



CALCULATING WITH SCIENTIFIC NOTATION — COMPARING POPULATIONS

Activity Item

The following item is part of this activity and appears at the end of this student version.

- Item 1: Population of the Nation, All 50 States, the District of Columbia, and Puerto Rico: 1910–2010

Student Learning Objectives

- I will be able to perform operations with numbers, including decimals, expressed in scientific notation.
- I will be able to use scientific notation to express ratios.
- I will be able to create and interpret a scatter plot.

NAME: _____ DATE: _____

Refer to the following example of scientific notation and its parts to help you complete this activity. In scientific notation, the coefficient (m) is a number greater than or equal to 1 and less than 10, and the exponent (n) raises the base of 10 to a power.

$$\begin{array}{ccc}
 \text{coefficient} & & \text{exponent} \\
 | & & | \\
 m \times 10^n & & \\
 & & | \\
 & & \text{base}
 \end{array}$$

- Use **Item 1: Population of the Nation, All 50 States, the District of Columbia, and Puerto Rico: 1910–2010** to fill in the following table, rounding your scientific notations to two decimal places.

Location	Population	Scientific Notation
Total U.S. population in 1910		
Population of Alabama in 1920		
Population of Alaska in 1920		
Population of Puerto Rico in 2010		
Total U.S. population in 2010		

- Answer the following questions about what different scientific notations represent.
 - 2.03×10^8 represents the population of the United States in what year?
 - 2.92×10^6 represents the population of Tennessee in what year?
 - 7.84×10^5 represents the population of Delaware in what year?

3. Answer the following questions and prompts to compare the populations of North Carolina and South Carolina in 2010. Round your scientific notations to two decimal places.
- Write the population of North Carolina in scientific notation.
 - Write the population of South Carolina in scientific notation.
 - Subtract the 2010 South Carolina population from the 2010 North Carolina population written in scientific notation, showing your work. (To subtract using scientific notation, first check that your two bases use the same exponent. If they do, subtract the coefficients and leave the exponent the same. If they don't, convert one of the coefficients so that both use the same exponent, then subtract the coefficients and leave the exponent the same.)
 - Use your answer for question 3c to indicate how many more people lived in North Carolina than in South Carolina in 2010:

North Carolina had _____ more residents than South Carolina in 2010.
 - Divide the North Carolina population by the South Carolina population, using the values written in scientific notation and showing your work. (To divide with scientific notation, divide the coefficients and subtract their exponents.)

- f. Indicate how many times more people lived in North Carolina than in South Carolina in 2010:

North Carolina had _____ times more residents than South Carolina in 2010.

4. Now write three of your own questions that each compare two population values: either for two different states in the same year or for the same state in two different years.

Question 1

- a. Write your question.
- b. Write your two populations in scientific notation, rounding to two decimal places.
- c. Complete your calculation, showing all your work.
- d. Write a concluding statement.

c. Complete your calculation, showing all your work.

d. Write a concluding statement.

5. Use data for your school's state to calculate the ratios of its population in one decade to its population in the previous decade, using scientific notation. Round your answers to two decimal places and show your work.

Ratio Formulas by Population Year	Ratio in Scientific Notation
2010 population / 2000 population =	Example: $6.39 \times 10^6 / 5.13 \times 10^6 = 1.25$
2000 population / 1990 population =	
1990 population / 1980 population =	
1980 population / 1970 population =	
1970 population / 1960 population =	
1960 population / 1950 population =	
1950 population / 1940 population =	
1940 population / 1930 population =	
1930 population / 1920 population =	
1920 population / 1910 population =	

Item 1: Population of the Nation, All 50 States, the District of Columbia, and Puerto Rico: 1910–2010

State/District	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010
Alabama	2,138,093	2,348,174	2,646,248	2,832,961	3,061,743	3,266,740	3,444,165	3,893,888	4,040,587	4,447,100	4,779,736
Alaska	64,356	55,036	59,278	72,524	128,643	226,167	300,382	401,851	550,043	626,932	710,231
Arizona	204,354	334,162	435,573	499,261	749,587	1,302,161	1,770,900	2,718,215	3,665,228	5,130,632	6,392,017
Arkansas	1,574,449	1,752,204	1,854,482	1,949,387	1,909,511	1,786,272	1,923,295	2,286,435	2,350,725	2,673,400	2,915,918
California	2,377,549	3,426,861	5,677,251	6,907,387	10,586,223	15,717,204	19,953,134	23,667,902	29,760,021	33,871,648	37,253,956
Colorado	799,024	939,629	1,035,791	1,123,296	1,325,089	1,753,947	2,207,259	2,889,964	3,294,394	4,301,261	5,029,196
Connecticut	1,114,756	1,380,631	1,606,903	1,709,242	2,007,280	2,535,234	3,031,709	3,107,576	3,287,116	3,405,565	3,574,097
Delaware	202,322	223,003	238,380	266,505	318,085	446,292	548,104	594,338	666,168	783,600	897,934
District of Columbia	331,069	437,571	486,869	663,091	802,178	763,956	756,510	638,333	606,900	572,059	601,723
Florida	752,619	968,470	1,468,211	1,897,414	2,771,305	4,951,560	6,789,443	9,746,324	12,937,926	15,982,378	18,801,310
Georgia	2,609,121	2,895,832	2,908,506	3,123,723	3,444,578	3,943,116	4,589,575	5,463,105	6,478,216	8,186,453	9,687,653
Hawaii	191,909	255,912	368,336	423,330	499,794	632,772	768,561	964,691	1,108,229	1,211,537	1,360,301
Idaho	325,594	431,866	445,032	524,873	588,637	667,191	712,567	943,935	1,006,749	1,293,953	1,567,582
Illinois	5,638,591	6,485,280	7,630,654	7,897,241	8,712,176	10,081,158	11,113,976	11,426,518	11,430,602	12,419,293	12,830,632
Indiana	2,700,876	2,930,390	3,238,503	3,427,796	3,934,224	4,662,498	5,193,669	5,490,224	5,544,159	6,080,485	6,483,802
Iowa	2,224,771	2,404,021	2,470,939	2,538,268	2,621,073	2,757,537	2,824,376	2,913,808	2,776,755	2,926,324	3,046,355
Kansas	1,690,949	1,769,257	1,880,999	1,801,028	1,905,299	2,178,611	2,246,578	2,363,679	2,477,574	2,688,418	2,853,118
Kentucky	2,289,905	2,416,630	2,614,589	2,845,627	2,944,806	3,038,156	3,218,706	3,660,777	3,685,296	4,041,769	4,339,367
Louisiana	1,656,388	1,798,509	2,101,593	2,363,880	2,683,516	3,257,022	3,641,306	4,205,900	4,219,973	4,468,976	4,533,372
Maine	742,371	768,014	797,423	847,226	913,774	969,265	992,048	1,124,660	1,227,928	1,274,923	1,328,361
Maryland	1,295,346	1,449,661	1,631,526	1,821,244	2,343,001	3,100,689	3,922,399	4,216,975	4,781,468	5,296,486	5,773,552
Massachusetts	3,366,416	3,852,356	4,249,614	4,316,721	4,690,514	5,148,578	5,689,170	5,737,037	6,016,425	6,349,097	6,547,629
Michigan	2,810,173	3,668,412	4,842,325	5,256,106	6,371,766	7,823,194	8,875,083	9,262,078	9,295,297	9,938,444	9,883,640
Minnesota	2,075,708	2,387,125	2,563,953	2,792,300	2,982,483	3,413,864	3,804,971	4,075,970	4,375,099	4,919,479	5,303,925
Mississippi	1,797,114	1,790,618	2,009,821	2,183,796	2,178,914	2,178,141	2,216,912	2,520,638	2,573,216	2,844,658	2,967,297
Missouri	3,293,335	3,404,055	3,629,367	3,784,664	3,954,653	4,319,813	4,676,501	4,916,686	5,117,073	5,595,211	5,988,927
Montana	376,053	548,889	537,606	559,456	591,024	674,767	694,409	786,690	799,065	902,195	989,415
Nebraska	1,192,214	1,296,372	1,377,963	1,315,834	1,325,510	1,411,330	1,483,493	1,569,825	1,578,385	1,711,263	1,826,341
Nevada	81,875	77,407	91,058	110,247	160,083	285,278	488,738	800,493	1,201,833	1,998,257	2,700,551
New Hampshire	430,572	443,083	465,293	491,524	533,242	606,921	737,681	920,610	1,109,252	1,235,786	1,316,470
New Jersey	2,537,167	3,155,900	4,041,334	4,160,165	4,835,329	6,066,782	7,168,164	7,364,823	7,730,188	8,414,350	8,791,894
New Mexico	327,301	360,350	423,317	531,818	681,187	951,023	1,016,000	1,302,894	1,515,069	1,819,046	2,059,179
New York	9,113,614	10,385,227	12,588,066	13,479,142	14,830,192	16,782,304	18,236,967	17,558,072	17,990,455	18,976,457	19,378,102
North Carolina	2,206,287	2,559,123	3,170,276	3,571,623	4,061,929	4,556,155	5,082,059	5,881,766	6,628,637	8,049,313	9,535,483
North Dakota	577,056	646,872	680,845	641,935	619,636	632,446	617,761	652,717	638,800	642,200	672,591
Ohio	4,767,121	5,759,394	6,646,697	6,907,612	7,946,627	9,706,397	10,652,017	10,797,630	10,847,115	11,353,140	11,536,504
Oklahoma	1,657,155	2,028,283	2,396,040	2,336,434	2,233,351	2,328,284	2,559,229	3,025,290	3,145,585	3,450,654	3,751,351
Oregon	672,765	783,389	953,786	1,089,684	1,521,341	1,768,687	2,091,385	2,633,105	2,842,321	3,421,399	3,831,074
Pennsylvania	7,665,111	8,720,017	9,631,350	9,900,180	10,498,012	11,319,366	11,793,909	11,863,895	11,881,643	12,281,054	12,702,379
Rhode Island	542,610	604,397	687,497	713,346	791,896	859,488	946,725	947,154	1,003,464	1,048,319	1,052,567

Item 1: Population of the Nation, All 50 States, the District of Columbia, and Puerto Rico: 1910–2010 (Continued)

State/District	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010
South Carolina	1,515,400	1,683,724	1,738,765	1,899,804	2,117,027	2,382,594	2,590,516	3,121,820	3,486,703	4,012,012	4,625,364
South Dakota	583,888	636,547	692,849	642,961	652,740	680,514	665,507	690,768	696,004	754,844	814,180
Tennessee	2,184,789	2,337,885	2,616,556	2,915,841	3,291,718	3,567,089	3,923,687	4,591,120	4,877,185	5,689,283	6,346,105
Texas	3,896,542	4,663,228	5,824,715	6,414,824	7,711,194	9,579,677	11,196,730	14,229,191	16,986,510	20,851,820	25,145,561
Utah	373,351	449,396	507,847	550,310	688,862	890,627	1,059,273	1,461,037	1,722,850	2,233,169	2,763,885
Vermont	355,956	352,428	359,611	359,231	377,747	389,881	444,330	511,456	562,758	608,827	625,741
Virginia	2,061,612	2,309,187	2,421,851	2,677,773	3,318,680	3,966,949	4,648,494	5,346,818	6,187,358	7,078,515	8,001,024
Washington	1,141,990	1,356,621	1,563,396	1,736,191	2,378,963	2,853,214	3,409,169	4,132,156	4,866,692	5,894,121	6,724,540
West Virginia	1,221,119	1,463,701	1,729,205	1,901,974	2,005,552	1,860,421	1,744,237	1,949,644	1,793,477	1,808,344	1,852,994
Wisconsin	2,333,860	2,632,067	2,939,006	3,137,587	3,434,575	3,951,777	4,417,731	4,705,767	4,891,769	5,363,675	5,686,986
Wyoming	145,965	194,402	225,565	250,742	290,529	330,066	332,416	469,557	453,588	493,782	563,626
Puerto Rico	1,118,012	1,299,809	1,543,913	1,869,255	2,210,703	2,349,544	2,712,033	3,196,520	3,522,037	3,808,610	3,725,789
United States	92,228,531	106,021,568	123,202,660	132,165,129	151,325,798	179,323,175	203,211,926	226,545,805	248,709,873	281,421,906	308,745,538

www.census.gov/data/tables/2010/dec/density-data-text.html

Click on the link above to view the source data online.