

Geographic Educators of Nebraska

Advocating geographic education for all Nebraskans

Measuring Nebraska

Students will use the scale bar on different maps to measure distance between cities and between sites.

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Grade Level	4th
Class Period(s)	1 (40 – 50 minutes)

Nebraska Social Studies Standards

SS 4.3.1
Students will explore where (spatial) and why people, places and environments are organized in the state.

SS 4.3.1.a. Read local and state maps and atlases to locate physical and human features in Nebraska.

SS 4.3.1.b Apply map skills to analyze physical/political maps of the state.

Nebraska Science Standards

Nebraska Language Arts Standards

Nebraska Math Standards

MA 4.1.2 Operations:
Students will demonstrate the meaning of addition and subtraction of whole numbers and fractions and compute accurately.

MA 4.1.2.a Add and subtract multi-digit numbers using the standard algorithm.

Overview

Students will develop an understanding of scale and use paper and pencil to measure distance using a scale bar.

Purpose

Students will learn how to interpret a map's scale and use one method of determining distance between two locations.

Key Vocabulary

Scale- "...the relationship between the distances on the map and the actual distances on Earth." A bar scale is "...a horizontal line marked off in miles, kilometers, or some other unit measuring of distance."

Source: nationalgeographic.org/encyclopedia/map

Materials

- *Student Atlas of Nebraska* (1 copy for each student)
- Narrow strips of paper for marking distances (plain copy paper cut into 1" strips)
- Measuring Nebraska Practice Sheet

Objectives

The student will be able to:

- Use a scale bar to measure distance on a map.

Procedures

(Where there are 2 page numbers, the second is for the 2nd edition of the *Atlas*.)

1. Introduce and explain the vocabulary word "scale." Students are likely to suggest other meanings such as an instrument to measure weight or the body covering of a fish or reptile. If items are drawn *to scale* they are proportionate on paper as they are in real life. (If you draw a picture of yourself standing next to your house, the house should be much taller and larger than you as it is in real life. It may help students understand if you draw such a picture that is NOT to scale.)

2. Refer to page 6 "Measuring Nebraska" and the scale bar. Students should note that the first mark after 0 is 25 miles, which means the unlabeled mark is $50 + 25 = 75$ miles. Often a scale bar will indicate

a scale such as 1 inch = 100 miles. It is important to read the scale bar because maps differ in scale.

3. Tell students to page through the Atlas and look for other maps that have scale bars. (Maps on pages 16, 19, 21, 23, 24, and 43/47 have scale bars.) Which map has a scale that is different from the others? (Page 19 "Expeditions" has a scale with intervals of 15 miles.) What is the distance for the unlabeled mark on this scale bar? ($30 + 15 = 45$ miles)

If you have a US wall map in your classroom or in a social studies text, ask students to look at the scale for a map of the 48 contiguous states to see its range and the intervals. Then have them look at inset maps for Alaska and Hawaii. They should notice that the scales for those two states are different. They are not drawn in proportion to the 48 contiguous states. Alaska is about twice the size of Texas. Does it look like it on your US map? (Alaska is drawn to a different scale so it fits on the same map. It probably appears to be about the same size as Texas.)

4. Demonstrate how to use the scale bar on page 6 "Measuring Nebraska". It is often easiest for students to use a narrow strip of paper to mark and measure. How can you measure distances that are longer than 100 miles since you will "run out of scale?" Show students how to place the end of the paper strip at one end of the green line and make a mark on the paper where the line ends. Then place the marked strip on the scale with the end at 0. Make a mark at 100, slide that mark back to 0, mark again at 100, and so on until you have measured the entire length of the green line. Total the numbers, estimating if the final mark falls within the scale intervals. Caution students against trying to estimate too precisely. It isn't possible to find exact distances with such a method so we wouldn't expect to find 79 miles or 156 miles, for example. Use your judgment if students should estimate to the nearest 5 or 10 miles. Demonstrate the procedure again with the red and blue lines.

5. Continue guided practice with the "Cities and Villages" map on page 43/47. Why is measuring distance directly between two points not completely realistic? (Students may have heard "the shortest distance between two points is a straight line" or "as the crow flies." We are not really measuring ground travel. Roads do not connect locations in a straight line because of landforms, bodies of water, and man-made structures. But for travel in a vehicle, it probably doesn't matter if the actual distance is 69 miles or 73 miles.)

6. Assign the Measuring Nebraska Practice sheet for independent practice.

Assessment

Use other maps on pages 16 and 23 with the same scale to measure distances. A short assessment for “Frontier Forts” (page 23) is provided.

Extensions

1. Use maps on pages 21 and 24 to measure trails and railroads. Lay string or yarn along the routes and cut it at the end. Then place the cut length of string on the scale to measure the distance (similar to the procedure with the paper strips). In this case, it may be easier for students to actually cut the string into lengths of 100 miles and total the lengths.
2. The “Expeditions” map on page 19 has a different scale and winding routes. Present this as a challenge to students.
3. Show students how to use the Nebraska Mileage Chart to find more exact mileage. Have them compare their mileage estimates to the distance on the table.

Sources

nationalgeographic.org/encyclopedia/map

Support for these lessons was provided by:
Geographic Educators of Nebraska
(GEON) a member of the National
Geographic Geography Alliances
and
Nebraska Department of Education
(NDE) Social Studies Department

NEBRASKA MILEAGE CHART

	Alliance	Beatrice	Bellevue	Blair	Chadron	Columbus	Fairbury	Falls City	Fremont	Gering	Grand Island	Hastings	Holdrege	Kearney	Kimball	Lexington	Lincoln	McCook	Nebr. City	Norfolk	North Platte	Ogallala	Omaha	O'Neill	Plattsmouth	Scottsbluff	Seward	Sidney	So.SiouxCity	Valentine	Wayne	York
Alliance		404	402	382	59	327	389	470	369	55	274	295	268	257	96	237	366	230	417	327	176	122	397	275	409	53	343	78	394	163	358	317
Beatrice	404		96	113	462	115	28	73	92	415	131	107	153	151	402	187	40	212	71	162	246	296	99	236	94	418	65	366	166	343	163	85
Bellevue	402	96		35	446	94	126	91	48	447	146	158	215	183	434	219	56	286	37	122	278	328	12	197	12	450	74	398	108	309	119	104
Blair	382	113	35		413	69	139	123	24	447	133	159	210	176	435	220	69	282	68	89	279	328	26	164	43	450	87	398	73	276	83	117
Chadron	59	462	446	413		370	446	528	400	104	332	352	325	315	145	296	424	289	474	324	233	181	437	248	454	99	400	137	372	138	342	375
Columbus	327	115	94	69	370		108	181	48	378	64	89	141	106	366	142	75	213	128	47	210	259	85	116	102	381	51	329	120	227	72	51
Fairbury	389	28	126	139	446	108		98	120	403	115	95	137	139	391	176	68	195	99	154	234	284	127	214	121	406	58	354	194	325	155	73
Falls City	470	73	91	123	528	181	98		136	497	197	180	226	224	485	270	104	284	55	209	329	378	99	285	81	500	131	448	195	396	203	154
Fremont	369	92	48	24	400	48	120	136		426	112	137	189	154	414	190	52	261	81	77	258	307	39	152	56	429	67	377	74	263	70	96
Gering	55	415	447	447	104	378	403	497	426		314	322	268	268	42	233	393	227	443	381	171	119	449	330	450	3	378	73	449	223	413	350
Grand Island	274	131	146	133	332	64	115	197	112	314		25	73	42	302	78	93	146	143	110	146	195	149	116	149	317	70	265	183	213	136	44
Hastings	295	107	158	159	352	89	95	180	137	322	25		54	53	304	89	104	127	155	135	148	197	161	136	161	319	89	267	209	233	162	61
Holdrege	268	153	215	210	325	141	137	226	189	268	73	54		30	256	41	155	73	206	183	100	149	212	175	212	271	141	219	256	206	209	112
Kearney	257	151	183	176	315	106	139	224	154	268	42	53	30		256	36	129	103	180	152	100	149	186	149	186	271	115	219	226	196	179	86
Kimball	96	402	434	435	145	366	391	485	414	42	302	304	256	256		221	381	215	431	412	160	108	437	353	437	45	366	37	465	264	438	337
Lexington	237	187	219	220	296	142	176	270	190	233	78	89	41	36	221		166	78	216	188	65	114	222	165	222	236	151	184	261	177	214	122
Lincoln	366	40	56	69	424	75	68	104	52	393	93	104	155	129	381	166		228	50	122	224	274	59	196	57	396	25	344	126	305	122	50
McCook	230	212	286	282	289	213	195	284	261	227	146	127	73	103	215	78	228		279	256	68	108	285	246	285	230	213	178	329	198	281	185
Nebr. City	417	71	37	68	474	128	99	55	81	443	143	155	206	180	431	216	50	279		155	275	324	44	230	27	446	77	394	141	341	148	100
Norfolk	327	162	122	89	324	47	154	209	77	381	110	135	183	152	412	188	122	256	155		233	286	113	76	130	382	97	356	75	187	31	97
North Platte	176	246	278	279	233	210	234	329	258	171	146	148	100	100	160	65	224	68	275	233		53	281	193	281	175	210	123	309	130	268	181
Ogallala	122	296	328	328	181	259	284	378	307	119	195	197	149	149	108	114	274	108	324	286	53		330	247	331	122	259	72	362	183	321	231
Omaha	397	99	12	26	437	85	127	99	39	449	149	161	212	186	437	222	59	285	44	113	281	330		188	19	452	77	400	98	300	107	106
O'Neill	275	236	197	164	248	116	214	285	152	330	116	136	175	149	353	165	196	246	230	76	193	247	188		205	329	171	317	124	111	97	141
Plattsmouth	409	94	12	43	454	102	121	81	56	450	149	161	212	186	437	222	57	285	27	130	281	331	19	205		453	82	401	116	317	124	107
Scottsbluff	53	418	450	450	99	381	406	500	429	3	317	319	271	271	45	236	396	230	446	382	175	122	452	329	453		381	76	447	217	411	353
Seward	343	65	74	87	400	51	58	131	67	378	70	89	141	115	366	151	25	213	77	97	210	259	77	171	82	381		329	141	276	98	28
Sidney	78	366	398	398	137	329	354	448	377	73	265	267	219	219	37	184	344	178	394	356	123	72	400	317	401	76	329		432	253	391	301
So. Sioux Cit	394	166	108	73	372	120	194	195	74	449	183	209	256	226	465	261	126	329	141	75	309	362	98	124	116	447	141	432		235	44	167
Valentine	163	343	309	276	138	227	325	396	263	223	213	233	206	196	264	177	305	198	341	187	130	183	300	111	317	217	276	253	235		208	252
Wayne	358	163	119	83	342	72	155	203	70	413	136	162	209	179	438	214	122	281	148	31	268	321	107	97	124	411	98	391	44	208		123
York	317	85	104	117	375	51	73	154	96	350	44	61	112	86	337	122	50	185	100	97	181	231	106	141	107	353	28	301	167	252	123	

Name _____

Measuring Nebraska "Frontier Forts" Page 23

Measure the distance between these historic U.S. Military Forts and record the estimated distance in miles. Measure from the center of one star symbol to center of the next star symbol on the map.

1. Old Fort Kearny to Fort Kearny

_____miles

2. Fort Sidney to Fort Mitchell

_____miles

3. Fort Hartsuff to Fort McPherson

_____miles

4. Fort Crook to Fort Omaha

_____miles

5. Fort Robinson to Fort Niobrara

_____miles

Name _____

Measuring Nebraska "Frontier Forts" Page 23-KEY

Measure the distance between these historic U.S. Military Forts and record the estimated distance in miles. Measure from the center of one star symbol to center of the next star symbol on the map.

1. Old Fort Kearny to Fort Kearny

_____160_____miles

2. Fort Sidney to Fort Mitchell

_____65_____miles

3. Fort Hartsuff to Fort McPherson

_____85_____miles

4. Fort Crook to Fort Omaha

_____15_____miles

5. Fort Robinson to Fort Niobrara

_____145_____miles

Name _____

Measuring Nebraska

Measure the distance between these locations and record the estimated distance in miles. Remember to measure from “dot to dot” on the map.

1. North Platte to McCook _____miles

2. Alliance to Scottsbluff _____miles

3. Hastings to Beatrice _____miles

4. Broken Bow to Holdrege _____miles

5. Imperial to Ogallala _____miles

6. Valentine to Ainsworth _____miles

7. Norfolk to Wayne _____miles

8. Auburn to Falls City _____miles

9. Fairbury to Westpoint _____miles

10. Cozad to South Sioux City _____miles

Name _____

***Numbers in () are from the Nebraska Mileage Chart. Note the discrepancy in #3.**

Measuring Nebraska-KEY

Measure the distance between these locations and record the estimated distance in miles. Remember to measure from “dot to dot” on the map.

1. North Platte to McCook _____ 65__ (68)_____miles*
2. Alliance to Scottsbluff _____ 50__ (53)_____miles*
3. Hastings to Beatrice _____ 90__ (107)_____miles*
4. Broken Bow to Holdrege _____ 75_____miles
5. Imperial to Ogallala _____ 50_____miles
6. Valentine to Ainsworth _____ 40_____miles
7. Norfolk to Wayne _____ 25__ (31)_____miles*
8. Auburn to Falls City _____ 25_____miles
9. Fairbury to Westpoint _____ 125_____miles
10. Cozad to South Sioux City _____ 215_____miles