

Elementary Teacher Mathematics Content Summary Chart																	
	Student Information							Teacher Information							S	T	A
	NCTM CESSM	NCTM PSSM	AAAS Bench	MAP Achieve	TIMSS	NAEP	Research	CBMS	NCTM PTS	CCSSO INTASC	NBPTS	Praxis	Research				
<b>A. NUMBER/COMPUTATION</b>																	
<b>1. Whole Number Concepts &amp; Representations</b>																	
a. whole numbers	38	78,148	c9.2	5.2	12	21,22		18,19	136	13		11,49,26		6	4	10	
b. large numbers						21		19	136	13				1	3	4	
c. use a variety of models/representations	38	78		2.2	13	20,21		18		14	34	49	2(60)	6	5	11	
d. use of numbers in real life contexts	38,57,58	78,79	c9.2,3	2.2,5.2	12,13	20,22	12(74),7(154)	18	136	12,13	35	11,12	3(378),10(21)	7	6	13	
e. counting, counting on, counting back, skip counting	39	78,143	c9.2	k.3,1.3	12	21								6	0	6	
f. estimate/approximate to determine magnitude, incl	36	79	c9.2	4.3		22		19		13				5	2	7	
g. place value	38,39	81,148	c9.3	2.1,4.3	12	21,22		18,19	136	13	34	11,49,26		7	4	11	
h. relationships - comparisons, part-whole	39,40	78,80,148	c9.2,9.3	k.4,4.3	12			18	136	13	34	11		5	5	10	
<b>2. Rational Number and Integer Concepts/Representations</b>																	
a. negative integers		148,150		2.4				18	136	12,13				2	3	5	
b. small numbers (scientific notation)									136					0	1	1	
c. fractions	57	148	c9.3	5.2	12,13	21	11(32),12(75)	18	136	12		11,26	15(234),9(235),8(17)	7	5	12	
d. decimals	59	148		4.2	12	21	11(32)	18,19	136	14		11,26		6	4	10	
e. percents		148							136	12		51		1	3	4	
f. equivalent fractions	57	148		4.6,5.2	13				136	14		11	10(18)	4	4	8	
g. fraction and decimal equivalents	57,59	149		4.7					136	14		26		3	3	6	
h. equivalent fractions, decimals and percents		148							136	14				1	2	3	
i. irrational numbers									136	13				0	2	2	
j. relationships - comparisons, part-whole	58	148,150		3.4,4.6	13		11(24)	18,19	136	12		11	8(19)	5	5	10	
h. equivalent fractions, decimals and percents		148								14				1	1	2	
<b>3. Operations/Computation</b>																	
<b>Meaning of addition, subtraction, multiplication and division</b>																	
a. on whole numbers	41	78,148	c9.2	3.2,5.2	12	20		18	136	13	34	51,26	1(9),4(134),6(11),10(10)	6	6	12	
b. on common fractions/mixed numbers	57	148		3.5,5.4	13+/-	20	12(76)	19	136	13		26	4(134),5(451),6(15),8(17),9(	6	5	11	
c. on decimals (tenths, hundredths, thousandths?)	57	148		4.7	13+/-	20	11(26)	19	136	13		26		6	5	11	
d. on integers								19	136	13				0	3	3	
e. effects of adding, subtracting, multiplying and divid	40,43	78,148		5.8		22		19	136	12			1(8),10(11)	4	4	8	
f. inverse operations (add & subt, mult & div)	41,43	#####		2.4,4.5	12			18	136			26,24	7(157)	4	4	9	
g. word problems/real life problems	42,57	150	c9.3	2.2,5.2	12	22		18	136		34,35	26	8(18),10(9),13(29),16(63)	6	5	11	
h. computes on . . .	44,45	78,148	c9.3	5.2	12	22											
add/subt whole numbers	44	148		2.3	12	21		18	136	13,14	34	12,26		5	5	10	
mult/div whole numbers	44	148		5.2	12	21		18	136	13,15	34	12,26	10(11)	5	6	10	
add/subt fractions	59	148		4.7,5.3	13	21		18	136	13,16		12	7(157)	5	5	10	
mult/div fractions				5.4			11(23)	18	136	13,17		12	8(18),10(9),13(29),16(63)	2	5	7	
add/subt decimals	59	148		4.8	13	21	11(34)	18	136	13,18		12		6	4	8	
mult/div decimals								18	136	13,19		12		1	4	5	
add/subt integers							3(379)	18	136	13,20		12		1	4	5	
mult/div integers								18	136	13,21		12		0	4	4	
j. understand std/non-std algorithms - including invent	45,47	78,84,148		2.4,4.4		22		19	136	14		12,49,26	11),8(14),10(17),13(24),15(2	4	5	9	
k. estimation/reasonableness of results	36,44,45	148		3.3,5.2	12	22		19	136	12	34	49		5	5	10	
l. basic facts	44,47	78,83,148		2.5,3.3		20			136			26	10(8)	4	3	7	
<b>4. Number Theory and Number Systems</b>																	
a. containment relationships									136	13				0	2	2	
b. identity, understand and use properties (associative	43	83,148		4.1		22			136	13				5	2	7	
c. subsystem properties									136	13				0	2	2	
d. factors and multiples	42	150		4.3	12	23			136	13		12,49,26	17(21),10(26)	5	4	9	
e. primes and composites	42	150		4.3,5.2		23			136	13		12,26	17(22)	4	4	8	
f. classes of numbers (e.g. multiples of 3, even numbe	42	148			12	23			136	13		12,26	10(26)	4	4	8	
<b>7. Proportional Reasoning</b>																	
a. ratio and proportions						23			136	14		49	14(9)	1	4	5	
b. use proportional thinking					13	23				14				2	1	3	
c. solve proportions										14		49		0	2	2	
d. solve percentage problems						23				14		49		1	2	3	

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NCTM CESSM	NCTM PSSM	AAAS Benchr	MAP Achieve	TIMSS	NAEP	CBMS	NCTM PTS	CCSSO INTASC	NBPTS	PRAXIS								
<b>B. GEOMETRY/MEASUREMENT</b>																		
<b>1. Two-dimensional geometry</b>																		
a. Geometry properties/attributes of 2-D shapes/objects (describe, draw, visualize & classify)	48,49	96-8,164-5 100-101	223	K.8a, 1.6a	18,19,20	27 triangle	10L 169-200 20F 11L 137-167 1B 258-292	21	136	15,16			22	1, 49	21G 237-251	7	5	12
b. sides, angles, vertices, radius, diameter(circles)	49	165, 166		3.10c, 4.11	18	194,222	39P109-135, 40C 356-371	21	136		17		22	11,49		6	5	11
c. relationships among shapes (including hierarchical)	48	164,166		5	18	201-203		21	136		16			11		5	4	9
d. congruent shapes (similar shapes)	49	96-97, 100 164-167	223	1.6c, 2.10c	19,20	27	19C,2C 313-337,24J 85-91	21,22	136	15,17			22	49,11		7	5	12
e. symmetry- line and rotational, flips, slides, turns																		
f. points, lines, segments, parallel, perpendicular, bsctr, mdpt	166		223	2.10a,3.8a	18		16M 120-127, 22S						11			5	1	6
g. subdividing and combining shapes	48,49	96-8,164-5	223	K.8b, 3.10c	19	27		21			16					6	2	8
<b>2. Three-dimensional geometry</b>																		
a. Three-dimensional geometry properties/attributes (describe, visualize & reason)	48,49, 50	96-8, 164-5	223	2.10a, 3.10d	18,20		2.10a, 3.10a,b	21	136			16		49	21G 237-251	6	3	9
b. 2-D representation of 3-D shapes/objects (nets, isometric drawings)	49	164-5, 168	223	5.16, 5.17	18,20	198-199	5.16, 5.17	21					16,49			7	2	9
<b>3. Measurement</b>																		
a. premeasurement concepts (transitivity, conservation, unit iteration (non-standard)	51-52	102,104,105		K.6a,1.4b, 2,6b			K.6a,1.4b, 2,6b									4	0	4
b. metric and customary units, non-standard	51,52	102,105,17	212,223	K.1, 3.1, 4,	16	194	K.1, 3.1, 4.9c	21	136	15,16,17			22	11,26		6	5	11
c. convert units within systems		170		3.7b, 4.9d,	16,17	25 triangle	3.7b, 4.9d, 5.9	21,22			16					4	2	6
d. identify measurable attributes	51,52	103,170, 172		1.4a	17	25	1.4a	21	136		15					5	3	8
e. estimate measurements (using benchmarks)	36-37, 51	105,106, 170,172,		2.6a, 3.7a,	16	24	2.6a, 3.7a		136	16,17			11			5	3	8
f. select appropriate units	52	105,170,17	212	2.6a, 3.7c,	16	216, 24, 25	2.6a, 3.7c, 5.12	21	136		15					6	3	9
g. length	51	102, 170	223	1.4b, 2.6b	16		1.4b, 2.6b	21	136		17					6	3	9
h. area/perimeter	52	170-171, 1	223	1.4a,2.6b,4	16,17		1.4a,2.6b,4.9a, 5.11	21,22	136		17		16			6	4	10
i. volume	51	104,170	223	3.7d, 4.9a	16		3.7d, 4.9a	21,22	136		15					6	3	9
j. surface area	51	170,174	223	4.1, 4.9b		25	4.1, 4.9b	21	136	15,17						5	3	8
k. angles	52-53	170		5.14	16	214	5.14	22	136							6	2	8
l. measurement tools	51	105,170-17	223	K.6c, 1.4a	17	194, 216	K.6c, 1.4a		136		15		22	16,53		7	4	11
m. measurement formulas		170,171, 175		4.9b, 5.10		25 triangle	4.9b, 5.10	21	136		15					3	3	6
n. time, temperature and weight	51 temp	104, 170	212	K.1, 1.4c, 2	16,17		K.1, 1.4c, 2.7a	21	136		15		11,16,49			5	4	9
<b>C. ALGEBRAIC IDEAS</b>																		
Student Information										Teacher Information					S	T	A	
NCTM CESSM	NCTM PSSM	AAAS Bench	MAP Achieve	TIMSS	NAEP	CBMS	NCTM PTS	CCSSO PTS	NBPTS INTASC	PRAXIS								
<b>1. Patterns and Functions</b>																		
a. patterns (generating/generalizing)	29, 60-61	74, 90-92	2-3, 2-4	p.1, 2.11	p. 14	p. 33	10(8); 13(262,263)	-6,7-24,7-2	28, 171	7,8,22,29,50		20,23,36	(0140) p. 12	6(17); 7(20)		7	6	13
b. direct variation								12, 965		22,24						0	2	2
c. function concepts and representations	62	8,71,91-92,158		p.3, 5.20	p.15	p. 33	13(262)	3-5,3-6,7-23	05, 136, 14	4,7,22-24,50		20,21	(0730) p. 53	156,157; 7(20); 8(350); 11(639,6		6	6	12
d. slope/intercept		40,65,113,159,163							171	22		21,23				1	3	4
e. plotting points		34	2-6, 9-2	p.3, 5.19	p.15	p.33			106	22,50		21	(0730) p. 53	11(653,656)		5	5	10
f. graph representations	54-56	40, 71		p.3,5.20		p. 33		CH7-25	105	24,34		21-22	(0730) p. 56			4	5	9
<b>2. Variables and Expressions</b>																		
a. variables/unknown numbers	27, 60	68-69,94,114,2-9,9		p.3, 5.20	p. 15	p. 33	13(262)	CH3-6	136, 145	22,23,29,31		21,23	(0730) p. 53			7	5	12
b. expressions	61	68,80,92,159,160		p.3, 5.20	p.15			CH3-1		23,29		21,23				4	3	7
<b>3. Equations</b>																		
a. equation representations	60	9,94,140,158		p.3, 5.19	p. 15	p. 33	13(262)	CH7-23	136, 171	8,23,42,53		23	(0130) p. 55	2(133)		6	6	12
b. equation modeling	27, 60	39	CH9-6	p.3, 5.19	p. 15	p. 33		CH7-23		23,53		23	(0140) p. 12			6	4	10
c. equation solving	60			p.3,5.18	p.15	p.33		CH7-23		23,53		23	(0730) p. 53	4(2, 18); 12(231,234)		4	5	9
d. systems of equations										23						0	1	1
e. bivariate and univariate data										22						0	1	1
f. curve fitting										22,23						0	1	1

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<b>D. PROBABILITY/STATISTICS</b>																
<b>1. Data Analysis</b>																
a. formulate questions	54, 55	177, 181	14	k.2, 1.6, 2.1, 2.8, 3.1, 4.10	21		2(195); 5(6)	23, 87		20				6	2	8
b. collect data	54	177, 181	14	4.9, 4.10	21	28		23, 87	136	19, 20	22	0140(12); 0011(26); 0014(49)		6	5	11
c. represent data using appropriate graphs and plots (numerical & categorical data)	54, 55	177, 178	4, 6		21,22	28-30	2(201); 11(87); 7(123); 12(76)	23, 87, 88	136	20	22	0140(12); 0011(26); 0014(49)	1(4)	6	6	12
d. analyze data/draw conclusions	54, 55	177				28-30	7(123); 12(74)	23, 87, 88	136	19	22	0011(26)		4	5	9
e. making predictions/inferences	54, 55	180	15			29	12(77); 7(123)			19, 20	22	0140(12); 0014(49)		5	3	8
f. compare data sets		177, 179	4					23, 87						2	1	3
g. make conjectures	54	180		4.2, 5.1, 5.10				23, 34		19				3	2	5
h. sampling		177, 180-1	13			30		23, 88		19,20				3	2	5
i. use measures of central tendency	55	76-7, 179-8	14, 15			29, 30	8(35); 9(78); 7(123)	23, 88	136	20	22	0014(49)	1(4); 5(220); 6(109)	5	6	11
j. use measures of spread (dispersion)		179	4, 14, 15			30		23, 88	136	20	22			3	4	7
k. understanding correlation vs. causation			13			30		23, 92						2	1	3
l. distributions of data (shape)		177, 179-80	14, 15			30		23, 88	136	20				3	3	6
m. misuses of statistics						30	1(482)						15(486)	2	1	3
n. compare different representations of the same data					22		11(87)							1	0	1
<b>2. Probability</b>																
a. sample space (outcomes)		181				31	3(223); 10(515); 14(933); 13(104)	92	136			0014(49)		3	3	6
b. determine likeliness of an outcome/event	54, 56	108, 181	14-15			31	4(547); 13(105); 14(933)	23, 88, 93		19		0014(49)		5	3	8
c. determine simple/compound prob. w/ informal meth	56	181				31	4(547)	23, 88	136	19, 21		0014(49)	1(3)	4	5	9
d. compute probabilities based on		181				31	3(224); 15(485)	93	136	19			3(224)	3	4	7
e. determine theoretical probabilities									136	19, 21				0	2	2
f. independent and dependent events						31							1(3)	2	1	3
g. fair games and expected values								35	138					0	2	2
h. misconceptions about probability							15(482)						15(486)	1	1	2
i. describe and conduct experiments and simulations										19				0	1	1
j. concept of randomness								23, 88, 93		19, 20			1(3)	0	3	3
k. compare empirical & theoretical probabilities							13(105)			19, 21				1	1	2
l. conditional probability						31	4(548); 13(106)							2	0	2
<b>Legend</b>																
NCTM-CESM--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 (Draft)																
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																
PRAXIS--Professional Assessments for Beginning Teachers/Educational Testing Service--Middle School Mathematics (0069) Topics Covered																
Research--Research findings on elementary school teachers' misconceptions about mathematics																
S--total of student sources																
T--total of teacher sources																
A--total of student and teacher sources																