LESSON PLAN MATERIALS
The Mystery of the Missing Jewel Fish
An Original Story

Long ago, before dinosaurs were on Earth, the greatest of all kingdoms was under the sea. The ruler of this fine kingdom, King Lionfish, was a kind, wise and brave ruler. He lived in a sandcastle deep in the Pacific Ocean.

One day, King Lionfish discovered his valuable jewel fish had been stolen! The king was extremely angry and called upon his worthy friends, Seymour Swordfish and Franky Flashlight Fish to track down the precious jewel fish. They immediately mounted their seahorses and rode off to find the thief.

They decided to investigate the Atlantic Ocean first. They searched night and day, with Franky using his flashlight to brighten the way. As they passed the porcupinefish, they found the first clue. Stuck in the needles on his back was an orange wig with curly hair. They kept the wig, but it was not enough to solve the mystery. They rode on to find more clues.

The two brave "soles" traveled to the south and east until they reached the Indian Ocean. Here, they found some balloonfish from the Sea Circus. They knew this was odd and recorded it as clue number two in this perplexing mystery.

They steered their seahorses until they reached the Arctic Ocean. There they passed the cowfish where they discovered their third clue. The cowfish had been at the Sea Circus and mentioned that the clown fish had not performed.

Seymour and Franky began to put the clues together: the orange wig, the circus balloons and the missing clown fish. They knew immediately that the thief must have been the clown fish from the Sea Circus!

Knowing the clown fish would go somewhere to hide, Seymour and Franky again mounted their seahorses and rode south toward the Atlantic Ocean. As they were coming around a reef of coral, Seymour spotted the clown fish, who had the jewel fish trapped in a net. Franky distracted the clown fish with his flashlight while Seymour used his sword to cut the net and free the jewel fish. Quickly, they swam back to the king.

King Lionfish was overjoyed with their success and threw a sea party for the two heroes. All of their best friends were there. The trumpetfish, the guitar fish and the striped drum played music while the rest of the kingdom rejoiced!
Major World Oceans

Atlantic Ocean 38,000,000 sq. miles

Arctic Ocean 6,000,000 sq. miles

Indian Ocean 25,000,000 sq. miles

Pacific Ocean 64,000,000 sq. miles

Antarctic Ocean 12,000,000 sq. miles
GRAPHING OUR OCEANS

Pacific  Atlantic  Indian  Arctic  Antarctic

0  10,000  20,000  30,000  40,000  50,000  60,000  70,000
World Map to Color and Label

Did you know the Earth's surface is over 70% water? The ocean holds 97% of the world's water. Two percent is ice in the polar icecaps, and only one percent is fresh water. Study the map below. Label all the oceans. Use a globe or world map to find the names you do not know. Color the oceans blue. Color the land brown.

Use the following list of oceans for help:

Atlantic Ocean
Pacific Ocean
Arctic Ocean
Indian Ocean
Southern (Antarctic) Ocean

What is the biggest ocean?
Names ____________________

Salty Water Evaporation

1. With a partner, decide which of you will be responsible for the jobs below:
   Experimenter - responsible for following the given directions, gathering materials and cleaning up.
   Recorder - responsible for reading the directions out loud, reading the questions out loud and writing the answers.

2. Gather the following materials:
   - spoon
   - salt
   - paper cup
   - 1/4 cup water

3. Stir the salt into the water.

4. Put the cup in a warm place so the water will evaporate.

5. Use what you already know about science to predict:
   What do you think will happen to the water? ____________________
   What do you think will happen to the salt? ____________________

6. Check the cup in a few days and record:
   What has happened to the water? ____________________
   What has happened to the salt? ____________________

   What do you think happens to ocean water when it is exposed to the sun?
   What do you think happens to the ocean salt when the water evaporates?
STUFFED FISH

1. Give children the fish pattern on the next page along with two pieces of construction paper in their choice of color.
2. The students will trace the fish pattern onto the construction paper, cut out the fish, and then decorate with crayons, markers, glitter, paint, etc.
3. Staple the two fish pieces together only part way.
4. Stuff the fish with tissue paper, newspaper, cotton, etc. and then staple the fish together the rest of the way.
5. Hang the fish from the ceiling to decorate your ocean community.

SALTWATER PAINTINGS

Materials:
baby food jars 1/4 cup warm water for each jar
6 tsp. salt for each jar food coloring
paint brushes white construction paper

Directions:
1. Mix 1/4 cup warm water with 6 tsp. salt and 3 drops of food coloring in each jar.
2. Paint pictures with the mixture on white paper.
3. Let dry. The water evaporates, but the colored salt remains, creating beautiful pictures.
# OTHER COLORS OF THE OCEANS

<table>
<thead>
<tr>
<th>Body of Water</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow Sea</td>
<td></td>
</tr>
<tr>
<td>Red Sea</td>
<td></td>
</tr>
<tr>
<td>White Sea</td>
<td></td>
</tr>
<tr>
<td>Black Sea</td>
<td></td>
</tr>
</tbody>
</table>
Teacher Note: You might want to divide the class into groups and ask each group to prepare a glass. Then, rotate so each group reads all 4 thermometers.

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Name ______________________

Ocean Temperatures

Where do you think the ocean temperatures are the warmest? Do you think the salt makes the ocean warmer or cooler? Do you think the sun makes the ocean warmer or cooler? Try this experiment to find out!

1. Get 4 clear glasses of water.
2. Add salt to 2 of the glasses and stir well.
3. Set one freshwater glass and one saltwater glass in the shade outside.
4. Set the other 2 glasses in the sun outside.
5. Set thermometers in each of the 4 glasses.
6. Divide into 4 equal groups and start at a different glass.
7. Wait 15 minutes, then read the thermometer and record below.
8. On signal, rotate to the next glass.

### Fresh/Shady
- °C

### Fresh/Sunny
- °C

### Salty/Shady
- °C

### Salty/Sunny
- °C

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NOW THAT'S COLD!!!

Materials:

thermometer
2 medium-sized bowls labeled A and B
1 large bowl filled with ice cubes

Directions for activity:

1. Fill bowl A with water that's between 65° and 75° F.

2. Fill bowl B with water that's below 36° F and place it inside the bowl of ice.

3. Explain that the samples represent water from different levels of the ocean.

4. After everyone has felt both samples ask: Which is most like the temperatures deep in the ocean? (Sample B). Which is like temperatures in most of ocean? (Sample A). Then point out that the shallow water closer to the shore where people swim is much warmer.
The Ocean Floor

After reading the page on the parts of the ocean floor, put the correct number in the circle next to the picture of the ocean floor described below.

1. **Continental shelf**: This area rims the land, and is important to fishermen because of the fish that live in the shallow waters above the shelf.

2. **Continental slope**: The big dropoff to the ocean floor.

3. **Trench**: A valley under the water.

4. **Floor**: Sometimes flat, covered with mud and the remains of dead animals and plants.

5. **Island**: The top of an undersea mountain.
The Ocean Floor

Imagine walking from the shallow end of a swimming pool toward the deep end. Can you feel how the bottom slopes gradually downward, until your head is no longer above the water? Now imagine taking a walk off a sandy beach into the ocean. The land slopes into the water. Along the land is a rim or shelf. This rim of underwater land is called the continental shelf. This shelf is important to fishermen because the fish they catch live in these areas.

At the edge of the continental shelf is the continental slope. This slope is the beginning of the big dropoff to the ocean floor.

Now pretend you can walk along the ocean floor. What would that walk be like? The ocean floor is a series of hills, mountains and valleys. You might get tired from climbing these underwater hills. Some underwater mountains reach high enough above the water to form islands.

In some parts of the ocean the floor is flat. The floor is covered with mud, sand, silt and the remains of dead plants and animals.

In the western Pacific Ocean you'll find the deepest trench in any ocean. A trench is like a valley under the water. The Marianas Trench is 35,000 feet deep. More than six miles down!
Layers of the Ocean Floor

Have you ever wondered what is under the beach that you see? Some beaches are really layers of rock, pebbles, shells and sand. Work in a group of 4 students and choose one of these materials to bring to school for your group. Write your name next to the material that you will bring:

- sand __________________________
- shells __________________________
- rock __________________________
- pebbles __________________________

Your teacher will provide a glass jar and water.

1. Gather the materials and take turns adding them to the jar. Add the same amount of each material.
2. Fill the jar to the top with water.
3. Close the lid TIGHTLY!
4. Take turns shaking the jar 10 times each.
5. Place the jar in a quiet place for one day.
6. Each of you should draw and label one layer of the jar on the worksheet. Then, all of you put your names on the paper.
7. For follow-up, each of you draw a picture of the ocean floor. Think about the layers you saw in your jar. Use layers in your picture.
SEA ANIMAL ACTIVITY

sea horse      goosefish
nurse shark    squirrelfish
feather duster batfish
hog fish       dogfish
starfish       tiger shark
angelfish      lionfish
leopard shark  boxfish
turkeyfish     guitarfish
horseshoe crab catfish
jewel fish     balloonfish
cowfish        porcupinefish
parrotfish     sawfish
clownfish      needlefish
swordfish

Write each fish on a slip of paper. Give each student a slip of paper and instruct them not to tell anyone what their fish is. Have students draw a picture of what they think their fish looks like based on its name. When the students are finished, have the students guess the name of each student's fish. As an extra activity, put the students' pictures on a bulletin board and title it "Our Fishy Zoo". Allow students to get encyclopedias and other books to find what their fish really looks like.
Ahoy, garbage!

Ask your students to study a globe or map and guess what percentage of the earth's surface is covered by the ocean (about 70%). Tell them that people used to think the ocean was so vast that it could easily handle any trash, sewage, chemicals—even radioactive material—we dumped into it. And as we began to run out of places on land for our waste, more and more often we used the sea as our “garbage can.”

Divide your class into four-person teams, and give each team a clean 2-liter plastic bottle with the label and top removed. Ask each team to collect small pieces of one type of trash—for example, paper, plastic, metal, food scraps (apple slices or orange peels). Have the teams place their items—or portions of them—in their bottle (only one type of item per bottle). After covering the items with salt water (see recipe, p. 42), the teams should fasten the bottle tops in place with vinyl tape.

Now ask the teams to predict which bottle of trash will decompose the most. Post the predictions. Monitor the experiment until the end of the school year (if water evaporates, unscrew the cap and refill). Warning: Make sure your students open any bottles that contain food products in well-ventilated areas.

As time passes, have the teams keep track of which items show the most change and which show the least. Discuss whether these results apply to the real world. In what ways does the plastic-bottle model differ from the ocean? (The bottle is much smaller; it has no creatures to eat the garbage or paper and no waves to break things up.)

Continue your investigation of ocean pollution by creating a bulletin board titled “Oh, Buoy!” Have teams of students each research one kind of ocean pollution—plastic such as old fishing line, six-pack holders, and shopping bags; toxic chemicals; thermal discharge; sewage; runoff; silta-

Pollution solution

Give your students insight into large-scale pollution with this microcosm activity.

Place a small wading pool in a corner of your classroom. Fill it with water, then add a few plastic birds, fish, and aquarium plants. Sometime in the course of your oceanography study (when your students aren’t present), pour a bottle of cooking oil into the water. After the kids notice the disaster, discuss who is responsible for cleaning it up. Have them form three- or four-person “cleanup crews” to suggest ways to handle the spill. Bring the crews together and make a class list of possible techniques or materials—paper towels, sand, feathers. (Suggest they use bits of polystyrene. Your kids will be amazed at the results.) After the spill is cleaned up, invite your students to share their feelings about dealing with someone else’s mess.

While some teams investigate the cleanup policies of the EPA and various oil companies, others could research the latest techniques in oil spill cleanup.
Pollution and Food Chains

1. While students are out of the room, hide 8-10 small pieces of candy around the room.
2. Randomly divide the class into 4 equal groups.
3. Name the groups: Small Creatures, Medium-Sized Fish, Large Fish and People.
4. Explain that the classroom is going to be the ocean and set specific boundaries.
5. Direct the Small Creatures to "swim" around and look for plants to eat (candy). When they find a piece, pick it up and hold it.
6. After about 2 minutes, those who did not find food must return to their seats because they did not survive.
7. The Medium-Sized Fish will then try to catch food by crawling after the Small group. Those who did not catch one must return to their seats.
8. The Large group does the same, then the People.
9. The students should begin to see the importance of many healthy plants to feed the small fish, many healthy plants to feed the medium fish, etc. With polluted waters, the plants begin to die. What will happen next?

Give each group a copy of the questions below. Allow groups 10 minutes to work on them and then come back to the whole group. After sharing answers, reward each student with a piece of candy.

1. What would happen to the small creatures if the plants were gone? ______________
2. What would happen to the large fish if the medium-sized fish were gone? ______________
3. What would happen to the people if the large fish were gone? ______________
4. What would happen to the food chain if the plants were all gone? ______________
5. Why is it important to take care of our oceans? ______________

Critical Thinking

Oceans IF8828 22 ©MCMXII Instructional Fair, Inc.
BULLETIN BOARDS
Whale of a Good Job!!

Purpose: to display students' good work throughout the unit and to encourage good work
Purpose: Teachers and students check the newspapers or magazines for articles dealing with the ocean. Articles and pictures should be posted on this bulletin board. This bulletin board will be the center of discussion on ocean current events.
Did You Know????

Write interesting facts from the next page on fish pattern, sand pails, boats, etc. and hang them on this bulletin board.

Purpose: to motivate, catch attention, inform
Interesting Facts

** for use with bulletin board on previous page

1. The fastest fish in the world is the tropical sailfish. One has been timed over 68 mph.

2. A fully grown blue whale, the biggest animal ever to live on earth, weighs as much as 25 adult male African elephants.

3. The biggest wave officially recorded measured 112 feet trough to crest.

4. If a 2 pound iron ball was dropped overboard at the deepest part of the Marianas trench in the Pacific Ocean, it would take just over an hour to hit the ocean floor.

5. The worlds biggest giant clam was found on the Great Barrier Reef off the coast of Australia. It was more than 3 feet across and weighed a quarter of a ton.

6. About 5 million years ago the Mediterranean Sea dried up. In fact, it has dried up and flooded again several times over.

7. Food is very scarce in the deep ocean basins so some fish, like the gulper eel, have enormous jaws and elastic stomachs so they can swallow fish bigger than themselves.
LEARNING CENTERS
READING CENTER

1. Section off the reading corner of the classroom by hanging strips of crepe paper from the ceiling. Let it hang to the floor.

2. Fill the reading corner full of fictional and non-fictional books about the ocean. Suggested books are listed in the student section of the bibliography.

3. Students must read at least 5 books and complete an activity for the story. Keep track of their activities using one of the suggested methods in the "Evaluation" section.

4. Suggestions for the reading activities:
   * draw the setting, main characters, an event, etc. from the story
   * make a time line of the story
   * list the facts learned from a non-fiction book
   * write out the main idea or the theme of the story
   * write about the story's problem
   * give a book talk
   * tell the story using only pictures
   * make a mobile that describes the story
   * write a different ending to the story
CREATIVE WRITING CENTER

1. Provide pictures of oceans, sea animals, beaches, boats, and anything dealing with oceans to encourage students' creativity.

2. Provide fish paper (like that on the next 2 page), patterns of fish, sand pails, starfish, etc. on which the students can write. Provide a copy of the glossary which follows.

3. Writing ideas to put in the center:
   * Write about a buried treasure that you just found.
   * Pick a sea creature. Imagine that you are that animal and write all about your life.
   * Describe a walk along the beach that you just took. What did you see, hear, feel, or smell?
   * Write a poem about the ocean or animal that lives in the ocean.
   * Use the pictures that are provided and write a story telling about what is taking place in the picture.

4. Put writing ideas on index cards and place them in a plastic sand bucket. Students will use a plastic sand shovel to "scoop" out an idea and then write about it.

5. Put writing ideas on paper fish and place a magnet on each fish. Place the fish in a box which has been covered with
blue plastic wrap and has a hole cut in the top. Make a fishing pole with a magnet on end of the string. Students will "fish" out an idea and then will write about it.

** Students should be required to complete four writing activities. Keep track of the number of activities completed in one of the ways suggested in the "Evaluation" section,
<table>
<thead>
<tr>
<th>Glossary</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>bay</td>
<td>part of a sea that stretches into land</td>
</tr>
<tr>
<td>bivalve shells</td>
<td>shells made of 2 separate parts</td>
</tr>
<tr>
<td>coast</td>
<td>the edge of land that touches the ocean</td>
</tr>
<tr>
<td>current</td>
<td>powerful movement of water through the ocean</td>
</tr>
<tr>
<td>food chain</td>
<td>animals depending on each other and plants for food</td>
</tr>
<tr>
<td>gulf</td>
<td>part of a sea partially surrounded by land, usually larger and deeper than a bay</td>
</tr>
<tr>
<td>iceberg</td>
<td>large mass of floating ice in the water</td>
</tr>
<tr>
<td>island</td>
<td>body of land completely surrounded by water</td>
</tr>
<tr>
<td>kelp</td>
<td>brown seaweed</td>
</tr>
<tr>
<td>marine</td>
<td>having anything to do with the sea</td>
</tr>
<tr>
<td>ocean</td>
<td>a large body of salt water</td>
</tr>
<tr>
<td>oceanographer</td>
<td>scientist who studies the ocean</td>
</tr>
<tr>
<td>river</td>
<td>large stream of fresh water that leads to the ocean</td>
</tr>
<tr>
<td>sea</td>
<td>part of an ocean that is partially surrounded by land</td>
</tr>
<tr>
<td>seaweed</td>
<td>plants that live in the ocean</td>
</tr>
<tr>
<td>shallow</td>
<td>not deep</td>
</tr>
<tr>
<td>shore</td>
<td>land that touches water</td>
</tr>
<tr>
<td>strait</td>
<td>narrow channel between 2 bodies of water</td>
</tr>
<tr>
<td>surface</td>
<td>top of the water</td>
</tr>
<tr>
<td>tide</td>
<td>regular rise and fall of the ocean surface caused by the pull of the sun and the moon</td>
</tr>
<tr>
<td>tsunami</td>
<td>giant, fast-moving ocean wave</td>
</tr>
<tr>
<td>univalve shell</td>
<td>shell made of only one part</td>
</tr>
<tr>
<td>whitecap</td>
<td>the white-colored foam on top of a wave</td>
</tr>
</tbody>
</table>
A Deep Sea Tale . . .

Reported by ________________________________________,

Great Underwater Explorer

Write a short story about your dive deep in the ocean. Describe what you saw, how you felt, and tell about your discovery.
Using Descriptive Language

Stories are always more exciting when you can picture them happening in your mind. Descriptive words help make the story imaginable. Use these categories to think of words that describe a walk along the beach. Pretend you are barefoot walking close to the water. With a partner, write three words in each area. Then, use all the words in a story.

<table>
<thead>
<tr>
<th>What I smell:</th>
<th>What I taste:</th>
<th>What I hear:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. __________</td>
<td>1. __________</td>
<td>1. __________</td>
</tr>
<tr>
<td>2. __________</td>
<td>2. __________</td>
<td>2. __________</td>
</tr>
<tr>
<td>3. __________</td>
<td>3. __________</td>
<td>3. __________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What I see:</th>
<th>What I feel on my feet:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. __________</td>
<td>1. __________</td>
</tr>
<tr>
<td>2. __________</td>
<td>2. __________</td>
</tr>
<tr>
<td>3. __________</td>
<td>3. __________</td>
</tr>
</tbody>
</table>

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**My Walk Along the Beach**

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1. Provide worksheets on pages 78-83 for students to complete at the center.

2. Provide whale handouts on pages 84-89 for students to color and make into a book titled Whale Watchers Guide.

3. Provide sea shells for students to look at and handle.

4. Provide pictures of the oceans and sea animals for students look at.

5. Provide models of sea animals for students to look at and handle.

6. Provide a pan of water and various objects for students to experiment with and identify which ones sink and which ones float.
"Catch of the Day" Combinations

Below is a menu from Fedora's Fish Market. You must order one entree, one side dish and one drink, but you love everything on the menu! Using one item from each group, list all the possible dinners you may order! There are 12 possibilities!

<table>
<thead>
<tr>
<th>Entrees</th>
<th>Side dishes</th>
<th>Drinks</th>
</tr>
</thead>
<tbody>
<tr>
<td>shrimp</td>
<td>French fries</td>
<td>milk</td>
</tr>
<tr>
<td>fish sandwich</td>
<td>salad</td>
<td>soda</td>
</tr>
<tr>
<td>lobster</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| shrimp       | French fries| milk   |       |
|--------------|-------------|--------|
|               |             |        |
|               |             |        |
|               |             |        |

Name ____________________
A Fishy Word Search

Look for each of these words in the word search. The words can be found either across or down.

- SCALES
- SWIM BLADDER
- FRESH WATER
- SEAHORSE
- EGGS
- SALMON
- SPAWN
- SWIMMING
- SALT WATER
- COLD BLOODED

Name ____________________
Beach Walk

All of these animals can be found along the beach. Can you find them in the hidden word puzzle?
The words may appear horizontally, diagonally, and vertically.

<table>
<thead>
<tr>
<th>SAND DOLLAR</th>
<th>P S L T U X R S A L P T F O</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIMPET</td>
<td>M E E S A N D D O L L A R P</td>
</tr>
<tr>
<td>HORSESHOE CRAB</td>
<td>S A R L J L E S S U M L C T</td>
</tr>
<tr>
<td>PERIWINKLE</td>
<td>C S O I T M Q L A T P M E N</td>
</tr>
<tr>
<td>SCALLOP</td>
<td>A T R P W I E L S H M P R T</td>
</tr>
<tr>
<td>SEA STAR</td>
<td>L A T P G I L V T E M Q A L</td>
</tr>
<tr>
<td>STEAMER CLAM</td>
<td>L R O E T R N E R I A P Z I</td>
</tr>
<tr>
<td>MUSSEL</td>
<td>O E I R S U M K L B J K O A</td>
</tr>
<tr>
<td>SLIPPER SHELL</td>
<td>P G S S S F R E L A L Q R N</td>
</tr>
<tr>
<td>SEA URCHIN</td>
<td>S O E H D C H T M E N S C S</td>
</tr>
<tr>
<td>QUAHOG</td>
<td>P H S E A U R C H I N S L N</td>
</tr>
<tr>
<td>MOON SNAIL</td>
<td>S A C L R A P W C E H F A O</td>
</tr>
<tr>
<td>WHELK</td>
<td>P U E L D V H W R M O L M O</td>
</tr>
<tr>
<td>QUARX</td>
<td>X Q S T E A M E R C L A M M</td>
</tr>
<tr>
<td>COURTESY OF MYSTIC AQUARIUM</td>
<td>T B A R C E O H S E S R O H</td>
</tr>
</tbody>
</table>
Find and circle the words that are hidden in the puzzle. All the words read from top to bottom or left to right. You should find 15 words.

1. Periwinkle
2. Fish
3. Mussel
4. Scallop
5. Sea urchin
6. Sea star
7. Barnacle
8. Sea cucumber
9. Rockweed
10. Anemone
11. Sponge
12. Lobster
13. Crab
14. Tidepool
15. Hermit crab

Courtesy of New England Aquarium
Most fish lay eggs in the water. Seahorses are fish, but they do something quite different with their eggs. The mother seahorse lays her eggs in a special pouch on the father seahorse’s abdomen. Here he safely carries the eggs while they develop. In about 45 days the eggs hatch. Then the father bends and squirms to push the baby seahorses out into the water. He may have 200 babies. Once they are free of the pouch, the young seahorses can care for themselves. The father’s job is done.

Help the baby seahorses find a way out of the seaweed maze.
Suppose you are a periwinkle (snail). Can you get through the maze to lunch on some seaweed? Be careful! You could take the wrong turn to danger.

Courtesy of Mystic Aquarium
This is a humpback whale. It can sing whale songs!
This is a bottlenose dolphin.  
It is a member of the whale family.
This is an orca whale. It is black and white.
This is a beluga whale. 
It is all white.
This is a gray whale.
It swims a long way each year.