



Jacquelyn Fallon

SECTION 2
Natural
Systems

LESS/MORE

Students build a concept map on the wall.

LESSON OBJECTIVES:

At the end of this lesson, students will be able to:

1. Identify at least three other animals, emotions or factors that are intertwined with the presence of the wolf.
2. Predict long-term interactions between the wolf and other components of the human and natural environments.

VOCABULARY:

Make sure that students are familiar with the words on the cards.

TEACHER BACKGROUND:

While most students realize that the wolf has an important relationship with its prey, they may not realize that the wolf is also connected to other elements of the natural and human environments. This activity helps students identify relationships and domino effects that wolves have.

Please note: For the sake of simplicity we are using the word less, even in cases where fewer would be more grammatically correct!

Preparation:

1. Less/More cards: With a thick marker, the teacher should write the word *more* on about 25 index cards and the word *less* on about 25 cards.
2. Impact cards: With a thick marker, the teacher should write the following words on index cards (one word per card):

- | | |
|-----------------|----------------|
| disease | knowledge |
| beaver | fossil fuels |
| death | frustration |
| open spaces | statistics |
| starvation | global warming |
| arguments | water |
| cars | jobs |
| forests | clouds |
| conflict | garbage |
| meetings | hunting |
| information | insects |
| romanticism | gardens |
| wolves | parasites |
| deer | power |
| scavengers | plants |
| optimism | sun |
| poaching | flowers |
| overpopulation | nutrients |
| money | pollution |
| independence | decay |
| property rights | fire |
| depredation | politics |
| limitations | scat |
| public lands | grass |
| indoctrination | soil |
| understanding | learning |
| propaganda | recycling |



Lynn and Donna Rogers /www.bearstudy.org

National Science Education Standards

Unifying Concepts and Processes

Systems, order, and organization

Evidence, models, and explanation

Change, constancy, and measurement

Science as Inquiry

Abilities necessary to do scientific inquiry

Understanding about scientific inquiry

Life Science (5-8)

Structure and function in living systems

Population and ecosystems

Life Science (9-12)

Interdependence of organisms

Matter, energy, and organization in living systems

For more correlations, please see Appendix IV.

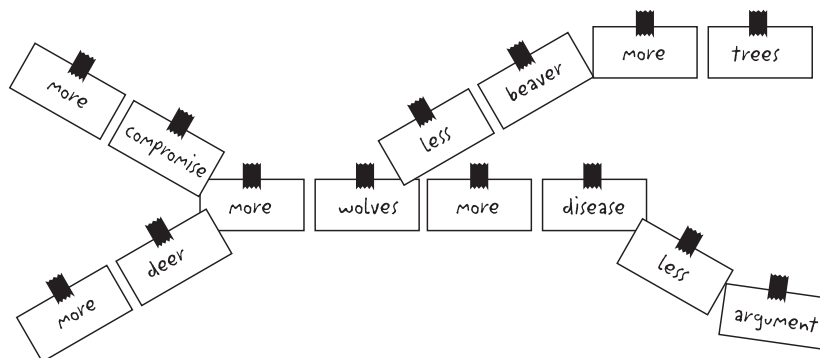
- puppies
- highways
- protection
- solutions
- moose
- empowerment
- dialogue
- food
- control
- taxes
- trees
- unemployment
- confusion
- research
- trust
- ecotourism
- compromise
- freedom
- peace
- stories
- fear
- laws
- songbirds
- chaos
- education
- humans
- wolves
(it may be interesting to have several of these)
- money
(it may be interesting to have several of these)
- and any other appropriate words.*

fewer deer? More eco-tourism? More conflict? Less protection? Direct the students to look at the “impact cards” that they have and ask for a volunteer to build a link. For example, if a student has an impact card with the word *disease* on it, the student might tape another *more* card next to the word *wolves* on the wall and add *disease* next to it, as illustrated. The student should explain their rationale for putting up that card. In this example, the student might explain that if there are a lot of wolves, then a disease might easily spread through the wolf population.



ACTIVITIES:

1. Tape a card with the word *more* on the wall or chalkboard. Tape a card with the word *wolves* to its right, as illustrated.
2. Distribute the impact cards so each student has several. Leave the *more* cards and the *less* cards on a table nearby.
3. Ask the students to think about what impact would be caused by “more wolves.” Would there be
4. Students should think about more relationships they can identify and, one at a time, add them to the relationship diagram, as illustrated. Be sure to tell students to explain their answers. If a student does not see a place where their impact word could fit, have other students place their words first, and an opportunity should eventually come up for all of the words. Encourage the students to be creative.



- Students continue this until all the impact cards are used up or the class runs out of time. Instruct students to step back and look at the diagram of relationships.
- Have the students point out relationships that they would disagree with or explain differently.

Discussion:

- In what ways does this diagram reflect the real world as you know it?
- In what ways does this diagram not reflect the real world?
- What relationships surprise you?
- In what way is the wolf connected to environmental issues like global warming or waste management?
- Which elements (or impact cards) cause the most complexity in the diagram?

ASSESSMENT:

- Tell students to look up the word *synergy* and in small groups discuss how the diagram illustrates this concept.
- Have students discuss or write a paragraph about how this diagram would be different if they had started with “less wolves” instead of “more wolves.”

EXTENSIONS:

Do this activity again, but allow the students to write their own impact words on the index cards.

Activity adapted with permission from Population Connection's Counting on People learning kit, www.populationeducation.org



Patrick Tilbury