated with the Iowa Technical Adequacy Project may be obtained from the ITAP website:

<http://projects.education.uiowa.edu/itap/>

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Executive Summary of Process and Findings

Process

The AEA 13 team met in May, 2003, to intensively review the items on the grade 11 mathematics ICAM modules. Note that the ICAM Form X modules were used for the alignment study. The results of this study should generalize to ICAM Form Y, since the alternate forms are considered to be equivalent. Generally, the process suggested by the Iowa Technical Adequacy Project (ITAP) was utilized to compare the content of the various modules to the Cooperative Curriculum Project (C2P) standards document. Some slight modifications were made to the process, and these are noted within this document.

For further information on the ITAP alignment process, refer to documents on the ITAP website (<http://projects.education.uiowa.edu/itap/>). The process is outlined in detail in Dr. David Frisbie's 2003 paper, "Checking the Alignment of an Assessment Tool and a Set of Content Standards." At the time this document was released, the paper and other supporting materials were available on the web site noted above. It is also linked with the AEA 13 Assessment Resources Page (<http://www.aea13.org/assessment>). This paper was modified from a paper previously written by Dr. Frisbie and made available as an "Occasional Paper" through the University of Iowa/Iowa Testing Program. After August, 2003, the ITAP website will not be available, however, templates and resources are to be made available to Iowa school districts in a compact disk format.

For each of the seven grade 11 ICAM mathematics modules, this document includes several charts and summary documents. For module, the order of documents is:

- 1) **Summary of Alignment Evidence**
- 2) **Alignment Checking Matrix** – The matrix shows content matches per item and cognitive complexity for items and benchmarks. Please note that the alignment matching was done with grade level *benchmarks*. The grade level *indicators* provided additional details regarding the knowledge and skills represented in each benchmark. While matching was not done with the indicators, they were very helpful for the reviewers as they analyzed the intent of each benchmark.
- 3) **Chart Showing Analysis of "Depth of Knowledge"** – This chart outlines the extent to which high or low level items match with high or low level benchmarks in terms of cognitive complexity.
- 4) **Summary of Decisions Chart** – This chart concisely summarizes the extent to which each test meets criteria for:
 - **Comprehensiveness** – How well is the standard covered? The criteria of at least five items matched to a standard was used to determine appropriate comprehensiveness.

- **Range of Knowledge** – The evenness (balance) with which the items matching a content standard are distributed across the set of benchmarks for that content standard. For example, there may be a substantial number of items aligned to a standard, but if all or most of those items match to just one benchmark, the assessment is not balanced. A criteria of having at least one item matched to 75% of the benchmarks under a standard was used to determine appropriate range of knowledge.
- **Depth of Knowledge (Cognitive Complexity)** – How well does the level of cognitive complexity required by benchmarks conform to the demands of the items that match the benchmarks in content? For example, a benchmark may have a number of items matched by content, but perhaps, the benchmark represents a "high level" cognitive demand, while the items focus more on "low level" cognitive demands. A global judgment process was used to estimate whether there is at least a "moderate" degree of match in cognitive complexity between the assessment content and benchmarks. For each grade, a chart has been produced that summarizes the cognitive complexity analysis.

How Should A District Use This Document?

A Word of Caution to Districts – This document is being made available to all districts. For some districts that use C2P or a slightly modified version of C2P, the study results will be applicable for your district, and you may choose to use the AEA 13 study as part of the documentation you will use in preparation for submitting ITAP information to the Iowa Department of Education in October, 2003. *However, remember that the alignment results in this document only apply to your district to the extent that your benchmarks are similar to C2P benchmarks.*

Also keep in mind that while the ITAP process is established as an appropriate way to document curriculum and assessment alignment, the process can be subjective and there are always judgmental decisions made by the alignment team. A district may or may not agree with all of the decisions made by this AEA 13 alignment team.

Be cautious about generalizing the results of this C2P document to your district standards and benchmarks, unless they are very similar to C2P. Do not automatically assume that the findings of this study are true for your district without conducting some internal study of your curriculum.

The primary intent was for this document to be reviewed by a district as a model, to show how the necessary components of the ITAP process might be compiled to summarize the extent to which a set of instruments (ICAM grade 11 modules for mathematics) addresses standards in terms of comprehensiveness, range of knowledge, and depth of knowledge (cognitive complexity).

Finally, when referring to this document or when using your own analysis of alignment, it is critical to consider issues of alignment between *curriculum, assessment, and instruction*. Even when curriculum documents match well with an assessment, **an alignment study is not very beneficial unless a district has checked that the curriculum document actually describes what is being taught in a system.**

Executive Summary

A brief statement appears below regarding the alignment of each module. Please refer to the charts and summaries in this booklet for more detailed information.

Problem Solving Process & Strategies - This module has the largest number of item matches under the standard of number and operation, with emphasis falling on benchmark #4 (strategies in solving word problems).

Number Concepts & Operations - This module has the largest number of item matches under the standard of number and operation, with emphasis falling on benchmark #3 (evaluating expressions)

Measurement - As would be expected, this module matched primarily with the measurement standard. There were also a number of matches under the geometry standard on benchmark #19 (properties of geometric figures).

Geometry - As would be expected, this module matched primarily with the geometry standard, with heavy emphasis on benchmarks # 17 (Pythagorean Theorem) and #19 (properties of geometric figures). In the mathematics C2P study of ITED grade 11 (which is available at <http://www.aea13.org/assessment>), it was noted that geometry was an area that did not have comprehensive coverage or adequate range of knowledge (based on the Iowa Tests alone). If the ITED were combined with the ICAM Geometry module, the C2P mathematics standards appear to be covered well. The charts shown on the next several pages show the total number of combined item matches for each C2P benchmark when synthesizing ITED and ICAM Geometry.

Data Analysis, Statistics & Probability - As would be expected, this module matched primarily with the Data Analysis & Probability standard. The item matches are fairly distributed across the three benchmarks.

Functions and Algebra - This module has, as expected, most items matched primarily to benchmarks under the Algebra standard. There were matches to 4 of the 6 C2P benchmarks (no matches for evaluating and simplifying expressions and simplifying polynomials). In the mathematics C2P study of ITED grade 11 (which is available at <http://www.aea13.org/assessment>), it was noted that range of knowledge criteria was not met for the Algebra standard (although the comprehensiveness criteria was met since there were more than 5 items). ICAM Algebra also does not meet range of knowledge criteria because 4 of 6 benchmarks are assessed (less than 75% of the benchmarks). While neither ITED or ICAM alone show adequate range of knowledge, when synthesizing the information from both, this

criteria is satisfied. The charts shown on the next several pages show the total number of combined item matches for each C2P benchmark when synthesizing the two instruments. Synthesizing ITED and ICAM Algebra, 83% of the C2P benchmarks are measured, satisfying the range of knowledge criteria. The benchmark dealing with simplifying polynomials (benchmark #12) is not assessed with either assessment.

Solving Work Related Problems - All items on this module were obviously focused on work related, applied mathematics problems. However, when matching with the C2P benchmarks, the items are fairly evenly distributed between the Number and Operation standard and the Measurement standard (there were a number of work related problems that focused on practical skills involving measurement).

Combining Two Instruments – Example of Grade 11 ITED and Several ICAM Modules

Alignment-Checking Matrix – Comparison of *ITED Grade 11 Math Totals* and *ICAM Grade 11 Geometry Module Totals*

ITEM NUMBER	Number & Operations				Data Analysis & Probability			Measurement		Algebra						Geometry				NO FIT		
	Demonstrates computational fluency with whole numbers, decimals, integers, and rational numbers.	Demonstrates the ability to model/represent fractions, decimals, and percents and the relationship among them.	Demonstrates the ability to evaluate expressions.	Understands and demonstrates different strategies in solving word problems.	Uses various methods to interpret and display data and make predictions.	Understands simple probabilities and use them to make predictions.	Understands appropriate statistical methods to analyze data.	Demonstrates the ability to solve simple problems involving rates and derived measurements for such as velocity and density.	Measures and/or estimates using appropriate units of length, weight, mass, and capacity.	Understands and finds slope.	Evaluates and simplifies expressions (including expressions with radicals and exponents).	Demonstrates the ability to simplify polynomials.	Solves equations and inequalities.	Demonstrates the ability to graph linear equations and inequalities.	Demonstrates the ability to write linear equations.	Understands the properties of parallel and perpendicular lines.	Understands and applies the Pythagorean Theorem.	Understands coordinate geometry.	Understand and apply properties of geometric figures.			
CC	L	L	L	H	H	H	H	L	L	L	L	L	L	H	L	L	H	L	H	L	H	
ITED Sum	21	19	12	13	8	1	1	1	6	0	7	0	4	1	0	0	0	0	0	1	0	
ICAM Geometry Sum	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	10	1	10	0		
Total	21	19	12	14	8	1	1	1	6	0	7	0	4	1	1	1	10	1	11	0		

Interpretation: Note above that for the Standard of **Geometry**, the ITED does not *alone* meet the criteria for comprehensiveness (at least five items per standard) or range of knowledge (at least 75% of benchmarks under a standard are measured). When complementing the ITED with the ICAM Geometry module, these two criteria are met for the Standard of Geometry.

Alignment-Checking Matrix - Comparison of ITED Grade 11 Math Totals and ICAM Grade 11 Algebra Module Totals

	Number & Operations				Data Analysis & Probability			Measurement		Algebra						Geometry				
ITEM NUMBER	Demonstrates computational fluency with whole numbers, decimals,	Demonstrates the ability to model/represent fractions, decimals, and percents and the relationship among them.	Demonstrates the ability to evaluate expressions.	Understands and demonstrates different strategies in solving word problems.	Uses various methods to interpret and display data and make predictions.	Understands simple probabilities and use them to make predictions.	Understands appropriate statistical methods to analyze data.	Demonstrates the ability to solve simple problems involving rates and derived measurements for such as velocity and density.	Measures and/or estimates using appropriate units of length, weight, mass, and capacity.	Understands and finds slope.	Evaluates and simplifies expressions (including expressions with radicals and exponents).	Demonstrates the ability to simplify polynomials.	Solves equations and inequalities.	Demonstrates the ability to graph linear equations and inequalities.	Demonstrates the ability to write linear equations.	Understands the properties of parallel and perpendicular lines.	Understands and applies the Pythagorean Theorem.	Understands coordinate geometry.	Understand and apply properties of geometric figures.	NO FIT
CC	L	L	L	H	H	H	H	L	L	L	L	L	L	H	L	L	H	L	H	
ITED Sum	21	19	12	13	8	1	1	1	6	0	7	0	4	1	0	0	0	0	1	0
ICAM Algebra Sum	0	0	0	1	0	0	0	0	0	2	0	0	3	2	9	0	0	0	0	0
Total	21	19	12	14	8	1	1	1	6	2	7	0	7	3	9	0	0	0	1	0

Interpretation: Note above that for the Standard of **Algebra**, the ITED did meet the criteria for comprehensiveness (at least 5 items per standard), while the criteria of range of knowledge was not met (less than 75% of benchmarks under a standard are measured - 3/6 or 50% of benchmarks were assessed with ITED alone). When complementing the ITED with the ICAM Algebra module, the issue with range of knowledge is solved. While there is still one benchmark not assessed (simplifying polynomials), 5/6 or 83% of the benchmarks are assessed for Algebra.

High School

Standards, Benchmarks and Grade Level Indicators Loess Hills AEA 13 Cooperative Curriculum Project *

	Number and Operation	Data Analysis and Probability	Measurement	Algebra	Geometry
Grade 9 and 10	<p>1) Demonstrates computational fluency with whole numbers, decimals, integers, and rational numbers.</p> <ul style="list-style-type: none"> Estimate to check for reasonableness of results. <p>2) Demonstrates the ability to model/represent fractions, decimals and percents and the relationship among them.</p> <ul style="list-style-type: none"> Convert between forms. Understand basic percent problems. Use rates of interest. Model/represent each graphically. <p>3) Demonstrates the ability to evaluate expressions.</p> <ul style="list-style-type: none"> Use order of operations. Use exponents. Use ratios and proportions. Use square roots. <p>4) Understands and demonstrates different strategies in solving word problems.</p> <ul style="list-style-type: none"> Estimate to check for reasonableness of results Work backwards. Identify patterns. Represent problem graphically or with models. Work a simpler problem. Translate English phrases and sentences to algebraic expressions and equations. 	<p>1) Uses various methods to interpret and display data and make predictions.</p> <ul style="list-style-type: none"> Stem and leaf plots. Box and whisker. Scatter grams. Line graph. Bar graph. Circle graph. Pictograph. Histogram. <p>2) Understands simple probabilities and use them to make predictions.</p> <p>3) Understands appropriate statistical methods to analyze data.</p> <ul style="list-style-type: none"> Apply measures of central tendency. Apply measures of variation. 	<p>1) Demonstrates the ability to solve simple problems involving rates and derived measurements for such as velocity and density.</p> <p>2) Measures and/or estimates using appropriate units of length, weight, mass, and capacity.</p> <ul style="list-style-type: none"> Temperature. Capacity. Linear measurement. Area. Mass. 	<p>1) Understands and finds slope.</p> <ul style="list-style-type: none"> Graphing method. Algebraic method. <p>2) Evaluates and simplifies expressions (including expressions with radicals and exponents).</p> <ul style="list-style-type: none"> Algebraic. Numerical. <p>3) Demonstrates the ability to simplify polynomials.</p> <ul style="list-style-type: none"> Combine like terms Use rules of exponents <p>4) Solves equations and inequalities.</p> <ul style="list-style-type: none"> Linear equation/inequality. Quadratic equation. <p>5) Demonstrates the ability to graph linear equations and inequalities.</p> <ul style="list-style-type: none"> Slope-intercept form. Table of values. <p>6) Demonstrates the ability to write linear equations.</p> <ul style="list-style-type: none"> Write the equation given the graph of a line. Write the equation given a point and the slope. Write the equation given two points on the line. 	<p>1) Understands the properties of parallel and perpendicular lines.</p> <ul style="list-style-type: none"> Transversal. Angle relationships. Slope relationships. <p>2) Understands and applies the Pythagorean Theorem.</p> <p>3) Understands coordinate geometry.</p> <ul style="list-style-type: none"> Distance formula. Mid-point formula. Slope. <p>4) Understand and apply properties of geometric figures.</p> <ul style="list-style-type: none"> Congruence. Similarity. Symmetry.

***Note:** The C2P group designated that above standards and benchmarks for grades 9 and 10, suggesting that these might be outcomes for students during the first few years of high school. The alignment team compared these benchmarks with the 11th grade ICAM mathematics modules. The interpretation would be that these benchmarks suggest content and skills that students should master *by the time they are administered standardized assessments in grade 11.*

Grade 11

Alignment Evidence Summary:

ICAM – Problem Solving Strategies
(Form Z) and Cooperative Curriculum
Project

District Name:	Loess Hills AEA 13	Reviewer's Names:	R. Russell, B. Loeffelbein, S. Huffman, H. Paul, C. Confer
Review Date:	May, 2003		

Alignment Evidence Summary:

Grade 11 Iowa ICAM Problem Solving and Cooperative Curriculum Project

General Instructions: This template is to be completed for each instrument being checked for “alignment.” The information provided here should be a consolidation of the findings of the team that did the alignment checking. Provide the following information for the specific instrument being reviewed. Then, complete each of the six numbered parts of this template.

Title:	ICAM	Grade Level Reviewed:	11
Author/Publisher:	Iowa Association of AEAs	Content Area Reviewed:	Problem Solving
Publication Date:	2002	Purposes/Uses by District:	Public Reporting, Student Progress/History

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- **ICAM User's Guide (Iowa Association of Area Education Agencies) - content specifications**
- **Loess Hills AEA 13 Cooperative Curriculum Project Standards and Benchmarks**
- **Iowa Technical Adequacy Project (ITAP) Materials and Resources (process adapted for cognitive complexity and alignment)**
- **Western Hills Area Education Agency ICAM cognitive complexity rankings (adapted)**

Summary of Alignment Evidence

Alignment (How does the assessment align with the content standards?)

1. What process was used to check the alignment between the assessment items or tasks (including scoring criteria where relevant) and the LEA's content standards?
a. Describe the qualifications of the panel of people who participated in the alignment-checking process.
AEA staff including two mathematics consultants, three assessment consultants.
b. Describe what was done to determine that the content standards and benchmarks (or grade-level indicators) are of sufficient quality for use in an alignment-checking process.
1) Describe (or reference) the process used to evaluate the quality of the set of content standards and benchmarks (or grade-level indicators).
The Cooperative Curriculum Project, during June, 2002, involved math educators from 26 districts in AEA 13. National standards documents such as NCTM were used as models for teachers who developed the curriculum document during a five-day session facilitated by AEA staff. The alignment checking group (see above) did not make changes to the documents.
2) List content standards and/or benchmarks (or grade-level indicators) that were excluded from the alignment-checking process.
None were excluded from the process.
c. Describe (or reference) the process used to evaluate the extent to which the knowledge/skills of the collection of items/tasks matches the knowledge/skills in the content standards and benchmarks (or grade-level indicators).
1) Describe (or reference) the classification system used to categorize the extent to which an item/task matches the content represented by the benchmarks (or grade-level indicators).
Step 6 of the ITAP process was used with some modification. We used the ITAP rating system for "complete," "partial," and "no fit." The category of "slight fit" was not used.
2) Describe the process followed (i.e., independent review vs. consensus) to check the alignment of content.
A group consensus format was used in the alignment checking process.
d. Describe (or reference) the process used to evaluate the extent to which the level of cognitive complexity of the collection of items/tasks matches the cognitive complexity of the content standard and benchmarks.
1) Describe (or reference) the classification system used to categorize benchmarks (or grade-level indicators) and assessment items/tasks in terms of cognitive complexity.
The alignment team referenced the cognitive complexity item classifications ranked by Western Hills AEA with modifications. Their system included rankings of low, moderate, and high. The AEA 13 team modified their decisions into a two-level system (low and high). For classifying our benchmarks, we modified Step 4 from the ITAP process, using only the definitions of "low" and "high." The "moderate" and "unclassifiable" categories were not used. Therefore, for both test items and benchmarks, the terms and definitions of "high" and "low" were used for a comparable analysis.
2) Describe the process followed to check alignment in terms of cognitive complexity.
ITAP Step 7 was used to review for depth of knowledge/cognitive complexity. A summary table is attached.

2. Attach the completed table(s) used by each reviewer to record/summarize judgments from the alignment-checking process. How many tables are attached?
One alignment-checking matrix, one depth of knowledge summary chart, one summary of decisions chart.
3. To what extent is this collection of items/tasks measuring something different than the knowledge/skills represented by the collection of content standards (extraneous content)?
a. Provide the total number of items/tasks that did not match at least one content standard.
None - all items matched at least one benchmark.
b. Specify, as a percentage, the portion of total points possible on the assessment that were <u>not</u> matched to at least one content standard.
N/A
4. To what extent are all the content standards in the subject area being assessed by this assessment tool (comprehensiveness)?
a. Describe the criteria used to determine “sufficiency” of content alignment for a content standard.
A minimum of five items must align to a content standard.
b. List the content standards that align sufficiently with this assessment, and specify the total number of points associated with each content standard.
Number and Operation – 14.
c. List the content standards that do <u>not</u> align sufficiently with this assessment.
Geometry – 4; Data Analysis and Probability – 1; Measurement – 3; Algebra – 2.
5. To what extent are the benchmarks (or grade-level indicators) within each content standard given proper content emphasis (range of knowledge) by this collection of items/tasks?
a. Describe the criteria used to determine “sufficiency” of range of knowledge for a content standard.
75% of the benchmarks within a content standard must have at least one item match.
b. List the content standards for which the range of knowledge is sufficient.
Number and Operation.
c. List the content standards for which the range of knowledge is too narrow.
Algebra; Data Analysis and Probability; Measurement.
d. List each of the significant benchmarks that are not assessed.
Benchmark numbers 2, 6, 7, 8, 11, 12, 13, 14, 16, 17, 18.

6. Is the level of cognitive complexity with which each content standard is assessed (depth of knowledge) by the collection of items/tasks appropriate?
a. Describe the criteria used to determine whether benchmarks and items/tasks match well enough.
Criteria in Step 7 of the ITAP process was used - global judgment of matching.
b. List the content standards for which most benchmarks and items/tasks match well enough.
Number and Operation - moderate match.
c. List the content standards for which most benchmarks and items/tasks do <u>not</u> match well enough.
Items from this module aligned primarily with the standard of Number and Operation. There were matches with other scattered benchmarks under other standards. However, there were not sufficient matches under other standards to allow for a meaningful analysis of cognitive complexity (see attached cognitive complexity chart).

Classification Codes:

Cognitive Complexity: L = low; H = high
Item Content: C = complete; P = partial

Title:	ICAM Problem Solving Strategies/Procedures (Form Z)	Grade Level:	11
Reviewer(s):	R. Russell, B. Loeffelbein, S. Huffman, H. Paul, C. Confer	Content Area:	Mathematics

Alignment-Checking Matrix – Grade 11 Problem Solving Strategies/Procedures - ICAM

ITEM NUMBER	Item Cognitive Complexity	Number & Operations				Data Analysis & Probability			Measurement		Algebra					Geometry				NO FIT	
		Demonstrates computational fluency with whole numbers, decimals, integers, and rational numbers.	Demonstrates the ability to model/represent fractions, decimals, and percents and the relationship among hem.	Demonstrates the ability to evaluate expressions.	Understands and demonstrates different strategies in solving word problems.	Uses various methods to interpret and display data and make predictions.	Understands simple probabilities and use them to make predictions.	Understands appropriate statistical methods to analyze data.	Demonstrates the ability to solve simple problems involving rates and derived measurements for such as velocity and density.	Measures and/or estimates using appropriate units of length, weight, mass, and capacity.	Understands and finds slope.	Evaluates and simplifies expressions (including expressions with radicals and exponents).	Demonstrates the ability to simplify polynomials.	Solves equations and inequalities.	Demonstrates the ability to graph linear equations and inequalities.	Demonstrates the ability to write linear equations.	Understands the properties of parallel and perpendicular lines.	Understands and applies the Pythagorean Theorem.	Understands coordinate geometry.		Understand and apply properties of geometric figures.
Number		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
CC		L	L	L	H	H	H	H	L	L	L	L	L	L	H	L	L	H	L	H	
Selected Response Items																					
1	L															C					
2	H			P	P																
3	L				C																
4	H					P				P											
5	L	P			P																
6	L				C																
7	L				P					P											
8	L				C																
Constructed Response Items																					
A	H				C-2																
B	L				C-2																
C	H									P-2											P-2
D	H				P-2																P-2
Sum		1		1	12	1				3	1					1					4

Grade 11 ICAM Problem Solving - Depth of Knowledge (Cognitive Complexity) Analysis with C2P Benchmarks

Standard	Benchmarks	Complexity of Benchmark	Complexity of Items	Global Judgment	Summary Judgment
Number and Operation	...Computational fluency...	Low	0 high, 1 low	Strong	1S + 1 M + 1W = Moderate
	...Represent fractions, decimals, percents...	Low			
	...Evaluate expressions...	Low	1 high, 0 low	Weak	
	...Solving word problems...	High	5 high, 7 low	Moderate	
Data Analysis and Probability	...Interpret and display data...	High	1 high, 0 low	Strong	
	...Simple probabilities...	High			
	...Statistical methods...	High			
Measurement	...Derived measurements, velocity, density...	Low			
	...Units of length, weight, mass, capacity...	Low	2 high, 1 low	Moderate	
Algebra	...Finds slope...	Low	1 high, 0 low	Weak	
	...Simplifies expressions...	Low			
	Simplifies polynomials...	Low			
	...Solves equations and inequalities...	Low			
	...Graphs linear equations and inequalities...	High			
	... writes linear equations...	Low	0 high, 1 low	Strong	
Geometry	...Parallel and perpendicular lines...	Low			
	...Pythagorean theorem...	High			
	...Coordinate geometry...	Low			
	...Properties of geometric figures...	High	4 high, 0 low	Strong	

Grade 11 ICAM Problem Solving – Summary of Decisions

Content Standards	Comprehensiveness	Range of Knowledge	Cognitive Complexity
Number and Operation	Yes	Yes	Yes
Data Analysis and Probability	No	No	N/A
Measurement	No	No	N/A
Algebra	No	No	N/A
Geometry	No	No	N/A

Grade 11

Alignment Evidence Summary:

ICAM – Number Concepts/
Operations and
Cooperative Curriculum Project

District Name:	Loess Hills AEA 13	Reviewer's Names:	R. Russell, B. Loeffelbein, S. Huffman, H. Paul, C. Confer
Review Date:	May, 2003		

Alignment Evidence Summary:

Grade 11 Iowa ICAM Number Concepts/Operations and Cooperative Curriculum Project

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Publication Date:	2002	Purposes/Uses by District:	Public Reporting, Student Progress/History

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d. Describe (or reference) the process used to evaluate the extent to which the level of cognitive complexity of the collection of items/tasks matches the cognitive complexity of the content standard and benchmarks.
1) Describe (or reference) the classification system used to categorize benchmarks (or grade-level indicators) and assessment items/tasks in terms of cognitive complexity.
The alignment team referenced the cognitive complexity item classifications ranked by Western Hills AEA, with modifications. Their system included rankings of low, moderate and high. The AEA 13 team modified their decisions into a two level system (low and high). For classifying our benchmarks, we modified Step 4 from the ITAP process, using only the definitions of "low" and "high." The "moderate" and "unclassifiable" categories were not used. Therefore, for both test items and benchmarks, the terms and definitions of "high" and "low" were used for a comparable analysis.
2) Describe the process followed to check alignment in terms of cognitive complexity.
ITAP Step 7 was used to review for depth of knowledge/cognitive complexity. A summary table is attached.

2. Attach the completed table(s) used by each reviewer to record/summarize judgments from the alignment-checking process. How many tables are attached?
One alignment-checking matrix, one depth of knowledge summary chart, one summary of decisions chart.
3. To what extent is this collection of items/tasks measuring something different than the knowledge/skills represented by the collection of content standards (extraneous content)?
a. Provide the total number of items/tasks that did not match at least one content standard.
One item did not match with a benchmark.
b. Specify, as a percentage, the portion of total points possible on the assessment that were <u>not</u> matched to at least one content standard.
5% of items did not match with at least one benchmark.
4. To what extent are all the content standards in the subject area being assessed by this assessment tool (comprehensiveness)?
a. Describe the criteria used to determine “sufficiency” of content alignment for a content standard.
A minimum of five items must align to a content standard.
b. List the content standards that align sufficiently with this assessment, and specify the total number of points associated with each content standard.
Number and Operation – 19.
c. List the content standards that do <u>not</u> align sufficiently with this assessment.
Geometry – 0; Data Analysis and Probability – 0; Measurement – 0; Algebra – 0.
5. To what extent are the benchmarks (or grade-level indicators) within each content standard given proper content emphasis (range of knowledge) by this collection of items/tasks?
a. Describe the criteria used to determine “sufficiency” of range of knowledge for a content standard.
75% of the benchmarks within a content standard must have at least one item match.
b. List the content standards for which the range of knowledge is sufficient.
Number and Operation.
c. List the content standards for which the range of knowledge is too narrow.
Algebra; Data Analysis and Probability; Measurement; Geometry.
d. List each of the significant benchmarks that are not assessed.
Benchmark numbers 5-19.

6. Is the level of cognitive complexity with which each content standard is assessed (depth of knowledge) by the collection of items/tasks appropriate?
a. Describe the criteria used to determine whether benchmarks and items/tasks match well enough.
Criteria in Step 7 of the ITAP process was used - global judgment of matching.
b. List the content standards for which most benchmarks and items/tasks match well enough.
Number and Operation – moderate match.
c. List the content standards for which most benchmarks and items/tasks do <u>not</u> match well enough.
Module, by design, aligns primarily to Number and Operation benchmarks.

Grade 11 ICAM Number Concepts and Operations – Depth of Knowledge (Cognitive Complexity) Analysis with C2P Benchmarks

Standard	Benchmarks	Complexity of Benchmark	Complexity of Items	Global Judgment	Summary Judgment
Number and Operation	...Computational fluency...	Low	2 high, 0 low	Weak	2S + 1 M + 1W = Moderate
	...Represent fractions, decimals, percents...	Low	1 low, 1 high	Moderate	
	...Evaluate expressions...	Low	2 high, 5 low	Strong	
	...Solving word problems...	High	1 high	Strong	
Data Analysis and Probability	...Interpret and display data...	High			
	...Simple probabilities...	High			
	...Statistical methods...	High			
Measurement	...Derived measurements, velocity, density...	Low			
	...Units of length, weight, mass, capacity...	Low			
Algebra	...Finds slope...	Low			
	...Simplifies expressions...	Low			
	Simplifies polynomials...	Low			
	...Solves equations and inequalities...	Low			
	...Graphs linear equations and inequalities...	High			
	...writes linear equations...	Low			
Geometry	...Parallel and perpendicular lines...	Low			
	...Pythagorean theorem...	High			
	...Coordinate geometry...	Low			
	...Properties of geometric figures...	High			

Grade 11 ICAM Number Concepts and Operations – Summary of Decisions

Content Standards	Comprehensiveness	Range of Knowledge	Cognitive Complexity
Number and Operation	Yes	Yes	Yes
Data Analysis and Probability	No	No	N/A
Measurement	No	No	N/A
Algebra	No	No	N/A
Geometry	No	No	N/A

Grade 11

Alignment Evidence Summary:

ICAM – Measurement and
Cooperative Curriculum Project

District Name:	Loess Hills AEA 13	Reviewer's Names:	R. Russell, B. Loeffelbein, S. Huffman, H. Paul, C. Confer
Review Date:	May, 2003		

Alignment Evidence Summary:

Grade 11 Iowa ICAM Measurement and Cooperative Curriculum Project

General Instructions: This template is to be completed for each instrument being checked for "alignment." The information provided here should be a consolidation of the findings of the team that did the alignment checking. Provide the following information for the specific instrument being reviewed. Then, complete each of the six numbered parts of this template.

Title:	ICAM	Grade Level Reviewed:	11
Author/Publisher:	Iowa Association of AEAs	Content Area Reviewed:	Measurement
Publication Date:	2002	Purposes/Uses by District:	Public Reporting, Student Progress/History

Whenever the evidence reported in this template is in the form of a reference (or citation), complete citation information needs to be provided so that those who are evaluating the quality/sufficiency of this evidence can locate the referenced material. In the space below, list the references cited within this summary of alignment evidence for this instrument.

- **ICAM User's Guide (Iowa Association of Area Education Agencies) - content specifications**
- **Loess Hills AEA 13 Cooperative Curriculum Project Standards and Benchmarks**
- **Iowa Technical Adequacy Project (ITAP) Materials and Resources (process adapted for cognitive complexity and alignment)**
- **Western Hills Area Education Agency ICAM cognitive complexity rankings (adapted)**

Summary of Alignment Evidence

Alignment (How does the assessment align with the content standards?)

1. What process was used to check the alignment between the assessment items or tasks (including scoring criteria where relevant) and the LEA's content standards?
a. Describe the qualifications of the panel of people who participated in the alignment-checking process.
AEA staff including two mathematics consultants, three assessment consultants.
b. Describe what was done to determine that the content standards and benchmarks (or grade-level indicators) are of sufficient quality for use in an alignment-checking process.
1) Describe (or reference) the process used to evaluate the quality of the set of content standards and benchmarks (or grade-level indicators).
The Cooperative Curriculum Project, during June, 2002, involved math educators from 26 districts in AEA 13. National standards documents such as NCTM were used as models for teachers who developed the curriculum document during a five-day session facilitated by AEA staff. The alignment checking group (see above) did not make changes to the documents.
2) List content standards and/or benchmarks (or grade-level indicators) that were excluded from the alignment-checking process.
None were excluded from the process.
c. Describe (or reference) the process used to evaluate the extent to which the knowledge/skills of the collection of items/tasks matches the knowledge/skills in the content standards and benchmarks (or grade-level indicators).
1) Describe (or reference) the classification system used to categorize the extent to which an item/task matches the content represented by the benchmarks (or grade-level indicators).
Step 6 of the ITAP process was used with some modification. We used the ITAP rating system for "complete," "partial," and "no fit." The category of "slight fit" was not used.
2) Describe the process followed (i.e., independent review vs. consensus) to check the alignment of content.
A group consensus format was used in the alignment checking process.
d. Describe (or reference) the process used to evaluate the extent to which the level of cognitive complexity of the collection of items/tasks matches the cognitive complexity of the content standard and benchmarks.
1) Describe (or reference) the classification system used to categorize benchmarks (or grade-level indicators) and assessment items/tasks in terms of cognitive complexity.
The alignment team referenced the cognitive complexity item classifications ranked by Western Hills AEA, with modifications. Their system included rankings of low, moderate and high. The AEA 13 team modified their decisions into a two-level system (low and high). For classifying our benchmarks, we modified step 4 from the ITAP process, using only the definitions of "low" and "high." The "moderate" and "unclassifiable" categories were not used. Therefore, for both test items and benchmarks, the terms and definitions of "high" and "low" were used for a comparable analysis.
2) Describe the process followed to check alignment in terms of cognitive complexity.
ITAP Step 7 was used to review for depth of knowledge/cognitive complexity. A summary table is attached.

2. Attach the completed table(s) used by each reviewer to record/summarize judgments from the alignment-checking process. How many tables are attached?
One alignment-checking matrix, one depth of knowledge summary chart, one summary of decisions chart.
3. To what extent is this collection of items/tasks measuring something different than the knowledge/skills represented by the collection of content standards (extraneous content)?
a. Provide the total number of items/tasks that did not match at least one content standard.
All items matched at least one benchmark.
b. Specify, as a percentage, the portion of total points possible on the assessment that were <u>not</u> matched to at least one content standard.
N/A
4. To what extent are all the content standards in the subject area being assessed by this assessment tool (comprehensiveness)?
a. Describe the criteria used to determine “sufficiency” of content alignment for a content standard.
A minimum of five items must align to a content standard.
b. List the content standards that align sufficiently with this assessment, and specify the total number of points associated with each content standard.
Number and Operation – 5; Measurement – 15; Geometry – 6.
c. List the content standards that do <u>not</u> align sufficiently with this assessment.
Data Analysis and Probability – 0; Algebra – 0.
5. To what extent are the benchmarks (or grade-level indicators) within each content standard given proper content emphasis (range of knowledge) by this collection of items/tasks?
a. Describe the criteria used to determine “sufficiency” of range of knowledge for a content standard.
75% of the benchmarks within a content standard must have at least one item match.
b. List the content standards for which the range of knowledge is sufficient.
Number and Operation; Measurement.
c. List the content standards for which the range of knowledge is too narrow.
Data Analysis and Probability; Geometry; Algebra.
d. List each of the significant benchmarks that is not assessed.
Benchmark numbers 2, 5-7, 10-18.

6. Is the level of cognitive complexity with which each content standard is assessed (depth of knowledge) by the collection of items/tasks appropriate?
a. Describe the criteria used to determine whether benchmarks and items/tasks match well enough.
Criteria in Step 7 of the ITAP process was used - global judgment of matching.
b. List the content standards for which most benchmarks and items/tasks match well enough.
Measurement - moderate match; Number and Operation - moderate match; Geometry - strong match.
c. List the content standards for which most benchmarks and items/tasks do <u>not</u> match well enough.
Items did not match with other standards.

Grade 11 ICAM Mathematics – Measurement (Cognitive Complexity) Analysis with C2P Benchmarks

Standard	Benchmarks	Complexity of Benchmark	Complexity of Items	Global Judgment	Summary Judgment
Number and Operation	...Computational fluency...	Low	0 high, 1 low	Strong	1S + 1 M + 1W = Moderate
	...Represent fractions, decimals, percents...	Low			
	...Evaluate expressions...	Low	2 high, 1 low	Moderate	
	...Solving word problems...	High	0 high, 1 low	Weak	
Data Analysis and Probability	...Interpret and display data...	High			
	...Simple probabilities...	High			
	...Statistical methods...	High			
Measurement	...Derived measurements, velocity, density...	Low	4 high, 1 low	Moderate	Moderate
	...Units of length, weight, mass, capacity...	Low	7 high, 3 low	Moderate	
Algebra	...Finds slope...	Low			
	...Simplifies expressions...	Low			
	Simplifies polynomials...	Low			
	...Solves equations and inequalities...	Low			
	...Graphs linear equations and inequalities...	High			
	...writes linear equations...	Low			
Geometry	...Parallel and perpendicular lines...	Low			Strong
	...Pythagorean theorem...	High			
	...Coordinate geometry...	Low			
	...Properties of geometric figures...	High	6 high, 0 low	Strong	

Grade 11 ICAM Measurement – Summary of Decisions

Content Standards	Comprehensiveness	Range of Knowledge	Cognitive Complexity
Number and Operation	Yes	Yes	Yes
Data Analysis and Probability	No	No	N/A
Measurement	Yes	Yes	Yes
Algebra	No	No	N/A
Geometry	Yes	No	Yes

Grade 11

Alignment Evidence Summary:

**ICAM – Geometry and
Cooperative Curriculum Project**

District Name:	Loess Hills AEA 13	Reviewer's Names:	R. Russell, B. Loeffelbein, S. Huffman, H. Paul, C. Confer
Review Date:	May, 2003		

Alignment Evidence Summary:

Grade 11 Iowa ICAM Geometry and Cooperative Curriculum Project

General Instructions: This template is to be completed for each instrument being checked for "alignment." The information provided here should be a consolidation of the findings of the team that did the alignment checking. Provide the following information for the specific instrument being reviewed. Then, complete each of the six numbered parts of this template.

Title:	ICAM	Grade Level Reviewed:	11
Author/Publisher:	Iowa Association of AEAs	Content Area Reviewed:	Geometry
Publication Date:	2002	Purposes/Uses by District:	Public Reporting, Student Progress/History

Whenever the evidence reported in this template is in the form of a reference (or citation), complete citation information needs to be provided so that those who are evaluating the quality/sufficiency of this evidence can locate the referenced material. In the space below, list the references cited within this summary of alignment evidence for this instrument.

- **ICAM User's Guide (Iowa Association of Area Education Agencies) - content specifications**
- **Loess Hills AEA 13 Cooperative Curriculum Project Standards and Benchmarks**
- **Iowa Technical Adequacy Project (ITAP) Materials and Resources (process adapted for cognitive complexity and alignment)**
- **Western Hills Area Education Agency ICAM cognitive complexity rankings (adapted)**

Summary of Alignment Evidence

Alignment (How does the assessment align with the content standards?)

1. What process was used to check the alignment between the assessment items or tasks (including scoring criteria where relevant) and the LEA's content standards?
a. Describe the qualifications of the panel of people who participated in the alignment-checking process.
AEA staff including two mathematics consultants, three assessment consultants.
b. Describe what was done to determine that the content standards and benchmarks (or grade-level indicators) are of sufficient quality for use in an alignment-checking process.
1) Describe (or reference) the process used to evaluate the quality of the set of content standards and benchmarks (or grade-level indicators).
The Cooperative Curriculum Project, during June, 2002, involved math educators from 26 districts in AEA 13. National standards documents such as NCTM were used as models for teachers who developed the curriculum document during a five-day session facilitated by AEA staff. The alignment checking group (see above) did not make changes to the documents.
2) List content standards and/or benchmarks (or grade-level indicators) that were excluded from the alignment-checking process.
None were excluded from the process.
c. Describe (or reference) the process used to evaluate the extent to which the knowledge/skills of the collection of items/tasks matches the knowledge/skills in the content standards and benchmarks (or grade-level indicators).
1) Describe (or reference) the classification system used to categorize the extent to which an item/task matches the content represented by the benchmarks (or grade-level indicators).
Step 6 of the ITAP process was used with some modification. We used the ITAP rating system for "complete," "partial," and "no fit." The category of "slight fit" was not used.
2) Describe the process followed (i.e., independent review vs. consensus) to check the alignment of content.
A group consensus format was used in the alignment checking process.
d. Describe (or reference) the process used to evaluate the extent to which the level of cognitive complexity of the collection of items/tasks matches the cognitive complexity of the content standard and benchmarks.
1) Describe (or reference) the classification system used to categorize benchmarks (or grade-level indicators) and assessment items/tasks in terms of cognitive complexity.
The alignment team referenced the cognitive complexity item classifications ranked by Western Hills AEA, with modifications. Their system included rankings of low, moderate and high. The AEA 13 team modified their decisions into a two level system (low and high). For classifying our benchmarks, we modified Step 4 from the ITAP process, using only the definitions of "low" and "high." The "moderate" and "unclassifiable" categories were not used. Therefore, for both test items and benchmarks, the terms and definitions of "high" and "low" were used for a comparable analysis.
2) Describe the process followed to check alignment in terms of cognitive complexity.
ITAP Step 7 was used to review for depth of knowledge/cognitive complexity. A summary table is attached.

2. Attach the completed table(s) used by each reviewer to record/summarize judgments from the alignment-checking process. How many tables are attached?
One alignment-checking matrix, one depth of knowledge summary chart, one summary of decisions chart.
3. To what extent is this collection of items/tasks measuring something different than the knowledge/skills represented by the collection of content standards (extraneous content)?
a. Provide the total number of items/tasks that did not match at least one content standard.
All items aligned to at least one benchmark
b. Specify, as a percentage, the portion of total points possible on the assessment that were <u>not</u> matched to at least one content standard.
N/A
4. To what extent are all the content standards in the subject area being assessed by this assessment tool (comprehensiveness)?
a. Describe the criteria used to determine “sufficiency” of content alignment for a content standard.
A minimum of five items must align to a content standard.
b. List the content standards that align sufficiently with this assessment, and specify the total number of points associated with each content standard.
Geometry – 22.
c. List the content standards that do <u>not</u> align sufficiently with this assessment.
Number and Operation – 1; Data Analysis and Probability – 0; Measurement – 0; Algebra – 1.
5. To what extent are the benchmarks (or grade-level indicators) within each content standard given proper content emphasis (range of knowledge) by this collection of items/tasks?
a. Describe the criteria used to determine “sufficiency” of range of knowledge for a content standard.
75% of the benchmarks within a content standard must have at least one item match.
b. List the content standards for which the range of knowledge is sufficient.
Geometry.
c. List the content standards for which the range of knowledge is too narrow.
Algebra; Number and Operation; Data Analysis and Probability; Measurement.
d. List each of the significant benchmarks that is not assessed.
Benchmark numbers 1-3, 5-14.

6. Is the level of cognitive complexity with which each content standard is assessed (depth of knowledge) by the collection of items/tasks appropriate?
a. Describe the criteria used to determine whether benchmarks and items/tasks match well enough.
Criteria in Step 7 of the ITAP process was used - global judgment of matching.
b. List the content standards for which most benchmarks and items/tasks match well enough.
Geometry - moderate match.
c. List the content standards for which most benchmarks and items/tasks do <u>not</u> match well enough.
Module, by design, aligns primarily to Geometry benchmarks.

Classification Codes:

Cognitive Complexity: L = low; H = high
Item Content: C = complete; P = partial

Title:	ICAM Geometry (Form X)	Grade Level:	11
Reviewer(s):	R. Russell, B. Loeffelbein, S. Huffman, H. Paul, C. Confer	Content Area:	Mathematics

Alignment-Checking Matrix – Grade 11 Geometry - ICAM

ITEM NUMBER	Item Cognitive Complexity	Number & Operations				Data Analysis & Probability			Measurement		Algebra					Geometry				NO FIT	
		Demonstrates computational fluency with whole numbers, decimals, integers, and rational numbers.	Demonstrates the ability to model/represent fractions, decimals, and percents and the relationship among them.	Demonstrates the ability to evaluate expressions.	Understands and demonstrates different strategies in solving word problems.	Uses various methods to interpret and display data and make predictions.	Understands simple probabilities and use them to make predictions.	Understands appropriate statistical methods to analyze data.	Demonstrates the ability to solve simple problems involving rates and derived measurements for such as velocity and density.	Measures and/or estimates using appropriate units of length, weight, mass, and capacity.	Understands and finds slope.	Evaluates and simplifies expressions (including expressions with radicals and exponents).	Demonstrates the ability to simplify polynomials.	Solves equations and inequalities.	Demonstrates the ability to graph linear equations and inequalities.	Demonstrates the ability to write linear equations.	Understands the properties of parallel and perpendicular lines.	Understands and applies the Pythagorean Theorem.	Understands coordinate geometry.		Understand and apply properties of geometric figures.
Number		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
CC		L	L	L	H	H	H	H	L	L	L	L	L	L	H	L	L	H	L	H	
Selected Response Items																					
1	H																			C	
2	H																	C			
3	L																	C			
4	L																			C	
5	L																	P		P	
6	L				P												P				
7	H																	P		P	
8	L																			C	
9	H																		C		
10	L																	P		P	
Constructed Response Items																					
A	L																			C-2	
B	H															P-1		P-3			
C	H																	P-2		P-2	
Sum					1											1	1	10	1	10	

Grade 11 ICAM Geometry – Depth of Knowledge (Cognitive Complexity) Analysis with C2P Benchmarks

Standard	Benchmarks	Complexity of Benchmark	Complexity of Items	Global Judgment	Summary Judgment
Number and Operation	... Computational fluency...	Low			
	... Represent fractions, decimals, percents...	Low			
	... Evaluate expressions...	Low			
	... Solving word problems...	High	0 high, 1 low	Weak	
Data Analysis and Probability	... Interpret and display data...	High			
	... Simple probabilities...	High			
	... Statistical methods...	High			
Measurement	... Derived measurements, velocity, density...	Low			
	... Units of length, weight, mass, capacity...	Low			
Algebra	... Finds slope...	Low			
	... Simplifies expressions...	Low			
	... Simplifies polynomials...	Low			
	... Solves equations and inequalities...	Low			
	... Graphs linear equations and inequalities...	High			
	... writes linear equations...	Low	1 high, 0 low	Weak	
Geometry	... Parallel and perpendicular lines...	Low	0 high, 1 low	Strong	1S + 2M + 1W = Moderate
	... Pythagorean theorem...	High	4 high, 3 low	Moderate	
	... Coordinate geometry...	Low	1 high, 0 low	Weak	
	... Properties of geometric figures...	High	3 high, 5 low	Moderate	

Grade 11 ICAM Geometry – Summary of Decisions

Content Standards	Comprehensiveness	Range of Knowledge	Cognitive Complexity
Number and Operation	No	No	N/A
Data Analysis and Probability	No	No	N/A
Measurement	No	No	N/A
Algebra	No	No	N/A
Geometry	Yes	Yes	Yes

Grade 11

Alignment Evidence Summary:

ICAM – Data Interpretation,
Statistics, and Probability
and
Cooperative Curriculum Project

District Name:	Loess Hills AEA 13	Reviewer's Names:	R. Russell, B. Loeffelbein, S. Huffman, H. Paul, C. Confer
Review Date:	May, 2003		

Alignment Evidence Summary:

**Grade 11 Iowa ICAM Data Interpretation,
Statistics, and Probability
and
Cooperative Curriculum Project**

General Instructions: This template is to be completed for each instrument being checked for “alignment.” The information provided here should be a consolidation of the findings of the team that did the alignment checking. Provide the following information for the specific instrument being reviewed. Then, complete each of the six numbered parts of this template.

Title:	ICAM	Grade Level Reviewed:	11
Author/Publisher:	Iowa Association of AEAs	Content Area Reviewed:	Statistics & Probability
Publication Date:	2002	Purposes/Uses by District:	Public Reporting, Student Progress/History

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Summary of Alignment Evidence

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AEA staff including two mathematics consultants, three assessment consultants.
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2) List content standards and/or benchmarks (or grade-level indicators) that were excluded from the alignment-checking process.
None were excluded from the process.
c. Describe (or reference) the process used to evaluate the extent to which the knowledge/skills of the collection of items/tasks matches the knowledge/skills in the content standards and benchmarks (or grade-level indicators).
1) Describe (or reference) the classification system used to categorize the extent to which an item/task matches the content represented by the benchmarks (or grade-level indicators).
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2) Describe the process followed (i.e., independent review vs. consensus) to check the alignment of content.
A group consensus format was used in the alignment checking process.
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2) Describe the process followed to check alignment in terms of cognitive complexity.
ITAP Step 7 was used to review for depth of knowledge/cognitive complexity. A summary table is attached.

2. Attach the completed table(s) used by each reviewer to record/summarize judgments from the alignment-checking process. How many tables are attached?
One alignment-checking matrix, one depth of knowledge summary chart, one summary of decisions chart.
3. To what extent is this collection of items/tasks measuring something different than the knowledge/skills represented by the collection of content standards (extraneous content)?
a. Provide the total number of items/tasks that did not match at least one content standard.
All items matched to at least one benchmark.
b. Specify, as a percentage, the portion of total points possible on the assessment that were <u>not</u> matched to at least one content standard.
N/A
4. To what extent are all the content standards in the subject area being assessed by this assessment tool (comprehensiveness)?
a. Describe the criteria used to determine “sufficiency” of content alignment for a content standard.
A minimum of five items must align to a content standard.
b. List the content standards that align sufficiently with this assessment, and specify the total number of points associated with each content standard.
Data Analysis and Probability – 20.
c. List the content standards that do <u>not</u> align sufficiently with this assessment.
Number and Operation – 1; Geometry – 0; Measurement – 0; Algebra – 0.
5. To what extent are the benchmarks (or grade-level indicators) within each content standard given proper content emphasis (range of knowledge) by this collection of items/tasks?
a. Describe the criteria used to determine “sufficiency” of range of knowledge for a content standard.
75% of the benchmarks within a content standard must have at least one item match.
b. List the content standards for which the range of knowledge is sufficient.
Data Analysis and Probability.
c. List the content standards for which the range of knowledge is too narrow.
Number and Operation; Measurement; Algebra; Geometry.
d. List each of the significant benchmarks that is not assessed.
Benchmark numbers 1, 3, 4, 8-19.

6. Is the level of cognitive complexity with which each content standard is assessed (depth of knowledge) by the collection of items/tasks appropriate?
a. Describe the criteria used to determine whether benchmarks and items/tasks match well enough.
Criteria in Step 7 of the ITAP process was used - global judgment of matching.
b. List the content standards for which most benchmarks and items/tasks match well enough.
Data Analysis and Probability - strong match.
c. List the content standards for which most benchmarks and items/tasks do <u>not</u> match well enough.
Module, by design, aligns primarily to Data Analysis benchmarks.

Grade 11 ICAM Data Interpretation – Depth of Knowledge (Cognitive Complexity) Analysis with C2P Benchmarks

Standard	Benchmarks	Complexity of Benchmark	Complexity of Items	Global Judgment	Summary Judgment
Number and Operation	... Computational fluency...	Low			
	... Represent fractions, decimals, percents...	Low	1 high, 0 low	Weak	
	... Evaluate expressions...	Low			
	... Solving word problems...	High			
Data Analysis and Probability	... Interpret and display data...	High	5 high, 3 low	Moderate	
	... Simple probabilities...	High	4 high, 0 low	Strong	
	... Statistical methods...	High	7 high, 1 low	Strong	
Measurement	... Derived measurements, velocity, density...	Low			
	... Units of length, weight, mass, capacity...	Low			
Algebra	... Finds slope...	Low			
	... Simplifies expressions...	Low			
	... Simplifies polynomials...	Low			
	... Solves equations and inequalities...	Low			
	... Graphs linear equations and inequalities...	High			
	... writes linear equations...	Low			
Geometry	... Parallel and perpendicular lines...	Low			
	... Pythagorean theorem...	High			
	... Coordinate geometry...	Low			
	... Properties of geometric figures...	High			

Grade 11 ICAM Data Interpretation – Summary of Decisions

Content Standards	Comprehensiveness	Range of Knowledge	Cognitive Complexity
Number and Operation	No	No	N/A
Data Analysis and Probability	Yes	Yes	Yes
Measurement	No	No	N/A
Algebra	No	No	N/A
Geometry	No	No	N/A

Grade 11

Alignment Evidence Summary:

ICAM – Patterns, Functions, and
Algebra and
Cooperative Curriculum Project

District Name:	Loess Hills AEA 13	Reviewer's Names:	R. Russell, B. Loeffelbein, S. Huffman, H. Paul, C. Confer
Review Date:	May, 2003		

Alignment Evidence Summary:

Grade 11 Iowa ICAM Patterns, Functions, and Algebra and Cooperative Curriculum Project

General Instructions: This template is to be completed for each instrument being checked for "alignment." The information provided here should be a consolidation of the findings of the team that did the alignment checking. Provide the following information for the specific instrument being reviewed. Then, complete each of the six numbered parts of this template.

Title:	ICAM	Grade Level Reviewed:	11
Author/Publisher:	Iowa Association of AEAs	Content Area Reviewed:	Patterns, Functions, Algebra
Publication Date:	2002	Purposes/Uses by District:	Public Reporting, Student Progress/History

Whenever the evidence reported in this template is in the form of a reference (or citation), complete citation information needs to be provided so that those who are evaluating the quality/sufficiency of this evidence can locate the referenced material. In the space below, list the references cited within this summary of alignment evidence for this instrument.

- **ICAM User's Guide (Iowa Association of Area Education Agencies) - content specifications**
- **Loess Hills AEA 13 Cooperative Curriculum Project Standards and Benchmarks**
- **Iowa Technical Adequacy Project (ITAP) Materials and Resources (process adapted for cognitive complexity and alignment)**
- **Western Hills Area Education Agency ICAM cognitive complexity rankings (adapted)**

Summary of Alignment Evidence

Alignment (How does the assessment align with the content standards?)

1. What process was used to check the alignment between the assessment items or tasks (including scoring criteria where relevant) and the LEA's content standards?
a. Describe the qualifications of the panel of people who participated in the alignment-checking process.
AEA Staff including two mathematics consultants, three assessment consultants.
b. Describe what was done to determine that the content standards and benchmarks (or grade-level indicators) are of sufficient quality for use in an alignment-checking process.
1) Describe (or reference) the process used to evaluate the quality of the set of content standards and benchmarks (or grade-level indicators).
The Cooperative Curriculum Project, during June, 2002, involved math educators from 26 districts in AEA 13. National standards documents such as NCTM were used as models for teachers who developed the curriculum document during a five-day session facilitated by AEA staff. The alignment checking group (see above) did not make changes to the documents.
2) List content standards and/or benchmarks (or grade-level indicators) that were excluded from the alignment-checking process.
None were excluded from the process.
c. Describe (or reference) the process used to evaluate the extent to which the knowledge/skills of the collection of items/tasks matches the knowledge/skills in the content standards and benchmarks (or grade-level indicators).
1) Describe (or reference) the classification system used to categorize the extent to which an item/task matches the content represented by the benchmarks (or grade-level indicators).
Step 6 of the ITAP Process was used with some modification. We used the ITAP rating system for "complete," "partial," and "no fit." The category of "slight fit" was not used.
2) Describe the process followed (i.e., independent review vs. consensus) to check the alignment of content.
A group consensus format was used in the alignment checking process.
d. Describe (or reference) the process used to evaluate the extent to which the level of cognitive complexity of the collection of items/tasks matches the cognitive complexity of the content standard and benchmarks.
1) Describe (or reference) the classification system used to categorize benchmarks (or grade-level indicators) and assessment items/tasks in terms of cognitive complexity.
The alignment team referenced the cognitive complexity item classifications ranked by Western Hills AEA, with modifications. Their system included rankings of low, moderate and high. The AEA 13 team modified their decisions into a two-level system (low and high). For classifying our benchmarks, we modified step 4 from the ITAP process, using only the definitions of "low" and "high." The "moderate" and "unclassifiable" categories were not used. Therefore, for both test items and benchmarks, the terms and definitions of "high" and "low" were used for a comparable analysis.
2) Describe the process followed to check alignment in terms of cognitive complexity.
ITAP Step 7 was used to review for depth of knowledge/cognitive complexity. A summary table is attached.

2. Attach the completed table(s) used by each reviewer to record/summarize judgments from the alignment-checking process. How many tables are attached?
One alignment-checking matrix, one depth of knowledge summary chart, one summary of decisions chart.
3. To what extent is this collection of items/tasks measuring something different than the knowledge/skills represented by the collection of content standards (extraneous content)?
a. Provide the total number of items/tasks that did not match at least one content standard.
All items match at least one benchmark.
b. Specify, as a percentage, the portion of total points possible on the assessment that were <u>not</u> matched to at least one content standard.
N/A
4. To what extent are all the content standards in the subject area being assessed by this assessment tool (comprehensiveness)?
a. Describe the criteria used to determine “sufficiency” of content alignment for a content standard.
A minimum of five items must align to a content standard.
b. List the content standards that align sufficiently with this assessment, and specify the total number of points associated with each content standard.
Algebra – 16.
c. List the content standards that do <u>not</u> align sufficiently with this assessment.
Number and Operation – 1; Data Analysis and Probability – 0; Measurement – 0; Geometry – 0.
5. To what extent are the benchmarks (or grade-level indicators) within each content standard given proper content emphasis (range of knowledge) by this collection of items/tasks?
a. Describe the criteria used to determine “sufficiency” of range of knowledge for a content standard.
75% of the benchmarks within a content standard must have at least one item match.
b. List the content standards for which the range of knowledge is sufficient.
None
c. List the content standards for which the range of knowledge is too narrow.
Number and Operation; Data Analysis and Probability; Measurement; Algebra; Geometry.
d. List each of the significant benchmarks that are not assessed.
Benchmark numbers 1-3, 5-9, 11, 12, 16-19.

6. Is the level of cognitive complexity with which each content standard is assessed (depth of knowledge) by the collection of items/tasks appropriate?
a. Describe the criteria used to determine whether benchmarks and items/tasks match well enough.
Criteria in Step 7 of the ITAP process was used - global judgment of matching.
b. List the content standards for which most benchmarks and items/tasks match well enough.
Algebra - moderate match.
c. List the content standards for which most benchmarks and items/tasks do <u>not</u> match well enough.
Module, by design, aligns primarily to Algebra benchmarks.

Classification Codes:

Cognitive Complexity: L = low; H = high
Item Content: C = complete; P = partial

Title:	ICAM Patterns, Functions & Algebra (Form X)	Grade Level:	11
Reviewer(s):	R. Russell, B. Loeffelbein, S. Huffman, H. Paul, C. Confer	Content Area:	Mathematics

Alignment-Checking Matrix – Grade 11 Patterns, Functions and Algebra - ICAM

ITEM NUMBER	Item Cognitive Complexity	Number & Operations				Data Analysis & Probability			Measurement		Algebra					Geometry				NO FIT	
		Demonstrates computational fluency with whole numbers, decimals, integers, and rational numbers.	Demonstrates the ability to model/represent fractions, decimals, and percents and the relationship among them.	Demonstrates the ability to evaluate expressions.	Understands and demonstrates different strategies in solving word problems.	Uses various methods to interpret and display data and make predictions.	Understands simple probabilities and use them to make predictions.	Understands appropriate statistical methods to analyze data.	Demonstrates the ability to solve simple problems involving rates and derived measurements for such as velocity and density.	Measures and/or estimates using appropriate units of length, weight, mass, and capacity.	Understands and finds slope.	Evaluates and simplifies expressions (including expressions with radicals and exponents).	Demonstrates the ability to simplify polynomials.	Solves equations and inequalities.	Demonstrates the ability to graph linear equations and inequalities.	Demonstrates the ability to write linear equations.	Understands the properties of parallel and perpendicular lines.	Understands and applies the Pythagorean Theorem.	Understands coordinate geometry.		Understand and apply properties of geometric figures.
Number		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
CC		L	L	L	H	H	H	H	L	L	L	L	L	L	H	L	L	H	L	H	
Selected Response Items																					
1	H																				C
2	L																				C
3	L																				C
4	L										C										
5	L				C																
6	H																				C
7	L										C										
8	L																				C
9	H																				C
Constructed Response Items																					
A	H													P-1		P-1					
B	H													P-1		P-1					
C	H													P-1	P-2	P-1					
Sum					1						2			3	2	9					

Grade 11 ICAM Patterns, Functions, and Algebra – Depth of Knowledge (Cognitive Complexity) Analysis with C2P Benchmarks

Standard	Benchmarks	Complexity of Benchmark	Complexity of Items	Global Judgment	Summary Judgment
Number and Operation	... Computational fluency...	Low			
	... Represent fractions, decimals, percents...	Low			
	... Evaluate expressions...	Low			
	... Solving word problems...	High	0 high, 1 low	Weak	
Data Analysis and Probability	... Interpret and display data...	High			
	... Simple probabilities...	High			
	... Statistical methods...	High			
Measurement	... Derived measurements, velocity, density...	Low			
	... Units of length, weight, mass, capacity...	Low			
Algebra	... Finds slope...	Low	0 high, 2 low	Strong	2S + 1 M + 1 W = Moderate
	... Simplifies expressions...	Low	0 high, 0 low		
	... Simplifies polynomials...	Low	0 high, 0 low		
	... Solves equations and inequalities...	Low	3 high, 0 low	Weak	
	... Graphs linear equations and inequalities...	High	1 high, 0 low	Strong	
	... writes linear equations...	Low	6 high, 3 low	Moderate	
Geometry	... Parallel and perpendicular lines...	Low			
	... Pythagorean theorem...	High			
	... Coordinate geometry...	Low			
	... Properties of geometric figures...	High			

Grade 11 ICAM Patterns, Functions, and Algebra – Summary of Decisions

Content Standards	Comprehensiveness	Range of Knowledge	Cognitive Complexity
Number and Operation	No	No	N/A
Data Analysis and Probability	No	No	N/A
Measurement	No	No	N/A
Algebra	Yes	No	Yes
Geometry	No	No	N/A

Grade 11

Alignment Evidence Summary:

**ICAM – Work Related Problems and
Cooperative Curriculum Project**

District Name:	Loess Hills AEA 13	Reviewer's Names:	R. Russell, B. Loeffelbein, S. Huffman, H. Paul, C. Confer
Review Date:	May, 2003		

Alignment Evidence Summary:

Grade 11 Iowa ICAM Work Related Problems and Cooperative Curriculum Project

General Instructions: This template is to be completed for each instrument being checked for “alignment.” The information provided here should be a consolidation of the findings of the team that did the alignment checking. Provide the following information for the specific instrument being reviewed. Then, complete each of the six numbered parts of this template.

Title:	ICAM	Grade Level Reviewed:	11
Author/Publisher:	Iowa Association of AEAs	Content Area Reviewed:	Work Related Problems
Publication Date:	2002	Purposes/Uses by District:	Public Reporting, Student Progress/History

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Summary of Alignment Evidence

Alignment (How does the assessment align with the content standards?)

1. What process was used to check the alignment between the assessment items or tasks (including scoring criteria where relevant) and the LEA's content standards?
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AEA Staff including two mathematics consultants, three assessment consultants.
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1) Describe (or reference) the process used to evaluate the quality of the set of content standards and benchmarks (or grade-level indicators).
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2) List content standards and/or benchmarks (or grade-level indicators) that were excluded from the alignment-checking process.
None were excluded from the process.
c. Describe (or reference) the process used to evaluate the extent to which the knowledge/skills of the collection of items/tasks matches the knowledge/skills in the content standards and benchmarks (or grade-level indicators).
1) Describe (or reference) the classification system used to categorize the extent to which an item/task matches the content represented by the benchmarks (or grade-level indicators).
Step 6 of the ITAP process was used with some modification. We used the ITAP rating system for "complete," "partial," and "no fit." The category of "slight fit" was not used.
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A group consensus format was used in the alignment checking process.
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The alignment team referenced the cognitive complexity item classifications ranked by Western Hills AEA, with modifications. Their system included rankings of low, moderate and high. The AEA 13 team modified their decisions into a two level system (low and high). For classifying our benchmarks, we modified Step 4 from the ITAP process, using only the definitions of "low" and "high." The "moderate" and "unclassifiable" categories were not used. Therefore, for both test items and benchmarks, the terms and definitions of "high" and "low" were used for a comparable analysis.
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ITAP Step 7 was used to review for depth of knowledge/cognitive complexity. A summary table is attached.

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a. Provide the total number of items/tasks that did not match at least one content standard.
All items matched at least one benchmark.
b. Specify, as a percentage, the portion of total points possible on the assessment that were <u>not</u> matched to at least one content standard.
N/A
4. To what extent are all the content standards in the subject area being assessed by this assessment tool (comprehensiveness)?
a. Describe the criteria used to determine “sufficiency” of content alignment for a content standard.
A minimum of five items must align to a content standard.
b. List the content standards that align sufficiently with this assessment, and specify the total number of points associated with each content standard.
Number and Operation – 11; Measurement – 12.
c. List the content standards that do <u>not</u> align sufficiently with this assessment.
Geometry – 0; Data Analysis and Probability – 0; Algebra – 0.
5. To what extent are the benchmarks (or grade-level indicators) within each content standard given proper content emphasis (range of knowledge) by this collection of items/tasks?
a. Describe the criteria used to determine “sufficiency” of range of knowledge for a content standard.
75% of the benchmarks within a content standard must have at least one item match.
b. List the content standards for which the range of knowledge is sufficient.
Number and Operation; Measurement.
c. List the content standards for which the range of knowledge is too narrow.
Algebra; Data Analysis and Probability; Geometry.
d. List each of the significant benchmarks that are not assessed.
Benchmark numbers 5-7, 10-19.

6. Is the level of cognitive complexity with which each content standard is assessed (depth of knowledge) by the collection of items/tasks appropriate?
a. Describe the criteria used to determine whether benchmarks and items/tasks match well enough.
Criteria in Step 7 of the ITAP process was used - global judgment of matching.
b. List the content standards for which most benchmarks and items/tasks match well enough.
Number and Operation - strong match; Measurement - moderate match.
c. List the content standards for which most benchmarks and items/tasks do <u>not</u> match well enough.
Items did not align with other standards.

Grade 11 ICAM Work Related Problems – Depth of Knowledge (Cognitive Complexity) Analysis with C2P Benchmarks

Standard	Benchmarks	Complexity of Benchmark	Complexity of Items	Global Judgment	Summary Judgment
Number and Operation	...Computational fluency...	Low	0 high, 1 low	Strong	3S + 1W = Strong
	...Represent fractions, decimals, percents...	Low	1 high, 0 low	Weak	
	...Evaluate expressions...	Low	1 high, 2 low	Strong	
	...Solving word problems...	High	6 high, 0 low	Strong	
Data Analysis and Probability	...Interpret and display data...	High			
	...Simple probabilities...	High			
	...Statistical methods...	High			
Measurement	...Derived measurements, velocity, density...	Low	3 high, 1 low	Moderate	1M + 1W = Moderate
	...Units of length, weight, mass, capacity...	Low	7 high, 1 low	Weak	
Algebra	...Finds slope...	Low			
	...Simplifies expressions...	Low			
	Simplifies polynomials...	Low			
	...Solves equations and inequalities...	Low			
	...Graphs linear equations and inequalities...	High			
	...writes linear equations...	Low			
Geometry	...Parallel and perpendicular lines...	Low			
	...Pythagorean theorem...	High			
	...Coordinate geometry...	Low			
	...Properties of geometric figures...	High			

Grade 11 ICAM Work Related Problems – Summary of Decisions

Content Standards	Comprehensiveness	Range of Knowledge	Cognitive Complexity
Number and Operation	Yes	Yes	Yes
Data Analysis and Probability	No	No	N/A
Measurement	Yes	Yes	Yes
Algebra	No	No	N/A
Geometry	No	No	N/A