

UNIT 4: IDENTIFYING STAKEHOLDERS

Exploring Multiple Perspectives

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OVERVIEW

This unit is designed to provide students with a foundation for understanding the complexity of energy development in Wyoming. The unit begins with an activity in which students will develop their own values about the land. They will then explore the complexity of systems through a group initiative. They will apply the complexity of systems to two different perspectives: ecological and economic. Next, students will define an issue in their own school, identify stakeholders, and engage in a debate from multiple perspectives. The summative project of this unit is for students to identify a key energy discussion in Wyoming as well as potential stakeholders and their positions. Students will then be ready to explore case studies of energy in Wyoming.

ESSENTIAL QUESTIONS

- What are your personal values?
- Who are the stakeholders in energy discussions and what do they represent?

ENDURING UNDERSTANDINGS

- Stakeholders representing multiple perspectives are valuable members of energy discussions.
- Exploring multiple perspectives is central to defining personal values.

DURATION

Five 45 minute lessons

STANDARDS

Next Generation Science Standards

- **Crosscutting Concepts**
 - Patterns
 - Stability & change
 - Systems & systems models
- **Science and Engineering Practices**
 - Analyzing and interpreting data
 - Constructing explanations and designing solutions
 - Obtaining, evaluating & communicating information

Wyoming Science Standards

- SC11.3
- SC11.3.1
- SC11.3.2

Wyoming Social Studies Standards

- SS12.3.5
- SS12.4.3
- SS12.5.2

- SS12.5.3

Common Core Language Arts Standards

- CCSS.ELA-LITERACY.SL.11-12.1
- CCSS.ELA-Literacy.RST.11-12.2
- CCSS.ELA-LITERACY.W.11-12.1
- CCSS.ELA-LITERACY.W.11-12.3

OBJECTIVES**Science and Energy Literacy**

- Students will understand that energy discussions are complex and multifaceted.
- Students will model how systems function.
- Students will identify that stakeholders represent diverse groups including energy industry, citizens, scientists, advocates, government, and any other party with interests in a resource.
- Students will understand that energy decisions are influenced by economic, political, environmental and social factors.

Community and Place

- Students will identify personal values about their communities and place.
- Students will identify stakeholders from their community.

STEM Careers and Leadership Development

- Students will collaborate to reach consensus on a local issue.
- Students will develop awareness of self and others through role-play.

Applied Problem Solving & 21st Century Skills

- Students will develop communication skills by engaging in solution-driven conversation of a localized issue.
- Students will evaluate the quality of information and apply information appropriately during mediation.

ASSESSMENT EVIDENCE

Diagnostic:

At the beginning of the unit, students will demonstrate understanding by:

1. Participating in a Values Activity to identify and develop personal values as well as understand the multifaceted nature of many issues.

Formative:

During the unit, students will demonstrate understanding by:

1. Participating in Take a Stand activity to develop awareness of others' values and opinions.
2. Responding to journal prompts related to values and stakeholder perspectives.
3. Participating in class discussions following systems activities.

Summative:

By the end of the unit, students will demonstrate understanding by:

1. Actively participating in class mediation, assuming a stakeholder role, and discussing an issue from perspectives that may not match their own.

DIAGNOSTIC & FORMATIVE ASSESSMENT: VALUE STATEMENT

***To be completed before the unit**

Standards:

<u>Next Generation Science Standards</u>	<u>Common Core Standards</u>	<u>WY Social Studies Standards</u>
SEP - Obtaining, evaluating & communicating information	ELA-Literacy.W.11-12.3	SS12.3.5 SS12.5.2

Instructions:

In this activity, students will write a brief statement about their personal values. Introduce the concept of the Cognitive Hierarchy where values lead to beliefs which turn into attitudes that ultimately end up as behavior. Prompt students to identify at least one behavior and ask them to:

- Narrow down the values that cause you to act that way.
- Try to verbalize why they value that behavior.
- Identify whether their values have changed over time.
- Consider if their values are a result of where they're from.

The goal of this activity is for students to start thinking about how value can lead to behavior and whether or not that behavior or value can change. Students should also understand that other people in the same community have different values.

LESSON 1: VALUES

Standards:

<u>Next Generation Science Standards</u>	<u>Common Core Standards</u>	<u>WY Social Studies Standards</u>
CCC - Patterns SEP - Obtaining, evaluating & communicating information	ELA-Literacy.RST.11-12.2	SS12.3.5 SS12.5.2 SS12.5.3

Lesson Overview:

This lesson uses the land ethic concept to introduce students to the myriad values of Wyoming's landscape and to challenge students to explore their own opinions about land use and management. *"The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land."* - Aldo Leopold

Guiding Question:

How do you value the land?

Duration:

45 minutes

Materials:

"Land ethic" in Sand County Almanac by Aldo Leopold, values statements, values worksheet

Engage: Gallery Walk

Prior to the start of class, post images of the sagebrush steppe (Wyoming's most abundant ecosystem) around the perimeter of the classroom. At the start of class, ask students to do a silent gallery walk, looking at each of the images. In their classroom journal, ask them to make note of words that describe this landscape and what this land might be 'used' for.

Think-pair-share: After students return to their desk, give them several minutes to reflect individually on the following questions: What are some words to describe this landscape? Why might this landscape be important? Then have students work with a neighbor to identify three key descriptors for the sagebrush steppe.

Explore: Values Activity

Provide students with a copy of the 13 value statements that people associate with the landscape including aesthetic, biological diversity, cultural, economic, future, historic, intrinsic, learning, life sustaining, recreation, spiritual, subsistence, and therapeutic. (See [Lesson 1 Resources](#) for descriptions.)

Ask students to imagine that they had \$100. Inform the students that they may use this 'money' to represent how they value the land using the 13 criteria provided. They can distribute the money however they want in at least dollar increments. See [Lesson 1 Resources](#) for values worksheet.

Lead a group discussion about how students allocated their money. What did most students spend money on? What did they spend the least on? Ask a few students to share their reasoning.

Explain: Values and action

Values are what each of us find important and these values impact the decisions and actions we make in everyday life. This activity stems from Aldo Leopold's Land Ethic, that *"simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land."* - Aldo Leopold (*Sand County Almanac, 1946*).

Elaborate: Class values

The idea of community is important to consider as we move forward to discuss energy conversations in Wyoming. It is easy for an individual to make decisions based on their values, but what is it like for a community to do the same thing?

Revisit the Values Activity. Challenge the class to re-allocate \$100 as a group.

Evaluate: Community decision making

As a class, use a Venn diagram to compare and contrast the similarities and differences between individual and group decision making. Finish class with a reflection on the following prompts.

- How was it different to come to a conclusion as a class as compared to coming to a decision an individual?
- What were the challenges in approaching this as a class versus when you made the decision on your own?
- How did you process values differently when thinking of an entire community?
- How do these values compare to people from other states?

Extend:

Read students the complete “Land ethic” excerpt from Aldo Leopold’s *Sand County Almanac* and ask them to reflect on how personal values are reflected in this reading. How do values differ from when Leopold wrote this in the 1940s with today?

Resources:

- Values Activity: Dr. Jessica Clement, University of Wyoming Ruckleshaus Institute
- <http://www.uwyo.edu/haub/about-us/fac-staff/jessica-clement.html>
- Leopold’s Land Ethic: <http://www.aldoleopold.org/AldoLeopold/LandEthic.pdf>
- <http://home.btconnect.com/tipiglen/landethic.html>

LESSON 1 RESOURCES

Values statements:

- **Aesthetic value (A)** — I value Wyoming Sagebrush areas because I enjoy the scenery, sights, sounds, smells, etc.
- **Biological diversity value (B)** — I value Wyoming Sagebrush areas because they provide a variety of fish, wildlife, plant life, etc.
- **Cultural value (C)** — I value Wyoming Sagebrush areas because they are a place for me to continue and pass down the wisdom and knowledge, traditions, and way of life of my ancestors.
- **Economic value (E)** — I value Wyoming Sagebrush areas because they provide grazing, fisheries, minerals, and/or tourism opportunities such as outfitting and guiding.
- **Future value (F)** — I value Wyoming Sagebrush areas because they allow future generations to know and experience Sagebrush areas as they are now.
- **Historic value (H)** — I value Wyoming Sagebrush areas because they have places and things of natural and human history that matter to me, others, or the nation.
- **Intrinsic value (I)** — I value Wyoming Sagebrush areas in and of themselves, whether people are present or not.
- **Learning value (L)** — I value Wyoming Sagebrush areas because we can learn about the environment through scientific observation or experimentation.
- **Life Sustaining value (LS)** — I value Wyoming Sagebrush areas because they help produce, preserve, clean, and renew air, soil, and water.
- **Recreation value (R)** — I value Wyoming Sagebrush areas because they provide a place for my favorite outdoor recreation activities.
- **Spiritual value (S)** — I value Wyoming Sagebrush areas because they are a sacred, religious, or spiritually special place to me or because I feel reverence and respect for nature there.
- **Subsistence value (Sb)** — I value sagebrush areas because they provide necessary food and supplies to sustain my life.
- **Therapeutic value (T)** — I value Wyoming Sagebrush areas because they make me feel better, physically and/or mentally.

Values activity handout

Name:			
	You	Partner	Difference
	\$	\$	
Aesthetic value (A)			
Biological diversity value (B)			
Cultural value (C)			
Economic value (E)			
Future value (F)			
Historic value (H)			
Intrinsic value (I)			
Learning value (L)			
Life Sustaining value (LS)			
Recreation value (R)			
Spiritual value (S)			
Subsistence value (Sb)			
Therapeutic value (T)			
Total			

LESSON 2: COMPLEXITY OF SYSTEMS

Standards:

<u>Next Generation Science Standards</u>	<u>Common Core Standards</u>	<u>WY Social Studies Standards</u>
CCC - Patterns; Systems & system models SEP - Constructing explanations/ Designing solutions	ELA-Literacy.SL.11-12.1	SS12.3.5

Lesson Overview:

We live in a networked world. To understand these networks (biological, social, etc.) we need to look at relationships in terms of patterns. In science, this way of thinking is known as 'systems thinking'. Since a network is a pattern of relationships, it is important to look at interconnectedness and dynamics- as opposed to parts in isolation. This systems approach will help as we move forward to look at complex problems related to reclamation.

Guiding Question:

Why is it important to look at the big picture?

Duration:

45 minutes

Materials:

Tape, markers

Engage: Selective attention

Begin by showing this YouTube video (commonly referred to as the 'Invisible Gorilla'):

<https://www.youtube.com/watch?v=1D07neiB7HI&feature=related>

This video stems from research on selective attention. As humans, we sometimes have selective attention, especially when it comes to things we're passionate about. But solving big problems requires us to look at multiple viewpoints. This video will serve as the introduction to looking at challenges from multiple viewpoints.

Explore: Systems game

Let students know that today, they will be doing an activity on systems thinking that demonstrates the interconnectedness of systems and use this as a jumping off point into studying Wyoming's energy conversations. See the [Lesson 2 Resources](#) for Triangles Game instructions.

Explain: Systems thinking

'Systems thinking' is a model for understanding systems that focuses on relationships, connectedness and context. Next, introduce the quote by noted MIT scientists and author/lecturer on systems theory, Peter Senge. *"Small changes can produce big results-but the areas of highest leverage are often the least obvious."*

Elaborate: What makes a system?

The following properties of systems influence the behavior of a system and can keep it in balance. Ask students to work in small groups and come up with examples of each of these within the complex system of their school.

- **Connectedness:** Every living organism is a system, parts of living systems are themselves systems, and communities of organisms are systems – schools, ecosystems, families

- **Emergent properties:** From parts to the whole “the whole is more than the sum of its parts”
- **Self-organization:** as a system takes in energy, the complexity of a system increases
- **Nestedness:** There are systems within systems at different spatial scales (a cellular system within an organ)
- **Feedback:** Negative feedback maintains balance in a system’s behavior, while positive feedback causes large-scale changes in a systems’ behavior.
- **Structure:** The structure of a system influences its behavior.
- **Ecological principles:**
 - Networks - interdependent complex efforts of one part enhanced by all parts of a system)
 - Interdependence - all parts of a system depend on other parts to stay in balance
 - Flows - the flow of energy through a system influences its behavior
 - Diversity - the more complex the interactions of individuals, the more resilient the system
 - Cycles - negative feedback loops act as cycles in the system, seen through nutrient cycling
 - Dynamic equilibrium - balance of a system over time, changes due to the amount of energy in a system.

Evaluate: Wyoming’s energy system

After identifying and discussing the components of systems, ask students to think about and write down the components of an energy system, like the one in Wyoming. Are there any leverage points?

Resources:

- Sweeney, L. B., & Meadows, D. L. (2010). *The systems thinking playbook*. Chelsea Green Publishing.

LESSON 2 RESOURCES

Triangles game: The Systems Thinking Playbook p. 206 (20 min)**Setup**

Number each student with a piece of tape in a visible location. Ask the group to form a circle. Tell students that we are creating a system with a simple cause and effect structure. Draw a diagram of numbers in a circle on the whiteboard. See Figure 1

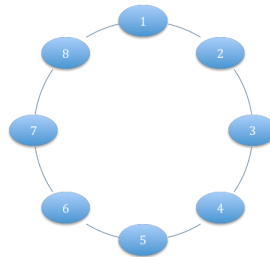


Figure 1.

In each round, students will pick two other people as reference points around the circle. The goal of this activity is to remain equidistant from both reference points. When the instructor says “go” the students should make themselves equidistant from their reference points (form a triangle). The system will keep moving as each person tries to stay equidistant from reference points. The system will behave differently each round due to the amount of leverage of certain individuals in the system. For example, if all students happen to pick the same person as a reference point, that reference point will influence the system greatly. Allow students to move around for 20-30 seconds each round.

Round 1 (practice): Everyone should pick two random reference points in the circle. Instructor will say “go,” and everyone will get equidistant from references. Play for a few minutes, and if the system does not slow down or quit moving, stop the game and discuss.

Return to original circle. Using the diagram on the board, have students draw lines between their own numbers and those they chose as reference points. Ask students to explain how the system behaved. See Figure 2 for example.

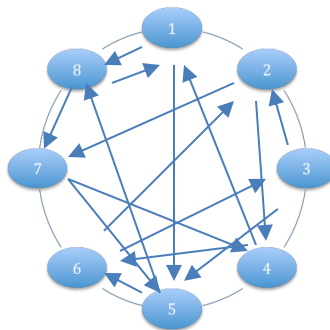


Figure 2. Round 1 Example

Round 2: Repeat the activity, but in this round, if the instructor asks any number to stop at any time, that number must stop moving. Ask students, “What do you think will happen when one person stops moving (i.e. Person #1)?”

Round 3: Everyone must choose a specific person (such as Person #2) as one of the reference points. And, then no one may pick someone who has _X_ as their second reference point (choose a characteristic, such as a red shirt or boots). During this round, ask one of the students with the X characteristic to stop (it should not affect system). Ask the specific person (such as Person #2) to stop (it should influence the whole system).

Return to original circle. Using the diagram on the board, have students draw lines between their own numbers and those they chose as reference points, like Figure 3. Ask students to explain how the system behaved. Did any reference point influence the system more than others? That person has high leverage or influence within the system.

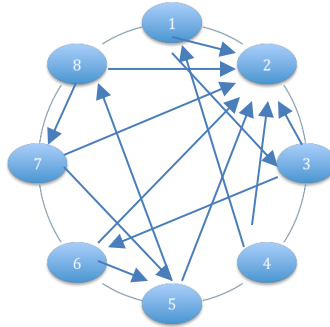


Figure 3. Round 3 Example

Round 4: Pick new references. In this round, introduce a new leverage point of different scale. Maybe all odd numbers have to choose person #8 as one of their reference points. Repeat the procedure from round 1.

Debrief: Ask students to identify some of the larger elements of this system's behavior (interdependence, the tendency for systems to stabilize, delays (lags between cause and effect), the impact of a system's structure on its behavior, leverage points)

LESSON 3: MEDIATION PART 1 – DEFINING AN ISSUE

Standards:

<u>Next Generation Science Standards</u>	<u>Common Core Standards</u>	<u>WY Social Studies Standards</u>
SEP - Obtaining, evaluating & communicating information	ELA-Literacy.SL.11-12.1	SS12.3.5 SS12.5.3

Overview:

People have different beliefs, opinions, and values. In this lesson, students will realize the spectrum of attitudes toward issues in their class. They will identify a challenging or hot topic in their school or community, define stakeholders, and research stakeholder values in preparation for a mediation.

Guiding Question:

How do stakeholders play roles in complex issues?

Duration:

45 minutes

Materials:

Tape or rope, prepare a set of “Take a Stand” prompts, paper and pencils, white board

Engage: “Take a Stand”

- Set up a straight rope, or imaginary line, representing a continuum of “I strongly agree” to “I strongly disagree”
- Read a set of prompts. After each prompt students should place themselves along the continuum where their beliefs fit. These prompts can be based on beliefs about different issues, and it would be good to incorporate issues relevant students’ lives. Ask for a few people to share their viewpoint from different places along the continuum.
- Ask students something they learned about themselves or about their classmates through this exercise. The purpose of this exercise is for students to understand that they all have different belief systems, values, and opinions about issues. In addition, they will be able to share their positions throughout the activity, so will encourage empathy and perspective shift among group.

Explore: Identifying complex issues in community

What are contentious issues in your school or community? On the whiteboard, set up a “silent conversation” activity to give students an opportunity to brainstorm an issue or debatable topic in their community. Some examples may include:

- School uniforms
- Cell phones at school
- Free unsupervised time and curfews

After brainstorming, discuss options and have students vote on one they would like to debate.

Explain: Defining Stakeholders

Now it is time to identify the stakeholders. In small groups, have students make a list of anyone who would be interested or have a say in this issue. Share out and make a list of the most relevant 5-6 stakeholder groups. This will set the stage for the rest of the mediation.

Elaborate/Evaluate: Pick a perspective

Randomly assign students into stakeholder groups by drawing the stakeholder name out of a hat. Each group will research their stakeholder and create a set of resources, quotes (real or fictional), and summary of positions.

Alternative: If time and resources are available, have students conduct interviews of people in their school, families, and community and use real quotes from real stakeholders.

LESSON 4: MEDIATION PART 2 - COLLABORATIVE DECISION MAKING

<u>Next Generation Science Standards</u>	<u>Common Core Standards</u>	<u>WY Social Studies Standards</u>
CCC - Systems & system models	ELA-Literacy.SL.11-12.1	SS12.3.5 SS12.4.3

Lesson Overview:

Students will participate in an activity based on the ethical “Prisoner’s Dilemma.” This activity helps introduce students to the concept of collaboration and its importance during large scale decision making processes.

Guiding Question:

How do stakeholders play roles in complex issues?

Duration:

45 minutes

Materials:

Notecards, Prisoner’s Dilemma worksheets

Engage: X’s or O’s

- Give students notecards and ask them to write an X on one and an O on the other. Hand out a Prisoner’s Dilemma worksheet for each student (See [Lesson 4 Resources](#))
- Breaks students into groups of 4 people.
- Students will choose an X or an O and all will lay down their cards at the same time. They will receive points based on combinations of cards laid down. Students should keep track of how many points they earn.
- Students may not talk during the game EXCEPT before each of the two bonus rounds. Students should be given one minute to talk before bonus rounds.
- The goal of the game is to get the maximum number of points possible.
- After the game, record all of the students’ scores on the board at the front of class to draw out any patterns and take note of groups with the highest/lowest scores.
- Debrief the experience with the students. What was going on in the groups with the highest and lowest scores? What did it feel like playing the game? Were there any clear strategies that lead to winning or losing? Were there any points in the game that someone seemed to have higher leverage?
- See [Lesson 4 Resources](#) for Prisoner’s Dilemma handout

Explore: Prisoner’s dilemma

Watch a clip from the Prisoner’s Dilemma game show (“Golden Balls” from the UK) available on YouTube (<https://www.youtube.com/watch?v=S0qjK3TWZE8>). Discuss students’ reactions. How is this similar or different from the activity they just played and/or real-life situations.

Explain: Collaboration

In a prisoner’s dilemma situation, there is high likelihood that at least one party is going to lose a lot. This happens regularly in major negotiations, but collaboration or collaborative decision making is a

tool that organizations use to help avoid the negative outcomes of these situations. Collaboration is useful only when people are willing to compromise because it allows everyone to have a share and gain in the decision making process rather than leaving out one group of stakeholders completely. This activity helps demonstrate the benefit of collaboration because it shows how everyone could have some profit, even if small, if all parties collaborated.

Elaborate: Real-world collaboration

Ask students to think of examples that they know of or that they have been a part of that were similar to a prisoner's dilemma type situation. Were there any points that felt as if someone or something had higher leverage? Would collaboration have been beneficial for them?

Evaluate: Collaboration in practice

In preparation for the mediation, have students consider the stakeholder groups they represent and determine if they are willing to collaborate and on what issues.

LESSON 4 RESOURCES

Prisoner's Dilemma Hand Out

Card combination:		Each X gets	Each O gets
4 Xs	0 Os	1	---
3 Xs	1 Os	2	-2
2 Xs	2 Os	-3	-3
1 Xs	3 Os	-1	2
0 Xs	4 Os	---	-1

	Others' cards	My card	Points earned	Cumulative points
Round 1	_____ + _____ + _____	_____	_____	_____
Round 2	_____ + _____ + _____	_____	_____	_____
Round 3	_____ + _____ + _____	_____	_____	_____
Round 4	_____ + _____ + _____	_____	_____	_____
Round 5 (*BONUS*)	_____ + _____ + _____	_____	_____ (Points x2)	_____
Round 6	_____ + _____ + _____	_____	_____	_____
Round 7	_____ + _____ + _____	_____	_____	_____
Round 8 (*BONUS*)	_____ + _____ + _____	_____	_____ (Points x3)	_____
Round 9	_____ + _____ + _____	_____	_____	_____
Round 10	_____ + _____ + _____	_____	_____	_____
Total Points				_____

LESSON 5: MEDIATION PART 3 - COMING TO A CONSENSUS

Standards:

<u>Next Generation Science Standards</u>	<u>Common Core Standards</u>	<u>WY Social Studies Standards</u>
SEP - Engaging in argument from evidence	ELA-Literacy.SL.11-12.1	SS12.3.5 SS12.4.3 SS12.5.3

Lesson Overview:

Students will play roles of different stakeholders in this culminating mediation. They will represent their stakeholders and present an argument for their local issue. Lastly they will try to come to a consensus and agree on an outcome in which all parties are satisfied.

Guiding Question:

How can we value multiple perspectives in community conversations?

Duration:

45 minutes

Materials:

Room arranged for groups with stage, stakeholder cards and resources, notebooks

Engage: Set the stage

Deliver an overview of the issue and introduce the stakeholders. Discuss the characteristics of good participants in this activity. Each group will represent their stakeholder’s perspective no matter their own opinions. Students’ should give respect to presenters by using appropriate and positive language and tone, waiting until designated times to ask questions and make comments, etc.

Explore: Mediation process

The mediation process will consist of three stages:

Stage 1: Opening claims (2 min. each)

Stage 2: Directed questions (each group takes 3 questions from others)

Stage 3: Closing statements including at least two arguments from other groups

Elaborate: Coming to consensus

Create new groups with one member of each stakeholder group. Consensus groups are tasked with coming to a consensus in which everyone in the group can agree on an outcome. This will most likely require compromise from group members. Give groups 5-8 minutes to discuss views and come to consensus. Not all groups will reach consensus, but it is the processing of and considering alternative perspectives that is the objective.

Evaluate: Reflection and discussion

Quick-write: How did you feel while playing the role of a stakeholder, did you agree or disagree with your stakeholder’s views initially? How did your perspective about your stakeholder or other stakeholder groups change? What emotions did you feel while participating?

Share out and discuss students’ experiences. Ask the question: Based on your knowledge and experience, who do you think are major players in energy discussions?

SUMMATIVE ASSESSMENT: DEFINING WYOMING'S ENERGY DISCUSSIONS

***To be completed at the end of the unit**

Standards:

<u>Next Generation Science Standards</u>	<u>Common Core Standards</u>	<u>WY Social Studies Standards</u>
SEP - Obtaining, evaluating & communicating information	ELA-Literacy.W.11-12.1	SS12.3.5 SS12.5.3

Instructions:

Apply this unit to the greater context of this curriculum - the energy discussion in Wyoming. Students should use what they have learned in this unit, previous units, and other prior knowledge to help with this assignment. In this activity, students are tasked with defining Wyoming's energy discussions, which will help frame the case studies in the next three units. Using the major topics we covered already - coal, oil and natural gas production, and the expanding renewable energy market, especially wind energy production, students should summarize in 2-3 pages:

- 3-5 examples of primary energy conversations in the state;
- Pick one major topic and describe it in terms of location and nearby communities;
- Identify possible stakeholders and positions
- Outline potential conflict that could arise between stakeholders