

## **FOSS® Animals Two by Two Teacher Preparation Video Transcript**

### **<Larry Lowery Introduction to FOSS Program>**

Lowery: Hello. Welcome to the Full Option Science System. This program was funded by the National Science Foundation. Its goal was to develop materials that would involve youngsters with both the processes and the content of science.

The program is developed at the Lawrence Hall of Science, with scientists, science educators, and teachers working together as a team to develop the materials. The materials are tested in the hands of teachers and children in classrooms. It takes about two years to turn out a module.

Each module begins with firsthand experiences. This is done because it has been found that firsthand experiences are the best way for youngsters to learn about the concepts of science. As the module progresses, children are introduced to abstractions and reading materials. The sequence from firsthand experiences through reading materials is deliberate because it has been found that youngsters, when they have some experience before they read, learn and understand more from the reading. Authors of reading materials can then take youngsters to greater abstractions.

Trust the materials that you are getting acquainted with. They have been well tested. We found that they work extremely well in the hands of all teachers and are effective for youngsters in learning about science.

### **<Sara Armstrong Introduction to Module>**

Narrator/Sara Armstrong: Hi. My name is Sara Armstrong. And I'm here to get you started with the FOSS module *Animals Two By Two*. Most of the equipment you'll need to teach this module is found in the equipment kit.

Everything on the table is part of the kit and comes in the single box. You will also need to supply a few additional classroom materials for your students to complete the activities. You will need to provide live organisms that your class will be studying. These organisms can most often be found in local pet stores, bait shops, or backyards.

Here is the all-important Teacher Guide. Take some time to read through the Overview folio before starting the module. It's full of helpful suggestions, including correlations to the national standards, background information, classroom management tips, and ideas for scheduling the module whether you teach a full day, half day, or combination kindergarten class.

The overview matrix summarizes the investigations and will help you plan the entire course of the module. The Materials folio comes next in the guide. Here is where you'll find an inventory list for the kit, materials that you'll need to supply for the investigations, valuable information on obtaining and caring for live organisms, directions for preparing the materials, and information on ordering any replacements.

The next five folios will guide you through the investigations. These are the heart of the program and will be described in this video. In the next section are the duplication masters.

Here you'll find all the student and teacher sheets and Home/School Connections for each investigation.

With the duplication masters, you'll find Center Instruction Cards. These are designed to be used by parents or other adult helpers to help them guide, not lead, the students through the activity. You can make copies of these and laminate the copies or put them in plastic sheet protectors to become a permanent part of your kit.

Read through the Assessment folio for more information on how to simply and effectively assess student learning. Check out the assessment duplication masters. There are two kinds of record sheets. The Assessment Checklists are used during the investigations to note specific skills or concepts students develop.

In the kit, you'll find a big book and a set of eight student books, the FOSS Science Stories. These are designed to be read periodically during the module after students have had firsthand experiences with the materials. In addition to the books in the kit, there are five trade books that go so well with the module that we have included their optional use during the investigations. By bringing their own experiences to trade books like these, students can distinguish between the facts and fiction of storybook animals. Information about using these is found in the Reading Connections folio.

The Resources folio lists other wonderful books, videos, and software for your class. Most of the activities are introduced to students in a whole class setting. Students then move into small groups and come to a learning center where they can more closely observe the animals with an adult guiding the activity. If you are the only adult in the classroom, you'll find suggestions in the Overview folio about how to run the centers on your own or how to turn them into whole-class experiences. In either case, plan on introducing only one investigation part on any given day.

Before teaching the module, there are a few preparations to be done. First, you'll want to make copies of the letter to parents and send it home with the students. The letter tells parents about what their children will be studying and suggests ways they might extend the learning at home.

Next, you'll need to make two charts. The Word Bank is for new vocabulary that comes up in the course of the investigations and the Content Chart is for recording students' suggestions about what they have learned or any questions the class would like to investigate further.

To keep track of student progress, you'll need to make a copy of the two Assessment Checklists found in the Teacher Guide. The Getting Ready sections for each investigation suggest specific objectives to assess. Since many of the same objectives can be assessed throughout the module, a good strategy is to focus on just a few students during any single investigation.

A science journal is a useful assessment tool as well as being a good way to integrate language skills with science. Suggestions for making and using science journals are found in the extensions for Investigation 1. Now we're ready to begin.

### ***<Investigation 1, Part 1>***

Narrator: In the first activity, Goldfish and Guppies, students study the structure and behavior of

these two kinds of fish. For Part 1, you'll need this equipment from the kit: two clear plastic basins, the dechlorinator, fish food, fish net, and Post-it labels.

You'll provide this equipment: Three feeder goldfish, eight feeder guppies—you'll want to try to find four male and four female, elodea, the aquatic plant you'll be using, and water. As you can see, I've returned from the pet store with my fish and put them into their aquariums. Be sure to float the bags of fish in the aquarium water to equalize the temperature before introducing the fish.

The goldfish are in one aquarium and the guppies and elodea in the other. Be sure to keep them separate since goldfish will eat guppies. Use a Post-it note to mark the water line in both aquariums, so you can monitor the water level. Keep the guppy aquarium out of sight until the children have finished studying the goldfish. Be sure to refer to the care and feeding section of the Teacher Guide for further information.

If you plan to use the “Fish Outline” sheet, you'll need to make copies from the duplication master. You may want to keep blank pages near the aquarium for students to draw on. They can make a class journal, such as this one.

Set up a learning center by bringing your goldfish aquarium to a table where six to eight students can gather around to observe. Center Instruction Card “The Structure of Goldfish” will guide the activity.

Part 1 begins with a class discussion about what kind of fish might be in the aquarium. When they learn they have goldfish, many students will want to share what they know. Then, students are sent to the learning center for a closer look.

Student: Those little tails; that goes back and forth.

Teacher: Tails that go back and forth that make them what?

Student: Swim.

Teacher: Swim. What are those things called?

Student: Fins.

Teacher: Anything else that they have? Anything else that they have besides fins?

Student: They have lower fins and upper fins.

Teacher: Lower fins. You see that. How many goldfish do you see at the top of the aquarium? Okay. In the middle of the aquarium? But most of them are where?

Student: On the bottom.

Teacher: On the bottom. All right. Can you think of anything else about the goldfish? Do you want to scoot up?

Narrator: When students visit the goldfish at the center, they observe the structures of the fish. They look for a head and a tail, for eyes, a mouth, and a nose. They look carefully to see if all of the goldfish look alike or if they are different in some ways.

Student: Where did they go?

Narrator: The FOSS philosophy is to follow the lead of the children. The structure of the lesson should always remain flexible, especially with living organisms. You never know exactly what they are going to do.

Students can record their observations on the Fish Outline student sheet or use blank pieces of paper that can be made into a class journal. Here are some of the vocabulary words and content learned that students might suggest adding to the charts during the course of this investigation.

**<Investigation 1, Part 2>**

Narrator: To prepare for Part 2, you'll need the same equipment you used in Part 1. Have the fish food available and take some elodea from the guppy container. Be sure not to feed the fish on the morning you plan to do this activity. If possible, each group should visit the center on a different day so the fish will be hungry. The Center Instruction Card guides this activity.

Teacher: What are these things on their side that they breath through?

Student: They are breathing.

Student: Gills.

Teacher: What are they called?

Student: Gills.

Teacher: What?

Student: Gills.

Teacher: Anything else? Bronwyn?

Student: They swim with their tail.

Narrator: A short discussion is held with the whole class to introduce this part. Then, the first group goes to the learning center to feed the fish.

Student: This much?

Teacher: Perfect. Excellent.

Student: This much?

Teacher: I think that's a little bit too much, Adam. Put some back. Okay? Okay. Herman, would you please put some back? Now, we're going to take turns feeding the fish. Could you please sprinkle the food over the tank? Watch what happens. Someone is really hungry. All right. Janesha? Impressive. Adam?

Student: I want to watch them. Look. One ate one.

Teacher: Now where are the fish? Are they on the bottom?

Student: No. They are on the top.

Teacher: Why are they on the top?

Student: Because they are eating.

Teacher: You can put yours in. Okay. Herman?

Narrator: After the fish have finished eating, the students put several sprigs of elodea on one side of the aquarium and watch to see how the fish respond to the plants. When all of the groups have had a chance to feed the goldfish, you are ready for Part 3.

### **<Investigation 1, Part 3>**

Narrator: In Part 3, students will add tunnels to the fish's environment and make paper aquariums to model the behavior of the fish they have been observing. You will need the aquarium already set up at the fish center and the tunnel from the kit.

You'll need to supply transparent tape and scissors to make the paper aquariums. You'll need to duplicate the student sheet "Paper Aquariums" for every student. And you may also want to provide envelopes for the students to take their paper aquariums home with them. To guide the activity, you'll use the Center Instruction Card called "Fish Behavior."

When students arrive at the center, they discuss the aquarium environment so far and discuss what they think will happen when a tunnel is put into the aquarium.

Student: This is stinky.

Student: The fish will go through it.

Student: Put something on the bottom and they will go.

Teacher: Anyone else?

Student: Put it in the water so they can swim through it.

Teacher: Would you please just place it gently in the water on this side of the aquarium? Okay. Now, let's see what happens with the fish. Are they going through the tunnel?

Student: No.

Teacher: Why not? Why do you think they are not going through the tunnel? They are what?

Student: They are scared.

Teacher: Scared?

Student: They are going in the tunnel.

Student: They are going in there.

Student: Yes!

Student: I just saw it first.

Teacher: Watch what happens. Look at those fish. What are they doing?

Student: They are swimming.

Teacher: Swimming what?

Student: Inside the box.

Student: Out of the box. They went that way.

Teacher: Okay.

Narrator: After they have had plenty of time to observe the fish, students make a paper aquarium. They cut on the solid lines and fold on the dotted lines to make the aquarium. The tunnels are the only pieces that require tape.

When students have completed their aquariums, they use them to model fish behavior. Students can demonstrate behaviors they've seen and describe what they are modeling, such as the fish swimming through the tunnel.

Teacher: Are they in front of the plant? Would you please put your fish in front of the plant?

#### **<Investigation 1, Part 4>**

Narrator: In the final part of this activity, you'll bring out the guppies for students to compare with the goldfish. You'll need the goldfish aquarium, fish food, another fish tunnel, and the guppy aquarium that you've kept hidden until this time. For this activity, you'll use the Center Instruction Card called "Comparing Guppies to Goldfish."

In general, it's a good idea to read books to students after they have had firsthand experience. This is a good time to read a book about fish, such as *Fish Faces*, which you will have to provide.

Teacher: Spotted fish.

Class: Spotted fish.

Teacher: Fish with lines.

Class: Fish with lines.

Teacher: And stripes.

Class: And stripes.

Teacher: And waves.

Class: And waves.

Narrator: After reading the book you've selected, send the students to the center to compare their guppies and goldfish. Students look for common structures, such as fins, eyes, and a mouth and common behaviors. They can add the elodea and the tunnel to see if the guppies react similarly to the goldfish.

An interesting topic you can discuss with the students about guppies that you couldn't do with goldfish is which are the males and which are the females. The students may have noticed that some of the guppies have bright-colored spots on them. You can tell them that those are the male fish.

### **<Investigation 2, Part 1>**

Narrator: Activity 2 involves the study of land and water snails. In Part 1, you'll need this equipment from the kit: a clear plastic basin and lid, a plastic cup for each student at the center, and a cardboard ramp for each student. You'll need to supply lettuce or carrots, paper towels, and the snails.

Keep your snails in the clear basin with damp paper towels on the bottom and the lid on top. Always be sure the lid is on securely, so you don't have to start the activity with a snail hunt. The snails should be fed once a day or so with lettuce and carrots. The important thing is to make sure the environment is moist at all times. For this part, you'll use the Center Instruction Card called "Land Snails."

The whole class begins this activity with a guessing game about what the new animal is that's coming into the classroom. Then gentle handling of the snails is discussed. When students arrive at the center, you will hand out the snails.

If the snails are inactive, you can wake them up by dipping them in water before you give them to the students. Each student gets a snail in a plastic cup. This allows students who are weary about holding the snails to get to know them first. Students focus on the movements and the structures of the snails in this part.

Student: One is crawling out of his cup.

Teacher: Yes, they are. Grab them by the shell. Slide them off.

Student: No way.

Teacher: Put it on your hand and see what it feels like.

Student: It feels like the shell will take off.

Student: No.

Teacher: Right there.

Student: Oh...

Student: It's sick and slimy.

Teacher: Can they travel backwards? Do you think snails can go backwards?

Student: No. But they can crawl through shells.

Teacher: Can they travel upside down? Can they crawl upside down?

Student: No.

Teacher: Why?

Student: Because they are not slimy.

Teacher: Why?

Student: Because they are shells.

Teacher: That's right. They are shells. That's their food. They want to eat.

Student: Look at my guy.

Teacher: Let him crawl.

Student: He's glued to it.

Narrator: After their initial observations, students can investigate how their snails react to cardboard barriers. Students are generally fascinated by these small creatures and will want to spend quite a bit of time with them.

### **<Investigation 2, Part 2>**

Narrator: No activity involving snails would be complete without a race. And that's what Part 2 is all about. You'll need the snails in their terrarium and two "Race Track" sheets from the kit. If you're the first teacher to use this kit, you'll need to tape the race track together.

Have cups from the kit available for holding snails. You'll need to provide transparent tape, lettuce or carrots, and paper towels. For this part, you'll use the Center Instruction Card called "Snail Races." You'll also need to provide a book, such as *The Snail's Spell* to introduce this part. After reading a story to the whole class, send small groups to the center to start the snail races.

Teacher: Would you like to choose a snail? Choose the fastest. One you think is going to go the very fastest.

Student: Help me, please.

Student: I want that one.

Teacher: Go ahead, Brian.  
Madelyn, do you want to choose one?

Student: Oh, I touched its body.

Student: Look at mine. I can touch its body.

Teacher: Okay. What I want everybody to do is put your snails in the center. Can you put it in the center? Let's watch and see where they go?

Student: Mine is going to go, too.

Narrator: The outermost circle is the finish line. Students can talk to their snails to coax them along. But they shouldn't touch them.

Teacher: Okay. Yeah, they are doing fine as long as they are moving. How neat.

Student: Sean, yours is going to win.

Teacher: Watch how they move, too.

Student: Watch him.

Teacher: Look at that. You can see their feelers. They put those out.

Student: He's winning; he's winning.

Teacher: You'll have to see.

Narrator: Questions from the Center Instruction Card will help guide discussion of the race results. Are big snails faster than small snails? Were you able to get your snail to go where you wanted it to go?

Student: Mine is going to win.

Narrator: After discussing these and other questions, your students will probably want to run a second race.

Student: Come on. It's winning. Wow! I never won before.

Teacher: Now your snail won. Good job, Brian.

Student: It's got to get part of its tail out.

Teacher: Just about.

Student: Oh, he's getting it.

Student: Oh...

Student: He's going to win.

Teacher: Oh, just a little bit more.

Student: A little bit more.

Teacher: I would say he's out.

Student: Go on.

Student: Oh, no. No; no.

Student: Yes!

Teacher: Tada.

Student: Yeah, I win; I win.

**<Investigation 2, Part 3>**

Narrator: In Part 3, water snails are brought to the center so students can observe them with the land snails. From the kit, you'll need this equipment: a clear plastic basin, dechlorinator, vials, and plastic cups. You'll need to provide the snails, elodea, and water.

Use the clear basin to make their aquarium. Be sure to age the water 24 hours or use the dechlorinator from the kit. You'll also need to provide paper towels and the Center Instruction Card called "Observing Water Snails."

Teacher: What are these?

Narrator: After you've introduced the water snails to the whole class, send the students to the center to begin their observations.

Teacher: What are the things you see? What do you see when you watch the water snails?

Student: They don't have their little bottom out like a lot of the normal snails.

Teacher: That's called the foot of the snail. Do you see that foot that Stephanie was talking about? I see it out there. It looks like a little tail.

Student: Down there?

Teacher: Yeah.

Narrator: Students observe the snails in their aquarium for a few minutes. Then they each use a vial to scoop a snail and some water out of the aquarium for a closer look.

Student: You pick it up.

Teacher: Real gentle. Okay. Madelyn.

Student: Wow, the magnifier.

Teacher: Why are some going in their shells?

Narrator: After a few more minutes of observation, students gently pour the contents of the vial into a plastic cup. They will find that the water pours into the cup but, usually, the snail continues to cling to the side of the vial. Students gently remove the snails from the vials with their fingers and put them in the cups.

Student: I put it in the cup.

Teacher: Now I would like you to each take one more snail and add it to the one in your cup. Be real gentle as you pick them up.

Student: Oh...

Teacher: Are they moving away from each other or toward each other?

Student: They are moving away from each other.

Student: They are kissing.

Student: Mine are kissing.

Student: So are mine.

Student: Mine are kissing.

Student: Look at mine.

Student: Look at the baby one.

Student: Chris, look at mine. They are kissing.

Teacher: What's different about them?

Student: Some are big and some are tiny.

Teacher: What about their shells; do their shells look the same?

Student: No.

Teacher: What's different about their shells?

Student: Mine is black and the other one is striped.

Teacher: So different colors.

Student: This one is curled and the other one is kind of like a bump.

Student: So are mine.

Teacher: So different shapes. Now, I'm going to give you guys each a little piece of this plant, which is called elodea. And add this to your cup close to where the snails are and see what happens. What do you think the snails might do with this elodea?

Student: Eat it.

Teacher: They might eat it.

Student: Eat it.

Teacher: Can you think of any other reason why snails might want to hang out where there's some elodea?

Student: Because they like to lay on it. It's comfortable.

Teacher: A comfortable place to rest. Okay. Now, I'm going to show you some land snails. And I want you to tell me about some differences you can see between the land snails and the water snails.

Student: You know what? Because the water snails are littler and the land snails are all bigger.

Teacher: Yes, that's one difference.

Student: One has a stickier bottom than the other.

Teacher: One is stickier than the other.

Student: Yeah.

Teacher: Okay. What do you notice that's the same about the water snails and the land snails?

Student: They both have antennas.

Teacher: They both have antennas. Do they have the same number of antennas?  
Stephanie, how many tentacles do you see on the land snail?

Student: Four.

Teacher: How many do you see on the water snail?

Student: Two.

Teacher: Just two. So that's a difference, isn't it?

Student: Uh-huh.

Teacher: What's something else that you see that's the same? They both have shells.

Student: And this one's yuckier.

**<Investigation 2, Part 4>**

Narrator: In Part 4, students work with shells: some from snails and some from other marine creatures. You'll find the shells in the kit. But you'll need to provide sheets of construction paper to be used as table mats by each of the students.

To introduce the activity, you'll need three shells from the same kind of snail, three random kinds of snail shells and two or three from other mollusks. For this activity, you use the Center Instruction Card called "Shells."

Teacher: We'll have some fun exploring shells. And I want you to think who lives in shells. Where do they come from? Mark?

Narrator: The activity begins with a discussion about the shells you have selected. The teacher here is introducing the shells to a small group. But you can work with the whole class. Then, send small groups to the center to work.

Teacher: Look at the shells that we have right in front of us. I would like you to see if you can find three shells that you think snails came from. Which -- find three shells that you think snails came from.

Narrator: They can sort the shells in different ways. For instance, find shells from snails and some that didn't come from snails.

Teacher: It's got some kind of spiral.

Narrator: They can match up shells, use shells to make patterns or surrogate(?) shells from big to small, dark to light, or by any other property.

Teacher: That goes together. And then find different ones that go together. Look and see if you can find some pairs. I see, Roxanne. Find some more. Good, Brian. Find some more. Find some more. Good. That's it Jessica. Beautiful. They are alike. Okay.

Now I would like you to make a pattern with shells. Figure out how you'd like to make a pattern. What kind of shells do you have in your pattern?

Student: I know how to do it.

Teacher: Okay.

Student: I made a pattern of shells where snails go in and snails don't go in.

Teacher: Okay.

Student: This kind of shell has little round things and this shell is long. And I did that pattern over and over again.

Teacher: You sure did.

### **<Investigation 3, Part 1>**

Narrator: In Activity 3, students will study big and little worms. In Part 1, you'll need this equipment from the kit: potting soil, a plastic cup for each student at the learning center, a half-liter container and cap, a clear basin, and lid. You'll need to put the water snails into the fish aquariums, so that you'll have this basin available for the worms. You'll need to supply a few dead leaves, oatmeal, paper towels, water and, of course, the worms. Thirty redworms and 12 night crawlers.

To set up the redworm terrarium, fill the clear basin about half full of potting soil. I'm estimating the amount here. But you can use the half-liter container to measure two scoops full of the soil. Add a little water so that the soil is moist but not enough so that you have standing puddles of water. Then add the worms. Add a little oatmeal and a few dead leaves for food. Put the lid on to keep them secure.

The night crawlers can stay in the container in which they came. Make sure the lid is on securely and then keep them in the refrigerator or another cool place until you need them. The Center Instruction Card called "The Structure of Redworms" will guide the activity.

The activity begins with students guessing what animal could be in the terrarium. After they guess worms, discuss the care and handling of the animals.

Teacher: What do I need to remember when I'm handling worms? Or any living animal? What do I need to remember, Haley?

Student: So we won't squish them like that.

Narrator: When students arrive at the center, they are challenged to dig into the terrarium to find the worms. Some students will dig right in, but others may be a bit reluctant. In most cases, they will join in if given the chance to observe the fun the other students are having.

Teacher: You think you might get some more in there? Go ahead. Dig in.

Narrator: Each student is given a small amount of water in a cup to rinse the worms off after they have been dug out of the terrarium.

Student: Yuck.

Student: Yucky.

Narrator: Students look carefully at the worms to observe their structures.

Teacher: Look at the worms carefully.

Narrator: After the students have had plenty of time to observe the worms, they need to put them back in the terrarium for the next group.

### **<Investigation 3, Part 2>**

Narrator: In Part 2, students will focus their attention on earthworm behavior. You'll need the earthworm terrarium from the first part and a set of objects to be used as barriers. Unifix cubes and other blocks work very well. You'll also need cups from the kit, towels, or sponges for cleaning up and the Center Instruction Card called "Redworm Behavior."

Teacher: Michelle?

Narrator: This part begins with a review of how worms look. Then, tell the students that today they will be observing how worms move. When the students arrive at the center, they dig for worms. Some may want to rinse their worms before continuing. Students wet the surface of the table and put their worms on it to watch closely how they move.

While some worms will be quite active, others may require some patience on the part of the observers. Then, students use the objects to block the progress of the worms to see what they do.

Student: Yuck!

Student: There you go.

Student: We're building a climbing structure for it.

Student: There you go.

Narrator: A favorite among students is worms that crawl through the hole in the unifix cube.

**<Investigation 3, Part 3>**

Narrator: In Part 3, students compare redworms and night crawlers. You'll need the earthworm terrarium, the barrier objects and, of course, the night crawlers. To introduce the night crawlers into the terrarium, take out the leaves and pour them in. Make sure that they are well covered before the students come to the center.

For this activity you don't need to put the leaves back in the terrarium, but make sure the lid is securely on. Once again, you'll need the cups for washing worms and you'll use the Center Instruction Card called "Comparing Redworms to Night Crawlers." This is a good time to read a story about worms if you have one available.

Teacher: Earthworms.

Class: Earthworms.

Teacher: Mix.

Class: Mix.

Teacher: And turn the dirt.

Class: And turn the dirt.

Narrator: After reading the story, tell the students they will once again get to dig for worms. But this time, they might find something new. Expect some extra excitement when the students find the night crawlers, which are quite a bit bigger than the redworms.

Student: They are crawling all over.

Narrator: They continue their investigation by using the objects to see if the night crawlers behave similarly to the redworms. All of the worms should be back in the terrarium and fairly well covered up before the next group comes so they, too, will be able to discover the much larger worms.

Student: They won't get covered up. They are too wiggly.

**<Investigation 4, Part 1>**

Narrator: In Activity 4, students observe isopods, otherwise known as sowbugs and pillbugs. To begin Part 1 of this activity, you'll need these materials from the kit: half-liter containers with lids and enough cups for each student at the learning center. You'll need to supply the barrier objects you used with the worms, carrot or potato, paper towels, and the isopods, about 25 pillbugs and 25 sowbugs. You'll need the Center Instruction Card called "Isopod Observations."

This activity begins a bit differently. The two kinds of bugs are mixed together and introduced to the class simply as isopods. In Part 2, students will begin to discover some of their differences.

Teacher: Little animals.

Student: Bugs. We are playing with bugs.

Teacher: Here's what we're going to do...

Narrator: Part 1 begins with the review of the animals the class has already studied in this module and then the isopods are introduced.

Teacher: But you must be gentle with them. Okay? Be gentle.

Narrator: When students arrive at the center, they are given a plastic cup with a moist paper towel in it. The paper towels are important to keep the gills of the isopods moist at all times. The isopods are taken from the half-liter containers and put into students' individual cups for closer observation.

Teacher: You can touch them if you want. Just be gentle. You don't want to?

Student: I think they are playing hide and seek.

Student: Follow the leader.

Student: I think they are playing hide and seek.

Narrator: Students share their ideas for investigation focusing on the structure and behavior of the creatures. Their ideas might include using the same objects that we used with the earthworms to see if the isopods behave in the same way.

Teacher: Just put the block there like that. See what happens. Don't chase them. Just put the block there. Bring them back with you. Just put the block in front of it.

Student: The yellow brick road.

Teacher: Where's his head?

Student: He got out the other side.

Teacher: Where do you think this little animal's head is?

Narrator: Students will probably not realize yet that there are two different kinds of isopods. And that's as it should be.

### **<Investigation 4, Part 2>**

Narrator: In Part 2, students will determine the differences between pillbugs and sowbugs. For this part, you'll need the isopods in their containers and cups and lids from the kit. You'll also need the Center Instruction Card called "Identifying Isopods."

First you'll want to make six or eight copies of the student sheet. You may want to laminate these sheets or put them in plastic sheet protectors to keep as a permanent part of the kit.

Students will then put moist paper towels in cups. Place one in each circle on the identifying isopods sheet.

They will then sort the isopods into the appropriate cup. Here is a pillbug. Here is a sowbug. The activity begins by telling the whole class that there are actually two different kinds of isopods in the terrariums. Some are pillbugs and some are sowbugs.

I'm going to demonstrate this part rather than take you to the classroom, so you can see close-ups of the two different kinds of isopods and be able to help students tell them apart. Isopods are most easily distinguished if you compare them side by side, so you can see the differences. This is a pillbug. This is a sowbug.

If you look at the shape of the carapace or outer covering of the two isopods, you'll see that the sowbugs flattens out on the edges and is a little more jagged. The pillbug's carapace is more rounded. And this allows it to roll up into a ball. Sowbugs can't do that. If the bugs are placed on their backs, however, sowbugs can turn themselves back over much more easily than pillbugs. Remember, it's the process and the close observation that are the focus here. Not that the students be absolutely right in the way they identify the bugs.

**<Investigation 4, Part 3>**

Narrator: In Part 3, students run isopod races. This part is optional. If you choose to do this activity, you'll need the isopods in their containers, the race track from the kit, and cups with moist paper towels. For this activity, you would use the Center Instruction Card called "Isopod Races," which provides questions to help guide the students in a discussion of the races.

Student: Yeah.

Student: Mine's upside down.

Student: Mine is winning.

Student: Mine won.

Student: Mine won.

Student: No. That's mine.

Student: Hey, mine won too.

Student: See. Mine is in my cup.

Student: Mine won.

Student: Look.

**<Investigation 4, Part 4>**

Narrator: The final part of this activity is called "Animals Living Together." You'll need the terrarium with the land snails, the terrarium with the earthworms, the isopods in their containers,

some materials to enrich the environment, and *Animals Two by Two*. The *Animals Two by Two* big book is included in the FOSS equipment kit. You'll also need the Center Instruction Card called "Animals Living Together."

This part begins with reading the book. In this book, students will be introduced to a wide variety of animals comparing two animals at a time as they have done throughout the module. This book shows them pictures of many animals that could not be brought into the classroom.

At the center, the students will put all of the land animals in the earthworm terrarium. They will enrich the environment and discuss how they will care for the animals for the next few weeks.

### <Investigation 5>

Narrator: The fifth activity in this module is optional. It involves hatching chicken or duck eggs in an incubator. Several important factors must be taken into consideration. First, you need to find a source of fertilized eggs. Make arrangements to pick them up or have them delivered. Eggs sent through the mail get jostled and may not hatch.

Second, you'll need to have a place to take them after a few weeks. You should not send them home with your students unless they already raise farm animals.

The third thing you need to consider is the equipment. You can order these pieces from the Foss replacement parts catalog if you decide to do this activity. You can order the incubator, automatic egg turner, feeder, and water bottle.

Hatching and raising chicks in your classroom is a wonderful experience both you and your students will long remember. Be sure to read the folio carefully, however, before you decide whether or not to do this activity.

The *Animals Two By Two* module allows students to use their natural curiosity and wonder to investigate real animals through firsthand experiences. In this module, students look carefully at the structure and behavior of several animals. They observe how those animals interact with their surroundings. They learn how to handle animals carefully as they participate in the care and feeding of these classroom visitors.

Student: It's crawling up to your hair.

Student: It feels like something gooey.