



ARCTIC EXPERIENCE

Grades 7 - 9
4.5 Hours

Thank you for booking the “Arctic Experience” program at FortWhyte Alive. This program is designed to help your students learn hands-on about Canada’s Arctic environment and people. Students will have the opportunity to explore the issue of the changing Arctic through hands-on activities related to climate, ecosystems, and human communities.

Appropriate Dress for Your Field Trip

To ensure that students get the most out of their FortWhyte experience, we ask that they be appropriately dressed for a full-day outdoor excursion. All of our programs include time outdoors, regardless of weather. Comfort and safety are key in making this an enjoyable and memorable experience.

Suggestions for Outdoor Dress

Layering of clothing is very important in maintaining body temperature and in remaining dry. Four thin garments may offer the same degree of warmth as one thick parka, but the four layers allow much greater flexibility. Layers can be shed or added as temperature, wind, exertion, or other variables dictate. Waterproof outer layers and insulated winter boots are also important.

Young people are very concerned about their appearances. Remind them that they will enjoy their time better if they are prepared! Use **Pre-Visit Activity Winter Wear** as an entry point for talking about appropriate winter dress.

***Please share this information with other teachers that are coming to FWA with your group.**



GOAL

To learn how global warming is changing Canada's Arctic: its climate, ecosystem and human communities, through hands-on experiences.

OBJECTIVES

Students will:

1. Carry out a group investigation of snow density, water content and temperature, and discuss the role that snow and ice play in both local and Arctic ecosystems.
2. Understand that light energy from the sun is converted to heat energy when absorbed by Earth's surface, and how "albedo" (surface reflectivity) affects the amount of energy absorbed. eg. ice and snow surfaces vs. land and water surfaces, solar oven
3. Identify the major players in an Arctic Ocean food chain and how they fit into an ecological pyramid. Understand that POPs or persistent organic pollutants (eg. mercury, dioxin) are transferred up the food chain through bioaccumulation, to concentrate in high levels in top predators such as polar bears.
4. Investigate a dissected fish, using appropriate tools (eg gloves, forceps). Make comparison between the circulatory systems of fish and humans. Discuss what affects fish growth rate and how fish age can be determined.
5. Be able to discuss traditional Inuit hunting and fishing methods, and the cultural values associated with living off the land. Compare the nutritional value and costs of country food and grocery store food in Arctic communities, and identify issues related to food security.
6. Understand the connection between global greenhouse gas pollution and rapidly changing Arctic climate, and set goals to reduce their greenhouse gas production and pollution at school and at home.





VOCABULARY

- Albedo:** A measure of how much light is reflected by the Earth's surface. If a surface reflects light, it remains cool, but if a surface absorbs light, it heats up. Albedo is affected by colour, texture and material of the surface. For example, snow has high albedo, bare land has low albedo.
- Arctic:** Can be defined as being north of the Arctic Circle at latitude 66°N, but more often includes all geographical areas north of the tree-line characterized by long cold winters and short summers. Arctic lands can be found in Canada, Alaska, Russia, Greenland, Iceland, Norway, Sweden and Finland.
- Arctic Amplification:** Increases in greenhouse gas concentrations in the atmosphere are raising the average global temperature, and also resulting in larger changes in temperature near the poles than the planetary average. Causes of this effect include reduction of snow cover and sea ice (which reflect solar heat), changes in atmospheric and ocean circulation, presence of soot (black carbon) from global pollution, and increases in cloud cover and water vapour.
- Bioaccumulation:** When a toxic substance builds up in an animals' tissues to a higher concentration than that of its surrounding environment.
- Biomagnification:** The process where a toxic substance increases in concentration as it is moved up the food chain, through the action of predators consuming contaminated prey.
- Carbon Footprint:** Also called the greenhouse gas footprint, this refers to the amount of carbon pollution (in form of carbon dioxide) that is emitted during the production of goods and services.
- Climate:** What we expect to happen with the weather. Climate is a 30 year expected average of weather. For example, in Winnipeg, the climate is characterized by hot, dry summers and cold, snowy winters.
- Climate Change:** When climates of different regions change over time (become hotter or cooler, wetter or drier). Climates have changed many times over Earth's history, but we are now experiencing an unprecedented rate of climate change due to human activity.
- Country Food:** Food that has been taken from the land by hunting or fishing locally. Traditional and modern diets of northern peoples include larger quantities of meat and fish, raw, dried or cooked, than a typical Western diet.
- Ecological Pyramid/Food Chain:** Shows the relationships of who-eats-who, starting with a species that eats no other species and ending with one that is eaten by no other species. An ecological pyramid represents the biomass or productivity of living things at each trophic level in an ecosystem (e.g. primary producers, primary, secondary and tertiary consumers).





Grasshopper Effect:

Global distillation or the grasshopper effect is the geochemical process by which persistent organic pollutants (POPs), are transported from warmer to colder regions of the Earth. Toxic chemicals that are in the form of vapor in warmer regions of the world are transported by atmospheric winds and ocean currents to colder regions where they condense on water or land, and are taken up into the food chain.

Greenhouse Gas:

Gases such as carbon dioxide, methane, and nitrous oxide which occur in our atmosphere and create the greenhouse effect which is essential for life on our planet. The greenhouse effect traps the heat from the sun close to the Earth's surface, increasing global temperatures to a livable level. Without these gases, Earth would be -18°C year-round. Current human practices of fossil fuel burning, as well as intensive farming, deforestation and development are increasing the amount of greenhouse gases, particularly carbon dioxide, in the atmosphere. This is leading to human-caused global warming and climate change.

Inuit:

Means "the people", singular Inuk. There are many groups of circumpolar Indigenous peoples across the Arctic, but the Inuit subgroup have lived in Canada, Greenland, and parts of Alaska, and Chutkotka, Russia for thousands of years. Across the 4 Inuit homelands in Canada, there are many differences in regional dialects of the Inuktitut language, as well as culture, clothing and traditions.

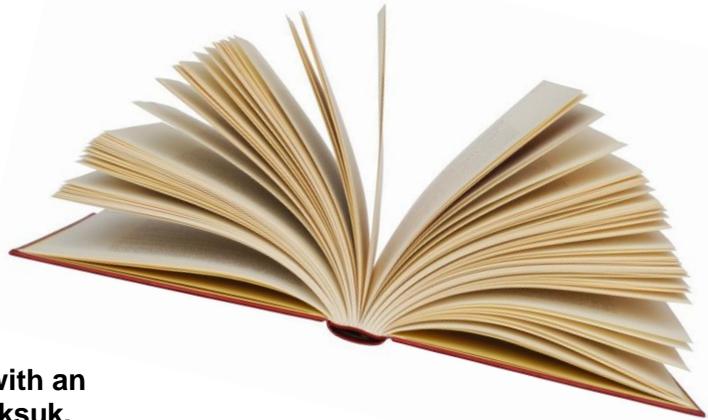
Persistent Organic Pollutants:

Toxic chemicals that take a long time to break down in nature, and can cause toxic effects on the body systems of animals (nerves, reproduction, immune system), as well as contributing to cancer risk. Examples include mercury (emissions from coal burning, waste incinerators and mining), dioxin (pulp and paper bleaching, car exhaust), PCBs (coolant in industry, now banned), PAHs (from fossil fuel burning), PFOA (byproduct of manufacturing Teflon and GoreTex) and brominated flame retardants.



LITERATURE CONNECTIONS

All of the books listed below relate to the theme of the Arctic, are recommended for young adults, and are available through the Winnipeg Public Libraries and/or the Manitoba Education Instructional Resources Library. You may wish to make these titles available in your classroom surrounding your 'Arctic Experience' field trip. **Books and activities with an Inuit perspective are indicated with an inuksuk.**



Fiction

- > **The Curse of the Shaman: A Marble Island Story** by Michael Kusugak 🇮🇺
This novel about Inuit life prior to European contact is full of mystery, magic, vocabulary, and warmth. A challenging and unique read for students.
- > **On Thin Ice** by Jamie Bastedo 🇮🇺
The story of a gifted northern youth struggling to find her true home in a fast-changing Arctic where culture, climate and environment seem to be crumbling all around her.
- > **Julie of the Wolves** by Jean Craighead George
A young aboriginal girl seeks her identity in the Alaskan wilderness.
- > **Lost in the Barrens** and **Never Cry Wolf** by Farley Mowat
Two classic novels about survival in Canada's Arctic.
- > **Fatty Legs** by Christy Jordan-Fenton and Margaret Pokiak-Fenton 🇮🇺
A young girl from the high Arctic bravely faces the challenges of residential school.
- > **Call of the Wild** by Jack London
The gripping tale of a heroic dog that, thrust into the brutal life of the Alaska Gold Rush, ultimately faces a choice between living in man's world and returning to nature.

Film

- > **The Snow Walker** (2003) – PG 🇮🇺
A bush pilot learns about survival and the true meaning of humanity when his plane crashes in the Arctic and he must rely on the knowledge and compassion of his only companion, a young Inuit woman.
- > **Inuit Knowledge and Climate Change** (2010) – PG 🇮🇺
Nunavut-based director Zacharias Kunuk and researcher and filmmaker Dr. Ian Mauro have teamed up with Inuit Communities to document their knowledge and experience regarding climate change. Available at www.isuma.tv.
- > **Chasing Ice** (2012) – PG-13
Follow National Geographic photographer James Balog across the Arctic as he deploys time-lapse cameras designed for one purpose: to capture a multi-year record of the world's changing glaciers.

Non-Fiction

- > **The Inuit Thought of It: Amazing Arctic Innovations** by Alootook Ipellie 🇮🇺
- > **Planet Arctic: Life at the Top of the World** by Wayne Lynch
- > **We Are the Weather Makers: The History of Climate Change** by Sally M. Walker and Tim Flannery
- > **Heroes of the Environment: True Stories of People Who Are Helping to Protect Our Planet** by Harriet Rohmer



PRE-VISIT ACTIVITIES

WINTER WEAR (1-2 lessons)



Social Studies

Have students investigate how to dress for cold climates, and compare with traditional Inuit clothing, as researched at the library and on the Internet. What are the environmental factors that clothing must be designed to withstand? How have both modern and traditional clothing managed to protect humans from these factors?

Suggested web resources:

Modern Clothing:

- > <http://arctickingdom.com/wp-content/uploads/2014/06/Polar-Clothing-Packages-WEB.pdf>
- > <http://www.thecoldestjourney.org/the-expedition/equipment/clothing/>

Traditional Clothing:

- > <http://www.johntyman.com/arctic/inuit201.html>
- > Canadian Museum of History, Caribou Skin Clothing:
http://www.historymuseum.ca/collections/search-results/?q=material%3ACaribou+skin&page_num=1

***Complete the following hands-on activity to reinforce warm dress.** What should you wear or bring to the field trip that will be warm enough for a whole day outside?

Materials: A trunk full of clothing including hats, mitts, gloves, long underwear, jackets, ski pants, fleece pants, boots, sneakers, t-shirts, sweatpants, jeans, wool socks, cotton socks, etc.

Procedure:

1. Split class into small teams. You may choose to have each group use all the clothing, or just focus on one body part (head, legs, torso, hands etc.).
2. Have each team brainstorm the important points of dressing for the outdoors.
3. Have one student from each team be the "dresser".
4. Assign each group a winter activity to dress for.
5. When you say start, with vocal help from teammates, the dressers will hurry and dress themselves.
6. Once a team thinks their outfit is complete, stop the activity and go through each team's outfit.

Winter Activities:

- > Sitting down ice fishing all day
- > Being active (e.g. cross country skiing)
- > Emergency clothes for the back of your car





Helpful Winter Dressing Tips:

- > Always dress in layers. Use many thin, warm layers rather than a few thick layers. It will insulate better and allow you to take off layers to avoid sweating.
- > Wear a base layer such as long underwear, or other warm, thin clothing that will wick moisture away from your skin.
- > Don't wear cotton. It will get wet and cold.
- > Wear a hat. While it's a myth that most body heat escapes through the head, covering any exposed body part helps retain body heat.
- > Dress for the appropriate activity level. Dressing for an active day of skiing will be different than dressing for a sedentary day of ice fishing.
- > Buy or find a pair of insulated boots.
- > Wear warm socks. Wool is best, although good synthetic socks are often quite good. Avoid cotton as it soaks up sweat and will make feet wet and cold. You can layer socks, but be careful that socks aren't too tight as this will cut circulation.
- > Use a good quality parka that breaks the wind. Make sure you wear warm layers underneath too.
- > Wear mittens. Fingers and hands are very vulnerable to the cold, so keep them covered. Keeping fingers together in a mitten is warmer than wearing a glove.
- > Hand warmers can be useful, but don't use these as a substitute for dressing warmly.
- > Wear more than one layer on your legs. Oddly, some people will wear five layers on their torso, and only one layer on the legs.
- > Keep dry with a snow-repelling outer layer. Being wet will cause chill to set in more quickly.

POLAR OPPOSITES (1-2 lessons)

Science/Social Studies

Ensure the students understand the differences between the **Arctic and Antarctic** regions of the world. Have students conduct their own research, then develop quiz questions for each other that can be answered with Arctic, Antarctic or both Arctic and Antarctic. This can also be done as a group Venn diagram exercise, using large poster sheets and sticky notes.

- a. Penguins, no permanent residents, no land mammals, land surrounded by water – Antarctic
- b. Polar bears, caribou, Inuit, beluga, an ocean surrounded by land – Arctic
- c. Ice, aurora, seals, magnetic field, seeing increase in ice melting due to global warming - both
- d. This Ted-Ed video is a great summary of the differences between the two regions:
<http://ed.ted.com/lessons/the-arctic-vs-the-antarctic-camille-seaman>





INUIT INQUIRY (1-10 lessons)



Social Studies

Isuma.tv is a great resource of multi-media learning material geared for Grades 4-6, but great for higher grades too. There are full-length videos and lesson plans surrounding Inuit culture. Great introductory activities include:

- > Traditional Foods of the Inuit lesson, and My Community vs. Nunavut, available at <http://www.isuma.tv/en/exploring-inuit-culture-online>. You can order the entire curriculum online for \$250, or borrow a copy from FortWhyte by contacting education@fortwhyte.org, or calling (204) 989-8359.
- > The National Film Board also has clips of archived videos showing Inuit traditional at <http://www.nfb.ca/playlist/unikkausivut-sharing-our-stories/>
- > The Inuit Cultural Online Resource is a great source of information about Inuit culture. Exploring modern vs. traditional Inuit life will help your students to get a better concept of how Inuit life is similar and different from our Western life: <http://icor.ottawainuitchildrens.com>
- > Inuktitut is the language of the Arctic. Explore the language and learn some new words: <http://www.tusaalanga.ca/>
- > Simple Inuit Games can be found in **Attachment #1**. Great community sites for some games for the athletically gifted or adventurous can be found at:
<http://www.athropolis.com/news-upload/11-data/index.htm>
http://www.jenshaven.k12.nf.ca/IGgrassroots/Page_1x.html
- > Inuit Legends:
http://www.artnunavik.ca/webconcepteur/web/fcnq/en/artnunavik/art/nav/myths_and_legends.html?iddoc=147038&page=homepage.jsp

FISH ANATOMY (1 lesson)

Science

In the program Arctic Experience students will explore an Arctic food chain and dissect a fish. Become familiar with the fish anatomy you will be investigating at FortWhyte.

See **Attachment #2**.

Fish vs. human heart: <http://esi.stanford.edu/circulation/circulation5.htm>





NORTHERN CONNECTIONS (ongoing)

Social Studies/Science/Language Arts

Connect with students and teachers in Northern Manitoba so your students can exchange stories about differences and similarities in their way of life. If possible, have students focus on climate change and human impact as a theme – what is climate change doing/will it affect their way of life? Examples include late freezing/early melting of ice roads on lakes, changes in animal populations, extreme weather events (tornadoes, floods, etc.) and pollution.

Contact Frontier School Division - information at the end of this document (**Attachment #3**).

INVESTIGATING BIOACCUMULATION (1 lesson)

Science

Teach about bioaccumulation. Have students research different substances, such as certain pesticides, industrial chemicals and pharmaceuticals that can bioaccumulate in organisms in the Arctic, and where they come from.

Introduce the concept by using this interesting concept demonstration.

Materials:

You will need 6 small jars (representing seal) and 1 large jar (represents polar bear) with lids, water, vegetable oil, and an oil-based dye. (If you can't find oil-based dye, try making your own. Grate several carrots and cover with water in a saucepan. Boil for 5-10 minutes, cool and strain. Beta-carotene (Vitamin A) is an orange dye that is fat-soluble!)

Procedure:

Begin with each small jar $\frac{3}{4}$ filled with water, and the large jar $\frac{1}{2}$ filled with equal parts water and oil. Add one drop of dye to the large jar and shake. Allow the mixture to separate, and you will see the dye partition into the oil. Then add one drop of dye to each of the small jars, and shake well. Throughout the class, have students add 5 of the small jars of coloured water to the large jar, shaking and settling each time. At the end of the class, compare the intensity of colour between the remaining small jar and the large jar. Students will see a much darker colour in the large jar. The oil-based dye has undergone "biomagnification."

This video about the process of global distillation of mercury to the Arctic, may be a good introduction for middle years students. Mercury Rising (2011): <http://vimeo.com/54936463>

*Warning, there are graphic hunting scenes in this video.





SEA ICE AND ALGAE (1 lesson)

Social Studies/Science/Language Arts

Investigate the differences between salt water ice and freshwater ice, and the habitat that sea ice can provide for the primary producers (algae) in the Arctic food chain.

Freeze enough saltwater (3.5g salt/100mL of water) and freshwater ice cubes for small groups of students to have 1 of each. You will also need blue food colouring dissolved in rubbing alcohol in dropper bottles, and shallow plastic dishes for the ice cubes.

Have students place a drop of dye on the saltwater and freshwater cubes and observe what happens. The dye will spread through the saltwater ice, while it will just run off the freshwater ice. This demonstrates the presence of brine channels in sea ice which can host entire microbial ecosystems.

While fresh sea-ice still forms every year, multi-year sea ice in the Arctic is disappearing as a result of climate change. If multi-year sea ice is habitat for primary producers such as algae, what is one way that climate change can affect the ecological pyramid in the Arctic Ocean?

This video sums up the importance of ice algae:

<http://www.ecology.com/2014/11/19/researchers-crack-ice-study-arctic-marine-food-web/>

Extension: Use this opportunity to teach about the differences in freezing temperatures between saltwater and freshwater.

ALBEDO AND CLIMATE CHANGE (1 lesson)

Science

Teach about the concept of **albedo** (solar reflectivity). Different surfaces reflect sunlight differently. If sunlight is not reflected, it is absorbed by the surface, and the surface heats up. Test out different surfaces in your classroom, choosing different colours and textures. Tape or place a thermometer on each surface and use desk lamps to simulate heat from the sun. Wait and see what happens to the temperature reading on each thermometer. Apply this theory to the loss of highly reflective ice and snow at the poles due to global warming. What effect will the loss of high albedo surfaces have on the rate of heating in the Arctic?

The website <https://www.cresis.ku.edu/content/education/k-12> outlines more good ice, snow and climate change activities and demonstrations.

Extension: Have students apply their understanding of albedo and use the design process to create a functional solar oven as a class or in small groups.





POST-VISIT ACTIVITIES

CLASS CLIMATE CHANGE REDUCTION

Science/Social Studies/Math

Find out what students can do to reduce your class' energy consumption and greenhouse gas emissions. FortWhyte recommends the resources below:

- > Online greenhouse gas emissions calculator for under 16's (link must be copied and pasted to work properly):
<https://www3.epa.gov/climatechange/kids/calc/index.html>
- > EnerAction online energy conservation lessons and lighting calculator:
<http://www.greenlearning.ca/programs/eneraction/>
- > Invite a speaker from Climate Change Connection **<http://climatechangeconnection.org/>** to your classroom. They will help your students brainstorm and then plan out the steps to take to reduce personal greenhouse gas emissions.
- > Visit the Manitoba Environmental Youth Network for great links to more sustainability projects and campaigns for youth: **<http://www.mbeconetwork.org/youth/>**
- > Visit the Prairie Climate Atlas **<http://climateatlas.ca/>** and explore their interactive website, such as investigating how differing levels of atmospheric carbon will affect prairie weather in the near and far future.
- > Complete a school water audit such as FortWhyte's Leak Detector Challenge: Visit **<https://www.fortwhyte.org/foreducators/teacherpd/slowtheflow/>** or a school waste audit such as Recycle Rangers: **<http://www.recyclerangers.ca/waste-reduction-resources/composting/>** as ways to reduce your school's impact on the environment. To save water at home, check out Manitoba Hydro's Water and Energy Saver kits that are available to all homes in Manitoba.
- > Join in Citizen Science projects that are helping us to learn more about how climate change is affecting our communities. Rink Watch **<http://rinkwatch.org/>** is a project where you can submit the dates at which your local outdoor hockey rinks are good or not good for skating. This will help scientists to look at local weather changes and notice how climate is changing over time. Project BudBurst looks at changes in the timing of plant growth in the spring **<http://budburst.org/>**
- > Let FortWhyte Alive know about your hard work to reduce greenhouse gas emissions at school by contacting us at **education@fortwhyte.org**. We'd love to hear what you've been up to and recognize your efforts on our website.





POLAR BEAR PERSPECTIVES (1-3 lessons)



Social Studies/Science/Language Arts

Polar bears are one of Canada's most iconic and at-risk animals. Impacted by climate change and hunting, their populations are in serious decline in many areas. Polar bears are currently classified as "Threatened" in Canada. But hunting them is also an important cultural tradition for the Inuit. A lottery system for hunting is currently used in Nunavut with a quota that is intended to keep polar bear populations at a sustainable level. Using the links below, explore polar bear biology, the impacts of climate change on polar bears, and Inuit perspectives on polar bear hunting. Discuss the differing perspectives of hunters and scientists with regard to polar bears. Students might present their findings in a variety of ways including a poster, diorama, debate, or piece of writing.

- > Introduction to the controversy:
http://www.canadiangeographic.ca/magazine/dec12/polar_bears.asp
<http://www.vox.com/2014/12/18/7415843/polar-bears-vanishing>
- > Polar Bear Distribution Maps:
http://wwf.panda.org/what_we_do/where_we_work/arctic/wildlife/polar_bear/population/
<https://www.canada.ca/en/environment-climate-change/services/biodiversity/maps-sub-populations-polar-bears-protected.html>
- > Nunavut's "We're Okay!" Polar Bear Campaign:
http://www.nunatsiaqonline.ca/stories/article/65674ntis_polar_bear_bumper_sticker_to_be_shown_at_cites/
- > Polar Bears International: Check out Educational Resources, webcasts from the tundra and student leadership programs at <https://polarbearsinternational.org/>

FortWhyte's Picks:

- > Polar Bears in a Warming World Presentation.
- > Videos: Journey Across Broken Ice and Crossing Thin Ice.
- > Tundra Connections: Live webcasts from the tundra each fall.





STORYTELLING AND SOAPSTONE CARVING (3-5 lessons)



Language Arts/Visual Arts/Social Studies/Science

Oral storytelling is an integral part of Inuit culture. Have students dramatize the legends, compare them with legends from other cultures, or write their own legends about the Arctic.

Extend the learning by connecting storytelling with art. Inuit art takes many forms including sewing, sculpting, print-making, and painting. The Winnipeg Art Gallery is home to the world's largest collection of Inuit art, visit <http://inuit.wag.ca/>. Many Inuit art resources can be found in Winnipeg's libraries and online. Inuit art depicts many aspects of life in the Arctic, and often focuses on characters from stories and legends. Soapstone carving is one unique project that will engage students with the process of sculpting.

Here are some tips and ideas for soapstone carving with your students:

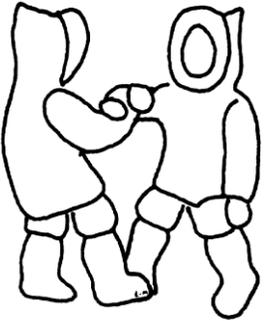
- > Research the properties of soapstone and where it comes from (Moh's Scale of Hardness is a great science connection).
- > Buy a block of soapstone at Artists Emporium or another art store and break it into small chunks with a hammer and chisel or a saw. The smaller the pieces, the easier they will be for students to carve.
- > Have students look for natural shapes in the stone. Do they see something that looks like an eye, a head, a specific animal or character?
- > Use files of various sizes to shape the stone and eliminate all sharp corners. The process should mainly consist of smoothing and shaping, not chopping or drastically changing the shape of the stone.
- > Use at least three grades of sand paper (starting with coarse and ending with fine) to further smooth the stone. The final smoothing can be completed with steel wool.
- > Bring out the colours in the soapstone by polishing the stone with a small dab of baby oil or cooking oil.
- > Dust from soapstone is just talc (baby powder). It is not toxic, but should not be inhaled in large quantities. This activity is best done in a large room with tarps on the floor or outdoors in the fall or spring.
- > Soapstone carving kits are available at <http://www.mp-soapstone.com/Kits.htm>





Attachment #1

INUIT GAMES



1. ARSAARARTUQ

A pulling contest involving different holds:

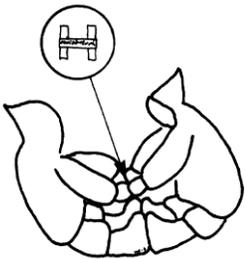
1. Wrist lock and pull
2. Finger lock and pull



2. TU NU MIU

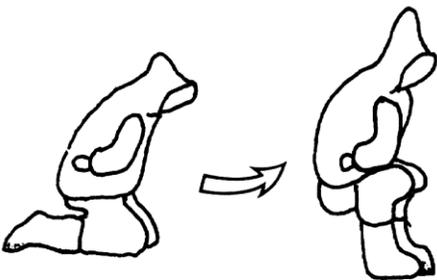
Back to back. The object is to push the opponent over a line using hands and feet.

1. Elbow lock and pull



3. AC SA RAQ

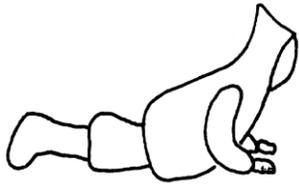
Thong game. Legs are kept straight while feet are placed against feet. The object is to pull opponent up off the ground.



4. PEED LE TA TUQ

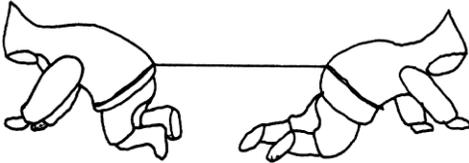
Move from kneeling position to squatting one with a quick jump and then back to kneeling again.





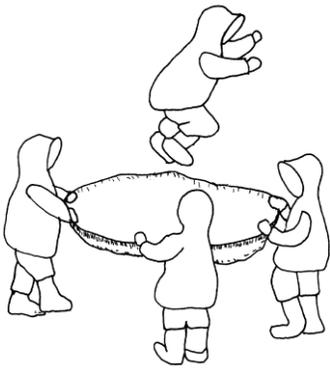
5. SEAL RACING

Racing each other on hands, with legs limp and body trailing.



6. HOLMAN ISLAND DOG TEAM PULL

Rope is used as harness. The object is to pull opponent over a line drawn between contestants.



7. HOLMAN ISLAND BLANKET TOSS

The game is full of fun and is played at festivals and celebrations. The blanket is usually made of large seal or walrus skins (the one at FortWhyte Alive is canvas). The object of the game is to get bounced higher than anyone else.

Choosing Teams

Those born in the summer on one side. Those born in the winter on the other. If born during freeze-up or break-up you can choose either side. Summer teams are the **sea pigeons**, winter teams are the **ptarmigans**. They never mix and always chase each other away.

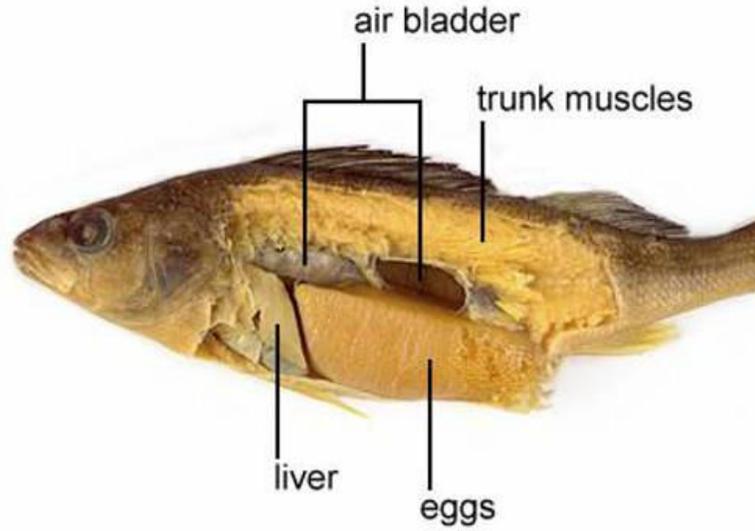




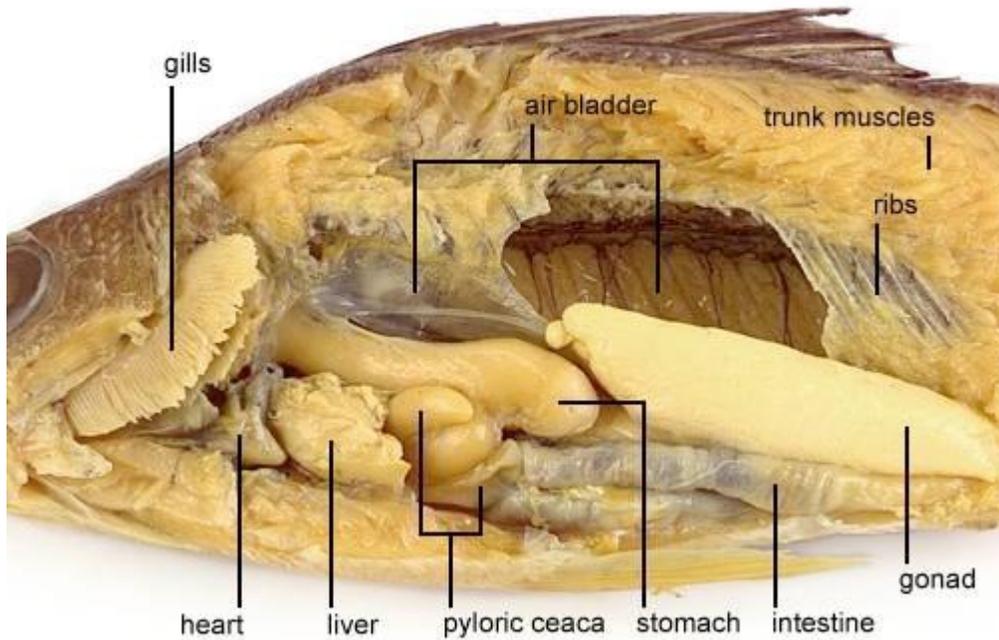
Attachment #2

FISH ANATOMY WORKSHEET

Perch - Internal Features (Female)



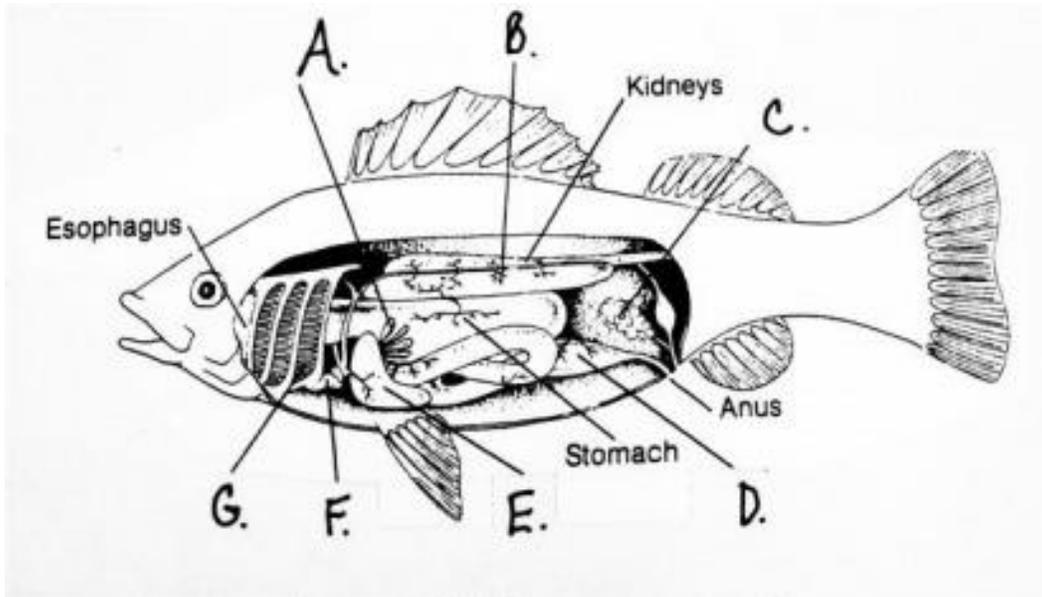
Perch - Internal Features (Male)





Attachment #3 (Continued)

FISH ANATOMY WORKSHEET



- A. _____
- B. _____
- C. _____
- D. _____
- E. _____
- F. _____
- G. _____

Choose two of the structures above and explain why they are important:

Structure 1:

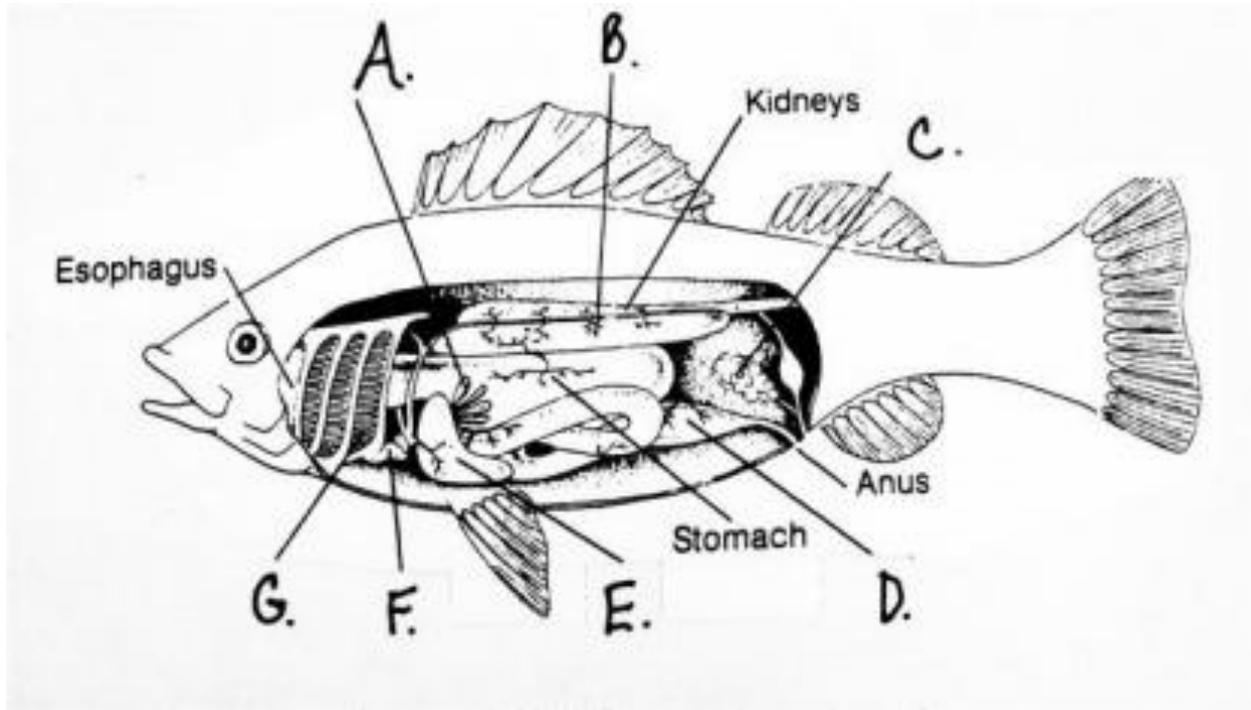
Structure 2:





Attachment #3 (Continued)

FISH ANATOMY WORKSHEET KEY



- A. Pyloric Caeca (a part of the digestive system)
- B. Swim Bladder (bladder that allows fish to float or sink)
- C. Pancreas (aids in digestion)
- D. Intestine (digestive organ)
- E. Liver (filters toxins out of the body)
- F. Heart (pumps blood)
- G. Gills (gas exchange organs)





Attachment #3

FRONTIER SCHOOL DIVISION

Partners in Learning

Frontier School Division is the home of 42 schools in Manitoba. Diversity is essential within our Division, both geographically and culturally. We have schools as far south as Falcon Beach, and as far north as Churchill.

We are hoping to join forces in all learning possibilities.

Some areas could be:

- > Land based education
- > Cultural identity and activities
- > Pen pals
- > Virtual field trips to the classrooms

If you would like to initiate classroom partnerships with a school in our Division, please contact Jacqueline Monteith, Science Consultant for Frontier School Division at **Jacqueline.monteith@frontiersd.mb.ca**

You can visit the division website at **<https://www.frontiersd.mb.ca/Pages/default.aspx>**

