Making Natural Connections

Integrating Social Studies and Science through lessons in ecology, wildlife management and civics

by Susan Pass and Christine Moseley

As teacher educators, we often tell pre-service and in-service teachers that to teach one subject in one lesson is to teach once; to teach two subjects in a lesson is to teach more than once. We encourage them to think about subject integration because we believe that it provides an opportunity for students to make natural and meaningful connections between and among multiple content areas. As Vars and Beane concluded, such an approach in this era of standards-based accountability is very helpful to students: “Almost without exception, students in any type of interdisciplinary or integrative curriculum do as well as, and often better than, students in a conventional, departmental teaching approach.”

But can students learn ecology and biology concepts while also learning social studies and civics? We believe the answer to this question is an emphatic “yes” if teachers carefully choose the tasks they have students engage in.

In this article, we describe two lessons that integrate civics, science and mathematics, and invite students to make meaningful connections between social studies and ecology. The lessons are adapted from activities in the Project WILD: Science and Civics, Sustaining Wildlife Curriculum and Activity Guide. This science and social studies curriculum uses two strands of activities — Habitat Exploration and Participatory Democracy — that prepare students to undertake action projects that will benefit local wildlife. The two lessons presented here are representative of both strands.

Both incorporate the principles of wildlife management in their conceptual frameworks and allow students to learn the importance of animal habitats and the factors that affect wildlife populations in continually changing ecosystems. In addition, students learn how personal and societal choices made today can affect the environment in the future. They also learn to track legislation through their state or provincial legislative process and discover how elected representatives can promote environmental protection.

Habitat Exploration: Limits to Living Here

Time: 1 class period

Grade levels: Elementary and middle school. If students collect and graph their own data, the activity can be done at the high school level.

Materials: Graph A: Populations, Graph B: Temperatures; alternatively, students can collect and graph data obtained from state/provincial and national parks, wildlife conservatories or local environmental organizations.

Background: This lesson teaches students to recognize the interdependence of ecosystem elements and the complexity of limiting factors. The law of limiting factors states that when a process, such as growth or reproduction, depends on several different factors, the speed of the process is deter-
mined by the slowest factor. The limiting factor might be an insufficiency or an overabundance, such as too little light in the morning or too high a temperature in the afternoon, which could impede growth or food sources. Limiting factors in nature could include temperature, light, water, salts, soil nutrients, fire, and predator and prey populations.

**Introduction:** Explain to students the law of limiting factors. Then provide them with the following background information about prairie falcons living in the Snake River Birds of Prey Natural Conservation Area in southwestern Idaho. The prairie falcons in that area, which is the largest concentration of nesting prairie falcons in the world, nest in the late spring and early summer on the cliffs along the Snake River. For food, the prairie falcon relies mainly on a large population of Townsend ground squirrels, which live on the flat land above the Snake River canyon. The availability of this prey is crucial to the survival of the nesting falcons. As the summer progresses, daytime temperatures increase. Eventually, the squirrels go underground and hibernate (aestivation) as a way to avoid the heat. The falcons then move to higher elevations where the ground squirrels remain active (thus obtainable) because the temperatures are cooler.

**Procedure:**
1. Show students Graph A: Populations, and ask them to explain what happened and what caused the change in population numbers.
2. Show the students Graph B: Temperatures, and ask them to speculate on a reason for the change in the prairie falcon population.
3. Ask students to suggest other physical factors that might influence wildlife activity and populations (e.g., amount of rainfall, wind speed, hours of sunlight). Have students propose some ways that physical factors influence or limit human activity or population growth.
4. Investigate the competitive uses of the land occupied by the prairie falcons. What happens when humans decide to create farmland or to extend a city into areas where falcons or other birds of prey live? Do human choices affect the factors that limit wildlife populations? Consider

**Grade levels:** Middle school and high school; can be adapted to elementary school by inviting government officials to talk to the class.

**Background:** All states and provinces have laws governing, and agencies that are responsible for, issues involving environmental protection and natural resources. In this lesson, students learn about their state or provincial legislature’s process for enacting laws that affect wildlife, as well as where to go for information on the current status of wildlife issues. They will also learn how to track the status of a bill in its progress through their legislature.

**Introduction:** Explain to students that state and provincial governments make legislative decisions that affect wildlife populations. In addition, the protection and management of wildlife in a state or province is the responsibility of a designated agency, governed by laws, and that other agencies are concerned with other aspects of the environment, such as water, land use and air quality. The students’ state senators or representatives, or members of their provincial parliaments (MPPs), have offices whose staff can provide information on laws governing wildlife issues and the responsible agencies.

**Procedure:**
1. Appoint a team of two or three students to contact their MPPs, state representatives or state senators to find out what bills have been introduced that would affect wildlife and/or wildlife habitat. Have another team of students contact the agencies responsible for the management of wildlife and the environment to find out what concerns they have.
2. Have each team present their findings to the class. The first team lists the proposed legislation on the chalkboard by bill numbers, titles, amendments, and who introduced each bill. The second team then lists the concerns of the agencies on the chalkboard and explains these concerns to the class.
3. Have students prepare a list of questions on the proposed legislation. These may include the following: How much would this cost? Why does it need to be done? What would the result be? After they have heard all of the
questions, have students discuss which concern is most worthy of consideration. Based on the concern chosen, students will select a bill to investigate.

4. Have students track the progress of the bill through the legislature. Every week, ask one student to report to the class on where the bill currently is in the legislative process.

Assessment: Have students write a letter to their state representatives or senators, either opposing or supporting the bill. The letter should be in essay form and must contain:
1. A concise description of the purpose of the bill.
2. A discussion of the major viewpoints supporting (or opposing) the bill.
3. An explanation of possible unanticipated consequences of the passage of the bill.
4. A description of actions that citizens might take at appropriate stages to affect the bill’s passage or defeat.
5. A personal statement from the presenter on whether or not the bill should pass.

Extension: Townsend ground squirrels, the major prey species of the falcons in the Snake River Birds of Prey Natural Conservation Area, are found throughout much of the plains area. This area is also potentially good agricultural land. With that in mind, have the students investigate the competitive and diverse uses for the land occupied by the Townsend ground squirrels, and the legislation and controversies behind the establishment of the Birds of Prey Natural Conservation Area.

Conclusion: Interdisciplinary lessons that blend science with social studies have many useful learning goals. Such lessons:
- require students to apply concepts, content and skills to the construction of knowledge
- engage students in tasks that challenge them cognitively and developmentally
- can engage students in service tasks that have clear goals and meet genuine needs
- can involve students in selecting, designing, implementing and evaluating their learning
- promote communication and interaction with the community and teach higher thinking skills

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Notes

References

Project WILD
Project WILD lesson plans and information can be found at <www.projectwild.org>. For more information about Project WILD, contact the sponsoring organizations: