

Grade 7 Curriculum Link Ideas

Subject	Unit	Season	Activity	Description
Language Arts	Expository Writing	Any	Nature Writers	Read students a passage from a nature writer e.g. John Muir or David Henry Thoreau. Have them sit in a spot and write about their surroundings in a similar fashion. Share writings to wrap-up.
Science	Interactions and Ecosystems	Any	Food Web Search	Define/discuss ecosystems food chains/webs and major ecosystem roles. Have students pair up and use the worksheet (below) to hunt for organisms in different roles, sketch examples and come up with a food web from the schoolyard.
	Interactions and Ecosystems	Any	Who dirtied the Water	Students investigate the links between human activities and water bodies via a role playing activity. Students go to the schoolyard and determine factors which may affect the quality of water leaving the schoolyard.
	Interactions and Ecosystems	Early Fall, Spring	Plants: invasives and natives	Students look for consequences of human activities such as weeds that are aggressively growing. Students identify native and introduced plants and discuss the benefits and consequences of replacing natives with ornamentals.
	Plants for Food and Fibre	Any	Native/Industrial Use of Plants and Plant Pests	Discuss the importance of plants in our world, how the relationship with them has changed over time and the impact of pests on industry. Tour native plants to take about some uses. Have students return to search one of the toured plants for signs of disease. Have them discuss possible solutions and also how to use a harvested plant that is diseased.
	Heat and Temperature	Any	Mello Jello	Have students take T of canisters of warm liquid jello indoors. Take these canisters outdoors and place in different spots. Students make predictions on T while they wait for T to adjust and try to find the warmest locations. Discuss findings.
	Structures and Forces	Any	Structures in Nature	Discuss structures and similarities/differences between natural and manmade. Have students work in groups to find natural equivalents of manmade structures and natural structural variation (see examples below). Discuss and then have students look at the difference between trees and shrubs and come up with pros/cons for each.
	Planet Earth	Fall (spring)	Schoolyard erosion	Discuss terms: weathering, erosion and sedimentation. Investigate schoolyard for examples of each of these and record findings in a science journal. Predict which areas will be eroded and to what extent (ie mm lost) over the schoolyear. Record predictions and revisit site in spring to measure. For further investigation, bring out water and mixtures of water and sand/silt/clay to test how erosion and sedimentation could occur in different areas of the schoolyard.

Social Studies	Local/Current Affairs	Any	Land use decisions	Students will wrestle through land use decisions (e.g. where to build a dam, where to allow development, sustainable development, agricultural permits etc) as if their schoolyard was the land in question. Students evaluate the pros and cons of doing different activities on the schoolyard or a certain part of it – ie impacts on public use, ecology, resource distribution etc.
Art	Components - design	Any	Schoolyard models	Discuss landscape models and perspectives. Have students make 2-D (map) and 3-D (model) representations of the schoolyard.
Art	Investigation	Any	Line and Texture in Nature	Students will look for natural objects and/or scenes that are aesthetically pleasing. They will record the lines and texture of these objects. Small groups will come together to look for similarities in pleasing features.
Wellness	Physical movement	Any	Schoolyard movements	Students design an obstacle course/ adventure race in the schoolyard that includes different movements including balance, jumps, strength etc.
	Mental/emotional wellness	Any	Nature benefits	Students divide the schoolyard into sections such as bare, few plantings, moderate plantings, many plantings. They then design short tests to determine the effect of spending time in these areas such as measuring heart rate, mental retention, emotional feelings etc.
Math	Estimation, Geometry	Any	Tree Height Estimation	Make clinometers out of a simple pattern. Teach students how to use them and then go outside and use them to measure tree heights after estimating the height. Discuss estimation strategies, accuracy etc.
	Math Problems	Any but better when warmer	Math Trail	Have students make groups of 3-5. Have students create math problems using natural items e.g. what how many of x tree could fit in the space of y tree?



Food Web Search

Name _____

Look in the school grounds to discover producers, consumers, and decomposers.
Look for evidence of interactions between living things. Record your observations.

SEARCH FOR PRODUCERS:

A leaf that caterpillars have partially consumed _____

Berries that birds can consume _____

Seeds for birds and mice _____

A producer that rabbits or deer consume _____

Flowers with nectar for insects and birds _____

SEARCH FOR CONSUMERS Find these consumers or evidence of their actions.

An animal with 6 legs that consumes nectar _____

An animal with 8 legs that consumes insects _____

An animal that consumes both plants and animals _____

A two-legged consumer _____

A consumer that hunts _____

A consumer that is eaten by other consumers _____

SEARCH FOR DECOMPOSERS

A squirmy animal that lives in soil and eats dead leaves _____

A black bumpy thing growing on the bark of flowering trees _____

A soft fleshy umbrella-like thing growing among the dead leaves _____

White stringy things found under dead wood or rocks _____

An animal with 6 legs that eats dead worms and other animals _____

A flying insect whose larvae feed on dead animals and plants _____

Native Plants and their pests

1. Red Osier Dogwood – fairly resistant to most pathogens; N.Americans would smoke inner bark in ceremonial pipes, dream catchers, peeled twigs used as toothbrushes to whiten teeth, eat sour berries, red dye, inner bark for tanning hides
2. Tamarack Larch - very prone to disease and bugs (infestations by larch sawfly have been common), so not a valuable wood on average; slow-growing trees have high resin and the wood is hard and water resistant (can be valuable in yacht building), generally thin and weak bark
3. Black Currant – bacteria and fungus cause discoloration of leaves, aphids cause bubble-like growths on top and bottom, can host white pine blister rust; berries for jam, jelly, ice cream, snakebite remedy (believed snakes afraid of the bush)
4. Trembling Aspen – borer beetles will dig and lay eggs, larva tunnel into bark, tent caterpillars eat leaves, leafminer feed on leaves and cause a streaked pattern; roots and inner bark made a poultice to stop bleeding, rotten bark lined child cribs as it is soft, suntan lotion, canoes made from the light wood, quinine derived from bark (medicine); modern uses include pulp, chopsticks, waferboard, sauna benches and playground structures as does not blister
5. Lodgepole Pine – Pine Terminal Weevil attacks immature pines, Dwarf Mistletoe is a parasite plant that takes C from host, Mountain Pine beetles which starve tree due to bluestain fungi they leave behind (look for tunnels, popcorn shaped resin extensions); used as poles for tipi, chew resin to heal mouth sores (and gum), make tea from needles; modern uses include plywood, paneling, doors, windows and railway ties
6. Willow – Galls form from various insects (generally do not harm if in small numbers), fungi cause leaf spot diseases and rusts; used as aspirin derivative, tannins good for hides; modern uses include paper, wicker, cricket bats, and rope
7. Wild Rose – Rose Rust and Powdery Mildew caused by fungus, aphids eat leaves, galls from bacteria may form on roots and stems; berries made into tea to provide vitamin C; used in perfumes
8. Paper Birch – Birch leaf miners eat out center of leaves which then turn brown, bronze birch borers dig into top 3rd of trunk and kill tree, fungus cause canker; bark used for baskets, cradles and canoes, sap used for birch beer and vinegar; modern uses include pulp and paper, veneer wood, tongue depressors, cheese boxes, and in BC for firewood
9. Buffalo Berry – insects eat leaves, fungi leave rusts and spots; used to make Indian Ice Cream (also called foamy berry), mixed with other berries and stirred into a foamy dessert, contains saponin and made into soap; no modern industrial usage
10. Spruce – Spruce Gall Adelgid caused by nymphs, Spruce Beetles bore into wood and eat phloem, leaving behind fungi and killing tree, moulds; needles contain water and help with dehydration, contains vitamins that prevented scurvy, sap into gum, resin into medicine, wood for kayaks and weaving baskets; modern uses include high importance in paper manufacture due to long, tough bark strands, construction (indoor uses), highly prized musical instrument wood (piano, violin, guitar)

Structure: "There is nothing new under the sun"

This does not mean that everything has been built already but that the principle behind the design already exists. One thing we have to keep in mind when comparing natural and manmade structures is that nature uses live materials while man uses inert ones and the two do not always behave in the same manner. An example of this is if you buy a pair of shoes the soles will wear over time, whereas the soles of bare feet actually grow thicker with excessive use.

We also have to remember that nature has had a much longer time to perfect its designs and just like man learns from his mistakes so too does nature. Living things have evolved structures that are so complex and so efficient that often man's best efforts look clumsy in comparison.

Examples of Structure in Nature

Plant Structure

If you look closely at a leaf you can see how the main rib tapers from the base, the point where the whole weight of the leaf is borne from. The other ribs spring from the centre rib in a regular pattern and taper from the centre to the edge. A leaf is a perfect example of a lightweight structure in nature.



Spiral Growth (Fibonacci Ratio may be mentioned)

When new leaves grow from the stem of a plant, the growth occurs in a spiral fashion around the stem. The spiral turns as it climbs. Nature spaces the leaves in this manner so that the higher leaves do not shade the lower leaves too much.



Patterns and Symmetry in Nature.

If you examine structures both natural and manmade you will frequently see patterns. Natural patterns occur in leaves, flowers, fungi and in shells. If you look closely at leaves from different trees, you will see that they are arranged in a pattern around the stem.

Man has noted this and has also used patterns in the building of structures. If you look at different buildings you will notice that the bricks or blocks are arranged in different patterns as are the tiles or slates on the roof of buildings.



Spider Webs

Spider webs are constructed to be as strong as possible. All webs follow 7 steps, and result in the maximum resiliency for the strength of silk spun. There is a spider called the Nephila that makes a web so strong it will repel a bullet! The pattern allows for maximum support.

Activity Tasks:

1. Students will be challenged with two initial jobs;
 - a) Determine the natural equivalent to the following – a ceiling beam, a column, a pyramid, a tower – and sketch what they see
 - b) Identify an example of spiral growth (leaves on a stem, a pinecone), pattern, spider web, and symmetry in nature. Sketch what they find

Students may work in pairs, and they must use a simple plant key to try and identify at least two of the plants they used today. They will be given approximately 15 minutes.

2. Identify at least 2 pro's of tree/shrub structure. Some ideas may include:

Trees – strong centre structure takes time to grow and maintain, but holds the leaves closer to the sun, does not die off each year and therefore has a 'head start' in the spring

Bush – no strong central core, but many branches that often spread out quite far to capture sunlight