INTRODUCTION:
• orientation to session, participants, prior knowledge and experience with inquiry, visual literacy for all learners (MN)
• orientation to dust bowls in the U. S. and in China and prior knowledge and experience on teaching it. (XC)

CHINA’S AGE OLD PROBLEM WITH SAND AND DUST STORMS:
• Brief orientation to inquiry strategy and visual literacy (MN)
• applying model to the various documents: reading for content (MN)
• what needs to be done to accommodate all learners: orientation to strategy and applicationL: choose what to do (XC)
• summing up findings (XC)

THE DUST BOWL OF THE THIRTIES IN THE U. S.:
• orientation to activity: groups to develop exercises using inquiry and all learner strategy (MN)
• group work stressing reading for content or other as desired.
• sharing and debriefing (XC)

CONCLUSION:
• dust bowls, visual literacy and all learners in perspective (MN and XC)
• thanks and fare thee well
The Dust Bowl

Celebrated in song and movies, the Dust Bowl of the 1930s was one of the worst environmental disasters in U.S. history. It changed the character of agriculture in the region and precipitated a huge migration that altered the demographics of the United States.

Noting natural and human forces played roles, Jess Porter explained that the 1930s Dust Bowl was “the worst long-term ecological disaster in the history of the United States.” Recent scholarship noted that local, regional, national, and global factors contributed to the disaster.

Several authors have also suggested a pattern of wet and dry conditions has characterized the Great Plains region for over a century. They say the Great Plains region experiences drought conditions about every 20 years. The most severe occurred on the late 1880s, 1930s, and 1950s. As Anita Pointon comments shows, the 2014 drought caused great hardship.

The recent findings offer rich opportunities to enhance the study of the Dust Bowl in the classroom. Using an inquiry-based learning method, students can gain new perspectives on the geographic theme of region and evaluate human-environmental interaction. They can explore how and why settlement in the Great Plains epitomizes the historical concept of change and continuity.

Human-Environmental Causes of the Dust Bowl

- Semi-arid climate and variation in soil fertility made agriculture on Plains risky.
- Sea Surface temperature anomalies (cold in Pacific, warm in Atlantic) reduced rainfall leading to drought
- High Temperatures intensified dry conditions, worsening drought
- Agricultural expansion, practices based on best weather conditions led to crop failure leaving soil unprotected
- High cyclone frequency resulted in high winds causing soil erosion and dust storms
When Dorothy stood in the doorway and looked around, she could see nothing but the great grey prairie on every side. Not a tree nor a house broke the broad sweep of flat country that reached the edge of the sky in all directions. The sun had baked the plowed land into a gray mass, with little cracks running through it. Even the grass was not green, for the sun had burned the tops of the long blades until they were the same gray color to be seen everywhere.

When Aunt Em came there to live she was a young pretty wife. The sun and wind had changed her, too. They had taken the sparkle from her eyes and left them a sober gray; they had taken the red from her cheeks and lips, they were gray also. She was thin and gaunt, and never smiled now.


Global drought monitor 2018
https://www.drought.gov/gdm/sites/drought.gov.gdm/files/gpcc-di-201910.jpg
Soil Erosion and Dust Storms


DUST STORM DAMAGE, 1930-1940

- Dust Bowl States
- Area with most severe dust storm damage
- Other areas damaged by dust storms
Living with the Dust Storms

We looked in the North and thought it was the Blue Norther comin’ such a huge black cloud, just looked like a smoke out of a train stack or something. About 4’o’clock 1934. . . .

We lit the lamp and it was just so dark we couldn’t see one another even with the lamp lit and we just choked and smothered... We had to wet rags over our mouths just to keep from smothering. We had wet blankets and hung them over the windows.

The old timers said they’d never seen nothing like that. . . .

Our house was sealed but that dust come through somehow. Even those stucco houses. . . .You had to mop real good when it was over to get it out. You couldn’t get it out no other way.

A real bad one would last for half a day. Sometimes it would be a week before we would see the sun. It was just dark. . . .Sometimes the cloud would look black and sometimes it would look red. It was according to which way the wind comes. . . .

We had cattle... It killed them; they were out there in it. We would cut their lungs open and it looked just like a mudpack or something.

Mrs. Flora Robertson, migrant from Oklahoma to California
Interview, Shafter FSA camp, August 5, 1940 Library of Congress, Voices from the Dust Bowl: The Charles L. Todd and Robert Sonkin Migrant Worker Collection, 1940-1941

Dust storm. Amarillo, Texas, April 1936
Rothstein, Arthur
http://hdl.loc.gov/loc.pnp/fsa.8b27554

Liberal (vicinity), Kan. Soil blown by dust bowl winds piled up in large drifts on a farm, March 1936
Rothstein, Arthur
http://hdl.loc.gov/loc.pnp/ds.01322

Kitchen in dust storm area with window sealed with towels. Williams County, North Dakota, October 1937
Lee, Russell
http://hdl.loc.gov/loc.pnp/fsa.8b38031
The Migrant Experience

Migrant family arrives in San Fernando, California

Living in ditch band camp, Imperial County California (left)

18 year mother from Oklahoma in tent home, California (right)

Steel cabin home in camp, Visalia, California (left)

Gardens, Tulare, California (right)
Migrant Experience Photo Bibliography

Lange, Dorothea, Oklahoma dust bowl refugees. San Fernando, California 1935 June. Library of Congress Farm Security Administration - Office of War Information Photograph Collection. hdl.loc.gov/loc.pnp/fsa.8b27316

Lange, Dorothea, Eighteen year-old mother from Oklahoma, now a California migrant 1937 Mar. Library of Congress Farm Security Administration - Office of War Information Photograph Collection hdl.loc.gov/loc.pnp/fsa.8b31764

Lange, Dorothea, Drought refugee living in a ditch bank camp. Imperial County, California 1937 Mar. Library of Congress Farm Security Administration - Office of War Information Photograph Collection. hdl.loc.gov/loc.pnp/fsa.8b31809

Rothstein, Arthur, Sanitary steel cabins are provided for each family. Tulare migrant camp. Visalia, California 1940 Mar. Library of Congress Farm Security Administration - Office of War Information Photograph Collection. hdl.loc.gov/loc.pnp/fsa.8b16013

Dust and Sand Storms in China over Time

Written on bamboo strips, the first official record of a dust storm in China dates back to the Han Dynasty (219 BCE-206 CE). It was described the destruction of a stage coach. It is believed dust storms have occurred in north and northeast China for hundreds of thousands of years. Between 1464 and 1913, one study estimates 1180 dust storms occurred. (Hui, et al, 2013)

According to one study, as much as 1/3 to 1/2 of annual global dust emissions come from various desert in China. The Takliman (Turkish for place of no return) desert in the Tarim basin is the major source of dust storm followed by the Gobi in Mongolia.

A major problem is the increase in the storms. Fifty years ago, they occurred every seven or eight years. Now, they are an annual phenomenon. Three quarters of the dust storms occur in spring. April has had the most dust storms followed by March. Over one-sixth happen in winter.

One of the worst storms hit Beijing on May 4, 2017. It originated in Mongolia and China’s Inner Mongolia Autonomous region. In total, the storm affected a large area of northern China from Xinjiang province in the west to Heilongjiang in the east.

The Chinese government reported 500 micrograms of small breathable particles per cubic meter. The maximum safe level is 25 micrograph per cubic meter. Children and the elderly were told to stay indoors. The storms have been connected to respiratory illnesses and epidemics.

The Chinese government has spent billions of dollars to plant forests to alleviate conditions with little effect.

Dust storm Beijing and northern China, May 4, 2017
https://www.youtube.com/watch?v=phJTHyojCWg

“It feels just like you’re breathing in dust into your stomach.”
—Zhang Liuliu
https://www.youtube.com/watch?v=WJ_h4fUUpLQ

Human-Environmental Causes of the Storms

- Desert soil and low precipitation create favorable conditions, such as shifting sand in Takliman
- Cold winter temperatures meet hot air stimulating cyclonic depressions that raise dust particles into the air
- Urbanization, deforestation leading to desertification, and climate change intensify conditions

Dust and sand storms that can spread particles across North China, the Pacific Ocean, and North America
Dust and Sand Storms in China over Time and Space

Figure 1: North China Plain:
10-Year Running Mean of Dust Storms, 1464-1904

Figure 2: China:
Dust Storm Spatial Distribution

Figure 3: China:
Paths of Modern Dust Storms

Resources:
INTRODUCTION:
The inquiry strategy described below focuses on pre-reading, reading for content, and analyzing findings. It assumes some prior experience in using the strategy to study varied primary source documents.

Pre-reading
1. Gaining Context: access prior knowledge of topic, survey document to get big picture of content and to identify type of document.
2. Provenance: examine document and bibliography to identity creator title, date, where published and possibly place of publication.
3. Identify new or difficult vocabulary and define as needed.
4. Pose compelling and supporting questions to guide reading and analysis of the document.

Reading for content
1. Identify items: Closely examine document and identify important items (people, places, things, aspects of charts or table, etc.). Make list of items.
2. Describe items: Describe what items look like, stressing g important features.
3. Organize information: Categorize items using major types of items, features, etc. Make a concept map, table, etc. of organizer
4. Summarize information: Using categories, prioritize most important components of document. Write a 1-2 sentence summary of findings.
5. Describe message: Use bibliographic information and summary, write a one sentence description of the message of the document.
   (NOTE: some questions will be answered and others posed and possibly answered during this stage.)

Analyzing
1. Answer remaining questions, constructing thesis statement (answer to compelling question).
2. Making meaning: explain what the implications of the findings and message of the document are to the topic of study.
3. Assess significance of visual and findings to topic of study, answering query: what do we care?
Inquiry Model with All Learner Support

**Pre-Reading**
- Gaining context: Activate or build prior knowledge on topic and visual
- Provenance: Make sense of parts and functions of bibliographic information
- Academic vocabulary: Preteach key vocabulary; provide access to L1, visuals, or teach vocabulary strategies to support comprehension
- Inquiry questions: Provide sample guiding questions and key words to ask questions (e.g., 5Ws); differentiate supporting and compelling questions

**Reading**
- Identifying items: Multiple ways to identify items (e.g., circling the items in the visual, using the provided word bank, correlating names of items in the visual with those in the narrative, use of L1)
- Describing items: Provide a list of descriptive words and directional phrases, sentence frames, use of L1
- Organizing information: Sort pictures or words that represent the items into categories with peers, complete graphic organizer
- Summarizing information: Work with peers to orally summarize information; use sentence stems and categories on the graphic organizer to write a summary that answers some inquiry questions (e.g., 5Ws).
- Describing message: Model and practice how to use information from different sources to construct the message

**Analyzing**
- Synthesizing information: Background knowledge on the structure of writing; provide sentence frames to construct thesis statement
- Making meaning: Combine information from different sources to gain content knowledge; use graphic organizers and group work to provide scaffolding
- Assessing significance: Connect the topic of study to students' life