

EDUCATIONAL ACTIVITIES BOOKLET



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INTRODUCTION

Part 1: PROGRAM HISTORY

The Great Canadian Shoreline Cleanup is an annual conservation event held **during a week in September** that aims to protect and restore the health of Canada’s shoreline ecosystems while changing attitudes and behaviours towards shoreline litter. It began in 1994 when the Vancouver Aquarium conducted its first shoreline cleanup as part of the International Coastal Cleanup (ICC), a global event hosted by the Ocean Conservancy. In the years to follow, the Great Canadian Shoreline Cleanup soon expanded to every province and territory.

Tens of thousands of Canadians volunteer at shoreline cleanups each year to make a positive change in their local community. Not only is it fun and easy way to make a difference, it is also a terrific educational opportunity. At each cleanup, teams record the type and amount of litter item removed. This data is then used to determine the predominant sources of shoreline litter, and this valuable information helps to raise awareness about the negative impacts of shoreline litter.

Part 2: USING THE EDUCATIONAL MATERIALS

Your participation in the Great Canadian Shoreline Cleanup provides a unique hands-on experience that teaches your students about environmental stewardship. This booklet contains a series of educational activities that can be used to extend your students’ learning experience **before** and **after** your shoreline cleanup.

The following materials are mentioned throughout the booklet:

1. **Ocean Conservancy’s International Coastal Cleanup Data Card**: Used by participating countries of the International Coastal Cleanup to record litter items collected during cleanups.
 - Available for download from www.shorelinecleanup.ca. Create or log in to your online account and select “**My Resources**” from your online dashboard.
2. **Dirty Dozen**: This list is compiled at the end of each cleanup year from the data cards and provides a ranking of the 12 most frequently collected litter items in Canada.



Questions about this booklet?

*Please contact the Great Canadian Shoreline Cleanup at
1-877-427-2422 or shorelinecleanup@vanaqua.org.*

PRE-CLEANUP ACTIVITIES

These exercises are designed to introduce your students to the impacts of shoreline litter before heading outdoors to participate in the Great Canadian Shoreline Cleanup.

Please complete them **before** your shoreline cleanup.

Included in this section are:

1. What is your Trash Quota?
2. Is that Animal Food in my Yard?
3. Classifying your Trash
4. Mistaken Identify
5. Mapping – Rivers and Estuaries
6. The Persistency Test
7. Mapping Currents – Trash Travel Itinerary

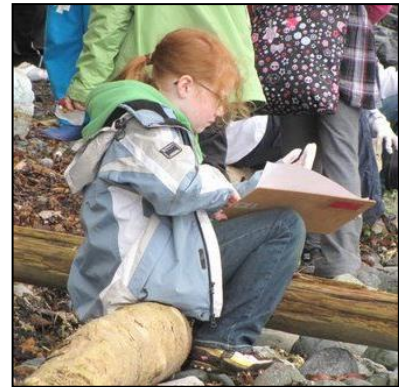


Pre-Activity #1: WHAT IS YOUR TRASH QUOTA?

Target Audience: Grades 2 and up

Objectives:

- Compare sets of data
- Gather data over an extended period of time
- Explain the impact daily choices have on the environment
- Recognize ways individuals can reduce the amount of trash produced daily and encourage personal responsibility to reduce, reuse and recycle



Materials:

- Log book or note pad for each student
- Great Canadian Shoreline Cleanup’s 2009 “Dirty Dozen” of most frequently collected items
- Ocean Conservancy’s International Coastal Cleanup Data Card

2009 Dirty Dozen		
Ranking	Litter Item	# Collected in 2009
1	Cigarettes/Cigarette Filters	367,010
2	Food Wrappers/Containers	116,138
3	Bags (Plastic)	74,276
4	Caps and Lids	63,471
5	Cups, Plates, Forks, Knives, Spoons	40,799
6	Beverage Cans	38,702
7	Beverage Bottles (Plastic)	37,618
8	Bags (Paper)	30,019
9	Straws, Stirrers	29,925
10	Beverage Bottles (glass)	29,361
11	Tobacco Packaging/Wrappers	19,906
12	Cigar Tips	17,328

Procedure:

1. Instruct students to review the litter items and categories listed on the **Ocean Conservancy’s International Data Card**.
2. Ask students to create and keep a personal trash log by recording every piece of trash they throw into the garbage for one week. Use the below “Trash Log” as an example.
3. At the end of the week, create a class tally by asking students to share their results on a group “Trash Log”.
4. Use the discussion questions below and review the class results.
5. Hold a waste reduction contest by asking students to continue recording for a second week to see who can reduce the largest amount. Explain that the less they throw out, the less that ends up in a landfill.

Results:

“Trash Log” Example

My Personal Trash Log				
Item	Mon.	Tues.	Wed.	Totals
Pop Can	I		I	2
Paper	IIII	II	### IIII	15
Plastic Wrap	I	I	II	4
Pen		I		1
Etc...				

Ways I can reduce the amount of trash I create:

1. _____
2. _____
3. _____

Questions:

1. What was the item that you threw out the most?
2. What is your personal “Dirty Dozen” and how does it compare with the 2009 “Dirty Dozen”?
3. What creative ways were you able to think of to reduce your personal trash quota?
4. Were you able to reduce your trash for the second week? By how much? How?
5. Discuss in your group creative changes you can make in your everyday life to reduce the amount of garbage sent to landfills.



Trash Fact! *Make sure to recycle glass bottles. Not only does broken glass pose a danger to animals and humans, but this durable material can exist in the environment for up to 1 million years! That’s a long time....*

Pre-Activity #2: IS THAT ANIMAL FOOD IN MY YARD?

Target Audience: Grades 2 and up, Extension Grades 9 and up

Objectives:

- Identify types of shoreline litter
- Demonstrate link between shoreline litter and wildlife health
- Explain connection between land litter and shoreline litter

Materials:

- Stop watch & Garbage bags
- Gloves (Canvas or Rubber)
- *Optional: Plastic buckets and tongs*



Procedure:

1. Take the class outside and break them into groups of 2-3. Provide each group with garbage bags.
2. Define an area of the property where the activity will take place.
3. Give the students five minutes to collect items they feel would be dangerous to wildlife (mainly plastics).
4. Collect garbage bags and empty items onto a table so students can view them.
5. Sort the items into the three piles according to how animals would perceive the materials:
 - Very likely (*to be considered food*)
 - Somewhat likely (*to be considered food*)
 - Not likely (*to be considered food*)

Results (charts for your use):

Likelihood of shoreline litter to be perceived as food:

Litter Item	Very Likely	Somewhat Likely	Not Likely
Plastic bag	X		
Plastic Lid		X	
Balloon	X		
Etc.			

Questions:

1. What kind of animal would eat each litter item marked “very likely to be eaten”? Do you know what effect it would have on the animal? What causes these plastics to enter into their habitat?
2. Why was the litter sorted by how likely they are to be perceived as food?
3. How do you think the materials may get from the land into a water body?

Extension: Discuss these issues

- Many fishermen lose plastic netting in the ocean (a phenomenon known as ghost fishing). Aquatic wildlife can then swim into it and have no chance for survival once in the net due to strangulation, suffocation, starvation, drowning, etc.
- Leatherback turtles mistake plastic bags for jellyfish. Plastics have also been found in the stomachs of whales, dolphins, fish, and birds.
- Fishing nets can entangle many animals that require air to breathe. Many aquatic mammals can drown in the ocean if they are kept from reaching the water's surface.

Pre - Activity #3: CLASSIFYING YOUR TRASH

Target Audience: Grades 4 - 7

Objectives:

- Identify major sources of shoreline litter
- Increase understanding of ways to reduce shoreline litter

Materials:

- Assorted pieces of trash
- Ocean Conservancy's International Coastal Cleanup Data Cards
- Great Canadian Shoreline Cleanup's 2009 "Dirty Dozen" list of most frequently collected items
- Chalkboard, wipe-off board or flip chart
- Paper and pencils



2009 Dirty Dozen		
Ranking	Litter Item	# Collected in 2009
1	Cigarettes/Cigarette Filters	367,010
2	Food Wrappers/Containers	116,138
3	Bags (Plastic)	74,276
4	Caps and Lids	63,471
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Procedure:

1. Show the “Dirty Dozen” list to the class and ask them to classify the “Dirty Dozen” items based on the five International Coastal Cleanup Data Card activity categories (Shoreline and Recreational, Ocean/Waterway, Smoking related, Dumping, Medical/Personal hygiene). Have a discussion with the students about the type of activities that fall under each category (eg. Shoreline and Recreational: A picnic or barbeque is a recreational activity that often leaves behind food wrappers and containers).

“Dirty Dozen” List to Classify into Activity Categories:

Dirty Dozen Item	Activity Category
Cigarettes/Cigarette Filters	
Food Wrappers/Containers	
Bags (Plastic)	
Caps and Lids	
Cups, Plates, Forks, Knives, Spoons	
Beverage Cans	
Beverage Bottles (Plastic)	
Bags (Paper)	
Straws, Stirrers	
Beverage Bottles (glass)	
Tobacco Packaging/Wrappers	
Cigar Tips	

2. Divide students into small groups. Provide each group with an assortment of trash items and ask each group to classify them into categories according to the data card (as in step 1).
3. For an added challenge, encourage groups to race against each other to see who can get items into the appropriate category first!



Handling Cigarette Butts: *Please use gloves or substitute another item to symbolize cigarette butts.*



Trash Fact! *Cigarette filters are consistently the most common litter item found during the Great Canadian Shoreline Cleanup.*

Shoreline Litter Tally Based on Activity Categories:

	Shoreline and Recreational Activities	Ocean/Waterway Activities	Smoking Related Activities	Dumping Activities	Medical/Personal Hygiene
Item 1			Cigarette packaging		
Item 2	Plastic spoon				
Item 3 etc.		Fishing line			
Totals	1	1	1	0	0

4. Ask each group to circle the items found in their assorted trash tally that are part of the “Dirty Dozen” and then write the total of each “Dirty Dozen” item in the chart provided below.

“Dirty Dozen” Tally:

Dirty Dozen Item	Total
Cigarettes/Cigarette Filters	
Food Wrappers/Containers	
Bags	
Caps and Lids	
Beverage Bottles (glass)	
Beverage Bottles (plastic), 2L or less	
Cups, Plates, Forks, Knives, Spoons	
Beverage Cans	
Straws, Stirrers	
Building Materials	
Tobacco Packaging/Wrappers	
Buoys/Floats	

5. Have each group discuss how changing our behaviours and attitudes regarding shoreline litter could reduce items in the "Dirty Dozen"
6. As a class, answer the questions in the section below.

Questions:

1. What was the most frequently found item in your miscellaneous trash? In the “Dirty Dozen”?
2. The shoreline litter sorted by your group was mostly the result of which activity? How did these activities compare with other groups?
3. Which items are from land based sources and which could result from ocean or waterway activities?
4. Considering the main activities that cause shoreline litter, what can be done to reduce the amount of litter that enters waterways?

Pre - Activity #4: MISTAKEN IDENTITY

Target Audience: Grades 5 and up

Objectives:

- Recognize how plastic pieces can be mistaken for food by aquatic animals
- Simulate a biological example of how plastic pieces can fill an animal's stomach (in this case a bird) and cause it to stop feeding and starve

Materials:

- Small foam pellets similar to those found in bean bag chairs or potting soil (represents *plastic pieces*)
- Popcorn kernels (represents *real food*)
- Spoons (represents a *bird's beak*)
- Cups (represents a *bird's stomach*)
- Shoeboxes (represents a *bird's habitat*, a littered beach)
- Stop watch



Procedure:

1. Explain to class what each of the materials represents (as listed in the Materials section).
2. Divide class into small groups. Provide each group with a shoebox filled with a mixture of approximately $\frac{1}{4}$ foam pellets and $\frac{3}{4}$ popcorn kernels.
3. Give each student a spoon and a cup.
4. Taking turns, have students “feed” for 10 seconds by using the spoon to scoop the mixture from the shoebox to the cup.
5. After each student has had their turn, have students separate the foam from the popcorn and count each piece.
6. Have the students put only the foam back into their 'stomachs' and then estimate the ratio of the stomach that is full with pellets.

Note:

For a really dirty beach use a mixture of $\frac{3}{4}$ foam to $\frac{1}{4}$ popcorn.

Results:

Stomach Contents Chart

	Number of Food Pieces	Number of Plastic Pieces	Ratio of Food to Plastic	Ratio of Stomach Full with Plastic After First Feeding
Example	20	10	2:1	10%
Stomach 1				
Stomach 2 etc				
Total				

Total Group Average

Questions:

1. What is the ratio of plastic to food in your bird's stomach? How does that compare to the class average?
2. After replacing only the plastic pieces, how much of the bird's stomach does it fill?
3. The bird is unable to digest plastic. What effect would this have on the health of the bird?
4. Create a bar graph to show the pieces of plastic compared with the amount of food in each bird's stomach.
5. Create a list of other shoreline litter items that could be mistaken for food by other types of wildlife.



Trash Fact! It is estimated that over 80% of the garbage found floating in our waterways is plastic.

Pre - Activity #5: MAPPING – RIVERS AND ESTUARIES

Target Audience: Grades 5-7, extension Grades 8 and up

Objectives:

- Locate the major rivers and estuaries of the world
- Explain the connection between freshwater and the ocean

Materials:

- Photocopier
- World Atlas
- Pencil crayons
- Books, computer with internet connection



Procedure:

1. Using the world atlas, make photocopies of each continent.
2. Break class into small groups of 4 or 5 and assign each group a continent.
3. Have groups research and list the requirements and qualities of an estuary (internet or library research).
4. Write the following words on the board: **river mouth, freshwater and saltwater mixing, nutrients being carried downstream by the river, abundant growth of plants and animals.** Inform students to use these words in their definitions.
5. Have groups use an atlas to locate and draw their assigned continent's major rivers and estuaries on the maps you photocopied for them. Discuss how litter from anywhere can eventually reach the ocean. (It may be helpful to list the water-bodies you want them to map).

Helpful weblinks:

- The Atlas of Canada:
<http://atlas.nrcan.gc.ca/site/english/index.html>
- Coastal Watershed Factsheets: <http://www.epa.gov/OWOW/oceans/factsheets/>

Extension:

1. Have groups mark estuaries of the whole world and research the current status of two of them (ecosystem health, governmental protection, etc).
2. Have groups write a paper or make a poster to show how shoreline litter and pollution from the interior of a continent can affect estuaries and the ocean.
3. Have class or groups of students write a letter to a politician to encourage the protection of a local estuary.

Pre - Activity #6: THE PERSISTENCY TEST

Target Audience: Grades 5-10

Objectives:

- Understand the processes that lead to the breakdown of garbage
- Determine which items remain the longest in the environment
- Draw reasonable conclusions from observations
- Gather data in a controlled situation and make observations



Materials: (per group)

- 4 identical sets of five trash items made from different materials (i.e. rope, newspaper, bread, balloon, metal bottle cap, cloth, cigarette, fishing line, etc.)
- 5 plastic jars with lids (the same size)
- Hose and bucket with water, sink, or watering can
- Rocks and pebbles

Procedure:

1. Divide the students into four groups.
2. Give each group a set of materials to perform the tests. Have them set up a chart to record their observations. The chart allows observations to be made about each item in all four situations before and after the experiment (Suggest they use both senses of touch and sight). Groups will rotate between stations.

3. Set up stations as follows:

- **Control Station:** Set up this station to show what happens to the items with no experimental influence. Set each item in a place where it will not be affected by water or sunlight for **three days**.
- **Rain Station:** Set this station up at the sink or bucket. Ask the students to 'rain' onto their shoreline litter simulating a light rain by slowly pouring a cup of water on the items. Let sit for **five minutes**.
- **Wave Station:** Put rocks and pebbles into plastic containers with a small amount of water. Ask students to put their shoreline litter into the container, seal the lid and shake the container for **five minutes**. This is to simulate trash being pounded by waves.
- **Sunlight Station:** Put water into clear jars or plastic containers. Ask students to put their shoreline litter into the container. Leave the jars on a windowsill for three days. Check on the jars after **three days** to see what happened to the different items.

4. Once all tests have been completed, ask each group to present their findings and make a chart of the results.

Results:

Please record observations in the following chart:

Material	Observations of Materials at Each Station			
	Control Station	Rain Station	Wave Station	Sunlight Station
Balloon	Initial:	Initial:	Initial:	Initial:
	After 3 days:	After 5 min:	After 5 min:	After 3 days:
Newspaper	Initial:	Initial:	Initial:	Initial:
	After 3 days:	After 5 min:	After 5 min:	After 3 days:
Rope etc.	Initial:	Initial:	Initial:	Initial:
	After 3 days:	After 5 min:	After 5 min:	After 3 days:



Trash Fact! Plastic bags can last up to 20 years in the environment.

Questions:

1. Which item was most affected by the Rain Station, the Wave Station, and the Sunlight Station?
2. Did you observe any changes in the materials in the Control Station?
3. Why is it necessary to have a control station?
4. How does your data compare to other groups?
5. Which item do you think would break down the fastest in the environment? Why?
6. Which item do you think would persist longest in the environment? Why?
7. Why is it important to understand which items last longest in the environment? If everyone knew this information do you think it would effect their decision to throw their shoreline litter into the garbage can? Does it affect yours?

Pre - Activity #7: MAPPING CURRENTS – TRASH TRAVEL ITINERARY

Target Audience: Grades 9 and up

Objectives:

- Recognize that shoreline litter can travel between countries. Borders do not stop pollution!
- Correctly map currents

Materials:

- Blackboard, flipchart, overhead projector
- Atlas
- Pencil crayons
- Books, computer with internet connection



Procedure:

1. Divide students into groups and assign them a major ocean surface current.
 - The 17 major currents include: North Pacific Current, California Current, Alaska Current, Oyashio Current, Kuroshio Current, North Equatorial Current, South Equatorial Current, Peru or Humboldt Current, Falklands Current, Brazil Current, Benguela Current, Guinea Current, Canaries Current, North Atlantic Current, Labrador Current, Equatorial Counter Current and Agulhas Current.
2. Have each group research their current and trace the path a piece of trash may follow from start to end – a trash travel itinerary.
3. Bring the groups together and have them present their information to the group.
4. Using the final map, discuss how a piece of trash could travel around the world.

Questions:

1. Where are some places that trash might end up if it originated from the East Coast of Canada? The West Coast of Canada?
2. What type of garbage could survive the journey? What characteristics would it need to have?

POST-CLEANUP ACTIVITIES

These exercises are designed to build on the knowledge of shoreline litter and conservation issues that your students gained during their participation in your shoreline cleanup.

Please complete them **after** your shoreline cleanup.

Included in this section are:

1. Design a Model Shoreline
2. Research Poster
3. Litter Inventory



Post-Cleanup Activities

Post - Activity #1: DESIGN A MODEL SHORELINE

Target Audience: Grades 1 and up

Objectives:

- Design and build a model shoreline habitat

Materials:

- Reference Books/Field Guides to local coastal animals and plants
- Newspaper, flour, and water (*see instructions for papier-mâché below*)
- Bowls
- Paint and paint brushes
- Sponges and rags to clean up
- Smocks or old t-shirts (to protect student's clothing)
- Wire mesh and rocks (optional)



Procedure:

1. On a scrap piece of paper, write the name of the shoreline your class cleaned up. List the names of several aquatic plants and animals that are usual inhabitants, and any additional ones that you saw during your cleanup.
2. Cut out the plant and animals names from the scrap paper and place these in a hat. Have each student draw a paper from a hat. Each will work individually to create their **organism** with the exception of the individual who selected the **shoreline**; he/she should select 2 partners and form a small group.
3. Provide class with criteria for how big the shoreline model will be and set guidelines for plant and animal sizes.
4. Organism students – they must learn what “their organism” looks like, where it lives and what adaptations it has. Organisms can be made out of papier-mâché and painted. Make sure the organisms are small enough to fit on the shoreline model.
5. Shoreline groups – they will use imaginative ways to create a mesh and papier-mâché model of your shoreline. Bring some materials, like rocks and sand, to add to the model.
6. Add the animals and plants to the appropriate places in your landscape and celebrate the new habitat you have created!





To make papier-mâché:

1. Rip newspapers into strips or small pieces
2. Mix flour with water until pasty in texture
3. Dip strips of newspaper into flour and water mixture, wipe excess paste off
4. Begin molding the organism or shoreline
5. Paper-mache material can be formed over a wire mesh frame



Adaptation: For younger students, draw a picture of an animal or plant that was seen during the cleanup – Teacher/Coordinator could make the shoreline model ahead of time.



Trash Fact! Shoreline litter from Canada has been found as far away as Scotland.

Post - Activity #2: RESEARCH POSTER

Target Audience: Grades 4 and up

Objective:

- Increase understanding of the effects of shoreline litter on wildlife
- Explain characteristics of one of Canada's endangered species

Materials:

- Poster board
- Markers, crayons, glue, scissors, paint, etc.
- Whatever else your imagination can come up with!



Procedure:

1. Explain the difference between the various classifications of Canadian species at risk to the class. These include: **Endangered, Extinct, Extirpated, Special Concern, and Threatened.**

Helpful weblinks:

- Species at Risk:
<http://www.speciesatrisk.gc.ca/>
 - Committee on the Status of Endangered Wildlife in Canada:
<http://www.cosewic.gc.ca/>
2. Assign an animal to each student and have them research their species.
 3. Have students create a poster about the animal they have researched. On the poster, include where the species lives, what it eats, the impact that shoreline litter has on it, what other natural or human-made threats it faces and how we can protect it.
 4. Have each student present each poster and their findings.
 5. For more in-depth research, have the students prepare full reports on their chosen species.



Post - Activity #3: LITTER INVENTORY

Target Audience: Grades 6 and up

Objectives:

- Create a “Dirty Dozen” list for your cleanup
- Effectively present and analyze data with charts/ graphs
- State reasonable conclusions drawn from observations

Materials:

- Completed International Coastal Cleanup Data Cards
- Paper (regular, graph), pencils, calculators or computer (with program like Excel)



Procedure:

1. As a group, determine the total number of shoreline litter items collected in each trash category such as recreational activities, smoking related activities etc.
2. Look at the individual totals for each item of garbage and compile a “Dirty Dozen” list for your cleanup site identifying the top 12 most common pieces of trash.
3. Determine the percentages of trash found for each category and express using a pie chart. Create a bar graph to show types of shoreline litter.
4. Divide students into pairs and have each group lead a discussion about one particular type of trash (*Include answers to these questions: Where did each object originate? How might each be damaging to the aquatic environment? What action could be taken to prevent these objects from turning up on the shoreline? What are some alternative disposal techniques?*).
5. Present your cleanup results to your school or local community with a display and/or presentation.



Trash Fact! *An 'island' of plastic debris, approximately the size of Texas, is currently floating undisturbed in the middle of the Pacific Ocean. Every year, it grows in size.*

GAMES

These games have been designed to be fun and entertaining activities for students, but to also help your students consolidate learned information. Try out some of following games in your classroom and help your students learn even more about shoreline litter!

These games can be adjusted to meet the needs and levels of understanding of any age group!

Included in this section are:

1. Cleanup Jeopardy
2. Trash Word Search
3. Cleanup Word Scramble
4. Get the Splash Out of Trash
5. Colouring Book
6. Cleanup Crossword
7. Who Wants to be a Shoreline Saver?



Game #1: CLEANUP JEOPARDY

Objectives

- Demonstrate knowledge learned about shoreline litter

Materials

- White-board, chalkboard, or flip chart (to keep score)
- Jeopardy “answers” and “questions”
- A board with the following chart on it (*this will act as a method to track which questions have been completed*):



Jeopardy

Animal Impacts	Vulnerable Animals	Sources of Litter	What can you do?	Other Impacts
100	100	100	100	100
200	200	200	200	200
300	300	300	300	300
400	400	400	400	400
500	500	500	500	500

Double Jeopardy

Persistency	International Coastal Cleanup	Aquatic Ecosystems	Water Flow	“Dirty Dozen”
100	100	100	100	100
200	200	200	200	200
300	300	300	300	300
400	400	400	400	400
500	500	500	500	500

Procedure: (in the style of the television show – Jeopardy)

1. Divide students into three or four groups.
2. Have a leader act as a host and one person to keep score for each group.
3. Each team may confer as a group to decide on response. Responses are given in the form of a question.
4. Select one group to go first (by draw). They then select the category and dollar value to begin.
5. The host reads the answer aloud.
6. The first team to 'buzz in' with the correct response gains the assigned dollar value. Be creative with your “buzz in” - have students place a can in a recycling bin or make the sound of an endangered animal.
7. The group with the correct answer selects the category for the next question.
8. Play until time expires, until all answers have been revealed or until a predetermined dollar value has been achieved by the winning group.

Jeopardy Questions and Answers

Animal Impacts

- 100 **Classification of a plant or an animal that is in immediate danger of becoming extinct.**
(Q) What is Endangered or Threatened?
- 200 **Happens when an animal swallows shoreline litter.**
(Q) What is ingestion/starvation/death?
- 300 **Causes starvation or drowning in aquatic animals.**
(Q) What is Entanglement?
- 400 **When nets or other fishing gear are lost or discarded and continue to catch sea animals.**
(Q) What is Ghost Fishing?
- 500 **A material that is often mistaken by birds for fish eggs or other types of food.**
(Q) What are Plastic Resin Pellets?

Vulnerable Animals

- 100 **I get caught in garbage because I often swim into holes and near objects to hide from enemies.**
(Q) What is a fish?
- 200 **I am a naturally curious marine mammal with a thick fur coat that likes to play with unusual objects.**
(Q) What is a seal, sea otter or sea lion?
- 300 **I am a scavenger bird that often mistakes garbage for food.**
(Q) What is a gull?
- 400 **I often mistake floating plastic for my favorite food, jellyfish.**
(Q) What is a Leatherback sea turtle?
- 500 **I am an animal that feeds on the ocean floor and may get caught in a discarded crate.**
(Q) What is a lobster or crab?

Sources of Litter – (Name the activity categories on ICC Data Cards)

- 100 **Balloons**
(Q) What is a type of waste from Shoreline and Recreational Activities?
- 200 **Fishing Line**
(Q) What is a type of waste from Ocean/Waterway Activities?
- 300 **Cigar Tips**
(Q) What is a type of waste from Smoking-Related Activity?
- 400 **Syringes**
(Q) What is a type of waste from Medical/Personal Hygiene Activity?
- 500 **Tires**
(Q) What is a type of waste from dumping activities?

What can you do?

- 100 **Event where a group gets together to remove garbage from shorelines.**
(Q) What is a beach or shoreline cleanup?
- 200 **Program where people paint yellow fish on new drains on roadways.**
(Q) What is storm drain marking?
- 300 **Collection and reprocessing of metal, plastic, glass and paper to be used as new materials.**
(Q) What is recycling?
- 400 **Pollution prevention strategy to produce less waste.**
(Q) What is waste reduction?
- 500 **Household pollution prevention strategy where organic waste is collected and used in your garden.**
(Q) What is composting?



Trash Fact! Plastic bags and jellyfish look identical floating in the water. Sea Turtles, who migrate along both coasts in Canada, rely on jellyfish for nourishment and will often mistake these plastic bags for food.

Other Impacts

- 100 **These people can be entangled in ghost nets just like aquatic animals.**
(Q) Who are divers?
- 200 **Garbage clogging water intake valves is a major concern for these machines.**
(Q) What are boats/engines?
- 300 **Organisms that are compressed or flattened by garbage on shorelines.**
(Q) What are plants?
- 400 **A business industry that depends on the money spent by people coming to experience the natural beauty of waterways.**
(Q) What is tourism?
- 500 **A plant or animal that is accidentally brought by shoreline litter into an area where it has no natural enemies.**
(Q) What is an invasive species?

Double Jeopardy Questions and Answers

Persistency

- 200 **Specially engineered sites for disposing of solid waste.**
(Q) What are landfills?
- 400 **A very common litter item that takes 5 years to degrade.**
(Q) What is cigarette filters/cellulose acetate?
- 600 **Causes animal entanglement and takes 600 years to degrade.**
(Q) What is fishing line (microfilament)?
- 800 **The biodegradable form of these household items takes 1 year to breakdown versus 450 years for the disposable form.**
(Q) What are diapers?
- 1000 **The process by which microorganisms degrade or decompose material.**
(Q) What is biodegradation?

International Coastal Cleanup (ICC)

- 200** **The most common litter item found during cleanups worldwide.**
(Q) What are cigarette butts?
- 400** **The form provided by the ICC used to record information about the cleanups.**
(Q) What is the ICC Data Card?
- 600** **The organization that coordinates the ICC.**
(Q) Who is the Ocean Conservancy?
- 800** **The month the International Cleanup takes place each year.**
(Q) What is September?
- 1000** **The organization that organizes the Great Canadian Shoreline Cleanup.**
(Q) Who is the Vancouver Aquarium?

Aquatic Ecosystems

- 200** **A place where the salt water of the ocean mixes with the fresh water of a river.**
(Q) What is an estuary?
- 400** **Sea otters search for food and live in this ecosystem.**
(Q) What is a kelp forest?
- 600** **Bogs, fens, swamps, marshes and shorelines.**
(Q) What are types of wetlands?
- 800** **In aquatic ecosystems this is on the bottom of the food web.**
(Q) What is plankton?
- 1000** **Process by which toxic chemicals enter organisms which don't uptake pollution directly.**
(Q) What is bioaccumulation?

Water Flow

- 200 **Freshwater waterways which can bring shoreline litter from inland to the ocean.**
(Q) What are rivers and streams?
- 400 **Movement of large bodies of water due to the phases of the moon.**
(Q) What are tides?
- 600 **The system through which water from the street flows before reaching a natural waterway.**
(Q) What are storm drains or ditches?
- 800 **An area of land that drains to a common waterway.**
(Q) What is a watershed?
- 1000 **These natural aquatic highways may be responsible for garbage from Japan showing up in Victoria.**
(Q) What are currents?

“Dirty Dozen”

- 200 **This item can be recycled over and over again.**
(Q) What are beverage cans?
- 400 **Most of the “Dirty Dozen” articles are made of this material.**
(Q) What is plastic?
- 600 **It is unknown how long this material persists in the environment.**
(Q) What is glass?
- 800 **This recyclable material takes up to 6 weeks to degrade**
(Q) What is paper?
- 1000 **Cigarette filters are made of this material.**
(Q) What is plastic or cellulose acetate?

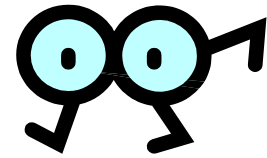


Trash Fact! *A plastic fork that enters the ocean today may still be decomposing in the year 2510.*

Game #2: TRASH WORD SEARCH

Objectives:

- Become familiar with shoreline litter vocabulary



Procedure:

- Find only the bold, underlined **words** in the word search.

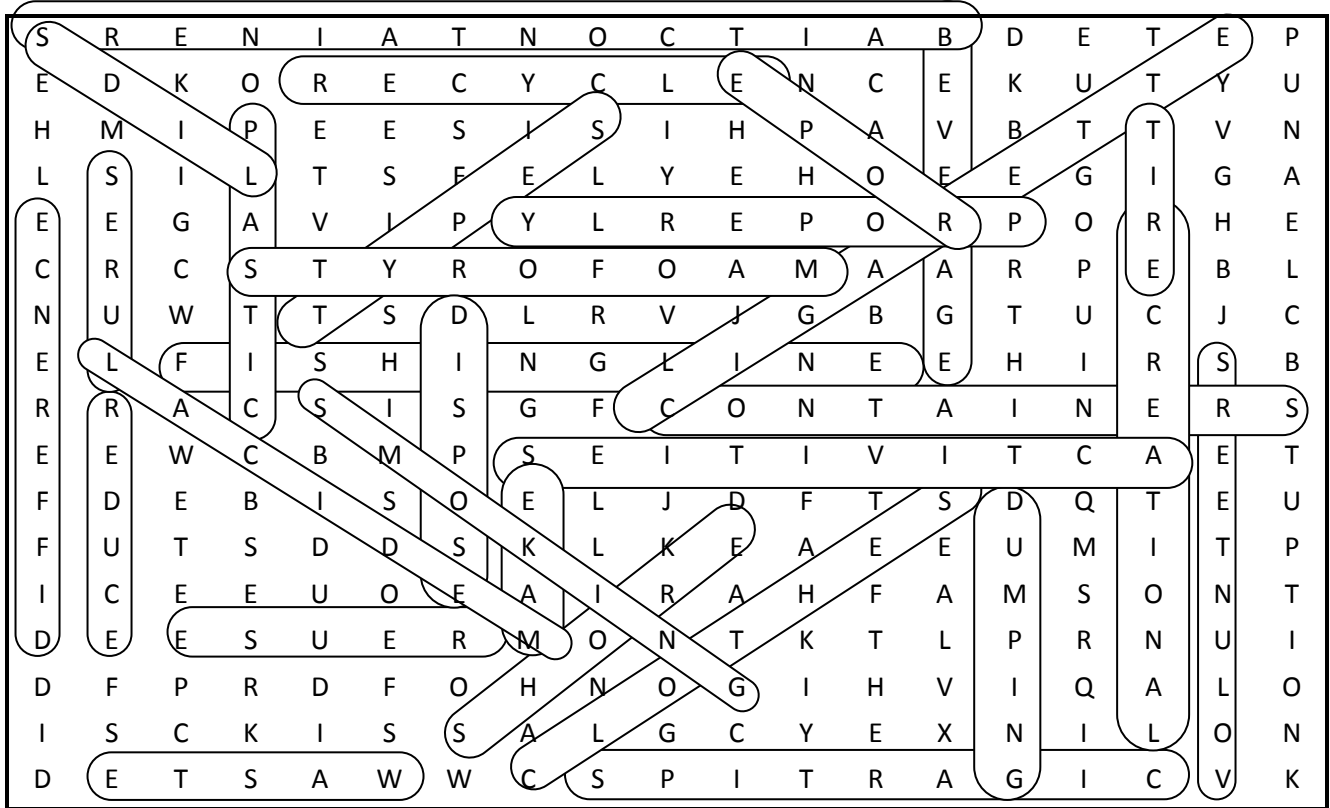
Volunteers **make** a **difference** each year during the Great Canadian Shoreline Cleanup. They remove many **types** of shoreline litter from **shorelines**, such as: **plastic**, **styrofoam**, **fishing line**, **cigarette** butts, **beverage** bottles, fast food **containers**, **lures**, **rope**, **cigar tips**, **bait containers**, old **clothes**, container **lids**, and **tires**.

The shoreline litter comes from many **activities** such as shoreline and **recreational** activities, ocean/waterway activities, **smoking** related activities, **dumping** activities, and **medical**/personal hygiene.

Everyone can **reduce**, **reuse** and **recycle**, so please **dispose** of **waste properly**!

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

Word Search Answer Key



Word List:

- Volunteers
- Make
- Difference
- Types
- Shore
- Plastic
- Styrofoam
- Fishing Line
- Cigarette
- Beverage
- Containers
- Lures
- Rope
- Cigar Tips
- Bait Containers
- Clothes
- Lids
- Tire
- Activities
- Recreational
- Smoking
- Dumping
- Medical
- Reduce
- Reuse
- Recycle
- Dispose
- Waste
- Properly

Game #3: CLEANUP WORD SCRAMBLE

Objective:

Identify and review shoreline litter vocabulary.

Procedure:

These words are all mixed up; you must rearrange the letters to find a cleanup related word.

Example: leehnrsl = Shoreline

- tslapci
- lrgddbboaaiee
- ase elrttu
- aatd
- oitcx
- niumgpd
- aetnlndge
- syotesmce



Answers:

Plastic, Biodegradable, Sea Turtle, Data, Toxic, Dumping, Entangled, Ecosystem

Game #4: COLOURING BOOK

Materials:

- Crayons, pencil crayons, markers, sparkles, paint or anything else you can think of...

Procedure:

1. Have students think of and draw their own cartoon style cleanup themed images. Make sure they leave enough room to colour in. Ideas include: examples of shoreline litter, trash filled shorelines, people picking up trash, animals in their natural habitat etc.
2. Make a copies of their work.
3. Ask students to colour and decorate their images work.
4. Display the completed work in a prominent place to remind others of the environmental issue of shoreline litter.



Extension:

1. Vote on the best picture from your group.
2. Submit the **uncoloured** version to the Great Canadian Shoreline Cleanup to be considered for future educational materials. We might even post these on our website!
 - **By Mail:**
Vancouver Aquarium
c/o Great Canadian Shoreline Cleanup
PO Box 3232
Vancouver, BC
 - **By Email:**
shorelinecleanup@vanaqua.org



Trash Fact! *Balloons can be made from latex or mylar. Latex is biodegradable, but mylar is not, and these balloons can stay in our environment for a very long time.*

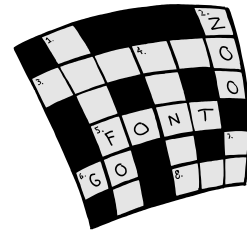
Game #5: CLEANUP CROSSWORD

Objectives:

- Review shoreline litter vocabulary

Materials:

- Pencil
- Crossword Clues and Board



Clues - Across:

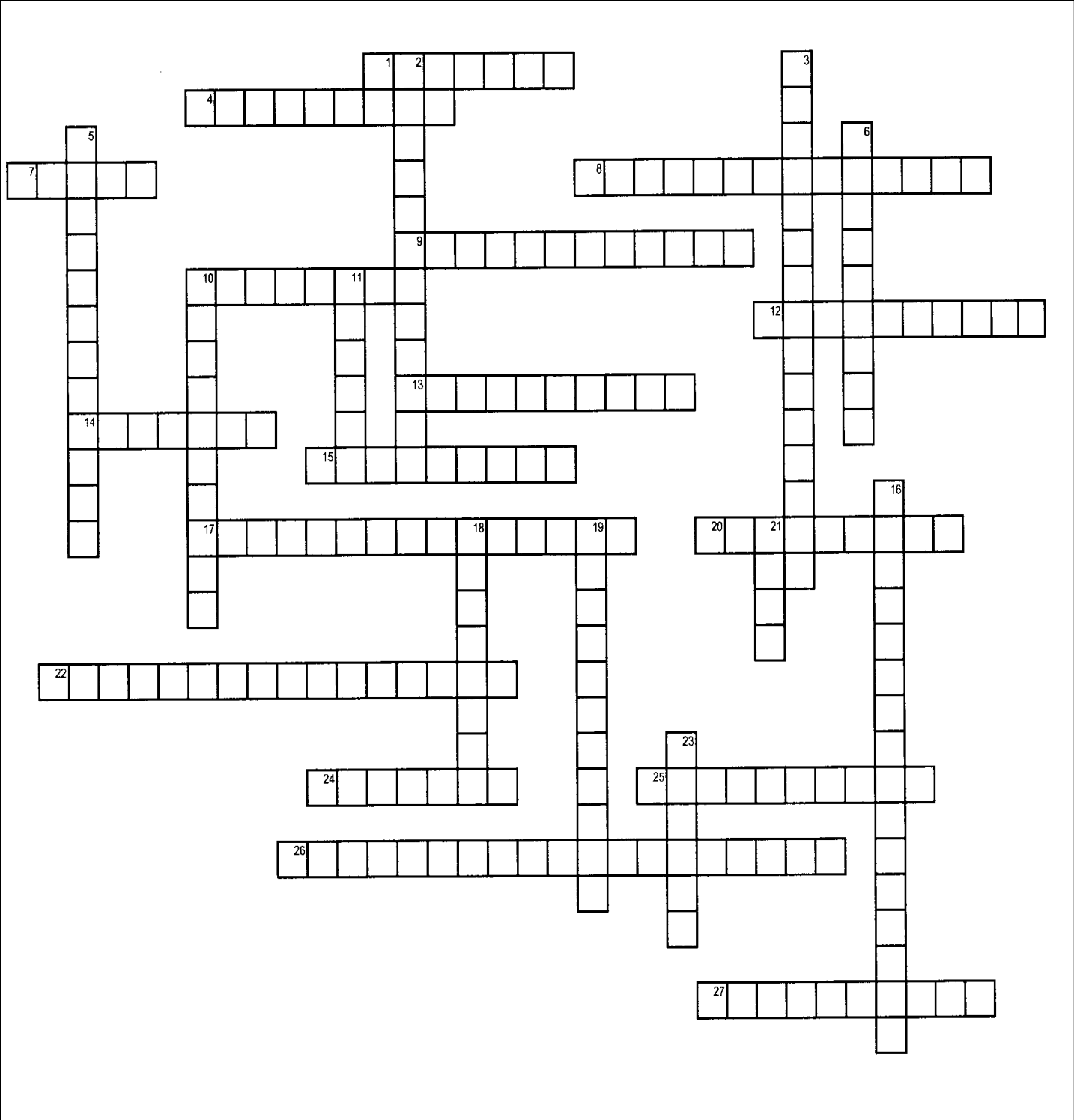
1. An area where the land is saturated with water long enough to have poorly drained soils, water-loving plants and biological processes suited to wet areas.
4. Transition zone between aquatic environment and terrestrial environment.
7. Articles that have been made or used by people and discarded.
8. Process whereby microorganisms decompose a material, causing it to be broken down into smaller compounds.
9. When fish and crustaceans are caught in lost or discarded fishing gear.
10. Permanently storing or removing trash from the environment (e.g. Landfilling).
12. Shoreline litter that does not easily biodegrade, and remains in the environment for a long time.
13. Species of plants or animals that are in immediate danger of becoming extinct because their population levels are so low.
14. Able to float in the water.
15. Endangered sea creature that often mistakes plastic bags for its favourite food: jellyfish.
17. Occurs when organisms low on the food chain consume a substance that remains in their bodies. When animals higher up the food chain eat those organisms, they also ingest that substance and it accumulates in their bodies.
20. Act of an animal swallowing shoreline litter; this can lead to starvation and malnutrition due to blockage of the intestinal tract.
22. The water that flows along streets or along the ground as a result of a rainstorm.
24. To collect and process materials so they can be used again.
25. Twelve most abundant types of trash collected during shoreline cleanups.

- 26. Small spheres that are produced as the raw form of plastic.
- 27. System of sewer pipes and drainage ditches that carry away stormwater runoff.

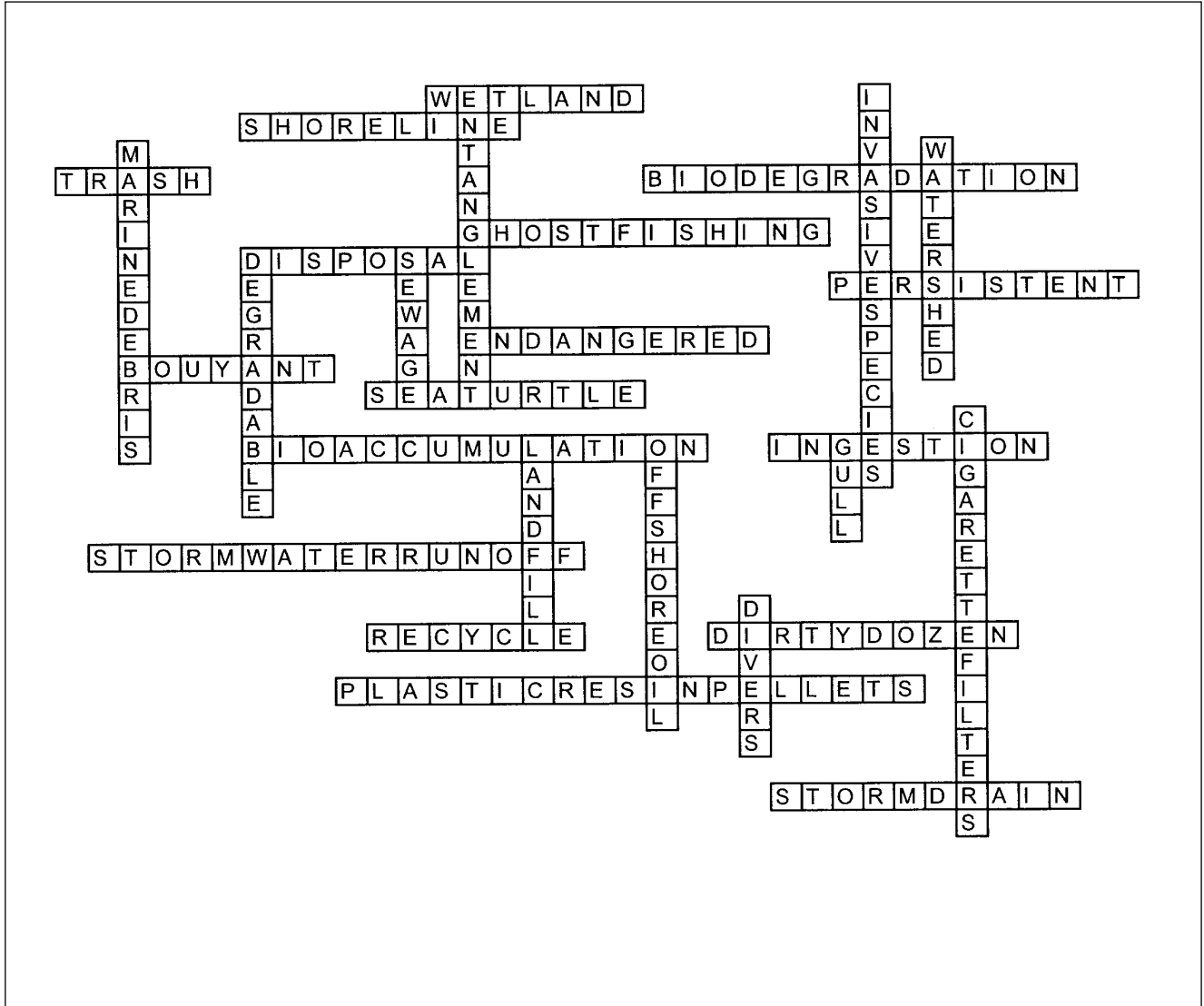
Clues - Down:

- 2. Results when an animal becomes encircled or ensnared by litter and can cause wounds, infection, loss of limbs, drowning, and starvation.
- 3. Kind of plant or animal that is not native to an area and has no natural predators there.
- 5. Includes all objects found in the aquatic environment that do not naturally belong there.
- 6. A region of land that drains water into a particular watercourse (river, stream, creek etc.) or water body (lake, wetland).
- 10. Able to be broken down into smaller pieces by abiotic and biotic forces.
- 11. Wet waste produced by households and disposed of at a central treatment plant.
- 16. The most abundant litter item found in shoreline cleanups.
- 18. Specifically engineered sites for disposing of solid waste on land that are constructed to reduce hazards to public health and safety.
- 19. Drilling for this can occur from platforms that are constructed in the ocean.
- 21. Shorebird that often mistakes plastic pieces for food.
- 23. These recreational water users can get entangled in shoreline litter just like aquatic animals.

Crossword Board



Crossword Answer Key



Game #6: WHO WANTS TO BE A SHORELINE SAVER?

Objective:

Review vocabulary and facts associated with shoreline litter and cleanups

Materials:

- 'Who Wants to be a Shoreline Saver' questions
- 'Who Wants to be a Shoreline Saver' answer key



Procedure:

1. Divide students into two or three groups.
2. Have a leader act as a host, and read the \$100 question aloud.
3. Each team may confer as a group to decide on the answer to each question. The first team to 'buzz in' with the correct answer gains the assigned dollar value. *Be creative - have students place a can in a recycling bin or make the sound of an endangered animal.* Wrong answers will be penalized and that group will sit out the next question.

Who Wants to Be a Shoreline Saver Questions:

An organized event where groups get together to remove garbage is called:

\$100

- A. Recycling
- B. Storm Drain Marking
- C. The Great Canadian Shoreline Cleanup
- D. Happy Water Day

The most abundant material found in shoreline litter:

\$200

- A. Glass
- B. Plastic
- C. Rubber
- D. None of the above

The aquatic animal that often mistakes floating plastic for its favorite food, jellyfish:

\$500

- A. Sea Turtle
- B. Seal
- C. Gull
- D. Fish

This environmental problem is caused by shoreline litter:

\$1000

- A. Global Warming
- B. Tides
- C. Barnacles
- D. Ghost fishing

Major impact(s) of shoreline litter on boats:

\$2000

- A. Clogging water intakes
- B. Fouling properties (rust, etc)
- C. Both A and B
- D. None of the above

Movement of large bodies of water due to the gravitational pull of the moon:

\$4000

- A. Storm flow
- B. Lunar flow
- C. Tides
- D. Aurora Borealis

The source category for tires is:

\$8000

- A. Sewer and sewage waste
- B. Dumping activities
- C. Ocean/waterway activities
- D. Smoking related activities

Bogs, fens, swamps, marshes and shorelines are examples of these:

\$16,000

- A. Estuaries
- B. Forests
- C. Wetlands
- D. Kelp forests

These people can get entangled in ghost nets just like aquatic animals:

\$32,000

- A. Fishermen
- B. Divers
- C. Construction Workers
- D. Police Officers

An area of land that drains to a common waterway is called a(n):

\$64,000

- A. Watershed
- B. Ditch
- C. Valley
- D. Airport

Biodegradation is:

\$125,000

- A. The destruction of our environment
- B. A process by which microorganisms degrade or decompose material
- C. Clinical term for stress caused by studying too much biology
- D. The title for a new Science Fiction movie

\$250 000

Cigarette filters take ____ years to degrade:

- A. 1
- B. 2
- C. 5
- D. 10

\$500,000

The organization that runs the International Coastal Cleanup is:

- A. Ocean Conservancy
- B. Vancouver Aquarium
- C. Centre for World Aquatic Training and Environmental Research
- D. Canadian Government

\$1000,000

Disposable Diapers persist in the environment for:

- A. 6 months
- B. 6 years
- C. 100 years
- D. 450 years

Who Wants to Be a Shoreline Saver Answers:

\$100

C. The Great Canadian Shoreline Cleanup

\$200

B. Plastic

\$500

A. Sea Turtle

\$1000

D. Ghost Fishing

\$2000

C. Both A and B

\$4000

C. Tides

\$8000

B. Dumping Activities

\$16,000

C. Wetlands

\$32,000

B. Divers

\$64,000

A. Watershed

\$125,000

B. A process by which microorganisms degrade or decompose material

\$250,000

C. Five

\$500,000

A. The Ocean Conservancy

\$1000,000

D. 450 years

TRASH CRAFTS

Use these innovative craft ideas to make wonderful things from objects that may otherwise may be thrown away as trash.

Objectives:

- Create something useful from trash
- Encourages the “reuse” of common trash items
- Identify and discuss the problems and threats around plastics in the environment

Included in this section are:

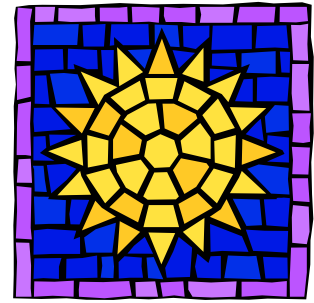
1. Six Pack Ring Stained Glass Window
2. Sick Pack Ring Bubbles
3. Pierced Tin Can Lantern
4. Pop Bottle Windsock
5. Plastic Mobile
6. Plastic Bottle Birdfeeder
7. Mr/Mrs Grasshead
8. Making Recycled Paper
9. Plastic Lid Picture Frame



Craft #1: SIX PACK RING STAINED GLASS WINDOW

Materials:

- One six-pack ring per student
- Coloured tissue paper
- Scissors
- Glue



Procedure:

1. Have students cut six different shapes out of the coloured tissue paper that are approximately the same size as one circle in the six-pack ring holder.
2. Have students glue the cut out shapes onto the six circles of the six-pack ring holder. Let glue dry and hang your six-pack ring in the window!
3. Discuss the importance of cutting six-pack rings before they are thrown away and the dangers of this shoreline litter item for wildlife.

Craft #2: SIX PACK RING BUBBLES

Materials:

- One six-pack ring per student
- One stick approximately 20cm long
- Scissors
- Solution of soap and water
- Bucket



Procedure:

1. Cut two rings at the end of a six-pack and tie to a stick.
2. Mix solution of soap and water in bucket
3. Have students dip six-pack into soap and water and blow bubbles!
4. After students are done, remind them to cut the rings before they dispose of their "bubble blower" and discuss the dangers six-pack rings pose to wildlife.



Trash Fact! *A six-pack ring of plastic is very strong and very difficult for animals to free themselves from if they become entangled.*

Craft #3: PIERCED TIN CAN LANTERN

Materials:

- Hammer
- Nails (assorted sizes)
- Tin cans
- 16-gauge wire
- Masking tape

Procedure:

1. Pick a used can with a shape that you like. Peel off any labels and wash and dry the can thoroughly. Fill it with water and freeze (*The ice will keep the can from collapsing*).
2. Decide on a design/pattern and mark it on the can with pencil. Pick a simple geometric design; for example, diamonds or hearts.
3. Lightly pound in the nails tracing your pattern. Use different sizes to create different-size holes, or use one size for all the holes.
4. Make a handle. Punch two holes near the rim of the can on opposite sides. Cut a length of 16-gauge wire and bend it into an even U-shape and thread through holes to form handle.
5. Put a votive candle inside or tea light.
6. Discuss the ways that metal cans can be recycled and reused again.



Craft #4: POP BOTTLE WINDSOCK

Materials:

- A clean 2-litre plastic pop bottle for every student
- Scissors
- Paint
- Hole punch
- Sand paper
- Fishing line
- Ribbon
- Large Swivel Snap (used for fishing)



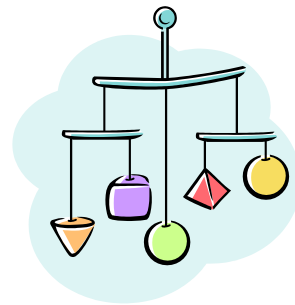
Procedure:

1. Cut the top and bottom off the 2-litre bottle so that you are left with a cylinder.
2. Use the hole punch and punch four evenly spaced holes near the top.
3. Tie a 30-cm piece of fishing line to each hole. Attach all four pieces to a large swivel snap.
4. Sand the bottle and paint.
5. When dry, punch holes every 1-2 cm around the bottom of the cylinder. Tie a 90-cm ribbon to each hole and hang the windsock. Discuss the recycling possibilities for plastics and the role of plastic as shoreline litter.

Craft #5: PLASTIC MOBILE

Materials:

- Assorted sizes and colours of plastic bottles and containers
- String, yarn or fishing line
- One coat hanger per student
- Paint, glue, glitter, paper, etc. (for decorations)
- Scissors



Procedure:

1. Use plastic bottles and containers and draw shapes on them (animals, birds, fish, etc.). Cut the shapes out.
2. Poke a small hole in the top of each shape and tie a piece of string, yarn or fishing line through it.
3. Attach the other end of the string to the hanger and hang from the ceiling.
4. Discuss the danger of plastics to wildlife.

Craft #6: PLASTIC BOTTLE BIRDFEEDER

Materials:

- Wire or thick string
- Scissors
- Bird seed
- One clean 4-litre milk bottle (or similar) per student

Procedure:

1. Cut two long pieces of wire.
2. Punch four evenly spaced holes near the top of the bottle and string the wire through so it makes an X-shape.
3. Cut a few 5-cm square holes through the bottle, where the bird will feed.
4. Put small drainage holes in the bottom (small enough so the seed does not fall out).
5. Fill with bird feed and hang from the wire threaded through the top.
6. Discuss the danger of plastics to wildlife.



Craft #7: MR/MRS GRASSHEAD

Materials:

- Grass seed
- One leg of pantyhose for each student
- Non-toxic paint and other decorations
- Potting soil
- One clean yogurt container per student



Procedure:

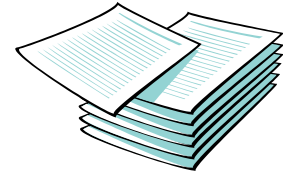
1. Put about two to three tablespoons of grass seeds into the foot of an old pantyhose leg.
2. Put about 1 to 1½ cups of potting soil on top of the seeds and tie a knot just above the soil in the hose to keep it from falling out.
3. Cut the leg about 4 inches below the knot, making sure to leave a long enough tail on the pantyhose so that it will be able to reach the bottom of the yogurt container.
4. Decorate Mr/Mrs Grasshead's face.
5. Fill the cup about ¾ full with water. Place the “head” at the opening of the yogurt container with the tail falling into the water in the container.
6. Ensure the container always has water in it. Watch the hair grow.
7. Mr/Mrs Grasshead's hair may be cut and styled as it grows!
8. Discuss plastic in the environment and where plastic can be recycled.

Craft #8: MAKING RECYCLED PAPER

Objective:

- Learn how recycled paper is made
- Make your own recycled paper

You can make your own paper the way it is done at a recycling mill. The pulp is put into a machine that drains the water from the fibers. The pulp is placed on top of a screen and then pressure is applied, squeezing out the water. Other parts of the machine then compress the pulp until the finish is as smooth as needed. You will make recycled paper in much the same way as the paper mills do, but on a smaller scale.



Materials:

- 4 to 6 sheets of used paper or 16 to 20 pieces of clean tissue
- A 6" by 6" square of window screen
- A flat pan (a little larger than the screen)
- A bowl and an egg beater or blender
- A newspaper
- A rolling pin
- Optional: Instant starch (for stronger paper), food colouring, flowers

Procedure:

1. Cut the tissue into small pieces and place them in the bowl, along with three to four cups of hot water. With an egg beater, beat the tissue and water to make the pulp.
2. If you want stronger paper, add three to four teaspoons of starch to the pulp-filled bowl. If you want to make decorative paper you may add food colouring or flower petals.
3. Place the screen at the bottom of the pan and cover it evenly with the pulp.
4. Lift the screen, hold it level, and let it drain for a minute. Then with the pulp right side up, put the screen on some newspaper.
5. Place more newspaper on top of the pulp. Then, use the rolling pin to squeeze out the remaining water.
6. Remove the newspaper from the top and switch the stack of newspapers over, so the screen will be at the top. Then, very carefully, remove the newspaper and screen, but do not move the pulp. Be sure to place a dry newspaper on top. To make sure your paper dries flat, place a weight like a phone book on top of the newspapers.
7. Let the pulp dry. You have made your own recycled paper!

Extension:

1. On the paper you made draw a picture of what a healthy environment would be for aquatic wildlife.
2. On a second sheet draw a hazardous aquatic environment.
3. On the back of the healthy environment, write down one thing that you currently do to protect the environment.
4. On the back of the hazardous environment, write down one small thing that you promise to do to protect aquatic wildlife.
5. Put these pictures on the wall and revisit the hazardous environment in a couple of months to determine if you have made the changes stated on the back!



Trash Fact! Paper takes 6 weeks to degrade in the environment!

Craft #9: PLASTIC LID PICTURE FRAME

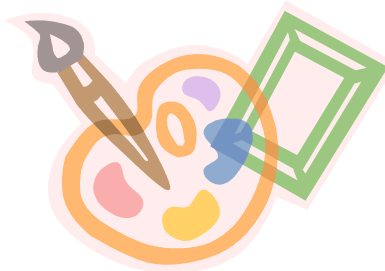
Materials:

- One plastic lid from a yogurt or margarine container per student
- Markers, acrylic paint, glitter, paper, etc. (the sky is the limit for decorations)
- Photo
- Glue or clear tape

Procedure:

1. Cut a hole in the top of the lid to hang.
2. Colour the lid with markers or paint it.
3. Glue or tape the photo on the lid.
4. Decorate the rest of the lid any way desired.
5. Hang the picture on the wall.

Discuss the problems plastics pose to the environment and talk about how long plastic lasts in the environment.



We want to hear from you! Feel free to send in your comments about these educational activities, crafts, and games. We would love to hear your ideas and suggestions! Please send any comments and submissions for new activities to: shorelinecleanup@vanaqua.org.