

**Wyoming Geographic Alliance/Library of Congress TPS
Summer Institute "A Sense of Place"**

Name: Tomi Sue Wille

Title of lesson: Energy and Agriculture Production in Wyoming

Teaching level: 4th Grade

Time: 1 week of social studies classes

Big Ideas / Essential Questions: What are the major energy/mining products and the major agricultural products in Wyoming and how do they compare from one county to another?

Objective: Students will be able to identify the products produced in each county; compare the energy and agricultural production of each county; discuss the reasons for differences and influences on both energy/mineral production and agricultural production; analyze what the data predicts for the future of Wyoming's economy and how this affects their job opportunities personally.

Connection to Curriculum: This lesson incorporates reading, math, science, and social studies. An extension could also include writing.

Connection to Common Core Standards: Reading comprehension standards, graphing in math, energy standards in science, production, distribution and consumption and time, continuity and change in social studies.

Academic Language Objectives: Students will be able to compare the counties in Wyoming based on agriculture and energy/mining products and will be able to understand how this can affect their future as Wyoming citizens.

Materials:

Wyoming student atlas, pages 28, 36, 37, 38, 39, 40, 41, 42 *NOTE: color copies may need to be made of some maps to equalize the sizes to use the transparency overlay project.*

Blank transparencies and vis-à-vis pens

Blank wyo map showing county borders, two per student

Data sheet for each student—one showing energy/minerals products per county and the other showing ag products per county

Giant Wyo map, if available from Wyoming Geographical Alliance

Graph paper, colored pencils

Materials to make 3-D icons to depict both the energy/mining products and ag products

SUGGESTED PROCEDURE

Introduction: Background Needed Beforehand-Social Studies lesson regarding Wyoming counties and Wyo. Map. Science lesson on energy sources and mineral products (coal, natural gas, oil, wind, solar, uranium, geothermal, hydropower, bentonite, and trona). Science lesson on ag products in Wyoming (cattle, sheep, hogs, native hay, alfalfa, sugar beets, barley, beans, corn, dairy). Math lesson on making bar graphs. Introduce use of Wyo. Student Atlas.

Procedure:

1. Partner students in pairs with the Atlas, transparency, and markers. Use the pages for ag products and energy/mineral products. Each student maps one of these and then overlays their transparencies to discuss what they see per county. Discuss in partners. Discuss as a class. Ask students why some counties have lots of energy/mining, but little agriculture, etc. Ask what influences the ag production and the energy/minerals found in areas of Wyoming, connect to science lessons.
2. Pass out blank Wyo map to each pair of students and the list of agriculture product statistics. As a class develop a legend where one color designates each major ag product. Have the students work together to make a dot in each county on the map for each ag product that is major product produced and sold in that county. Discuss as a partnership and discuss as a class. Compare differences.
3. Break the data into crops and livestock production to make a double bar graph. Use the counties on the x axis; use the amounts on the y axis. Use one color for total livestock production and a different color for total crop production. Discuss in partners; discuss as a class. Compare between counties and compare crop to livestock production amounts. Analyze the differences.
4. Now pass out new blank map to partners (or new partners) for marking the energy/mining products. Use the same procedure. Color in dots in each county based on the data sheet. Discuss in partners, discuss as class. Analyze differences.
5. Now choose the energy/mining products you want to focus on and assign one to each partnership to graph. Ex: coal, trona, bentonite, uranium, combine oil and natural gas, etc, depending upon number of students. Each partnership will make a bar graph showing the counties and the amount of production of that energy/mineral product they are assigned.
6. Open the student Atlas again. Compare and discuss the student maps and graphs to the info on ag and energy in the Atlas. Discuss and analyze.
7. Introduce the giant floor map of Wyoming. Assign counties to students, depending upon size of class, just make sure all 23 counties get covered. Show how you want students to use materials to make the icons. Pass out the data sheets on ag products to do those first. Explain how to make a fraction of an icon. Guide students in how to adjust the amounts into the ratio of icons. Have them make and place their ag product icons on the giant map. Be sure to take a photo of the completed map.
8. Repeat step seven, but making icons for energy/mining products.
9. Discuss and analyze differences between the projects on the giant map. Refer again to the info in the Student Atlas. Close the lesson and find out what further questions students have and what further research could be done. Relate this to their personal lives, such as jobs in Wyoming.

Conclusion: Reiterate the three major force of Wyoming's economy: Energy, Agriculture, and Tourism. Have students explain how energy/mining and agriculture are essential industries to the state as a whole and to the economies of each county.

Assessment of student learning (Assessment will match the objectives):

Extension #1, the writing activity could be an assessment. A presentation by partners could be an assessment. Having the entire class show off the giant map to the rest of the school and explain what they've done and learned could be assessed as well.

Extending the lesson:

1-Writing and language arts: Each student can write a short essay on an assigned county using the data as evidence of the major products of that county and what influences what is produced there.

2-Use the information from the Student Atlas, p. 20 land biome/ecosystems and p. 16 precipitation amounts, and page 15, elevation and temperature to have students further analyze the influences on agriculture production in various counties of the state.

3-use the Student Atlas, p. 34—land ownership patterns to have a further discussion regarding public land ownership (Forest Service, BLM, and state land) in Wyoming and how this affects natural resource and agriculture industries.

4-Have guest speakers from the above agencies talk to students, visit a ranch, contact a teacher from a county that grown an ag product foreign to your county (ex: sugar beets) and have that sent to you to show your students.

Resources:

Wyoming Student Atlas, also the state of Wyoming has other maps of land ownership (contact the state land office in the dept. of ag.)

GEOGRAPHIC SKILLS:

- Ask Geographic Questions
- Acquire Geographic information
- Organize Geographic information
- Analyze Geographic information
- Answer Geographic Questions