Trash-
"It ain't heavy...until I have to carry it!

Orca Scientists,

We live in a disposable age. Things quickly break down and are quickly discarded. We do it so often that sometimes we forget how much of what we buy ends up going back out the door to the landfill. All of those lost resources end up affecting the habitat and food chains of our neighborhood orca friends. In this exercise we are going to get a real life experience of exactly how much we toss out and how we can reduce that amount

Supplies:

Bathroom Scale
A full indoor home trash can
A child's back pack or bag
Something "weighty" like a bag of flour, bean bags, 2 liter bottles of water, etc...

Preparation:

With the help of their parents/guardians, have the students weigh their home garbage cans, right before they send them out to the curb or dumpster. Have them report those results to the class.

Hands on:

Have the students add the results together to get a total weight for the class. Record that number in a conspicuous place and in a place that it will be easy to see.

Next, help the students divide that number (total lbs. of trash) by the number of students in class. (For example 150 lbs divided by 30 students= 5 lbs per student).

For homework that night, they must create a backpack or bag that weighs as much as the class average. (Using our example, each child would need to have a bag for the next day of school that weighed 5 pounds). Use bean bags or water bottles to simulate the weight.

The following day have each child wear that bag the whole day, or as much as possible.

Journal and record their observations. How does it feel, does it help or hinder their movement? Etc.....

Following the experiment, brainstorm some ways that they could reduce that amount of weight. Could they recycle? Buy items with less packaging? Reuse items.

The following week, after the brainstorming, have them once again weigh their trash cans and report that number back to class.

Did they end up with less garbage than they had previously? Do the math and compare!

Blubber, or how do they stay warm in such cold water ?

Orca Scientists,

Killer whales next to humans, are the most widely distributed mammals on the planet. They are found in all the oceans of the world but are most commonly found in the cooler waters both north and south of the 50th parallel. Through time their bodies have adapted to life in these cold waters. In fact whales have become very well adapted to both keeping their vital body heat as well as shedding it. One way that they retain the heat is through their blubber, a fatty substance that acts as a form of insulation, or a warm coat, against the frigid waters. Our job as scientists is to examine how this blubber works as insulation and to experience how effective it really is.

Supplies:

Ziploc storage bags
Duct Tape
Shortening
Miscellaneous "fillers" like cotton balls, shredded paper, etc...
Bucket of ice cold water

Preparation:

Place a cup full of shortening into one of the ziploc bags. Then take another ziploc bag, turn it inside out and insert it into the one with the shortening.

Zip the edges of the two bags together so that the shortening is encased between the 2 bags. You now have a blubber glove!

You can duct tape the seams together to make sure the blubber stays in the glove.

Using the same technique as above make additional gloves that have different fillers.

Hands on:

Taking turns, have students alternate sticking their bare hands in the water.
Make sure to record their reactions, writing down how it feels, how long can they hold their hand in the water, etc...

Then have the students repeat the experiment except this time use the filler gloves.
Again record their reaction, endurance etc.
Make clear recordings of your findings.
Analyze your results and compare them to your previous findings.

Now utilize the blubber glove. Record your results and compare!

Use your imagination-
Draw yourself as a whale

Orca Scientists,

What would you look like if you were an orca? Would you have a tall straight dorsal fin or would it be curved like the crescent moon. Would your saddle patch, the grey behind your dorsal fin, be puffy like a cloud or crooked like a hook. What about your eye patch, pectoral fins and your fluke? Would they have scars on them or would they be perfect? Now is your time to exercise your imagination and picture yourself as a whale. Use the pictures below to get some ideas and then off you go. Remember each whale, like yourself is unique.....Don't forget to draw in your habitat too!

(Use the space below to draw yourself as a whale)

Killer Whale Tales
How did the whale get its _____?

Orca Scientists,

Ever since humans and orcas first met, people have tried to understand and comprehend their neighbors in the sea. They have been intrigued by the whale's hunting skills, their vocalizations and their incredible ability to inspire awe. Cultures around the world have incorporated killer whales into their stories and song. Some of those stories have tried to explain how orcas came into existence, while others have focused on what the killer whale world is like under the sea.

Now its your turn to write and tell your own orca creation story.

Supplies: Paper and pencil.

Preparation: Discuss peoples' use of stories to explain the world around him and how he relates to it.

Hands on: Have the students write their own creation stories regarding how the orca got its...(fill in the blank)

Examples: How did the orca get it's unique black and white color?
How did it get it's curved dorsal fin?
Why do they almost always spend their entire lives with their families?
Millions of years ago they lived on land and chose to return to the sea, why?
How did the orca get it's voice?

Once they have written their stories have them share them with the group verbally.

Variations: Have the students illustrate the stories
Have a group act out the story as it is being told

Additional resources:

Below is a brief list of books that are readily available at your local library or on-line.

Orca Song– told by KLOPINUM, written and recorded by Cameron, Anne
Isbn 0-920080-29-4

Myths and Legends of the Haida Indians of the Northwest– arranged by Martine Reid, Ph. D.
No Isbn. Available through Bellephron books, Santa Barbara, CA

Storm Boy– by Paul Owen Lewis. Isbn 1-58246-057-4

Rostrum to fluke-
How many students make a whale

Orca Scientists,

Killer Whales are big. But in fact they are not a whale at all, they are world's biggest dolphin. But how big are they really? We usually get a good view of their dorsal fin when they come up to breathe, but unless they breach it is often hard to appreciate how big they actually are. In the following math exercise we will see how many of us it takes to make up one of them!

Supplies: Paper and Pencil
Tape Measure (at least 30' in length)
Bathroom Scale

Preparation: Have the students hypothesize, (discuss the scientific method), how big orcas are, both in weight and length. Record their guesses on the chalkboard.

Hands on: This activity works well with large group (10 or more), especially the whole class.

Orca weight: Have each student weigh themselves and record their individual weights. Using the figures on the back, methodically add the students own weight together, one at a time, until their collective weight equals that of the whales listed below. You may find yourself going through the class roster more than once!

How many students does it take to equal a calf? a grown female? a bull?

Were their hypothesis' correct?

Orca length: This exercise works by either measuring each others height individually and adding them together like the exercise above or; Break the class into 3 even groups and using the figures below, take the long tape measure and measure out how long the orca is on the wall, floor, in the hallway, wherever you have a wide open space. Then have the students line up or lay down and see how many of them it takes to equal the length of a killer whale. If you want to compare them to other whales, use the additional figures to measure out some other cetacean species.

Additional Exploration: Discuss why whales are the sizes they are. What benefit do they derive from their size and weights? Discuss how the relative absence of gravity in the bouyant salt water allows animals to grow so large?
Why in some species is the female bigger?
How do they compare to us?

Rostrum to fluke- Whale Statistics

	Weight*	Length*
Killer Whales		
Males	11,000 lbs.	up to 30 feet
Females	8,000 lbs.	up to 25 feet
Calves	800 lbs	8-9 feet
Minke Whales		
Males	12,000-20,000 lbs.	26-31 feet
Females	12,000-20,000 lbs.	27-33 feet
Calves	1,000 lbs.	10 feet
Grey Whales		
Males	48,000 lbs.	40-50 feet
Females	68,000 lbs.	42-50 feet
Calves	3,000 lbs.	15 feet
Sperm Whales		
Males	up to 80,000 lbs.	up to 50 feet
Females	up to 44,000 lbs.	up to 36 feet
Calves	up to 2,000 lbs.	13 feet

* all figures taken from "Whales of the World" by Lyall Watson

Make Your Home Orca Safe-
Kids Making a Difference Now!

Hello Orca families,

Want to make your home orca safe? Then take a crack at our "*Kids Making a Difference Now!*" orca conservation activity. The project's goal is to demonstrate that students throughout the region can make an immediate and positive impact on the overall health of the Puget Sound's killer whale population.

To do this, they will need your help and assistance in examining and recording their ecological footprint, both in their energy consumption habits and the products that they use around the home.

The "laundry/checklist" is yours to post on your refrigerator to serve as a reminder to your student to continue to do the work they started. There is also a resource sheet if you want to take things even further. As a reward, everyone who completes the activity gets a "Kids Making a Difference Now!" sticker like the one below. Simply assist your student in filling out the attached worksheet and return it to:

Killer Whale Tales
PO Box 2462
Vashon, WA 98070

Killer Whale Tales will document their results and add them to the hundreds of other students throughout the region who are also participating in this project. The updated results will posted on our website at www.killerwhaletales.org.

Hopefully you will have some time to work with your child on this activity and to demonstrate to them the powerful impact each of us can make. Even a tiny bit of change, when added to that of the other students in the class, can add up to an enormous difference in the environment, both for the whales and ourselves.

If you have any questions please feel free to contact us at the information below.

Thanks and we look forward to working with you!

Jeff Hogan
Executive Director
Killer Whale Tales
jeff@killerwhaletales.org
206.660.0835

Kids Making a Difference Now!
Helping Orcas At Your Home

It is up to us to do something for the whales. A great deal of what is affecting the orcas can be fixed if we are all willing to make some small changes at our homes. Fill out the activity sheet below. Investigate your ecological "foot print" and make changes where you can. Record the results and return them to Killer Whale Tales, PO Box 2462, Vashon, WA 98070 and we will send you a "Kids Making Difference Now!" sticker. Remember, even a little change, when added to what everyone else is doing, can add up quickly.

Recycling Fact:

Packaging alone makes up 64 million tons by weight or 33% of all of our garbage. Last year alone King County residents threw away 4 pounds of trash per person each day! Recycling one aluminum can saves enough electricity to power your television for 3 hours. That's a lot of hydroelectric power saved, which means more safe habitat for salmon and more food for whales.

Do you recycle? *(Circle one)* *Yes* *I started today* *Sorry, no recycling centers in our area*

If so, what do you recycle: *(circle all you do)* *Paper* *Plastics* *Glass* *Newspaper* *Food (worm bin?)* *Cans*

Organic Food Fact:

The word "organic" is used to describe food that has been grown or raised without artificial fertilizers and pesticides. Often these pesticides and fertilizers end up in the watershed and cause significant damage to the salmon living there.

Do you use products labeled as organic? *(Circle one)* Always Occasionally We will from now on

If you do, what organic products are in your house now? Veggies Fruits Milk Meat Canned Food Other

---

Recycled/Chlorine Paper Fact:

*If every household in the US replaced just **one** 12 pack of virgin fiber bathroom tissue with 100% recycled ones we could save 4.4 million trees and avoid 275,000 pounds of pollution! More trees means more habitat for salmon, which are orcas' main food source. According to Washington Toxic Coalition, bleaching paper with chlorine compounds to make it whiter is one of the largest causes of toxic pollution in Washington State. This toxic contaminant is called Dioxin and is one of the most toxic chemicals known to man. Dioxin causes all sorts of immunological and reproductive problems in mammals.*

Do you use recycled/chlorine free paper products in your home? *(Circle one)* Yes No

Check the packaging on the paper products in your home. Are they recycled? Chlorine Free?

Toilet paper recycled-	*recycled?*	yes	no	*chlorine free?*	yes	no
Paper towels recycled-	*recycled?*	yes	no	*chlorine free?*	yes	no
Facial tissue recycled-	*recycled?*	yes	no	*chlorine free?*	yes	no
Computer paper recycled-	*recycled?*	yes	no	*chlorine free?*	yes	no
Napkins recycled-	*recycled?*	yes	no	*chlorine free?*	yes	no
Envelopes recycled-	*recycled?*	yes	no	*chlorine free?*	yes	no

On your next shopping trip can you replace at least one of your normal paper purchase with a chlorine free/recycled product? *(Circle one)* **Yes** **One time** **From now on**

Kids Making a Difference Now!
Helping Orcas At Your Home

Electricity Fact:

Here in the Northwest we get a lot of our power from hydroelectric dams. These dams generate electricity by blocking the free flow of river water and allowing gravity to draw the water through a turbine. These waters are also the habitat for our salmon.

Find your hot water heater, what temperature is it set on? ___ (If you do not have a hot water heater skip down)
(You can also use a candy/meat thermometer held under the hot water faucet)

Most manufacturers recommend 120 degrees. I turned ours down to_____

Thermostat Fact:

If we all turned down the heat by 5 degrees during the winter we would save the energy equivalent of 475,000 barrels of oil everyday. That means less pollution and a smaller chance of a catastrophic oil spill!

Check the thermostats in each room and record what it's set at. Make note of the change you made!

Room	Temp. before	Temp. after	Room	Temp. before	Temp. after
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Count the number of lights and electronic equipment currently using electricity.
Make sure to include TV's, VCR's, DVD players, computers, especially those with remotes as they usually draw power even when they are off.

Enter that number here_____ I turned off or unplugged the following number of Lights_____ Equipment_____

Water Consumption- Showering, Bathing and Brushing Fact:

Every drop of water in your home has to be pumped from rivers, reservoirs, or underground caverns. That takes a lot of energy. Plus the more water we consume for ourselves and to generate electricity means less for salmon.

Time yourself. When brushing your teeth how long is the water on? _____ seconds.

I cut that time by_____ seconds

Do you shower? If so, for how long? _____ I cut my shower time by_____ seconds

Or do you take a bath? If so, measure with a ruler the depth of the bathwater you use.

Normal Bath _____ inches I reduced the amount of water in my bath by_____ inches

---

Please list any other things that your family does to reduce their environmental impact:

_____

_____

_____

Thanks for your help! Return this to your teacher and get your "*Kids Making a Difference Now!*" sticker

Kids Making a Difference Now!
Reminder List/ Resources

Post this list on your fridge or some place obvious to remind yourself of the changes you have made and will continue to make! Remember even a tiny change can make a big difference when we work together!

To Do:

Limit your water consumption to the following:

- ☐ When brushing teeth only use the water at the beginning and when finished.
- ☐ Limit showers to 5 minutes per day.
- ☐ Reduce the bathing water level by 1-2 inches.

For more information and tips go to www.h2ouse.com

Reduce Electrical Consumption:

- ☐ Set all thermostats in your house for 68 degrees or less.
- ☐ Want to save more? Put on a sweat shirt and you could turn the heat down about 2 degrees. Add a sweater to that and take off another 3 degrees! That's 5 degrees, which will save you 15% on your home heating. That's saving whales and money!
- ☐ Turn down your hot water heater. Most manufacturers recommend 120 degrees.
- ☐ Want to save more? Put your hot water heater on a timer, set to about one hour before your high use time.
- ☐ Go through each room and unplug all rarely used items and make sure to switch off all unused lights.

Reach for Unbleached:

- ☐ Look for paper products with oxygen instead of chlorine. This includes toilet paper, facial tissue, paper towels and office paper. Also buy oxygen bleach for your laundry. Recycled computer/copy paper is available at most Kinko's print shop as well as office supply stores, like Staples.
- ☐ On your next grocery run look for paper products that contain the most post-consumer content. Try for 80% or more. Most local groceries offer at least one recycled option.

For more information check out www.watoxics.org or www.rethinkpaper.org or www.seventhgeneration.com or www.ecomall.com

Recycle:

- ☐ If you don't already, separate your trash from your recyclables. One bag for paper products, one for glass, one for plastics and one for cans.
- ☐ Put paper towels out of reach, use a sponge or reusable washrag instead.
- ☐ Re-use paper grocery sacks or better yet replace them with sturdy cloth bags.
- ☐ Buy frequently used items like popcorn, cereal and soap in bulk.

For more information visit www.metrokc.gov/DNR/kidsweb

Buy Organic:

- ☐ Concentrate your shopping dollars on buying as much organic food as possible. Even one piece of organically grown fruit will help. Look for food labeled organic that meets or exceeds the standards set by the USDA (www.ams.usda.gov/nop)

For more information visit www.kids.organics.org or www.pccnaturalmarkets/issues/pesticide.html or www.ewg.org or www.ota.com

Swim the Extra Mile:

- ☐ Can you walk or ride a bike instead of drive? How about busing or carpooling?
- ☐ Check out www.earthday.net/footprint/index.asp to see how many Earths it would take if everyone lived like you.
- ☐ Get involved! Stay up on current events and write your elected officials. Find their contact information at www.firstgov.gov/Contact/Elected.shtml

Printed on recycled, chlorine free paper

Who are you swimming with ?
Turn your family tree into an orca pod

Orca Scientists,

Our resident killer whales travel in large family groups called pods. These pods are led by the oldest female and include all of her blood-related family members. Our whales usually stay with their grandmother, mother, sisters and brothers for their entire lives. Remember, if you were a Southern Resident orca you would only be traveling with your ***mom's*** side of the family. A whale's father does not usually travel with his offspring, because he is traveling with his mother's pod. Put on your imagination and change your family tree into an orca pod. Everybody's pod will be different!

1 **In one of these boxes, write the name of the oldest living female on your mom's side. It might be your great grandma.**

Give your grandma a scientific name, use her first initial and make her number one.

Example: Grandma Helen would be H1. She leads H Pod! Her daughter, Donna, would be H2.

Great Grandma- (_ _)

Grandma- (_ _)

2 **In these three boxes below, write the names your aunts and uncles. These are your mom's brothers and sisters. Give them scientific names too! The older they are the lower their number.**

Aunts

Uncles

Your Mom

Cousins

3 **In this box write names of any of your cousins.**

4 **In these 2 boxes below write the names of your brothers and sisters and any other young people who you live with. What's your scientific name?**

Your brothers and sisters

Your name

( )

Track the whales
Where are they and why are they there?

Orca Scientists,

The inland waters of Washington State are home to one of the most heavily studied and observed killer whales on the planet. Since 1976, scientists have been researching and recording the whales as they move around our waters going about their daily whale business. Now, just like real scientists, we can too. In association with the Orca Network, you too can chart, record and hypothesize just like everyday researchers. Monitor the whales each day and see what kind of theories you can come up with about the whales and their use of habitat.

Supplies:

Paper and Pencil
Map or chart of the regions inland waters
Bulletin board to display the map on
Colored push pins or post it notes
Access to the internet or a teacher's email account

Preparation:

Join the Orca Network's sighting network at www.orcanetwork.org

Hands on:

Hang your map/chart and have the students help you to create a key for it. Assign a different color for each pod, *Blue for J Pod, Red for K-pod, Yellow for L-pod*, etc... Perhaps assign other colors for different species, as the network often gets reports of whales other than orcas.

Each day check to see if you have received an email from the Orca Network describing a recent sighting. Make note of the location, time and any identifying details of the whales that were sighted. Mark that position on map.

Begin to notice the habitat use of the orcas and the distances they travel. Have student theorize what may be drawing the orcas to each location. What does the frequency of sightings or lack thereof mean?

Have them speculate where the orcas might be seen next.

Additional:

Record the specific behaviors listed in the emails.
- make note of what they are doing, as well as where they are doing it.

Make graphs of sightings for certain areas
Create and write out stories about the daily life of the whales

(It is possible for this activity to go on for the whole year. Early fall and spring there are many orca reports and grey whales show up around March. Be patient you may go sometime without a report)

Let's learn to talk like scientists!
Orca Terminology

Orca Scientists,

Before we start to learn more about orcas and their world we must first become familiar with some basic terminology related to orcas. Below you will find words that scientists often use when talking about killer whales. They are of course hidden in the puzzle to make it a little more challenging.
One of the words is circled for you as an example. Good luck!

~~**Fluke**~~

Dorsal

Blow

Pectoral Fin

Salmon

Saddle

Scars

Pod

Matriarch

Mill

Log

Travel

Forage

Calf

Toxin

Echolocate

Resident

Transient

Breach

Bull

F	L	U	K	E	L	J	M	K	R	V	T
Z	P	A	L	S	C	E	P	I	X	G	N
Q	H	C	A	E	R	B	V	P	L	O	E
I	E	P	M	P	C	E	R	A	Y	L	D
D	C	E	F	O	W	O	L	B	R	K	I
T	H	C	R	D	M	H	F	W	F	T	S
R	O	T	O	X	I	N	W	L	P	L	E
A	L	O	J	H	C	F	A	E	B	U	R
N	O	R	I	D	Q	C	G	Z	K	E	N
S	C	A	R	S	C	A	L	N	U	I	O
I	A	L	H	C	R	A	I	R	T	A	M
E	T	F	X	O	C	N	D	B	U	L	L
N	E	I	F	D	O	R	S	A	L	U	A
T	Z	N	A	T	Q	E	L	D	D	A	S