Unit Ten
Field Trip Follow-up and Review Activities

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Objectives

To help students:
* Review the field activities (Activities 1, 4).
* Link the field experiences to pre-trip classroom work (Activities 1, 10, 12, 14).
* Use the field experience as the stimulus for language arts, music and art activities (Activities 1, 2, 3, 4, 5, 6, 7, 8, 9, 10).
* Recall the different groups of mollusks and insects (Activities 13, 15).
* Appreciate the enrichment water invertebrates add to their local environments (Activities 1, 2, 8, 15, 16).
classroom curriculum, using interest generated by field experiences to stimulate classroom lessons.

UNIT TENS: FIELD TRIP FOLLOW-UP AND REVIEW. This unit is designed to transfer the understanding gained in the field to the classroom.
The field trip, as an ideal culmination of Sea Week studies, is also an ideal takeoff point in itself for further learning in the classroom. Thus, the following review activities are so designed, facilitating lessons across several subject areas: art, science and math, language arts and music.

Activity 1
Create a Habitat - Bubble Room or "Magic Submarine"

Background:

This activity simulates several different habitats in an underwater environment. As an artificial "immersion," it can be used to either stimulate creative activities or function as a retreat for a special reward.

If a "bubble room" is not possible, experiment with large cardboard boxes, or use a loft, hallway, or the corner of a classroom. Bubble rooms are special places with magical appeal.

Materials:

- three-inch wide duct tape or strapping tape (not masking tape)
- 50-foot roll of six-foot wide, .004-weight clear plastic
- acrylic paint (comes out of clothes with rubbing alcohol)
- paint brushes
- drawing or manila paper
- crayons
- scissors
• Scotch tape
• waxed paper
• window fan
• worksheet:

...Organisms in Their Habitats (10A)

Vocabulary:

• habitat
• bottom
• top
• sides
• organisms

Procedure:

1. Bubble rooms can be designed in many fashions. The following is among the simpler layouts.

Lay three pieces of six- by 12-foot clear plastic side-by-side on the floor. Tape the edges together where they touch.

Pull one 12-foot side across to the other edge. Tape these together. At this point, you should have a 12-foot tube, open at both ends.

Cut a new piece of plastic into a three- by six-foot rectangle to match the end of the tube. Close one end of the tube by placing the new length of plastic across the opening.

Place a sturdy window fan in the other end. Turn it on to inflate the bubble. Have students crawl past the fan. Once they're in, temporarily seal the plastic around the fan using clothes pins or masking tape.

2. Brainstorm plans for bubble-room artwork:

What was on the bottom?
What was on the surface?
What was on the edges?
What is in the open water?
What changes would occur if you traveled from a pond to the ocean?

3. Have students choose items they want to see from the bubble room. Instruct them to draw a picture of the object on paper. These patterns are then either taped on the top and sides, or placed underneath the bubble for students to copy onto the bubble with paint. As their confidence increases, they might want to delete the patterns and paint directly onto the bubble. Leave one area blank as a viewing screen.

NOTE: Patterns may be taped inside or out. Items that ordinarily would be out of the water—such as clouds, flying gulls, or water lily blossoms—appear more realistic if they are painted on the outside.

4. Picture suggestions:

Pond:

Top: bottom of a duck, fish, swimming beaver, duckweed roots, water strider.

Sides: beaver dam, otter slide, fish, water boatman, beetle, stems.

Bottom: clams, bottom fish, rocks, mud, litter.

Ocean:

Top: bottom of boat, bottom of an iceberg or float, bottom
of gull, duck or sea bird, sea otter, whale.

Sides: seal, whale, fish, octopus, ship wreck, rocks, algae.

Bottom: shells, bottom fish, rocks, litter.

5. Construction hints: Painting is best done on an inflated bubble. Painting outdoors can prove quite successful. Waxed paper makes an excellent paint-mixing palette for each child. Acrylics stick to the plastic, but eventually may begin to peel. It can be cleaned off and the bubble room recycled as another habitat or for other uses. Heavy plastic cannot smother children if accidently deflated. However, do not use light-weight materials.

6. Now your bubble is ready to use to further stimulate creativity. Expand the bubble environment to include auditory as well as visual experience by playing tapes of appropriate music: sea chanteys, loon cries, song of the bearded seal, song of the humpback whale, sounds of surf, water dripping. Write poetry inside. Sing songs inside such as "Mud, Mud, Mud" by Good Apple Press.

Write stories about living under water or being transformed into a predacious diving beetle (see Ghost boat by Jacqueline Jackson), or being a good fish in a bowl. Have a class storyhour inside, reading water legends or adventures. Design a bubble room home for people living at the bottom of ponds or oceans. Be sure to include air locks. (Contributed by Gerry Young, University Park Elementary, Fairbanks)

7. The magic submarine also can be used as a media bubble. Leave a viewing window blank when you paint your submarine. Show your favorite underwater movie or slides on the bubble from outside and view on the inside. Students can also create a water experience for their classmates inside the bubble, by mixing water, food coloring and oil in a glass pan on an overhead projector focused on the side of the bubble. Insects in petri dishes projected from the overhead will squirm and swim on the side of the submarine. (Contributed by Linda Rode, Koyuk Malamute School, Koyuk)

8. Use the Organised habitats worksheet to review habitats.
Activity 2
Sand Painting

Materials:
- sand (from field trip)
- bucket or dishpan
- dried tempera or printer's ink
- oven (optional)
- sprinkler (optional)
- paper
- pencil or crayon
- glue (such as Elmer's)

Procedure:

1. Collect sand from the beach and prepare it for painting: Strain it. For a half-hour, soak the sand in printer's ink or dried tempera, mixed in a strong solution of rubbing alcohol. Dry sand.

2. Have students draw pictures of shells on paper, then put glue on the drawing for one color of their picture.

3. Put one color of sand in a sprinkler. Allow students to sprinkle the glue with sand from the sprinkler or with their fingers. Let the glue dry, then dust off the excess sand.

4. Repeat steps 2 and 3 for additional colors.

Activity 3
Shell Mobile

Materials:
- thread, fishing line or dental floss
- supports: dowels, coat-hanger wire, or pieces of driftwood
- variety of shells (from field trip)
- white glue
- electric drill with small bit, or hand drill, or hammer and small nail.

Vocabulary:
- balance
- names of shells chosen
- mobile

Procedure:

1. Make a hole in each of the shells with an electric drill. This is time consuming. Most teachers prefer to drill the holes before class.

2. Tie thread, fishing line or dental floss to the shells.

3. Cut a support to the desired length. Suspend the threaded shell from the end of it.

4. Add as many balancing parts to the mobile as time and imagination allow.
Additional Art Activities:

1. Make a collage of life on the bottom of a pond or tide pool.

2. Make a picture of an insect, shell, beach or pond, using only natural materials.

3. Have students illustrate the "Young Raven" song in Activity 10.

4. Have students draw shells or insects, labeling them with their common names. Then have them add a new name of their own invention.

5. Make crayon resist sea creatures.

6. Make water color seascapes.

7. Make collage seascapes, using real sea or beach objects with crayon and paint.

8. Make shell pins by gluing safety pins to the back of shells.

### Activity 4

**Descriptive Words**

- **Texture**
- **Size**
- **Shape**
- **Density**
- **Temperature**

### Materials:

- objects found on the shores of an ocean or pond (These will be used to illustrate texture, size, shape, density and temperature. Representative objects include shells, sand, driftwood, stones, moss, water, plants, birds, clouds, sunlight.)
- task cards described below

### Vocabulary:

- description
- texture
- shape
- size
- density
- temperature

### Procedure:

1. Discuss description and words used to describe objects. Introduce students to the major category headings: texture, shape, density, temperature and size, using examples from the classroom to illustrate.
2. Divide the class into small groups. Give each group cards with the following questions:


* What do you see with a shape that could be described as round? Oblong? Triangular, Rectangular? Pointed? Curved? What other words describe the shapes of these objects?

* What do you see with a density that could be described as solid? Hollow? Spongy? Porous? Nonporous? What other density words describe the objects?

* What do you see with a temperature that could be described as hot? Cold? Clammy? Cool? Lukewarm? What other temperature words describe the objects?

* What do you see with a size that could be described as narrow? Large? Small? Tall? Short? Thick? Heavy? Bulky? What other words describe the sizes of objects?

3. Have the groups work through the task cards.

4. For review at the end of the period, assign each group a task card or part of a task card to present to the rest of the class.

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Activity 5
Water Stories

Procedure:

Use the following "Story Starters" to initiate stories in class. Either have students complete the stories on their own, or pass the story from student to student. Here are some "starters":

Suddenly, before my eyes, the shell began to grow.

My dog began barking fiercely at the strange creature that was floating toward shore.

I was beachcombing [or exploring a pond] one foggy afternoon and suddenly bumped into a....

The frothy wave leaped up onto the dock and carried me away on its crest.

I always thought sea monsters were make believe until....

I was slowly opening the clam shell and to my great amazement discovered.....

As I was wiggling my toes in the sand, my foot struck something strange.
I was studying this bivalve shell, when suddenly it moved its two halves and said...

I was exploring a beach [or pond] one rainy afternoon when I suddenly began to shrink! Soon I was the size of a [periwinkle, snail, etc.].

I find the inside of a univalve shell the most wonderful home because...

**Activity 6**
**Sharing Poetry**

Background:

Poetry links the natural world with language arts and also can help express values and feelings. The addition of poetry to Sea Week provides the opportunity to develop articulation and verbalization skills.

Materials:

- felt-tip pens
- large format paper

Vocabulary:

- poetry
- rhyme
- selected words from poems used in class

Procedure:

1. Have the poems on large format paper for group visibility.

2. Either read the poems to the class or have individual students read them orally.

3. Have the class memorize parts or all of a poem.

4. Have students illustrate a poem.
5. Write and add lines or change phrases, substituting either Alaska situations in general, or specific inspirations from the field trips.

Sea Shell

Sea shell, sea shell
Sing me a song, O please!
A song of ships and sailor men,
And parrots and tropical trees,

Of islands lost in the Spanish Main,
Which no man ever may find again,
Of fishes and corals under the waves,
And sea horses stabled in great green caves.

Sea shell, Sea shell,
Sing of the things you know so well.

--Amy Lowell

("Sea Shell" by Amy Lowell is from Domes of Many-Coloured Glass, published by Houghton Mifflin. Reprinted by permission.)

I took away the ocean once
Spiraled in a shell
And happily for months and months
I heard it very well
How is it that I should hear
What months and months before
Had blown upon me sad and clear
Down by the grainy shore.

--David McCord

(The above poem by David McCord is from One at a Time, published by Little, Brown. Reprinted by permission.)

The Snail

Little snail, little snail,
with your hard, stony bed,
First stick out your horns,
then stick out your head.

Oh, where is the little snail gone, I pray tell?
He has drawn himself up, head and horns, in his shell.

--Isaac Taylor Headland

("The Snail" by Isaac Taylor Headland is from Chinese Mother Goose, published by F. Leming H. Revell, Co. Reprinted by permission.)
Creatures

see here the diving beetle is
split
flat on the underside like a
peach pit

and Kindergarten blue the
frail
biplanes of dragonflies touch
head to tail

and water measures on jury-
rigged
legs--dent the surface film
and whirligigs
crowblack and paddle-footed
spin
clock-wise and counter-
somehow locked

in circus circles and back-
swimmers all
trim as college racing
shells

row trailing their four eyes
upside down
and mayflies seek the under-
sides of stones
to squirt their eggs in rows
as straight as corn
and only after clamber out to
drown

and pond's stillness nippled
as it
by rain instead is pocked
with life

and all, all except the black
horse leech
let pass my entering pale
enormous
flesh.

--Maxine Kumin

("Creatures" by Maxine Kumin is
from Up Country, published by
Harper and Row. Reprinted by
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Activity 7
Cinquain Poetry

Background:

Cinquain is a form of Japanese
verse. The Japanese construct
their poems by numbering syl-
ables. The following is a simplified
version for use with your stu-
dents. On completion, they will
have created a simple five-line
poem about their favorite shell.

Materials:

* pencils
* paper or cinquain worksheets

Vocabulary:

* cinquain
* describe
* doing
* phrase

Procedure:

1. Making a simple worksheet
   with blank spaces for each
   word will ease the instruc-
   tions for your students.

2. Split the class into small
groups or work as a class.
3. Instruct the students to fill in the lines as follows:

A. On line one, write the name of your favorite shell (or favorite part of Sea Week).

B. On line two, write two words describing the subject.

C. On line three, write three words that tell what the subject does, or is doing.

D. On line four, write a short phrase about the subject.

E. On line five, write a word that means the same thing as the word or words on line one.

4. Ask students to volunteer to share their poems with the class.

Example:

Shore
Sandy stormy
Hisses, splashes, rests
Changes with the ocean
Beach

Seaweed
Brown orange
Sways clings floats
Makes homes for limpets
Algae

(By Britta Weller, Gery Young's class, University Park Elementary, Fairbanks)

Activity 8
Water Creature Poetry

Squishy animal.
Squid quickly moves
Under some seaweed
Is there a fish.
Down there, for lunch?

Materials:
- pencil
- paper

Procedure:

1. Have each child select a mollusk or insect.

2. Now have them write the animal's name from top to bottom down the left-hand margin of their paper.

3. Ask them to write a sentence beginning with each letter of the animal's name.

Example:

Collect them carefully at the beach.
Look at the shell, inside and out.
Are you going to eat one?
M-m-m-m! It was good.

These "poems" can easily be compiled into a class book.
Activity 9
Thank You Letters

Dear Mrs. Grant,
Thank you for coming with us to sandy pond on Tuesday. We had fun and learned a lot.
From,
Miss Wells
2nd grade

Materials:
- pencil
- paper

Procedure:
1. Have the class write letters to all support personnel who went on the field trip.
2. Have the class help you make a list of people who should be thanked. Then let them decide the most appropriate thank you. Drawings or art projects could accompany letters as a special thank you.
3. Divide the letter writing and craft responsibilities for each thank you among student volunteers.

Activity 10
"There Was A Young Raven" - Food Chain

Background:

Songs can teach food chain concepts. The following song is sung to the tune of "There was an Old Lady Who Swallowed a Fly." After learning the song, discuss whether a raven is adapted to eat a bear.

In this activity students will begin to recognize the connection between animals and their food sources. Other post-trip activities deal with the complete food web.

Materials:
- There was a Young Raven" song
- worksheets:
  ...Insect Word Search (10B)
  ...Bivalve Word Search (10C)
  ...Mollusk Word Search (10D)
  ...Mollusk Crossword (10K)
  ...Sea Week Puzzle (10L)

Vocabulary:
- predator
- prey
- plankton
- adaptation
Procedure:

1. Teach the class the following song:

There was a young raven who
swallowed a mayfly
I don't why, she swallowed the fly
Perhaps she'll die.

There was a young raven who
swallowed a water strider
That wiggled and swiggled and
tickled inside her.
She swallowed the strider to catch
the fly
I don't know why she swallowed
the fly
Perhaps she'll die.

There was a young raven who
swallowed a frog.
What a hog, she swallowed a frog.
She swallowed the frog to catch
the strider.
That wiggled and swiggled and
tickled inside her.
She swallowed the strider to catch
the fly.
I don't know why she swallowed
the fly
Perhaps she'll die.

There was a young raven who
swallowed a fish
Without a dish, she swallowed a
fish
She swallowed the fish to catch the
frog
She swallowed the frog to catch
the strider.
That wiggled and swiggled and
tickled inside her.
She swallowed the strider to catch
the fly.
I don't know why she swallowed
the fly.
Perhaps she'll die.

There was a young raven who
swallowed an otter
She teetered and tottered and
swallowed that otter
She swallowed the otter to catch
the fish
She swallowed the fish to catch the
frog
She swallowed the frog to catch
the strider.
That wiggled and swiggled and
tickled inside her.
She swallowed the strider to catch
the fly.
I don't know why she swallowed
the fly.
Perhaps she'll die.

There was a young raven who
swallowed a bear.
She died right there.

2. Rewrite the "Young Raven" song using saltwater organisms or organisms found on your field trip.

3. Discuss students' individual eating habits, as well as their preferences for certain foods. For example, some may prefer meats, whereas others may prefer plant foods such as vegetables or fruit. Similarly, insects and mollusks also have their own food preferences.

4. List the foods insects eat.
Insects eat plants (live, dead, algae) or capture insects and other small animals, or collect the plankton floating in the water.

5. List the foods mollusks eat.
Mollusks eat other mollusks, plankton and algae, and octopus even eat crab.
ADDITIONAL LANGUAGE ARTS ACTIVITIES

Use water-related words for a spelling list, including shell or insect names and parts, the name of the beach you visited, types of weather you encountered, and other words that students will associate with their Sea Week experiences.

Have the class copy the following sentences from the board. Have them choose one insect or mollusk to be, and have them then complete the following sentences.

I am ________________.

I look like ________________.

I live ________________.

Begin the activity with a class discussion of the ocean—its ecological balances, pollution, and other subjects. To end the activity, have each student complete this sentence: "Hi! My name is Lonnie Limpet. The ocean is worth saving forever because ____________." 

Listen to a recording of "La Mer" by Claude Debussy. Discuss what it would be like to be a shelled animal living in the sea. As a contrast, listen to Richard Rodger's "Victory at Sea," and use it as a basis for discussing the sea's different moods.

Make shell grab bags. Place one shell in each bag. With student help, create a list of descriptive words. One at a time, have students put a hand in a bag without looking, and either a) name the object, b) describe the object with descriptive words and have the class guess what it is from the description, or c) play "Twenty Questions," having the class ask descriptive questions about the object.

Use the Insect Word Search (10B), Bivalve Word Search (10C), Mollusk Word Search (10D), Mollusk Crossword (10K) and Sea Week Puzzle (10L) worksheets to review terms.

Write "Tongue Twisters" such as "She sells seashells by the seashore."

Ask students to write a story about a day in the life of their favorite invertebrate.

Design a button about shells (ideas: beauty of shells, uses of shells, "catchy" sayings).
Activity 11
Food chain

Materials:
- butcher paper
- crayons
- construction paper
- tape or glue
- scissors

Vocabulary:
- food chain

1. With students, make a cross-section mural of your field trip. Place mollusks or insects on the mural where students found them.

2. Using either the cross-section mural or new student illustrations of water creatures, construct a food chain of the interaction at your site.

3. Barn swallows collect 900 insects per day to feed their babies. Insert barn swallows and mosquitoes in your food chain. Have students list other possible beneficial characteristics of mosquitoes.

4. Have students create a food chain for a food item they consume.

Example: apple

Seed company - farmer - sun, soil, water - truck - fruit company - airplane - grocery store - parents - lunch - student.
Activity 12
To Catch A Fish - Predator-Prey Relationships

Background:

Fish eat insects and people eat fish. People have understood this simple food chain for a long time and take advantage of this understanding to create the sport of fly fishing.

Fly fishing, as well as fly tying, is a popular sport and an ancient art. The first book on fly fishing was published in England in the 1600s. It was written by Dame Julianna Berners, lady prioress of Britain's Sopwell Nunnery. Its title was "A Treaty on Fysshing With an Angle." The most famous early book on fly fishing, however, was written about 150 years later during the Eighteenth Century by Izaak Walton, now famous as a conservationist. Walton's book, which is still widely published, is titled "The Compleat Angler." The "fly" used in fly fishing imitates one of the freshwater insects, usually either a caddis fly, mayfly or stonefly. These insects are important and popular food sources of freshwater fish. Fishing people try to imitate the appearances of these insects with bits of fur, feathers and other materials tied with string to a hook. They then try to recreate the behavior of the insects by placing their facsimiles lightly on the water surface or dangling them below the surface. Alaskans fly fish for grayling and trout in streams and rivers. The same strategy is used in most sport fishing. The popular pixie lure, for instance, imitates the flash of a small fish in the water. Fish also are always on the lookout for one of their favorite foods, the red roe of salmon. People who make flies have learned this and often include little bits of red to catch the eye of the fish.

There may be a fly fisher in your community who could visit your class to explain the craft and show students some "flies." If you live in an area with a sports or fishing store, they may be able to either lend you some flies, have one of their staff visit, or be able to recommend a fly fisher in your community.

Materials:

- reproduction of fishing fly pictures
- fishing flies (optional)
- pencil
- paper
- worksheet: ...Fish Flies (10E)

Vocabulary:

- food chain
- fly fishing
- lure
- predator
- prey
Procedure:

1. Ask how many students eat fish. Where do they get their fish? Where did the fish originally come from? What are the habitats of some of the fish they eat? On the board, draw a picture of a fish and a person, with an arrow between the two.

2. Ask students what that fish ate. (e.g., another small fish) Then ask what the food of the fish ate. Draw each addition to the food chain and continue the questioning until you have all the components of a food chain on the board. The final organic component should be a plant (If you get into the plankton line, the animal plankton eat plant plankton). Remind students that all plants require water, air and sunshine.

3. Explain to students that the picture on the board is a food chain because all the animals and plants are linked together by what they eat.

4. Discuss with students the ways people get fish—trap them in nets, catch them with worms or other bait, or otherwise trick them into biting a hook or a lure. Who has ever fished with lures? What did the lure look like?

5. If students are not familiar with fly fishing, remind them that fish eat insects, so some people try to copy insects to catch fish. Show them the pictures of either the fishing flies or the actual flies. Use the worksheet and have them identify the aquatic flies copied by people who fly fish.

6. Next have them create a fly that would catch an Alaskan fish. They can either draw a picture of their fly or use construction paper and art scraps to construct one.

7. Brainstorm with your students what other animals might be caught with lures (these demonstrate predator-prey relationships).

Examples:

A Little Red Riding Hood lure would catch a Big Bad Wolf.

Princess lures catch dragons.

Merchant ship lures catch pirates.

Ahab, Jonah or Pinochio lures catch whales.

Green willow sapling lures catch beavers.

Pac Man lures catch teenagers.

9. Make a mobile to illustrate as many lures as the students can imagine.

10. Have students research what the Native people of their community use to attract fish.
Activity 13
Insect and Mollusk Review

Materials:
- shell or insect specimens from field trip or class collection
- scissors (optional)
- worksheets:
  ...Mollusks and Insect Squares (10F)
  ...Insect Concentration (10G)
  ...Color the Mollusk Review (10H)
  ...Mollusk Matching (10I)

Vocabulary:
- similarities
- differences
- mollusk
- insect

Procedure:
1. Review invertebrates with the class. Remind students that mollusks and insects are both groups of invertebrates. Discuss the similarities and the differences of one they have found previously or now have in class.

2. Break the class into small groups. Instruct the groups to separate the blocks on the Mollusks and Insect Squares worksheet. Have each group find the two heading squares: Insects and Mollusks. Next have the class work with their group, and split the remaining squares between those two categories. Finally, check students' placement of squares, then have them explain why they put them there.

3. Ask students: if a person was to turn into an insect, what would have to change? (Get two more legs/arms attached to thorax, grow wings, lose bones and get a hard skin.) Repeat the questions with mollusks. Ask students to draw either themselves or a famous person to resemble an insect or mollusk (Captain Cook Dragonfly, Ulysses S. Grant Stonefly or Venus Scallop).

4. Use the Color the Mollusk Review and Mollusk Matching worksheets and Insect Concentration Game to review mollusks and insects.
Activity 14
Shell Treasure Hunt

Materials:
- samples of a variety of shells
- pencil
- worksheet:
  ...Treasure Hunt (10j)

Vocabulary:
- bivalve
- univalve
- tough, smooth
- old
- new
- drilled
- large
- small

Procedure:
1. Distribute the shells throughout the classroom so students do not have to crowd.
2. Review the names of each shell, or label the shells with their names.
3. Use the Treasure Hunt worksheet to initiate student observations. Part of that sheet has been left blank so you can add questions you would like to ask.
4. After students have filled the sheet, review and have them justify their responses.

Activity 15
Classroom Activities With Live Insects

Materials:
- aquarium or gallon jars
- scraps of meat for food
- jars
- water plants and litter
- food coloring
- petri dish
- India ink or food coloring
- overhead projector
- yeast
- dropper
- sugar

Vocabulary:
- temperature
- water level
- records
- food preference
- prey
- predator
- chase
- ambush
- grab
- bite

Procedure:
1. To keep the animals for long-term study, set up an aquarium. For detailed instructions, see the source book. If you plan to keep them only a few days, place them in the refrigerator,
replacing their water with fresh water at regular intervals. Be sure to release the insects to their original homes when your studies are complete.

2. The aquarium is a good place to observe interactions and see the drama of life played out. Students can watch insects chase each other, eat plants, or change from immature to adult. Even with close observations, you will miss much of the interaction that takes place. Keeping records will provide you with clues through which to work out the mysteries. Count the number of organisms put into the tank and record the number daily. Any change in number will indicate the births or deaths of individuals, and will provide clues to the dynamics of your system. Keep records of temperatures and water levels for future reference.

3. When feeding organisms, see what they like best. Is the most basic preference choice plant or animal? Do the vegetation eaters prefer dead leaves found in their original homes? Live water plants? Live leaves from trees? Lettuce? Something else? Try a variety of foods for the animal eaters, too. Which insects eat the most? The least?

4. Add mosquito larvae or pupae (or other easily gathered insect prey) to the aquarium. Keep a count and keep a cover on the aquarium so you can keep track of how many hatch. Watch to see who eats the most. Try another prey and see if the same predator is the chief predator. How do the predators catch the prey—chase, ambush, grab, bite? Try keeping the prey constant and varying predators in the system. (Recommended predators: predacious diving beetles, damselflies, dragonflies and water striders.)

5. An overhead projector provides an opportunity for the class to view insect movements as a group without crowding around a pan. Place a live insect in a petri dish or other clean container with just enough water to allow the animal to move. Place the dish on the overhead projector. The light is enough stimulus for action. If the critter crowds the edge of the dish or gets out of the field of view, it can be guided with a pencil or dull probe. Does the insect move its body up and down or from side to side? Does it use legs or other appendages to stroke with? Or does it move by jet propulsion as does the dragonfly? A drop of ink or food coloring will mark the currents created by these movements (See procedure 7 of this activity). Have the class pantomime the moving strategies they witness.

6. Animals that filter their food from the water do not seem to provide drama, action, or concrete experiences for students. This situation can be changed by marking food. Color yeast with India ink or some other insoluble dye. Place your dyed food in with filter feeders. Clear animals, such as some of the small plankton creatures, are the best for this experiment. The more transparent the
creature, the easier it will be to see what is going on. Remove the creatures from the water, and look for the dyed food in their digestive tracts under a microscope.

7. Insects create currents in the water for a number of different functions, such as breathing, swimming and feeding. Students can trace these currents with a drop of food coloring or ink. Each student, or group of students, should have a petri dish with water and an insect, and a food-color dropper. Have students experiment by dropping drops in various places around the insect—head, tail, abdomen, thorax. What happened? Ask students to hypothesize about the uses of the currents they discover.

8. Remove caddis-fly cases. Provide the naked caddis flies with both natural and synthetic raw materials with which to build cases. Now observe their construction. At which end do they start? How long does it take? What materials do they prefer? Which materials do they refuse?

9. Place plankton in a separate gallon jar aquarium, or purchase some brine shrimp. Keep it in a well-lighted area, but not in direct sunlight. Let students observe the plankton through a microscope or magnifying lens every day. Keep records of temperatures and water levels. Have students periodically draw what they see, trying to identify animals or body parts. Do some organisms disappear, or new ones appear? How does the population change?

10. Separate the same number of plankton into four smaller jars, placing them in different areas of the classroom. On roll paper, list facts about the environment of each jar, such as the number of plankton, temperature, amount of light, and number of times moved by students each day. Students can brainstorm other differences. Observe for a week to 10 days. How does each population differ? Use hand lenses or microscopes to observe.

11. Keep two identical jars at the same spot, but have twice as many organisms in one jar as the other. Record differences in the jar, as in procedure 10.

12. Add a teaspoon of sugar to a jar of plankton. What happens? Can people get too much sugar?

13. What is the plankton’s best habitat? What is the best learning environment in the classroom? How would learning be effected by heat or cold, by adding twice as many students, or by removing lights?

14. Use mosquitoes as a focus of study. Place water with mosquito larvae in a screen-covered jar. Keep track of the number of larvae by keeping daily records to follow their life cycle. Draw pictures of them daily. How long do they remain larvae? How long do they stay in the pupal stage? Have someone
volunteer to provide the female her requisite blood meal. Replace her in the jar. Watch for egg-laying behavior. How long from the time the insect draws blood until larvae appear? Ask students to predict how long after a puddle-producing rain there will be a mosquito "outbreak."

(Plankton activities contributed by Gerry Young, University Park Elementary, Fairbanks.)

Activity 16
Create A Pond

Background:
If you do not have easy access to a pond, or even if you do, you can make ponds for study purposes.

Materials:

- shovels
- clear plastic sheeting
- thermometers
- a variety of pond "treatments"

Procedure:

1. Split the class into groups. Have each group create a pond and keep records.

2. Dig shallow, gradually sloping depressions in soft ground. Line the ponds with clear plastic.

3. At this point, the variations begin. Have students add water to their ponds. Some can add tap water, others pond water, stream water or even ocean water.

4. Have each group treat its pond differently. For example, while some can be laissez-faire and leave their
ponds completely alone, others can manage them intensely.

5. In each pond, keep daily records of temperature, turbidity, water level, plant and animal life. What causes the variations? (Sunlight, rain, predation, reproduction, algal growth.) Which pond provides the best plant habitat? The best insect habitat?

6. Possible treatment of ponds include adding soil, adding fertilizer, adding plants, adding animals, covering ponds with clear plastic, covering ponds with dark material.

ADDITIONAL SCIENCE AND MATH ACTIVITIES

Draw a picture of an ideal dragonfly or periwinkle habitat. Tell why it is good for the dragonfly or periwinkle. Draw a picture of the perfect habitat for a person. How does the habitat meet the needs of the person? (Contributed by Gerry Young, University Park Elementary, Fairbanks.)

Start a shell museum in your classroom. Establish rules for handling and displaying shells before the shells start arriving. Set up your museum as a display for the whole school.

Label the shells in your museum with the following information: name of shell, where found, interesting fact about shell.

Draw a bivalve or univalve shell, labeling the important parts.

Create a recipe using an insect as one of the ingredients that an otter or bear might order if these were "fast food" streams.

Design a matching game using the types of insects with the predators that eat them.

Draw an outline map of the pond or stream you visited. Mark areas where fish might seek food and suggest styles of lures for fishing in that pond or stream.

Split the class into groups. Provide each group with a collection of water objects. Ask students to place the objects in groups and then justify their groupings. Possible groupings (classifications) include: shells/not shells, bivalves/univalves, objects once alive/never alive, or color, size, shape or descriptive groups.

What is a shell made of? Put broken bits of shells in vinegar (a weak acid) and observe the reaction. Then try putting chalk, beach sand, gravel, coral, glass, aluminum or other materials into the acid. (Shells are made of calcium carbonate, a base, which will react in the presence of an acid.)