

Pre 1.5a

Factors and Products Games

Lesson Summary: In the games in Pre 1.5a and 1.5b, students will be challenged to think about factors and products in fun ways and receive some applied practice of multiplication facts. After playing the games, students will analyze the games, evaluate prime and composite numbers, and create product game boards of their own with identified specifications.

Directions: See below

I. The Factors Galore Game: Play this game with a partner.

- Create a game board. (Choose how many numbers you want to use, 30, 40, 50, 100)
- Player A selects a number from 1-100. Player B circles the factors of that number on the game board, writes the factors next to the selected number, adds up the factors, and records the total in the score column. The player with the largest total wins.
- Player B selects a number. Player A circles and writes factors and records the score.
- Circles numbers cannot be used more than once as factors. However they can be used as number choices.
- A move is legal only if there is a factor for the other player to get. You may choose an illegal number and add that number to your score, but you lose your next turn.
- Decide if calculators can be used to find the factors. Do not use one to choose the number.

	Factors		Factors		Factors		Factors		Factors	Player A Score	Player B Score
1		2		3		4		5			
6		7		8		9		10			
11		12		13		14		15			
16		17		18		19		20			
21		22		23		24		25			
26		27		28		29		30			
31		32		33		34		35			
36		37		38		39		40			
41		42		43		44		45			
46		47		48		49		50			
51		52		53		54		56			
56		57		58		59		60			
61		62		63		64		65			
66		67		68		69		70			
71		72		73		74		75			
76		77		78		79		80			
81		82		83		84		85			
86		87		88		89		90			
91		92		93		94		95			
96		97		98		99		100			

II. The Sieve of Eratosthenes, Finding Primes

When we played the factor game, we found that the prime numbers were the best first moves because the other person couldn't get any points—there are no factors other than the number itself and 1. In the following activity we're going to sift for primes.

- First, sift out the even numbers (not the 2 itself—2 is prime). Place a black dot in the upper left hand corner for all multiples of two.
- Second, we'll sift for multiples of 3. Place a black dot in the upper right hand corner of all multiples of 3 (not the 3 itself—3 is prime).
- Third, sift for multiples of 5. Place a black dot in the lower right hand corner for all multiples of 5 (not the 5 itself—5 is prime).
- Fourth, use the remaining numbers on the chart—starting with 11. Determine whether these numbers are prime or not. Place black dots in the lower left hand corner for all remaining composite numbers.
- Circle all the prime numbers.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1) What patterns did you observe?

2) How far did you have to sift before you could quit trying for primes from 1 - 100?

3) How many primes are there from 1 to 50? _____ 50 to 100? _____

How many would you expect from 100-150? _____ From 150-200? _____

Keep sifting to check your predictions.

101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

4) Describe what you did to find all the primes. Explain why you could stop sifting at 13.

5) When could you stop sifting on a 300 board? _____ Explain

A 400 board? _____ Explain