Middle School Mathematics Teacher Content Summary Chart University of Louisville Center for Research in Mathematics and Science Teacher Developmen																
	Student Information							Teacher Information								
	NCTM CESSM	NCTM PSSM	AAAS Bench	MAP Achieve	TIMSS	NAEP	Research	CBMS	NCTM PTS	CCSSO INTASC	NBPTS	PRAXIS	Research	S	T	A
A. NUMBER/COMPUTATION																
1. Number Representations																
a. whole numbers and integers	91	214	213	25	12	21	N28	27,107	136	12,13	21	29	N7	7	6	13
b. fractions, decimals, percent	91	214	213	25,26	12	21	N5,N17,N2	29,102	136	12,13	21	29	N8	7	6	13
c. large and small numbers/scientific notation	92	214,217	213	26	12	21		28,30,102		12				6	2	8
d. use a variety of models	92	215	213	26	13	22	N28		136		20	32	N14	7	4	11
e. complex numbers									137	14				0	2	2
2. Number Comparisons																
a. whole numbers and integers	92	214	213	26	12	22	N27,N28	27	136	12		29	N7	7	5	12
b. fractions, decimals, percent	92	214	213	25,26	12	22,23	N6	29,102	136	12		29	N13	7	5	12
c. rational vs. irrational	92	220		26				27		13		29		3	3	6
3. Number Systems & Properties																
a. containment relationships				25	12			29,102	136,137	13	21	29		2	5	7
b. identity and use properties (associative, etc.)		214		32	12	22		27,102	136	13	21	29		4	5	9
c. subsystem properties				32	12			27	136	13	21	29		2	5	7
d. bases other than 10												31		0	1	1
e. history of numbers			213													
4. Number Theory																
a. factors and multiples	91	214		25	12	23		30,103	136	13,14		29		5	4	9
b. primes and composites	91	214	210	25	12	23		30,102	136	13,14		29		6	4	10
c. union, intersection, subsets, disjoint sets												31		0	1	1
d. use permutations and combinations						32				26	22	31		1	3	4
5. Number Operations																
a. whole numbers, fractions, decimals	94	214	213	25	13	22	N1,N17	29,102	136	12	21	29	N12	7	6	13
b. integers	94	214	213	26	13	22		107	136	13	21	29	N7	6	6	12
c. positive/negative exponents		214,217		26	12	21,23						29		4	1	5
d. order of operations						35			136			29		1	2	3
e. squaring/square roots/absolute value	92	214		26	12							29		4	1	5
6. Computation																
a. select/use variety of methods	94	214	210		12	20	N10	29,102	136	14	21	29	N3	6	6	12
b. standard/non-standard algorithms	95	214		26	12	20	N10	29		14	21	29	N10	6	5	11
c. estimation strategies	94	214	210	26	12	22	N27	27-29,102	136	13	21	29		7	5	12
7. Proportional Reasoning																
a. ratio and proportions	94	214	213	25	13	23	N6,N19	30	136	14	21	21,29	N2	7	6	13
b. use proportional thinking	94	214	213,221		13	23,24	N18	26,111	136	14	21	20	N2	6	6	12
c. solve proportions	94	214	213		13	23	N18	30,102	136	14	21	29	N15,N16	6	6	12
d. solve percentage problems	97	214	214	26	13	23	N18	30	136	14	21	29	N18	7	6	13

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B. GEOMETRY/MEASUREMENT																
1. Geometric Shapes																
a. two- and three-dimensional shapes	112	232	224	27,29	18	28	G11	32,110	136,137	16	22	30	G13	7	6	13
b. angles, sides, perimeter, area, volume	113-15	232	224	28	18	28	G1,G3	32		16		30	G1	7	4	11
c. spherical geometry			224						137		22			1	2	3
d. relationships among shapes (hierarchical)	112	232	222	28				110			22	30		4	3	7
e. congruence and similarity	114	232	224	28,29	19	28	G2	32,33,110	136,137	16	22	30		7	5	12
f. draw/construct geometric shapes	112	232		27	19	28	G11	33	136,137			30		6	3	9
g. 2-D representations of 3-D shapes	112	232	224	29	18			33,111		16,17				5	2	7
h. polygons, circles, Pythagorean Th.	113	232		28,29	19	28	G11	34,111				30		6	2	8
i. points, lines, segments, parallel, perpendicular,		232	224	28	18	28	G11			15		30		6	2	8
bisector, midpoints, skew																
j. intersections of lines and planes						29								1	0	1
k. inductive and deductive arguments (conjectures)	112-14	232	224,231	27,29		29	G11	32,34,110	136,137	15,17	20	30,32	G13	6	6	12
l. topology										18				0	1	1
2. Coordinate Geometry																
a. examine properties		232		29				113	136,137			30		2	3	5
b. examine shapes		232		29				113	136,137	15,17				2	3	5
3. Transformational Geometry																
a. flips, slides, turns, scaling, dilations	112	232	224	26,29	20	28	G14	32,112	136,137	15,17	22	30		7	5	12
b. congruence, similarity, properties	114	232	224	29	20			32,110	136,137	15	22	30		5	5	10
c. rotation and reflection point symmetry	112,115	232		29	20	28		32,33,110	137					5	2	7
d. tessellations									136,137	15				0	2	2
4. Geometric Models																
a. networks		232							137	26				1	2	3
b. numerical/algebraic relationships	112	232				27		33				30		3	2	5
c. applications inside/outside math	112	232	231					32	137		21			3	3	6
d. spatial reasoning	112	232	224	28	20	28	G4	33	136,137	15	22			7	4	11
e. dynamic geometric environments	114	232	224				G14	33			22			4	2	6
5. Measurement Concepts																
a. metric and customary units		240		27	16	25,26		34,111	136	16,17	22	30		4	5	9
b. units within systems	116	240		26,27	16	25	G8			17	22			6	2	8
c. appropriate units	116-17	240	224	26	16	25	G6	32,111	136	15				7	3	10
d. measurable attributes	116	240		27,29		24		33,111	136	15,17				4	3	7
e. benchmarks for estimating	116	240		27		25	G8	111	136	17		30		5	4	9
f. relationships between types of measurements				29	16									2	0	2
g. measurements beyond geometric	116			27	16			34	136	17				3	3	6
measures (time, blood pressure)																
h. history of measurement systems									136	17				0	2	2
i. angles	116	232,240	29		16			34						4	1	5
j. indirect measurement	116			27		26			136	17				3	2	5
k. trigonometry									137					0	1	1
m. surface area and volume		224		29		24		33	136	15				3	3	6
n. differentiation and integration									138	22,24	22			0	3	3
o. polar coordinates			224			34								2	0	2
p. role of pi in measurement								111		14				0	2	2

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6. Measurement Skills																
a. appropriate techniques and skills for measuring	116-17	240		27	17	24,25	G7	34,111	136	15		30		6	4	10
b. appropriate formulas for area, perimeter, circum.	116	240		27,29	17	26	G1	32,33,111	136	15		30		6	4	10
c. strategies/formulas for surface area and volume	116	224,240		27,29		25,26		32,33,111	136			30		4	3	7
7. Measurement Applications																
a. scale factors using ratio and prop.		240	224	27,29	17	26						29		5	1	6
b. rates and derived measurements	116,118	240		26,27	17	26			138					5	1	6
c. limit, maximum, minimum			219						138	22	22	30		1	4	5
C. ALGEBRAIC IDEAS																
1. Variation																
a. patterns (generating/generalizing)	98	222	219	30	14	23,34		30,108		22,23	21,23	31		6	4	10
b. direct variation		227	219	31				30,108					A12	3	2	5
c. inverse/indirect variation		222												1	0	1
2. Algebraic Concepts																
a. variables	102	222	219	31	15	33,34	A1,A9,A15	30,108	136	23		29	A9	7	5	12
b. expressions/polynomials	102	222	219	31	15	34		27		23	21	29		6	4	10
c. formulas	102	222	219	31	15	35		32				29		6	2	8
d. function & relation concepts		222	219	31		33,34	A13	30,108	138	22	21	30		5	5	10
e. function types & classifications	98	222		32			A11	31	136,137	23	21	30		4	5	9
f. function & relation representations & applications	98	222	219	31		34	A2	31,108	136	22,24	21	30	A2,A3	6	6	12
g. iterative & composite functions										23		30		0	2	2
h. equation/inequality representations	102	222	218,219	32	14	35	A4,A5,A7,A8	31,108		23		31		7	3	10
i. equation/inequality modeling & applications		222	219	32		33	A1,A4	31				30		5	2	7
j. equation/inequality solving	102	222	218,219	32	15	33		109		23	23	29,31		6	4	10
k. structures/field properties/proof/notation				32	15	35		31	137			29		3	3	6
l. systems of equations		222		32		35			137	23		29		3	3	6
m. matrices									137	23	22	31		0	4	4
n. quadratic and non-linear equations	102			31				30,108		24		30,31		2	3	5
3. Graphing Equations																
a. plotting points		228-30				34		108	138	23		30		2	4	6
b. bivariate and univariate data		222												1	0	1
c. curve fitting		223		27		32				23				3	1	4
d. slope/intercept		222		31							23	30		2	2	4
e. interpreting graphs		222	224	31	15	34		31	136		21	30		5	4	9

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D. PROBABILITY/STATISTICS																
1. Data Analysis																
a. formulate questions	105	248	228		21	30,32	P5	34,113	136	19, 20		31		6	4	10
b. collect data	105	248	228	27	21	29,31	P5	34,113	136,137	19, 20	22	31		7	5	12
c. organize data using graphs and plots	102,105	248	224,228	27	21	29,31	P5,P7	34,114	136,137	19, 20	22	31		7	5	12
d. analyze data/draw conclusions	105	248	228	27	21	29,31	P4,5,7	34	136,137	19, 20	22	31		7	5	12
e. compare two populations	105	248	228,229	27				35		19		31		4	3	7
f. make conjectures about populations based on samples	105	248	229		22	31		35	136	19	22	31		5	5	10
g. make conjectures	105	248	228	27	22	31		35	136	19	22	31		6	5	11
h. sampling	106	255	229			30,31		35,113		19, 20	22			4	3	7
i. misuses of statistics	105	248	229	27		32	P6	35	137					6	2	8
j. use scatterplots to aproximate lines of fit		248,251		27				114	136,137					2	2	4
k. understanding correlation vs. causation			226	27				114						2	1	3
l. use measures of central tendency and dispersion	106-7	248	228,229	27		31	P4	35,114	136,137	19, 20		31		6	4	10
m. distributions of data								114						0	1	1
n. confidence intervals and error								114						0	1	1
2. Probability																
a. sample space	109	254	229	28		32	P1,P7	35	136			31		6	3	9
b. determine simple and compound probabilities usir informal methods	109	248	229	28	22	32	P1,5,7	34,114	136	19, 20		31	P1	7	5	12
c. complementary events	109	248	229		22	32	P1	35,114	137	19		31		6	4	10
d. mutually exclusive events	109	248	229	28	22	32	P1	35	137	19		31		7	4	11
e. independent and dependent events	109	254	229	28	22	32	P1,P7	35	137	19		31		7	4	11
f. empirical/theoretical probabilities	109-10	254	229		22		P1	35,114	136	19, 20		31		5	4	9
g. fair games and expected values							P1	35,114	138					1	2	3
h. misconceptions about probability	110	254	226	28		30	P1,P3,P5,P6	35	137	19			P6	6	4	10
i. compute probabilities based on simulations and experiments		248	228	28		32	P1	34,114	137			31		5	3	8
j. describe and conduct simulations	109	248	228			32	P1	34,114	136	19, 20				5	3	8
k. determine odds			229						138					1	1	2
l. conditional probability								114						0	1	1

Legend

NCTM-CESSM--National Council of Teachers of Mathematics Curriculum and Evaluation Standards for School Mathematics (1989)
NCTM/PSSM--National Council of Teachers of Mathematics Principles and Standards for School Mathematics (2001)
AAAS Benchmark--American Association for the Advancement of Science Benchmarks for Science Literacy (1993)
MAP--Achieve, Inc. Mathematics Achievement Partnership--Foundations for Success (2001)
TIMSS--Trends in International Mathematics and Science Study (1995, 2000, 2003)
NAEP--National Assessment of Educational Progress (1996, 2000)
Research--Research findings on middle school students' misconceptions about mathematics
CBMS--Conference Board of Mathematical Sciences/MAA/AMS Mathematical Education of Teachers (2001)
NCTM-PTS--National Council of Teachers of Mathematics Professional Standards for Teaching Mathematics (1991)
CCSSO-INTASC--Council of Chief State School Officers/The Interstate New Teacher Assessment and Support Consortium-Model Standards in Mathematics for Beginning Teacher Licensing & Development: Middle School (1995)
NBPTS--National Board for Professional Teaching Standards (1991)
PRAXIS--Professional Assessments for Beginning Teachers/Educational Testing Service--Middle School Mathematics (0069) Topics Covered
Research--Research findings on middle school teachers' misconceptions about mathematics
S-total of student sources
T-total of teacher sources

A-total of student and teacher sources																