Harbours to Highlands

A Geography Manual

Natural Occurrences

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Natural Occurrences

The following information comes from the following Internet sites accessed 5/22/03:
http://www.redcross.org/services/disaster/keepsafe/landslide.html
http://earthquake.usgs.gov/faq/effects.html
http://www.insurance.ca.gov/EXECUTIVE/CatSeries/Mudslide/Mudslides.htm
http://www.sais.gov.uk/about_avalanches
http://www.msp.gouv.qc.ca/jeunesse/catastrophe/toutsecuritecivile/avalanche_en.html
http://www.factmonster.com/ipka/A0768988.html http://www.usatoday.com/weather/wtwist0.htm
http://www.usatoday.com/weather/resources/basics/twist0.htm
http://www.fema.gov/kids/tornado.htm
http://www.outlook.noaa.gov/tornadoes/
http://www.mb.ec.gc.ca/air/summersevere/ae00s02.en.html
http://www.nrcan.gc.ca/gsc/pacific/vancouver/volcanoes/index_e.html

Words to Preview		
landslides	avalanche	volcanoes
eruptions	hurricanes	destructive
vegetation	consecutive	tornadoes
erosion	spiral	

Some of the World's Natural Disasters

Landslides

A landslide is the movement of surface material, such as rock and soil, down a slope, due to gravity.

Not all landslides move fast. Some move along slowly, while gradually causing damage. Landslides happen due to three factors -- less friction of the land or soil causing it to slide easier, steeper slopes making the land less stable, and other stresses or vibrations which might cause the land to move. Heavy rains, snowmelts, erosion, construction, earthquakes, or volcanoes can all cause landslides.

Mudslides and Mudflows

Mudslides and mudflows are a type of debris flow. Debris flows are fast moving landslides. A mudflow is mostly water mixed with mud, silt, and other particles. Silt is a combination of mud and small rocks. Its texture is close to that of flour. This makes the mudflow thicker so it does not move along as fast as water in a river. Usually heavy rainfalls that fall in short amounts of time are the cause of mudflows.

A mudslide is a kind of mudflow that happens on a steep slope. Mudflows and mudslides happen mostly in areas with slopes that have little vegetation or plant life and not many roots holding the soil together. This causes erosion to happen quickly, creating mudflows.

Avalanche!

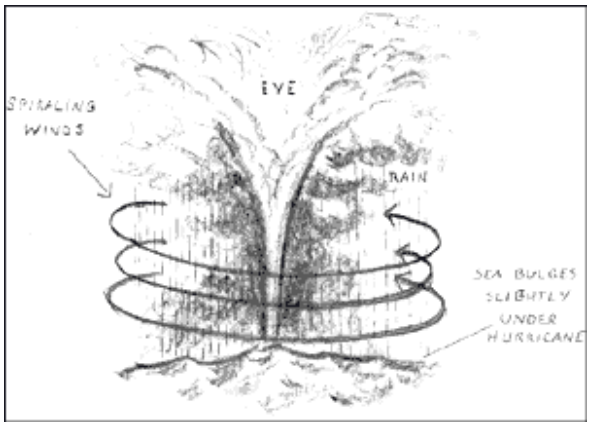
An avalanche is another type of natural disaster that occurs when a large amount of snow falls down the side of a slope or mountain. Avalanches are obviously very dangerous for people who are in the area. Avalanches happen when new snow falls on other compacted snow layers. The new snow is light, not wet and heavy like the compacted snow, and the new snow falls to the bottom of the slope or mountain causing an avalanche.

Avalanches can happen when skiers, hikers/climbers, or snow boarders disturb the new snow and cause it to fall.

Avalanches can also start by any type of loud noise such as yells or gun shots.

Hurricanes

A hurricane is a tropical cyclone with winds of 119 kilometers per hour or more. Usually these storms are found in the Atlantic Basin, the Pacific Ocean, or east of the International Date Line. The International Date Line is an imaginary line on Earth the separates two consecutive calendar days. That is why China is one day ahead of Canada.



Hurricane winds blow in a spiral motion. The center of this spiral motion is a calm, extreme low pressure called the eye. The winds circling around the eye can reach more than 321 kilometers per hour. The whole storm can stretch for tens of thousands of square kilometers. There are five categories of hurricanes. One is the least destructive and five is the most destructive.

Hurricanes draw their energy from warm surface water, so this explains why hurricanes usually lessen when traveling over cold water temperatures.

Tornadoes

One of the most violent storms in the world today is a tornado. A tornado is an extremely violent, turning funnel or column of air coming from a thunderstorm and extending to the ground. Tornadoes can come in many different shapes and sizes and happen most often in springtime in central United States. Tornado speeds can reach 402 kilometers per hour or more. The path of damage that a tornado can cause can be anywhere from 1.6 kilometers to 80.5 kilometers long. Tornadoes are responsible for causing millions of dollars of structural damage and several hundred deaths each year in the United States.

In Canada, tornadoes are a little less common than in the United States. There is an average of 80 tornadoes every year in Canada. Most of Canada's tornadoes happen in central Canada. Canada's worst tornado happened in Regina, Saskatchewan in 1912. Twenty-eight people were killed and hundreds were injured.

Volcanoes

A volcano is an opening or vent on the surface of the earth. In the vent, magma or molten rock and gases erupt through the vent. Volcanic eruptions can be mild or extremely explosive.

Most of Canada's volcanoes are located in western Canada in the province of British Columbia. There have been at least three volcanic eruptions in Canada within the past two hundred years. There is a possibility that more Canadian volcanoes will erupt in the future.

"Some of the World's Natural Disasters"

Comprehension Exercise

Decide which natural disaster each statement is describing: landslide, mudslide, avalanche, hurricane, tornado, or volcano.

1. An opening or vent on the surface of the earth. _____
2. It can reach speeds of 402 kilometer/hour or more. _____
3. A movement of soil down a slope. _____
4. A large amount of snow falling down the side of a mountain. _____
5. A type of debris flow that moves faster than a landslide. _____
6. A tropical cyclone with winds of 119 kilometer/hour or more. _____
7. Their path of damage can be anywhere between 1.6 kilometers and 80.5 kilometers. _____
8. Heavy rainfalls in short amounts of time cause this natural disaster. _____
9. An extremely violent, turning funnel or column of air coming from a thunderstorm and extending to the ground. _____
10. This natural disaster draws it energy from warm surface water. _____

(View answers)

Trivia Question

Do a bit of research.

Which one of the natural disasters mentioned in this story is sometimes referred to as a "twister?"

(View answer)

"Some of the World's Natural Disasters"

-er and -est endings

Add the -er and -est ending to each of the following words.
Hint: Don't forget to change y to i when necessary.

Example:	**quick**	**body**	**quickest**
1.	slow	_____	_____
2.	heavy	_____	_____
3.	fast	_____	_____
4.	small	_____	_____
5.	steep	_____	_____
6.	large	_____	_____
7.	light	_____	_____
8.	wet	_____	_____
9.	loud	_____	_____
10.	low	_____	_____
11.	cold	_____	_____
12.	long	_____	_____
13.	mild	_____	_____
14.	calm	_____	_____

(View answers)

Natural Disasters*

There are many natural disasters.

Some are landslides, mudslides, avalanches, hurricanes, tornadoes, and volcanoes.

Landslides are a movement of a surface material down a slope.

Mudslides are fast moving landslides of mostly water mixed with mud or silt.

Avalanches are large amounts of snow falling down a slope or mountain.

They are very dangerous.

Hurricanes are tropical cyclones with winds of 119 km/hour or more.

They blow in a spiral motion.

Tornadoes are one of the most violent storms in the world today.

They are violent, turning funnels of air coming from a thunderstorm and extending to the ground.

Tornadoes cause lots of damage and deaths in the United States each year.

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1. _____ are large amounts of snow falling down a slope or mountain.
2. _____ are one of the most violent storms in the world today.

* For sources to this article, see *Some of the World's Natural Disasters.*

The information for the following story is from these Internet sites accessed 01/11/03:
http://www.seismo.nrcan.gc.ca/questions/faq_e.php
http://www.factmonster.com/ce6/sci/A0816559.html
http://www.earthnet.bio.ns.ca/french/geology/qa/quakes/q11.html
http://www.earthnet.bio.ns.ca/french/geology/qa/quakes/q9.html
http://www.earthnet.bio.ns.ca/french/geology/qa/quakes/q13.html

Words to Preview		
earthquakes	interlocking	detectors
trembling	Richter	tsunami
vibrations	seismometers	destructive

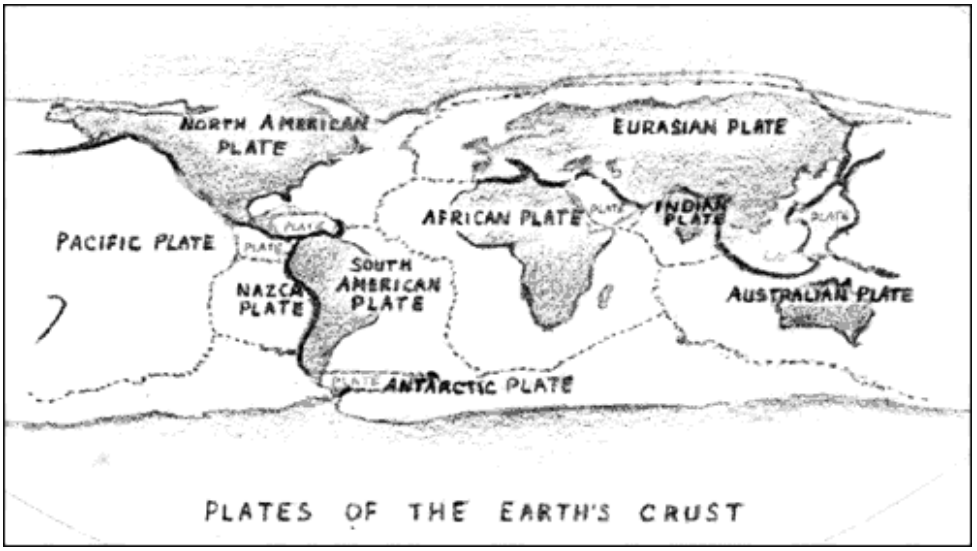
Canadian Earthquakes

Canada is probably not the first place you think of when talking about earthquakes, but Canada has had many earthquakes.

What is an earthquake?

An earthquake is the trembling and shaking of the Earth's surface. This happens when two tectonic plates try to move past one another but cannot because of bends in the rocks. Tectonic plates are big pieces of interlocking rock that form a layer beneath the Earth's surface. Interlocking means to fit together, resembling a puzzle. The pressure of the tectonic plates not being able to move past each other builds up and the vibrations create an earthquake.

Tectonic plates cover the entire earth, under both ocean and land. The earth is made up of seven large plates and many smaller ones. Each year these plates move a little bit. Canada is located on a stable region of the North American plate. This is why Canada doesn't have many earthquakes.



Some earthquakes are larger and more damaging that others. Scientists use a method called the Richter scale to measure the size of an earthquake. The Richter scale was invented in 1935. It bases earthquakes on a scale from 0 to 9. Severe earthquakes are higher than 7, but an earthquake higher than 4.5 can ruin buildings. Detectors called seismometers measure the ground motion.

Earthquakes are also based on the intensity scale. The intensity scale is based on the observed effects of an earthquake. This scale runs from 1 to 12.

Canada has had many small earthquakes but none have caused any deaths. The most powerful earthquakes recorded in Canada were in 1949, measuring 8.1 on the Richter scale in the Queen Charlotte Islands. A larger earthquake took place in Canada on January 26, 1700 in British Columbia. This earthquake could not be measured because the Richter scale was not yet invented.

On November 18, 1929, an earthquake occurred on the Grand Banks off the coast of Newfoundland. The quake was guessed to be 7.2 on the Richter scale. This earthquake occurred in the ocean and caused a tsunami. A tsunami is a tidal wave caused by an earthquake or a volcano. The tsunami caused $400,000 in damage and killed 29 people in Newfoundland.

In Nova Scotia, there have been several small earthquakes, most of them occurring offshore. There have been a few minor earthquakes in the Shelburne County area. One minor earthquake took place in Lake Ainslie, Shelburne County in 1909. It shook the earth enough to destroy a few buildings.

We are lucky that the most deadly earthquakes do not occur in Canada. Other areas around the world, like Asia, are not so lucky and the outcomes of some earthquakes are very deadly and destructive.

To read an interview with Emre Uzun who lived through the major earthquake in Turkey in 1999, See "Interview with Emre Uzan".

"Canadian Earthquakes"

Comprehension Questions

1. When does an earthquake occur?
2. What are tectonic plates?
3. What is the Richter scale?
4. What are the names of the detectors that measure the ground motion?
5. What is a tsunami? How much damage did a tsunami cause in Newfoundland in 1929?
6. In Nova Scotia, most earthquakes occur where?

(View answers)

Reading Between the Lines

1. Give a definition of a tidal wave.

Trivia Question

Do a bit of research.

Can earthquakes be predicted?

(View answer)

Interview with Emre Uzun

January 27, 2003

What follows is an interview with Emre Uzun who lived through the major earthquake in Turkey in 1999. Emre was born in Gölcük, a small city in northwestern Turkey, and he recently moved to Nova Scotia.

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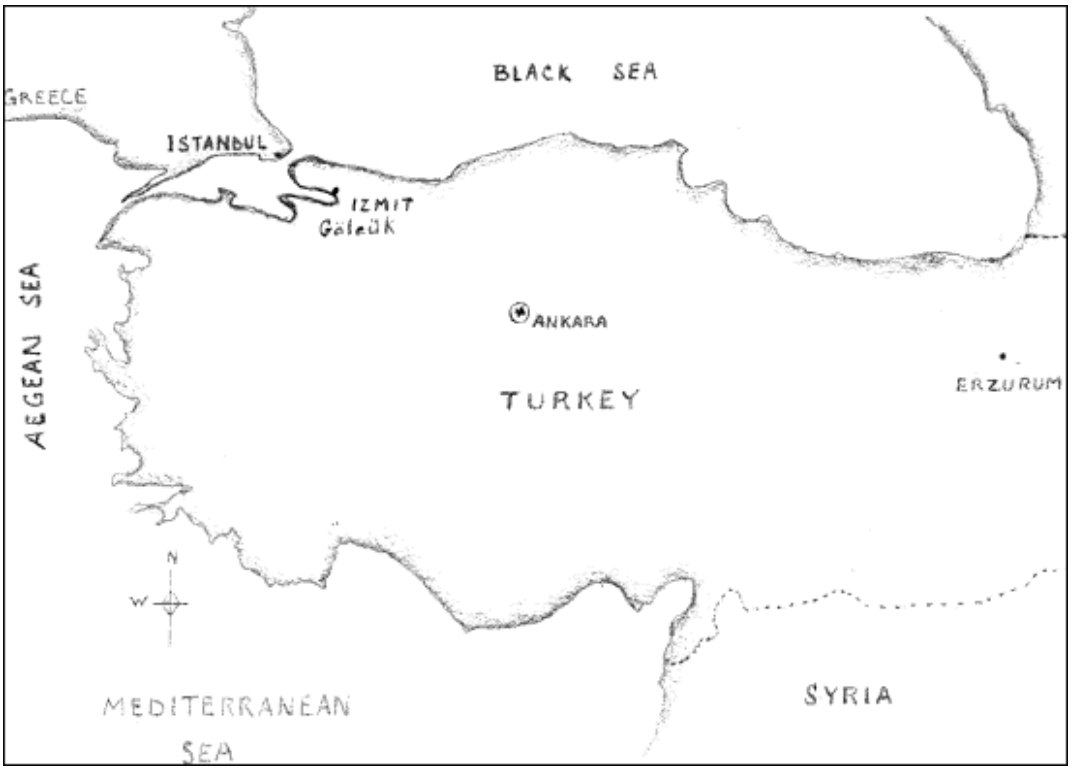
Where did the earthquake in Turkey take place?

The centre of the earthquake was in my hometown of Gölcük, but it was felt in all directions as far as the capital city, Ankara, 200 kilometers away. The major damage was in the area of the Bay of Izmit.



When did the earthquake in Turkey take place?

It took place on August 17, 1999, at 3:02 am. I was reading and listening to music wearing my headphones, so I didn't hear the early rumbling that woke up the people. They said it sounded like a roaring from the ground. I was living on the 3rd floor of a five floor apartment building. The building was made of cement blocks and was located high on a hill. It had a beautiful view of the Bay of Izmit.

What did you first notice?

Two or three months before, we had had a smaller earthquake and I had noticed my chair shaking. With this earthquake, I felt the same thing. Then the house began swaying back and forth. I could hear the people screaming outside.

What did you do next?

I tried to get up to get my mother in her bedroom. We were the only two people in the apartment. My mother was in shock. I was in shock too. I could hear the sand from the walls crumbling. I tried to find my lantern. When I opened the door to get out, there was a lot of smoke from the crumbling buildings. I spoke with my neighbor. She thought it was a bomb, but I told her I thought it was an earthquake.

There were 30-40 people outside. Some were still in their underwear. On the other side of the Bay of Izmit, there was an oil factory. It was one of the biggest oil factories in Turkey. I could see it was burning. Then I thought maybe it was a bomb from terrorists. I couldn't believe that an earthquake could do that. My mother and I started to walk down the hill. I was trying to get away from the apartment. I could see to my side that the apartment buildings looked lower. The first floors of the buildings had crumbled and the top floors fell on top of them. Other apartments were laying on each other.
I heard someone yelling, "Help me, help me." I asked, "Where are you?" I couldn't see the lady. She was in one of the buildings that had collapsed. Someone rescued her.
Eighty people had died around my blocks.

Where did you go?

We walked to the highway. We sat on the highway and listened to the radio. My lantern had a radio too.

When daylight came, what did you see?

Just a few apartments were standing. Mine was one of them. The fire burned for weeks. The official number of the deceased was 27,000 people, but the Mayor of Gölcük thought it was more than 40,000. The population of Gölcük was 30,000. Some of the dead bodies were put on ice in the local olympic size arena. I lost a few friends in the earthquake. I was one of the lucky ones.

Where were your other family members?

My father was away on business. The phones didn't work for a long time, but we finally reached him on his cellphone.
My brother was near Izmit at the time of the earthquake. He couldn't reach us by phone and the traffic couldn't get through, so he walked 60 kilometers to see if we were ok. As he was walking, he could see the dead people on the side of the road. He lost hope that my mother and I were alive. He was very happy to see we were alive.
My mother, brother, and I hitchhiked to Istanbul. The traffic was slow to the west side of the highway and the east side was totally jammed. My brother asked the driver of one of the slow moving vehicle for a ride. That is how we got there. We stayed at my brother's home in Istanbul.
The night after the earthquake, people slept outside in the parks since they were afraid that the buildings might crumble.

Had Turkey had any other major earthquakes?

Turkey is in a risky earthquake zone. In 1940, there was an earthquake in Erzurum. Twenty to thirty thousand people had died.

What is Turkey like now?

Now, three and a half years later, they are building a new city outside of the old city. The buildings are not as high and are built on hills. The economy of Turkey recovered within a year.
My parents moved to Gebze, but plan on returning to their old home since it has been renovated.
This disaster showed me one more time that we should respect and appreciate what we have. Millions of lives can be changed in a matter of seconds as it did in Turkey and that should not be ignored.

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1. Is Emre's story fiction or non-fiction?
2. What is the setting of Emre's story?
3. Emre describes many things in his interview. How does he describe:
   a) His apartment building before the earthquake.
   b) The apartment buildings after the earthquake.
   c) The "new" city.
4. Write a brief summary of Emre's story.

(View answers)

The information for the following story is from *"The New Book of Knowledge."*

Words to Preview		
erosion	glaciers	cultivating
process	erosive	continuous

What is Erosion?

When we are looking at our planet, we see a different-looking Earth than our ancestors saw. Why is that?

That is because things are gradually, but constantly, in the process of changing.

One of the changes that occur on the surface of the land is caused by erosion. Erosion is the process which causes the land to wear away, break up, and gradually change. Wind, rain, glaciers, and the action of rivers and waves all play an important roles as natural erosive agents.

Erosion can start as simply as a single raindrop moving a few grains of soil on a sloping land surface. Soon a pouring rainstorm loosens the topsoil. Rainwater running downhill cuts channels into the soil and carries it downhill. The channels deepen with the heavier rains, and more and more soil is washed away and transported elsewhere. This kind of erosion is called sheet erosion.

Often humans also help this kind of erosion by cutting down too many trees, and by loosening or over-cultivating the soil.

So people too, are guilty of speeding up the continuous process of erosion.

"What is Erosion?"

Comprehension Questions

1. What is erosion?
2. What are some natural erosive agents?
3. What is sheet erosion?
4. How do humans help sheet erosion?

(View answers)

Reading Between the Lines

1. Can you think of a land surface near you that has eroded over the years?

   Which natural erosive agents caused the erosion?

Trivia Question

Do a bit of research.

Wind causes erosion but is it strong enough to carry airborne material to other countries?

(View answer)

"What is Erosion?"

Compound Words

Take a word from column A and a word from column B to form a compound word.

Column A	Column B	Compound Words
every	stick	_____
some	fall	_____
water	pot	_____
rain	soil	_____
top	look	_____
no	book	_____
chop	one	_____
note	thing	_____
flower	coat	_____
over	where	_____

Find three compound words in the story.

_____ _____ _____

(View answers)

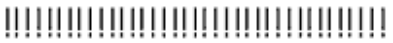
Erosion*

Sometimes land wears away, breaks up, or changes.

This is called erosion.

Erosion is caused by wind, rain, waves, and rivers.

When humans cut down too many trees, they are helping erosion occur.



1. Erosion happens when the land _____.
2. Erosion is caused by _____.
3. Humans help erosion occur by _____

   _____.

* For sources to this article, see *What is Erosion?*

The information for the following story is from a personal interview with Amberley McDonell and the following Internet site accessed 04/22/03: http://www.canoe.ca/CNEWSIceStorm/icestorm_dec15_cp.html

The 1998 Ice Storm

Amberley McDonell is a twenty-four year old young woman from the village of Summertown Station in Ontario. Amberley was in grade 11 when the infamous ice storm hit eastern Ontario, Quebec, western New Brunswick, and some of the northern states of the USA in January of 1998.

The population of Summertown Station is 110 people. "That is when I am away. When I'm home, there's 111," joked Amberley. Summertown Station is located one hour from Montreal.

The ice storm started like any other storm, but people soon realized that it was not an ordinary storm.

Amberley said that everything was ice-covered. Most people stayed close to home since the roads were very icy and dangerous.

Her village was left without electrical power for two and a half weeks. "We ate anything available and used lots of blankets and candles," said Amberley.

Generators were hard to find, but my father managed to get one. "The power was restored the same day he bought it," laughed Amberley.

Businesses kept functioning as normally as possible, but the school was closed and exams were cancelled.

People helped each other to get back on their feet. It cost many people a lot of money. There were many damaged roofs and also problems due to flooding. When spring arrived, many of the plants and trees were severely damaged due to the ice storm. It took a long time to get back to normal.

Though Amberley's village of Summertown Station was negatively affected by the storm, Amberley and her family were lucky that they didn't face the extreme problems that other places had.

Some say the 1998 ice storm was the most destructive storm in Canadian history. About 100 mm of freezing rain fell on eastern and central Canada between January 4 and 10, 1998.

The financial losses for Montreal were believed to be around $585 million. Sadly, some people loss their lives due to the storm. Some farmers lost their dairy cows to infection and crops and sugar maple taps were destroyed.

In Quebec and Ontario, there were over a million people without power. Seven hundred thousand people still didn't have power one month after the storm.

Canadian troops with the Armed Forces helped with emergencies caused by the storm. There had never been so many personnel deployed for a peacetime event.

I am certain that Amberley and other survivors of the 1998 ice storm hope they never see another storm like it!

"The 1998 Ice Storm"

Comprehension Questions

1. Where is Amberley from?
2. When was the icestorm and what areas did it affect?
3. How long was Amberley's village without power?
4. What were the financial losses from Montreal due to the ice storm?
5. How many people didn't have power one month after the storm?

(View answers)

Reading Between the Lines

1. In Quebec and Ontario, there were over a million people without power. Power outages lasted for weeks. What problems would you have if you were without power for a few weeks in the middle of winter?
2. If you had been in Ontario during the ice storm, what would you have done to help?

Trivia Question

Do a bit of research.

How many power transmission towers and wooden utility poles were affected by the 1998 ice storm according to Statistics Canada?

(View answer)

"The 1998 Ice Storm"

Consonant Blends

Consonant blends are two or more consonants blending together to make one sound.
For example: There is the consonant blend "st" in "stop."
There is the consonant blend "ch" in "each."

Replace each consonant blend with one letter to form a new word.

1.	storm	_____	10.	still	_____
2.	most	_____	11.	cost	_____
3.	start	_____	12.	plant	_____
4.	school	_____	13.	place	_____
5.	close	_____	14.	lost	_____
6.	when	_____	15.	each	_____
7.	two	_____	16.	tree	_____
8.	state	_____	17.	though	_____
9.	that	_____	18.	spring	_____

(View answers)