Place-Based Project Ideas: Biodiversity

Place-based education involves students in local culture, ecology, landscapes, opportunities, and experiences so they can connect science concepts they are learning to something that they know already, and to something that matters to them. Research shows that place based education helps students learn, invites students to become active citizens, transforms school culture, and connects schools with the community*. These project ideas are included to get teachers and students thinking about ways to make science education relevant to the place they live. This is only a starting place; the list is certainly not exhaustive, and teachers are invited to continue adding, sharing and building the list.

These ideas were developed with the Yukon Flats School District in mind. Other districts using the Yukon Flats curriculum resource should adapt the list of ideas to fit their own district and region.

# Project Idea: Gardening

What are some examples of questions students can investigate, and projects students can do, related to the concepts of biodiversity?

<table>
<thead>
<tr>
<th>Question</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>How do different soil types (soil, charcoal, sand) affect plant growth?</td>
<td>Vary the amount of light, water and/or fertilizer that plants receive to study the effects.</td>
</tr>
<tr>
<td>How does differing pH in the soil affect plant growth?</td>
<td></td>
</tr>
<tr>
<td>Which fertilizers work most effectively?</td>
<td></td>
</tr>
<tr>
<td>Do pesticides have an adverse effect on plant growth?</td>
<td></td>
</tr>
<tr>
<td>Which pesticides work best?</td>
<td></td>
</tr>
<tr>
<td>Vary the amount of light, water and/or fertilizer that plants receive to study the effects.</td>
<td></td>
</tr>
<tr>
<td>How does thinning affect plant growth?</td>
<td></td>
</tr>
<tr>
<td>What is the role of microorganisms in the soil?</td>
<td></td>
</tr>
<tr>
<td>How long does it take seeds to germinate under different conditions?</td>
<td></td>
</tr>
<tr>
<td>Classify garden plants using dichotomous keys and observe similarities in groups.</td>
<td></td>
</tr>
<tr>
<td>How do different conditions affect the speed at which fruit and vegetables ripen?</td>
<td></td>
</tr>
<tr>
<td>What happens when you grow sweet potatoes next to other plants?</td>
<td></td>
</tr>
<tr>
<td>What effect does seed size have on how plant grows?</td>
<td></td>
</tr>
<tr>
<td>Start a business producing plants such as rhubarb, herbs, etc.</td>
<td></td>
</tr>
<tr>
<td>Create a product from plants that you grow.</td>
<td></td>
</tr>
<tr>
<td>Look into hydroponic gardening and greenhouses for your community.</td>
<td></td>
</tr>
</tbody>
</table>

## Possible Resources:

- **Schoolyard Garden Initiative – Calypso Farms, Fairbanks**  [http://sgicalypso.wordpress.com/sgi/](http://sgicalypso.wordpress.com/sgi/)
- **Cooperative Extension Service**

## Connections:

- **Year 3 Life Science:** Genetics (seeds and plant reproduction), Year 2 Life Science Ecosystems (relationships between organisms and with the physical environment), Year 1 Earth Science: Rock Cycle (soils), Year 1 Physical Science Properties of Matter (preserving foods)**
**Project Idea: Animals, Fish, Birds, and Bugs**

What are some examples of questions students can investigate, and projects students can do, related to the concepts of biodiversity?

- Dissect animals to identify organs and body systems.
- Learn how different organs of a fish, bird, or animal are used traditionally.
- Learn to preserve animal skulls and create a classroom skull collection.
- Participate in a statewide classroom salmon project.
- Compare the anatomy of different animals.
- Learn traditional names and uses for animals.
- Allow blowflies to lay their eggs in a fish and watch the eggs hatch.
- Study the life cycle of blowflies.
- What do blowflies need to survive? How can you keep them away from fish that is drying?
- Investigate the life cycles of local animals and fish.
- Take part in a citizen science project to count birds.
- Raise chickens or earthworms and observe their life cycles.
- What types of organisms are found in local soils and ponds?
- Learn to identify local birds, fish, bugs, and animals, and keep a class list of organisms seen during the year.
- Choose an observation area near the school and make a species map.
- Test for calcium in bones and other hard parts of animals (beaks, nails, teeth, etc.).
- Compare body sizes of local animals. Is there a correlation between body size and life span? Is there a correlation between body size and brain size?
- What seeds do birds prefer to eat?
- Study sled dogs’ diet, metabolism and nutritional needs.
- Observe and document growth and development of sled dog puppies.
- Study wildlife noise.
- Study local wildlife diseases and their possible causes.

**Possible Resources:**


Shorebird sister schools: [http://www.fws.gov/sssp/](http://www.fws.gov/sssp/)

Searchable database of all North American mammals: [http://www.mnh.si.edu/mna/](http://www.mnh.si.edu/mna/)


4H Salmon Incubation Project: Peter Stortz, 907-354-7194 (cell) or via e-mail at pjstortz@alaska.edu.

Connections to other units and concepts: Year 2 Life Science: Interdependence, Year 3 Life Science Adaptations and changes in life over time
### Project Idea: Local Plants

What are some examples of questions students can investigate, and projects students can do, related to the concepts of biodiversity?

Create an identification guide to local plants.
Learn traditional names and uses for plants.
Identify invasive species in the area – document rates of invasion and investigate methods of control.
Experiment with salves and other products made from local plants.
Identify, cook and eat local edible plants.
Test local plants for vitamin C content, starch content, etc.
Make species maps of plants in the area.
Compare transpiration rates of different plants.
Separate plant pigments with paper chromatography: What happens to pigment as leaves change color with seasons? Why are two leaves of the same tree different in color intensity? Does the temperature of a refrigerator have an effect on a plant's pigment composition?
Color Fabrics With Dyes From Plant Materials.
Investigate Antibacterial Properties of Leaves, Berries, and Bark.

### Possible Resources:
- Alaska Science Forum Plants Index: [http://www2.gi.alaska.edu/ScienceForum/plants.html](http://www2.gi.alaska.edu/ScienceForum/plants.html)
- Alaska’s Blooming Buddies Plant Project by students, for students: [http://library.thinkquest.org/6274/](http://library.thinkquest.org/6274/)

### Connections to other units and concepts:
Year 2 Life Science: Interdependence, Year 3 Life Science Adaptations and changes in life over time

---

### Project Idea: Human Bodies
What are some examples of questions students can investigate, and projects students can do, related to the concepts of biodiversity?

What are microbes and bacteria and how do they affect human health?
Test for presence of bacteria in different parts of the school.
Design experiments to answer students’ questions about the functioning of various body systems. Examples: Does your sense of smell alter your sense of taste? Which sense (taste, smell, touch) is best for identifying foods? Does music affect blood pressure? Hand-eye coordination? Does exercise affect memory retention? Does gender affect reaction time? Is yawning contagious? Does sight affect the ability to determine sound direction? Do all people have the same normal body temperature? Which types of exercise increase muscle growth the most? How do various types of acid (phosphoric acid, citric acid, etc.) affect tooth enamel? Does a person's heart rate and blood pressure vary during the day? Does exercise affect lung capacity? Does eye color affect a person's ability to distinguish colors?
Observe blood cells with a microscope.
Research the effects of smoking or alcohol consumption on the body, and provide information (posters, pamphlets, radio spots) to publicize what you learned to others in your community.
Measure heart rates at different times of day and before and after activities.
Study the effects of ultraviolet radiation on the body, and measure the UV index at different times of the day and year.
Learn first aid and CPR.
Study the human life cycle: how do humans grow, develop, and age? How do these stages differ according to cultures? Compare childhood, old age, etc. in modern and traditional culture.
Learn about vitamin D and possible deficiencies for Alaskans.
Study the effects of light on humans, and Seasonal Affective Disorder.

Possible Resources:
Cells Alive – interactive site about cell biology; http://www.cellsalive.com
Interactive animated atlas of cells, tissues, organs; http://www.bioanim.com/
Human Anatomy Online; http://www.innerbody.com/
Infection Detection Protection; http://www.amnh.org/nationalcenter/infection/
Making Sense of our Senses; http://www.hhmi.org/senses/

Connections to other units and concepts: Year 2 Life Science: Interdependence