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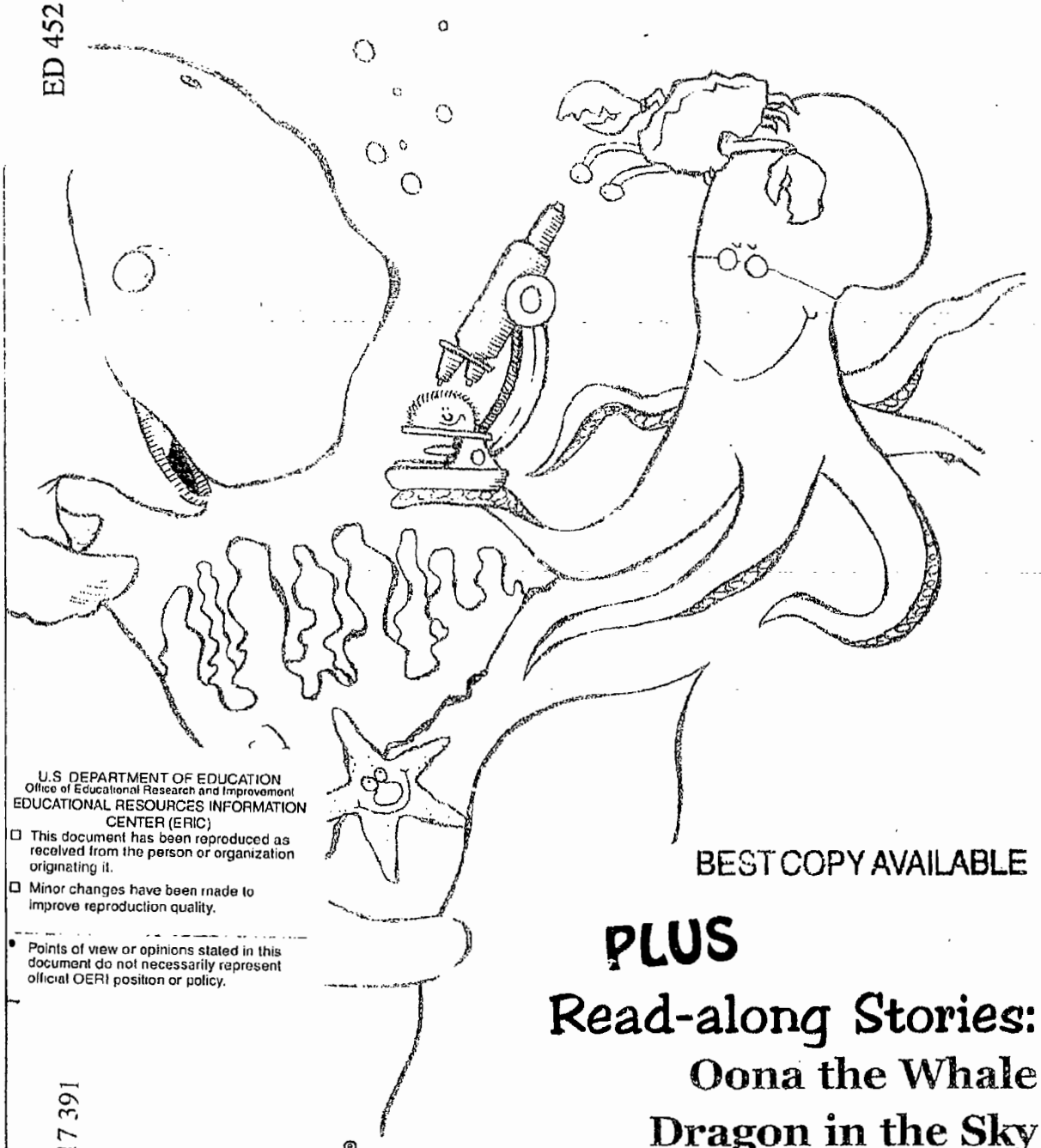
ABSTRACT

This book, one of a series, focuses on science seen every day in homes and neighborhoods. The message of the series of books urges parents and children to spend time together, talk about stories, and learn together. The first part of each book presents stories appropriate for varying grade levels, both younger children and those in grades three and four, and each book presents stories on a particular theme. The Read-along Stories in the book are: "Oona the Whale" (Willow Ann Soltow); "Dragon in the Sky" (Judy Braus); and "Green Goop" (Mary Morgan). On an accompanying audiotape, the stories are performed as radio dramas, allowing children to read along. The second half of each book provides ideas and guidelines for parents, as well as activities and books for additional reading. This book presents ideas to help children learn science through play and activities, as well as through school science assignments, and it suggests a month's worth of science activities. Chapters include: Science Is Everywhere; Questions about Science; Activities for Science Learning; and Bert and the Science Fair. Contains 21 references. (EF)

Parents and Children Together SERIES

Learning Science at Home

ED 452 531



PLUS

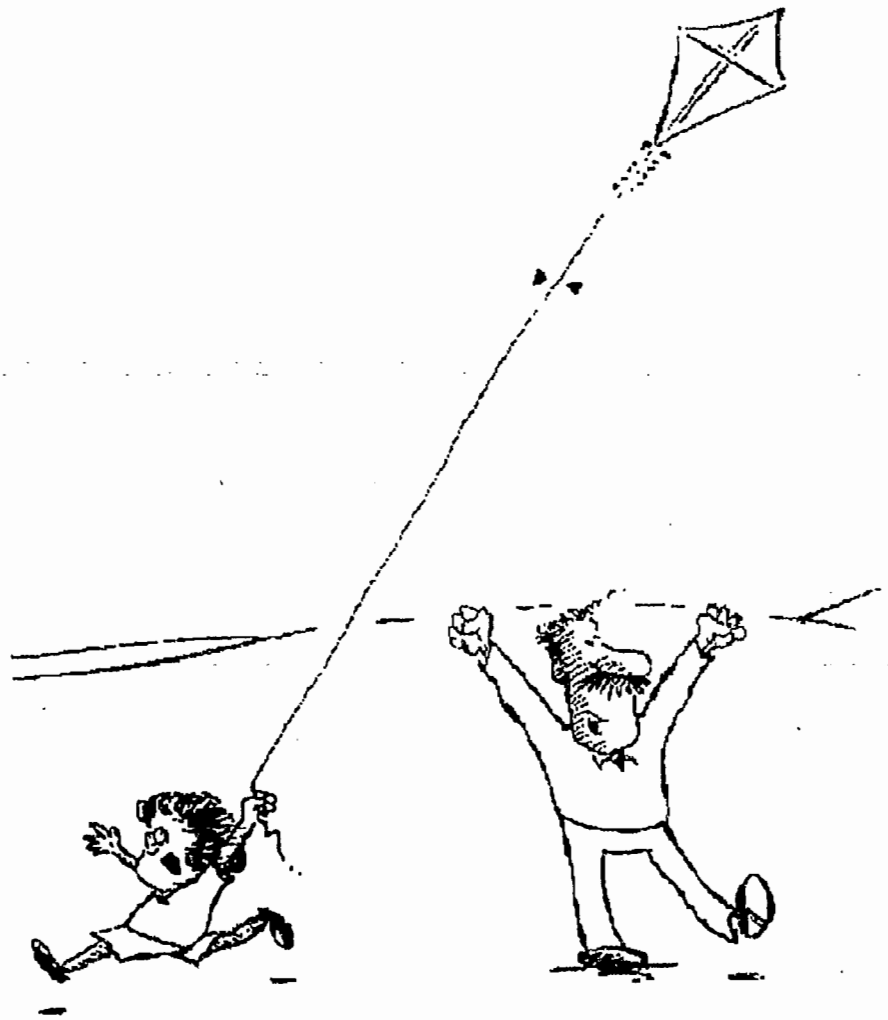
Read-along Stories:

Oona the Whale
Dragon in the Sky
Green Goop

CS 217 391

Guidance and fun for parents and children, ages 4–9

This book has a companion audio tape also entitled "Learning Science at Home." Occasionally there are directions on the tape that do not appear in the book or headings in the book that aren't spoken on the tape.



Parents and Children Together SERIES
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Introduction

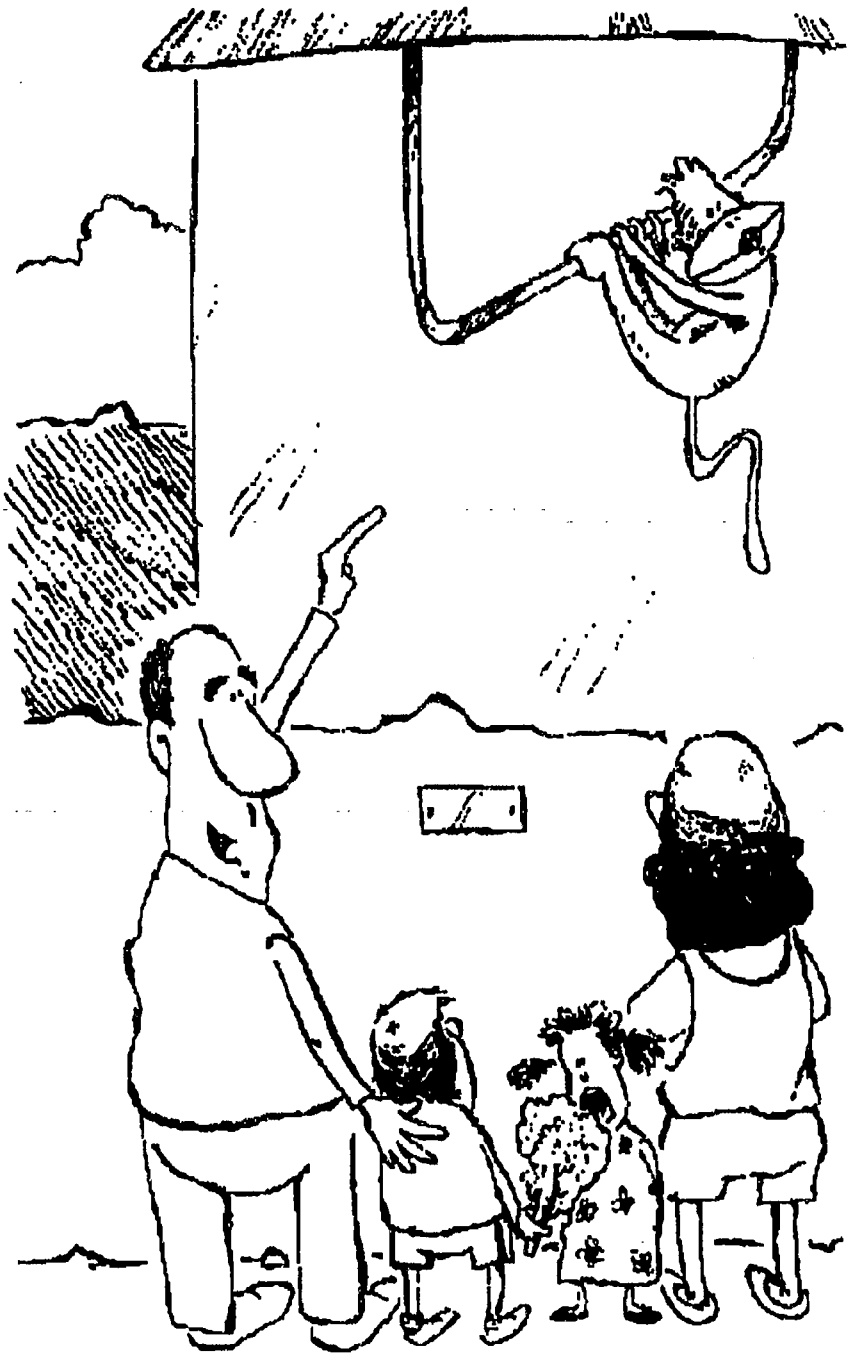
Get together with your children. Talk about stories and learn together. That's the message of this series of books, ***Parents and Children Together***.

You will find here several stories that you and your children can read together and talk about in a relaxed way. Some stories are more appropriate for younger children, some for children in grades three and four. Have fun with them but also use them as a way of guiding your child's thinking.

Before each story, you will be prompted to focus your attention. After the story, review some of the issues in a relaxed conversation. Please feel comfortable in making comments or asking questions when the two of you are reading a story together. Have fun along the way. The stories are performed as radio dramas on the accompanying audiotape. That gives your child a chance to read along with the voices on the tape.

In the second half of this book and on one side of the audio tape there are ideas and guidelines for the interested parent. On the topic of this particular volume you will find hints, practice activities, and books for further reading. If you want to use the tape as a way of preparing for reading with your child or in helping your child study, the tape gives you an opportunity to listen while you are driving or jogging.

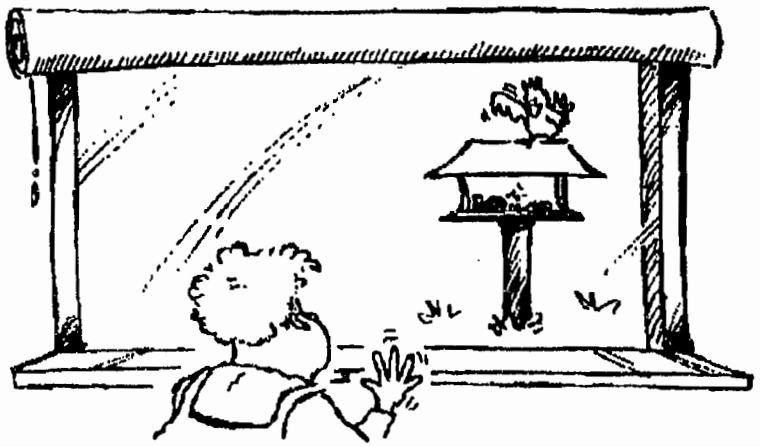
For more ideas on any of the topics in this Series, visit ***www.kidscanlearn.com*** or ***http://eric.indiana.edu***



Getting Started

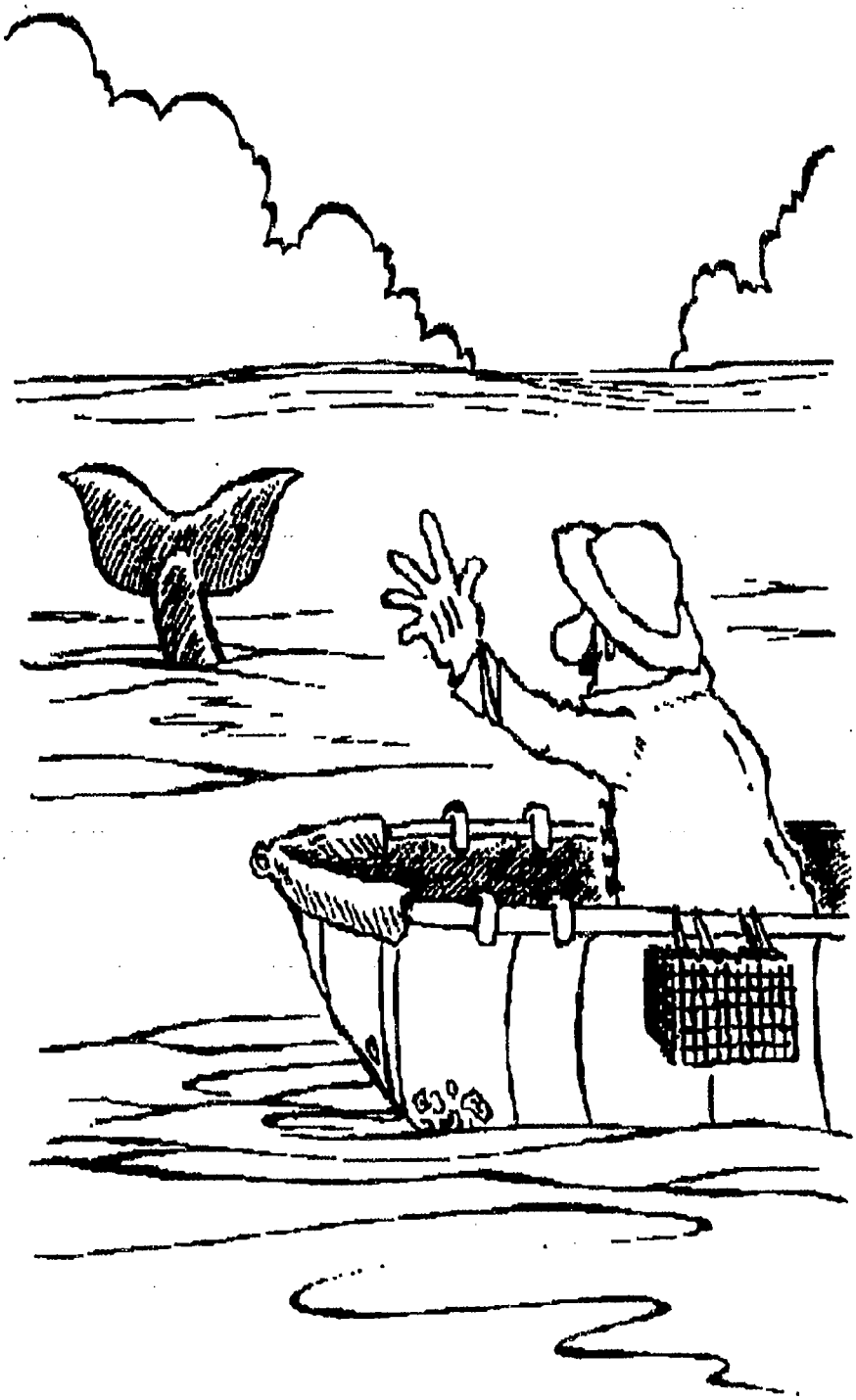
This book focuses on the science we see every day, in our homes and neighborhoods. These ideas may help your child learn science through play and simple activities, and may help both of you to work together on school science assignments. On Side B of the tape there are three read-along stories. We encourage you to listen to these stories and to read them with your children so you can share the excitement of story reading. Of course, your child can listen to the stories alone, if you wish.

Before reading the story, talk about the title or the things that might happen in the story. Then, after the story is finished, talk about it again. By the way, it's okay to stop the tape to answer your child's questions, to talk about something funny or exciting that happens in the story, or to discuss the story by asking questions, like "What other animals live in the ocean?" or "If you were making green goop, what stuff would you put in yours?" These discussions help make reading come alive and create an interaction between you and your child.



Part I

Read-along Stories



Oona the Whale

by Willow Ann Soltow

Things to Do *before* Reading the Story

Draw a picture of what you think Oona the whale looks like. The next time you are at the library, find a book about whales and see how many different kinds of whales there are and where they live.

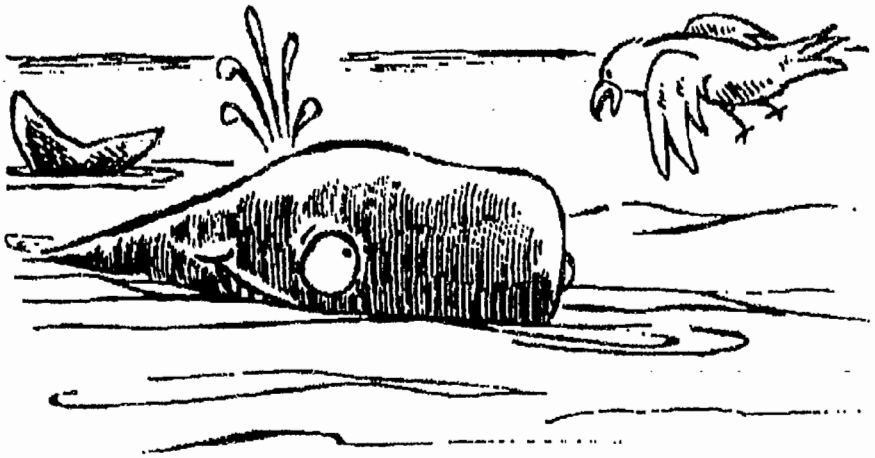
Oona was a whale who lived in Cape Cod Bay. Every day she swam past white farmhouses and past a lighthouse with a red roof. Every night she floated drowsily past jetties that keep the waves from beating too hard against the shore.

Each morning the lobsterman called out to her on his way to his lobster traps. "Good morning, Oona!" he would cry from his black boat. Oona would splash her tail loudly in the water just to say hello.

Oona loved the bay and the land around it. She loved the brightly colored rowboats that lined the shore. She loved to wake up to the squawk of noisy sea gulls. Oona had many friends. Most of them lived beneath the surface of the water on the ocean floor. Oona liked to dive down into the water to visit them. Sometimes she dived down to have a talk with Crab or to visit with shy Octopus.

Oona could not stay under the water for long, however. Whales need air to breathe, just as you and I do. Oona had to come back to the surface of the water every so often for air.

One day Oona was enjoying the warm sunlight when a sea gull flew by.



"I'm very, very busy!" squawked the gull. "Can't stop to talk! Simply can't! Well, perhaps just for a moment, since you insist."

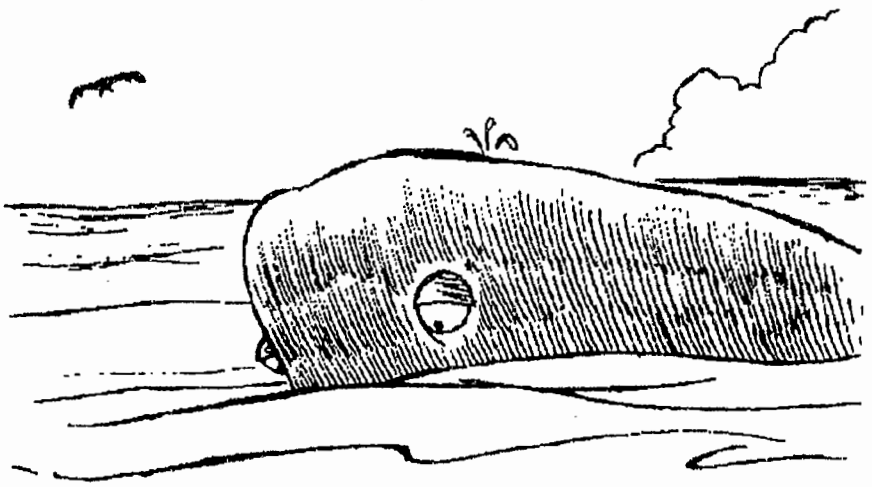
Oona had not insisted, but she was much too kind to say so. "I've just finished building my nest," the sea gull told her.

"What is a nest?" asked Oona. "Silly," answered the gull, "a nest is a home. It's a place of your own. I'm going to raise a family there." She cocked her head and looked at Oona. "Whales don't have nests, do they?" she asked.

"No, they don't," said Oona.

"That's too bad, Oona," the gull said. "I'm sorry you have no place of your own."

The sea gull took one last sad look at Oona. "Well, I must go. I'm very busy." And with that she flew away.



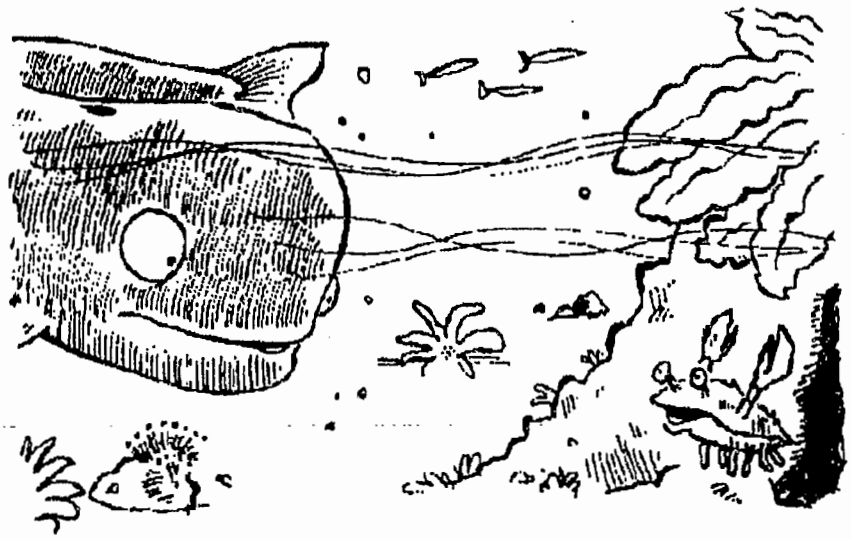
All of a sudden Oona was not happy anymore. She did not care about the sunlight on the waves or the friendly sound of the bell buoy.

"I do wish I had a home," sighed Oona. She had never really thought about it until now. "I do wish I had a place of my very own!"

Beneath the water Crab waved a claw to Oona. Oona did not really feel like talking to Crab, but she did not want to seem rude. She took a deep breath and dived. Crab could tell right away that his friend was unhappy.

"What is the matter?" he wanted to know.

"I wish I had a home," said Oona, "a home of my very own."



Crab thought to himself for a moment. "Now, let me see...Why don't you find a home in the rocks the way I do? You can't beat a pile of rocks for a nice, safe home."

"That's an idea," said Oona. She went to look for a pile of rocks. She looked and looked. She could not find one that was big enough for a whale. "I'll never find a home," said Oona sadly.

"Pssst! Hey there!" hissed a voice.

"Who's there?" asked Oona.

"Hey! Oona! Over here!" It was Octopus. He was hiding in a clump of seaweed. He was too shy to come out of hiding, so he waved a tentacle instead.

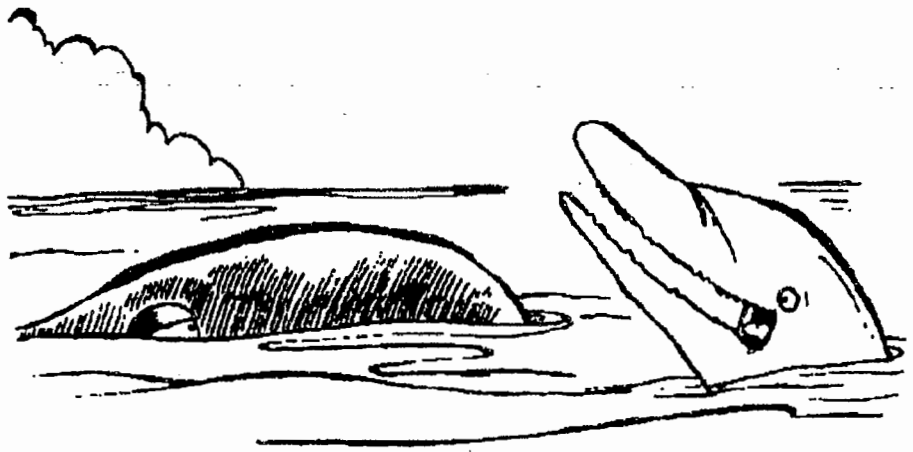
"How about a seaweed home?" he asked. "That's really the best kind of home there is." And he showed her how easily he could disappear into his seaweed.

"I see what you mean," said Oona. She went to hunt for a clump for herself. She hunted and hunted. Finally she found a very large clump of seaweed, but it was far under the water in the deepest part of the bay. Oona could stay there only a short time before she had to go to the surface and breathe. What good is a home where you cannot stay as long as you want?

"I'll never find a home," she said sadly.

The lobsterman passed Oona on his way home. He waved to her, but she did not splash her tail in reply. She was too sad. She watched his black boat follow the sunset into the shore. She watched as he got out of his boat and went into the clean, white farmhouse where his family and hot dinner were waiting for him.

"I am the only one with no place to go. I am the only one without a home," sobbed Oona. "Oh, what shall I do?"



Up popped a shiny, blue porpoise.

"What's the trouble?" asked the porpoise. She had to poke Oona with her snout several times before the whale would answer.

"I have no home," said Oona sadly. "I have no home of my own."

"Why, the whole ocean is your home," the porpoise said happily. "Your home is wherever you are. Where you are, it is."

"The whole ocean," said Oona softly. "The whole ocean is my home. And all the time that I was looking for it, my home was right here."

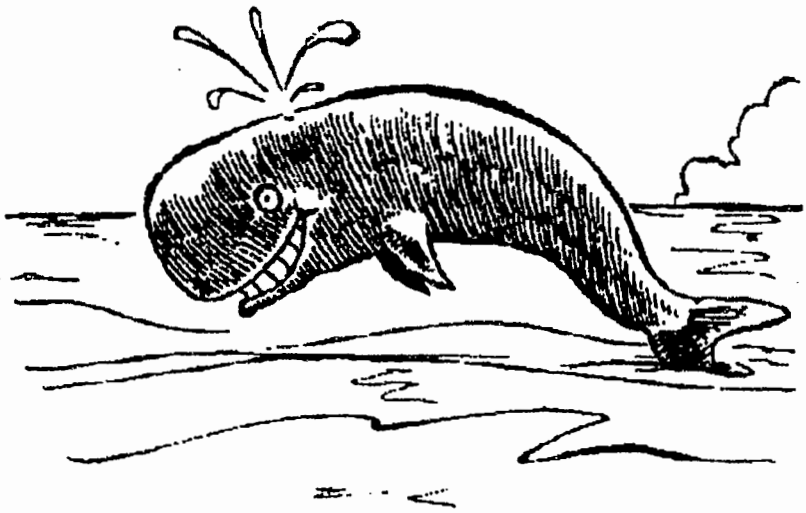
"A home is where you make it," said the porpoise.

"In the sand," cried the crayfish.

"In the reeds," said the sandpipers.

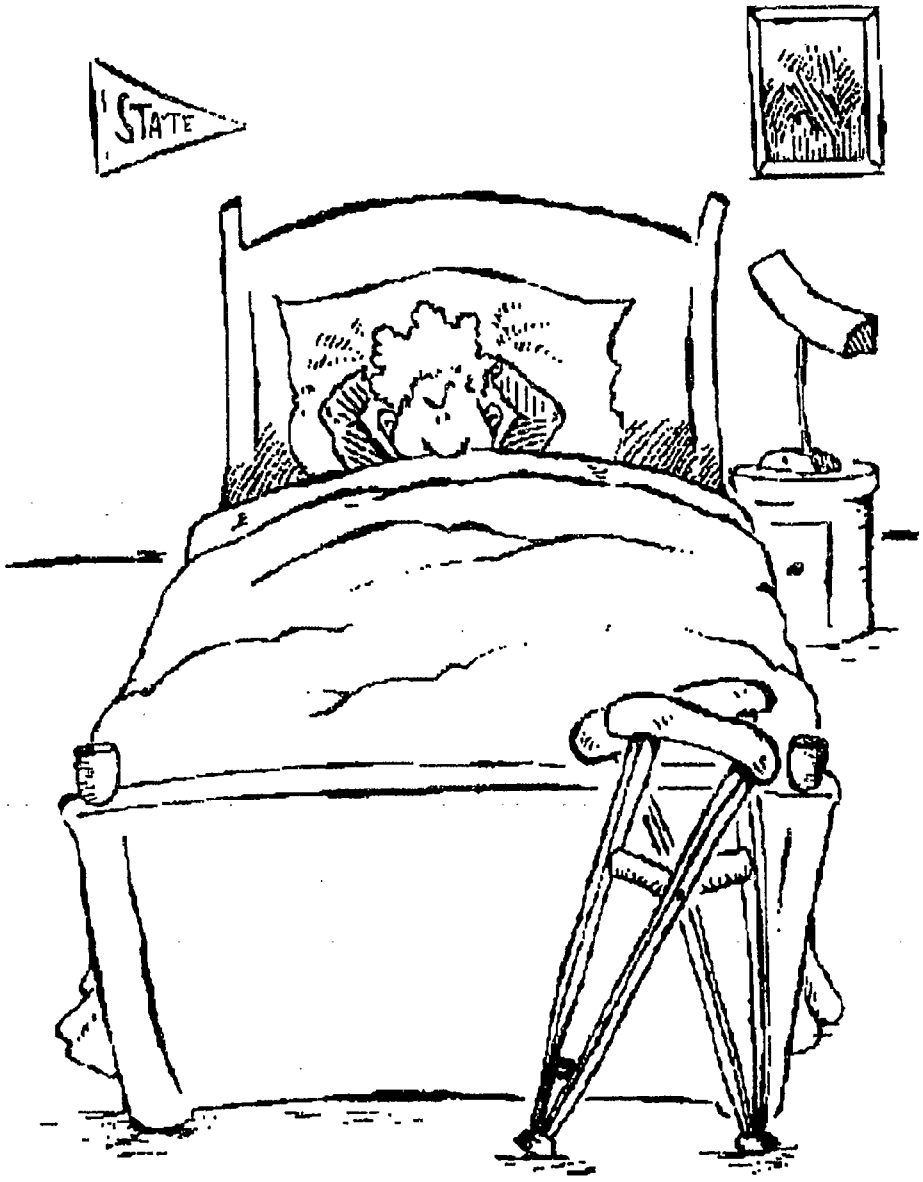
"In the deep sea," said the shrimp.

"A home is where you belong," said Oona. And she splashed her tail loudly in the water, just to show how happy she was.



Things to Do *after* Reading the Story

Just like Crab and Octopus, people live in different kinds of homes. Talk about the variety of places where people live. In what types of homes have you lived?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Dragon in the Sky

by Judy Braus

Things to Do *before* Reading the Story

Could there be a dragon in the sky? If you look at the sky, you can see many different shapes made out of clouds. Look at the sky and see what the clouds look like to each of you. Do you both see the same things?

It was a windy day in March, and it was cold. Peter Jackson pulled his bed covers up a little higher. Where was Spring, anyway? He snuggled down under the blankets. He just didn't feel like getting up yet. In fact, he didn't feel like doing anything at all.

"It's not fair," he said to himself. "Why did I have to sprain my ankle just before the kite-flying contest?"

Peter heard his brother Jeff coming down the hall. "How's the ankle?" Jeff asked.

"Oh, it's OK," said Peter. He sat up in bed and reached for his crutches.

"Are you making another kite for the contest?" asked Jeff. "I'll help, if you want me to."

"I'm not going to enter, Jeff," said Peter. "I can't fly a kite with this dumb ankle."

"Well, let me know if you change your mind," Jeff said. "Come on, breakfast time."

As Peter made his way slowly downstairs, he thought about yesterday. He had been testing his contest kite when it suddenly got tangled in a tree. An older friend, Wong Lee, had been watching. He went and got a ladder to help Peter get his kite down.

Wong Lee was untangling the kite when Peter climbed up onto the ladder. The ladder shook, and both boys came tumbling down. Wong Lee had broken his arm, and Peter had sprained his ankle. The kite was torn to bits.

"You'll have to walk with crutches for a week or two," the doctor had said. "And take it easy!"

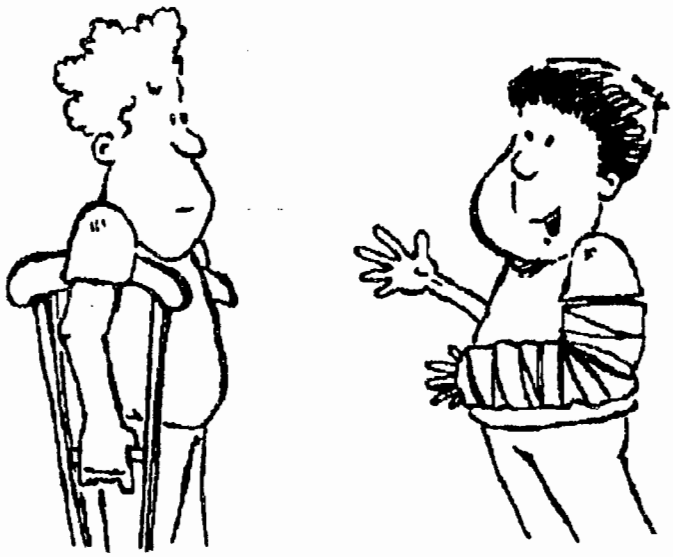
At breakfast Peter was very quiet. Everything was ruined. Sometimes things just didn't work out. "I don't even want to watch the contest," he said to himself. "It wouldn't be any fun."

After breakfast, Peter hobbled over to Wong Lee's house. "How's your arm? he asked his friend. "I'm really sorry about the ladder. It was dumb of me to climb it."

"Aw, that's OK," said Wong Lee. "I should have known better than to let you. But listen, I've got an idea. We could enter the contest together. We can build a new kite. I can't use my arm very well, so you could help me build a new one. And since you're on crutches, I'll fly it. We'll be a team!"

"But do we have time to make a kite?" asked Peter.

"Oh, sure," answered Wong Lee. "We can make one in no time."



As the boys walked into Wong Lee's room, Peter looked all around. There were pictures of insects everywhere. Some of the neatest were dragonflies. "Dragonflies are my favorite insects," said Wong Lee. "Want to make our kite look like one?"

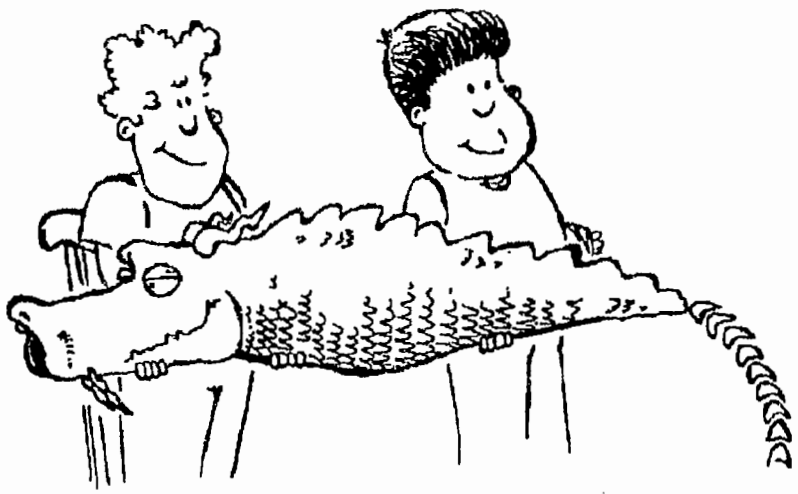
"You bet!" said Peter excitedly. "Let's get started."

The boys worked together all day. They used a special wood that Wong Lee had bought in a hobby shop. Then they added brightly colored tissue paper to the frame. Soon the kite began to look like a big dragonfly.

For the next few days, Peter spent almost every minute at Wong Lee's house. When Peter's brother, Jeff, asked what he was up to, Peter said, "It's a secret."

Finally it was the day of the kite-flying contest. Outside it was sunny, bright, and breezy—perfect kite-flying weather! Almost the whole town turned out to watch the contest. The judges looked at each kite very carefully. They looked at shapes and colors. They looked at sizes. They made notes about each kite and talked to the children who made them.

"We're a team," Wong Lee said proudly when the judges came to his and Peter's kite. "We call our kite the 'Green Dragon.'"

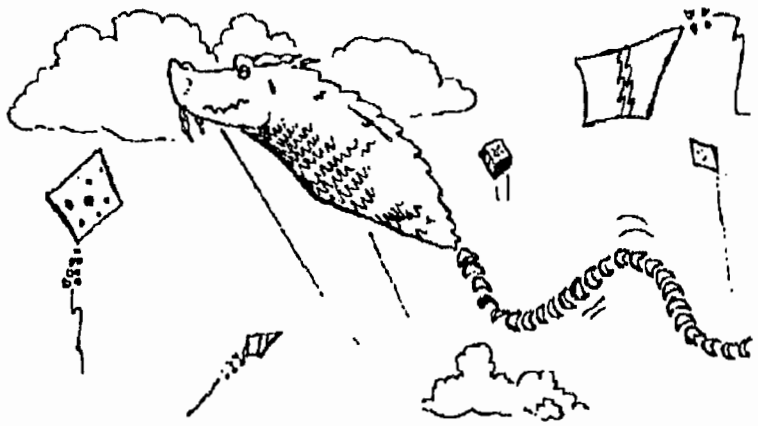


At last it was time for the contest to begin. Wong Lee started out with the other boys and girls. There were eagle kites and owl kites and butterfly kites all bobbing in the sky. But the highest-flying, most beautiful kite of all was the Green Dragon. It swooped and soared way above the crowd.

Suddenly the loudspeaker came on. The announcer said, "All right, kids. The contest is over. We have a winner! The winner—the best-flying kite of all—is the Green Dragon. The Dragon was made by Wong Lee and Peter Jackson. Come get your prize, boys!"

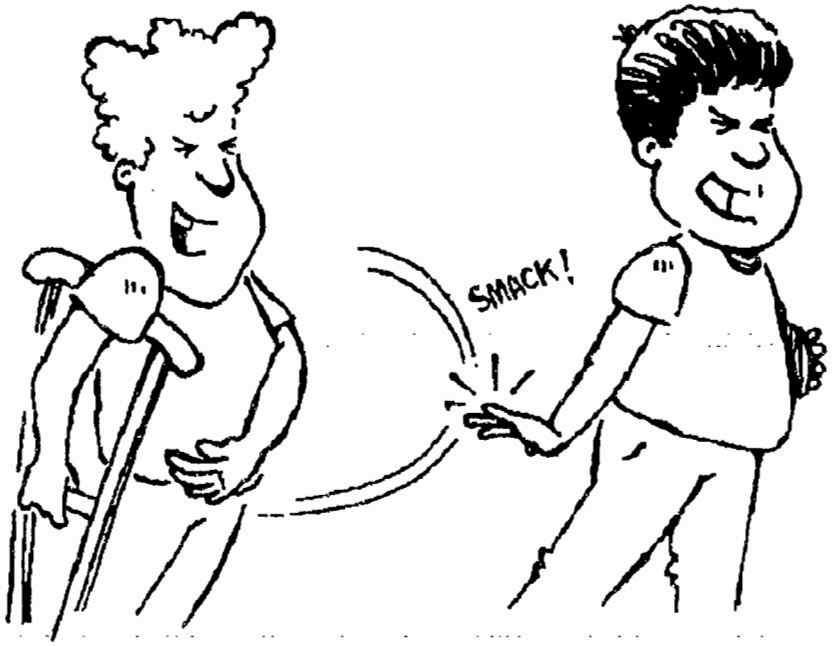
"We won, we won!" cheered Peter and Wong Lee as they headed for the judges' stand. Peter's brother came running up to give Peter a hug. He shook Wong Lee's hand and said, "You guys sure did a great job! Congratulations!"

"We did," said Wong Lee, "and we did it together!"



"Right," added Peter. "The Green Dragon team! That accident didn't stop us, did it, Wong Lee?"

"No way!" said Wong Lee with a big smile.



Things to Do *after* Reading the Story

Together, decide on a symbol or group of symbols that best represents your family. Then design a kite of your own using those symbols. (Your local librarian will help you find a book that shows how to make kites.) You will be able to fly your own kite and honor your family at the same time.

Green Goop

by Mary Morgan

Things to Do *before* Reading the Story

Rosalind creates something new in this story. Have you ever wanted to make or invent something? Think about something you could make together. Write a list of parts or ingredients you will need, describe what you are going to make and what purpose it will serve, then begin your invention.

School can be really dull sometimes. You go to the same room with the same kids and the same teacher, and nothing really cool ever happens.

But today was different. Today was the Science Fair.

Now, I know some people think that science is for nerds. But science can be great if you know enough about it. Shortsy says that "Science is the ladder from which humans can touch the stars." I'm not sure what that means, but I like how he says it.

Shortsy is our teacher, Mr. Schwartz, only nobody calls him Mr. Schwartz. He's bald and laughs like a horse. He says his hair burns off because he thinks so hard.

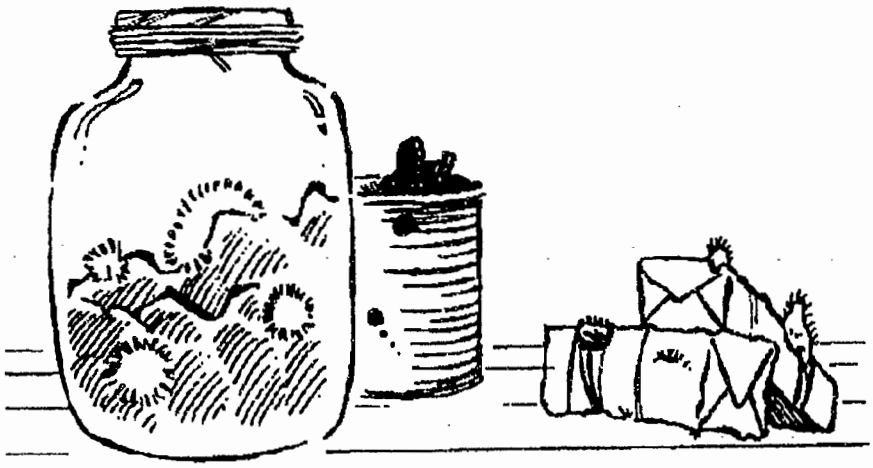
He likes to talk about weird things like global warming and solar energy, but he lets us play Catch the Cone during recess, so he's OK.

Anyway, today was the Science Fair. I stayed up almost all last night working on my project. My creepy brother Elmo tried to find out what I was making, but I put up a sign—"Enter and Die" —to keep him out. Plus, I locked the door. You never can be too careful with Elmo.

I thought a long time about what to do for my project. I didn't want to do anything sick like Stacey, who's cutting up a frog, or goofy like Howard, who's making about a zillion cut-out snowflakes. And there'll be at least five fake volcanoes. I wanted to do something different, but cool.

Then it came to me. Last week I'd seen a movie on TV called "The Goop" about a science experiment that screwed up and started growing bigger and bigger until it took over the world. What a great idea! I'd make my own Goop for the Science Fair!

This was really exciting. First I sneaked out to the kitchen and checked out the refrigerator. In the back of the bottom shelf Mom always keeps really gross stuff that no one wants to eat. I found one jar of brown ooze with furry green splotches growing on it, a half-empty can of something black and lumpy, and two sticks wrapped in foil and covered with yellowish prickles. Excellent!



I made sure that Mom was still in the living room; then I tiptoed into her bedroom. She has lots of jars and tubes filled with smelly colored jelly, stuff she smears all over her face (or maybe she eats it—I don't know), but I knew it would be great for the Goop.

After that, I went through the junk in my closet and found my Junior Chemistry Set. Most of the chemical bottles had crusted over so much that I couldn't tell what was in them, but I figured that it was bound to be something scientific, which was what mattered.

I went back to the kitchen and got an empty plastic butter tub to hold the Goop. Back in my room I mixed everything together carefully. It smelled gross and burped little bubbles of slimy green ooze, a sure sign of goopiness. I was satisfied, so I sealed the plastic lid on tightly. When I finally went to bed, I had a dream about riding to school on a wave of Big Green Goop.

This morning I woke up early. I looked on my desk—the tub of Goop had swelled up during the night. Perfect! I could hardly wait to get to school.

Elmo and I walked to school, and as usual we walked past Ralph's Quik Mart. Today we saw Cassie sitting on the curb in front of Ralph's. She yelled, "Hey!" and Elmo and I both yelled, "Hey!" and stopped so she could catch up. Cassie talks too much, but mostly she's OK. Today she had real news.

"Hey, Roz! Are you ready for the Science Fair? I heard there's a big prize this year for the best entry—you know what it is? I heard it's either $100 or a color TV or something really great. So what's your project?"

The Goop was in the butter tub in my backpack, but I hadn't heard about the prize. That was cool. "Yeah, I knew all that," I said to Cassie.

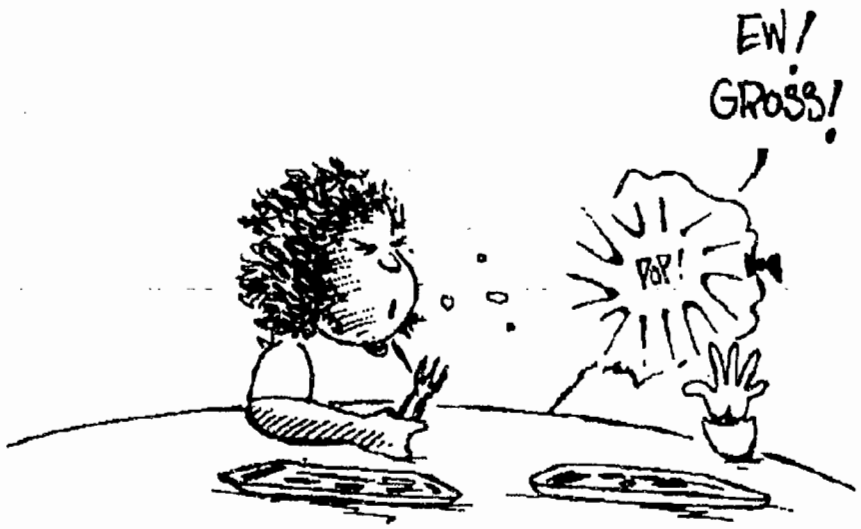
"So what's your project?" she asked again, I could tell that she was dying to find out, since she knew that it would be the best.

"It's a Nerd Detector, to track down nerds like...YOU!" I said as I reached for Elmo. He screamed and took off running, and Cassie and I chased him all the way to school. We got there just before the bell rang, and didn't have time to talk about it any more.

All morning I was really good. Shortsy asked once if I was sick, but I said, "No, I'm fine." The Science Fair started after lunch, but I wasn't nervous about waiting. I knew that whatever the prize was, it was mine! I couldn't wait to see the look on Shortsy's face when he found out what I'd made.

During lunch I could hardly eat. Cassie kept bugging me about the Goop. "Why can't you tell me? I'm your best friend, aren't I?" she whined. "I'll tell you about mine if you tell me about yours!"

I blew a big slobber bubble in her face. "You're gross!" she squealed, but she shut up after that.



Pretty soon Shortsy came to the cafeteria door. "ROOM 213—LINE UP!" he yelled at the top of his lungs. It can get really loud when we eat. Cassie and I stacked our trays on the conveyer belt and went to line up behind Lenny, who is always first in line, no matter what.

"Hey, Roz Jaws," he said and stuck out his tongue.

"Hey, Len Hen," I said and stepped on his foot.

"Rosalind!"

I didn't think Shortsy was looking, but I guess he saw the foot action. I pretended not to hear him.

"Rosalind, if you behave like a beast, you will surely become one!"

"But..."

"Rosalind?"

"Sorry, Leonard," I said. Life isn't always fair, but I would get Lenny back later.

By now everyone was lined up behind us, and Shortsy turned to lead us down the hall. I could hear Cassie whispering to someone, but I didn't look back. They were probably talking about my project.

We were almost back to the room when suddenly we heard a really loud BOOM! and we all jumped as the door to Room 213 rattled and shook. Shortsy ran to the door and jerked it open. He gave a snort and turned completely white, and it didn't take long for the rest of us to find out why. I can't really describe how horrible the smell was that rushed out into the hall, but Lenny puked, and he wasn't the only one.

Cassie screamed and then everyone started screaming and running around. Mrs. Madirez, the principal, came and was shouting, and it was all because of my Big Green Goop. It had exploded and was all over the floor and the chairs, and I can tell you that it stunk worse than anything I'd ever smelled before in my life. Shortsy just stood there shaking his head and coughing.

Well, Mrs. Madirez sent all the classes in that hall home for the afternoon because it smelled so bad and was making everyone sick. The janitor even had to wear a white mask over his face when he came to clean up the mess—it stunk that bad.

After all that happened, I thought Shortsy might be really mad. But I won the Science Fair prize, after all—a really cool book about how things work, like why water always swirls the same direction in a toilet.

Shortsy said I showed how science can affect the world, even if this time it was only our hall in school. He said that next time I should try to do something less odoriferous, though...whatever that means.

Things to Do *after* Reading the Story

The green goop blew up and made a mess of the classroom. Write a different ending to the story in which the green goop changes in another way.

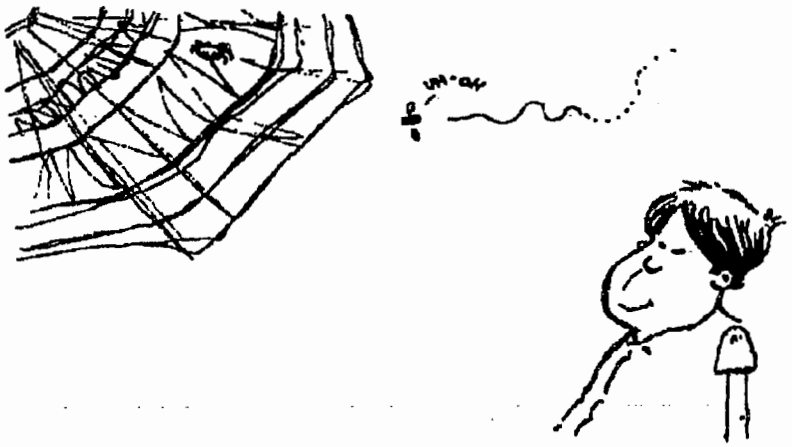
We hope you had fun with these stories!

Part II

Guidelines for Parents

Science Is Everywhere

When you watch a spider construct a web and marvel at its design or its strength in holding other insects, you are engaging in science. When you jack



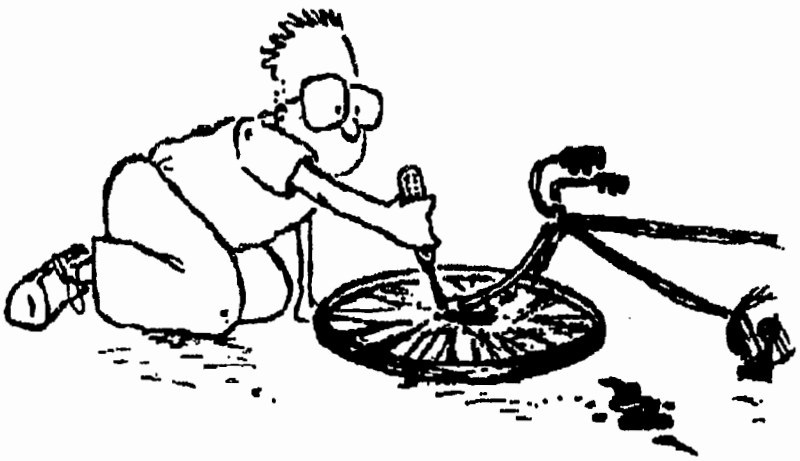
up a car to change a tire, you are using a lever to lift an object too heavy to lift with your own strength. That's science. When you spray an extra-strong cleaner on a stubborn dirt spot and see that spot dissolve, you are watching science. The list of your daily activities that involve you in science is really quite long.

Science is nothing more than the study of the physical and natural world in which we live. Anytime, therefore, that you ask a question about nature or try to figure out how something works, you are being a scientist; you are engaging in

science. The study of science in school helps students understand the facts and the principles that make some part of our world work.

At home with your child, you can make science easier and more valuable by asking questions and by encouraging your child to ask questions about the world around him. That's what scientists do. In fact, they think that asking questions to seek information or to solve a problem is so important that they give that activity a special name. They call it "inquiry," the orderly search for knowledge by asking questions and collecting information.

Science may sound like heavy business, with all that orderly questioning and searching going on, but for children, it is just natural. One of the best ways for them to solve science problems, as a matter of fact, is through play. Einstein said that that is what he did: he often arrived at a logical answer through a kind of "vague play," that is, he played "what if" games in his mind to explore new ideas. Probably most of us learn a lot about the world around us through "vague play."



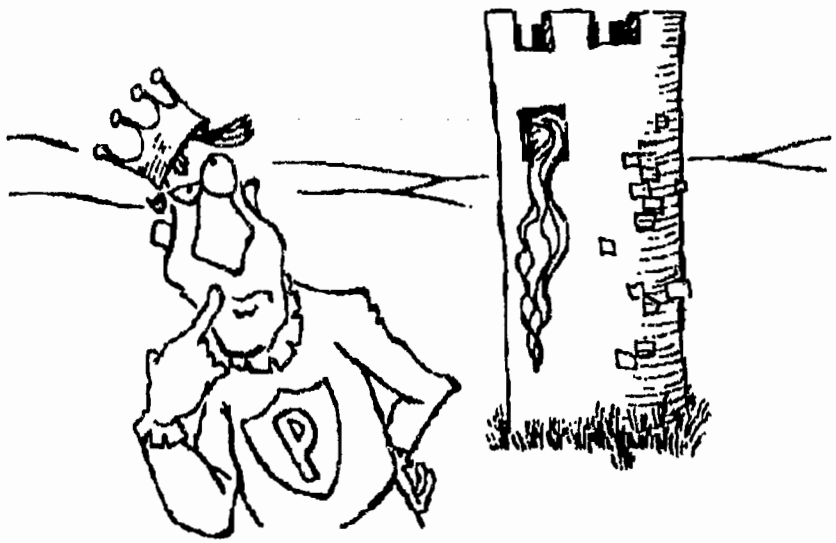
We play with potted plants by shifting them in the sunlight, by giving them more or less water, and even by talking to them to help them grow. Through that kind of play we learn how best to grow certain plants in our house, in our yards, and in our environment. Simply by talking about what we are doing with plants or laundry soaps or the tools we use for home repairs, we help our children develop inquiring minds.

We cannot emphasize enough the value of play in making science interesting. With young children, building blocks are excellent science play. Whether using old-fashioned wooden blocks or plastic ones

that snap together, children learn about balance, symmetry, and other principles of construction by simply playing with building blocks. Later, when they are able to use tools safely, children can learn some basic physical principles by nailing pieces of wood together, trying to construct a toy or a birdhouse, or repairing something that is broken.

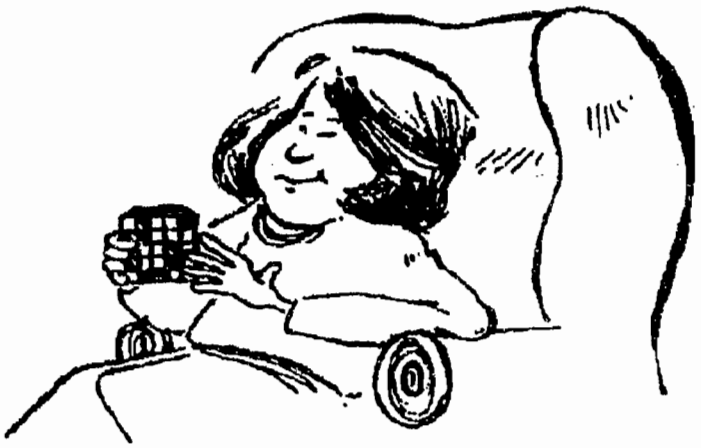
Play is a non-threatening way to face life and to solve some of the physical or chemical problems in our lives. The great Swiss psychologist Jean Piaget viewed play as an essential learning process because it's a way for children to feel and think, and it is a way to come into contact with failure and success while working with other people and with nature.

Play helps develop flexible thinking and motivation—important ingredients in scientific problem solving. So when you explore the world with your child, first try to produce large numbers of ideas. In a make-believe world, for example, you can try all kinds of solutions. Do you remember the fairy tale about Rapunzel, who had hair so long that the handsome prince could climb into her prison tower by making a rope ladder from her



hair? How else might he have gotten up to her? More questions provide more opportunities for the thinker to solve problems.

A flexible thinker is willing to try different strategies for solving a problem. One of the reasons that certain toys are so valuable is that they promote flexibility. Studies have shown that children who have played with blocks, construction toys, and puzzles are more willing to search for a variety of solutions, than children whose experience has been mostly with structured play and therefore are more likely to use a rigid, single strategy to solve a problem.



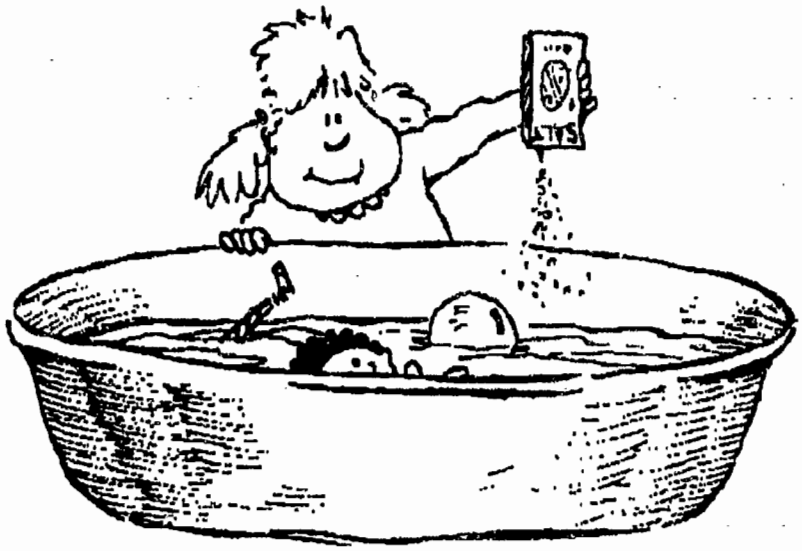
How about motivation to learn science? As with any learning, science learning depends on motivation. One of the characteristics of learning through play is that play usually provides its own built-in motivation. As they play a situation to its conclusion, children can be imaginative, self-directed, and spontaneous, all characteristics of children's play.

Since science learning and problem solving are closely linked, here are some guidelines that will help you work with your child to promote real-world problem solving:

- Encourage your child to play with concrete objects, such as blocks, boxes, string, rope, and stacking objects.
- Ask questions out loud and try to figure out the answers with your child. You may be surprised by her fresh solutions.
- Show interest by asking your child about school experiments, and then try to relate them to things that happen at home—following recipes, boiling water, or constructing models. Allow time for your child to ask questions, and don't be afraid to learn together.

- Let problem-solving skills develop gradually. Don't push. They need time to take shape.
- Take family field trips to the zoo, science museum, aquarium, and library regularly.
- Give science-focused books or magazine subscriptions as birthday and holiday presents.

- Watch a science-related television show with your child once a week, and talk about it.
- Try experiments at home; for example, float a drinking straw in plain water, and then in salt water. Because of the density of salt water, objects that sink in plain water will float in salt water. Or give your child a magnet and let him see if he can determine what sticks to the magnet and what does not.



Opportunities for making science interesting and real are everywhere. All we have to do is to ask standard science questions, like:

What is it?

How does it work?

How can I change it?

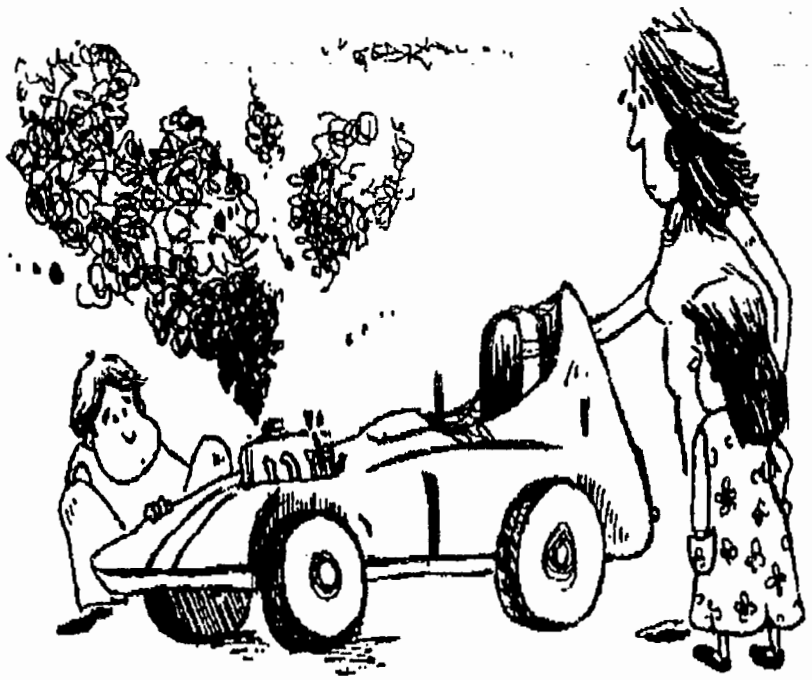
These will lead to more specific questions, such as:

What makes the body work?

What makes the world work?

How do the stars and planets stay on course?

But don't make science at home a heavy or serious experience. Relax and enjoy answering questions with your child. Learn to be a scientist right along with your child. That means ask, explore, play with ideas, and try to make sense of the world around you. When things don't work out, laugh and start the process all over again. If you can laugh at the trial-and-error play of being a scientist, so will your child. Then he will tackle school science with the same friendly attitude.



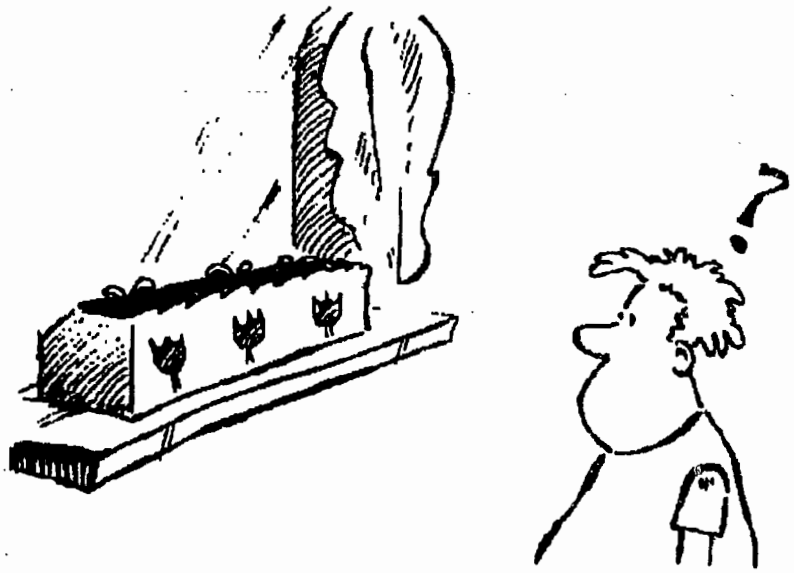
Questions about Science

Many parents have questions about science. Here are answers to a few of those questions, and some suggestions you can use.

I would like to help my children see the importance of studying science in school. How can I do science at home with my children that will encourage this?

As a parent, you can do a lot to help your children learn science. Children are scientists by nature—they have an almost unquenchable curiosity. Encourage your children to be inquisitive, to be investigators, and show them that you are curious also. There are things already in your home that you can use to help them discover science. Here are a few examples:

- Take apart an old toaster, bike, or flashlight so your children can see how it works.
- Use bird and squirrel feeders to attract wildlife to your yard. Explore with your children what they observe—feeding habits and protective behavior.
- Plant flower and vegetable gardens. Talk about the different types of seeds, seedlings, and plants. Observe the growth by charting or recording weather, precipitation, and plant growth each day. Are there relationships between these factors? Make daily observations of the sun and the moon. Discuss the changing shape of the moon and the position of the sun in the winter and summer.
- Take a walk. Bring back some seeds and plant them.



- Plant an herb garden in a window box and use the herbs in cooking.
- Watch science and nature programs with your child on educational television. Ask questions together about what you see.
- Build models from kits with your child. Discuss construction principles and techniques.
- Share your own hobbies. For example, if you are a hiker, biker, or camper, take your children along. Introduce them to animals, trees, plants, and everything the outdoors has to offer.

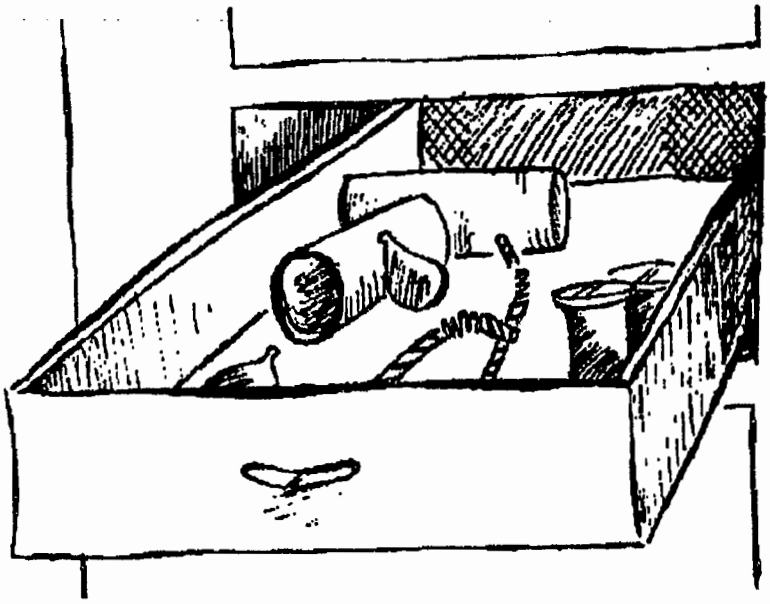
At Christmas time and for birthdays, buy children's gifts that encourage curiosity, questions, and further explorations. Even very young children will be fascinated by a microscope, a telescope, a magnifying glass, or a compass if they are shown how to use them.

Chemistry sets and science kits for the home are so expensive. Do you have any affordable alternatives?

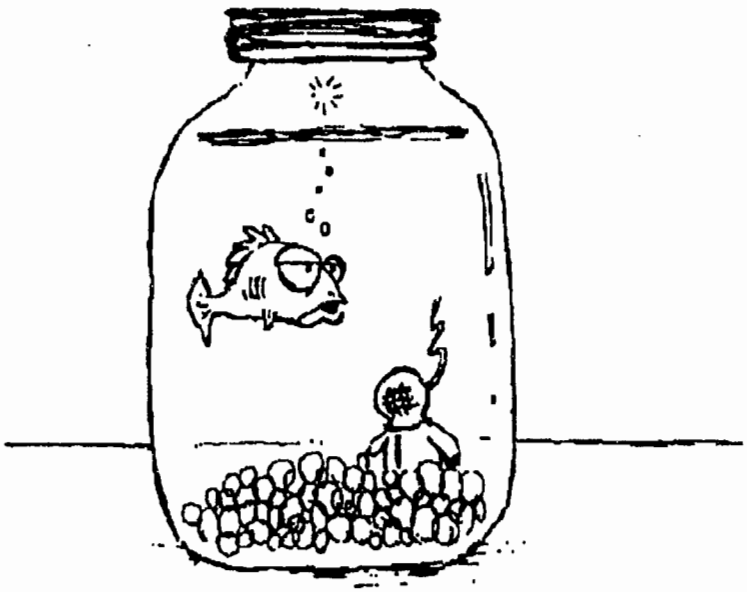
Science at home should be what I refer to as "shoestring science." That means collecting and saving almost everything from string to tinfoil. The key to successful, creative sciencing at home is to adopt the substitution habit. Substitute a babyfood jar or peanut butter jar for scientific glassware.

When you need:	Substitute:
flashlight casings	toilet paper
rolls	
vials	pill bottles
eyedroppers	soda straws
weights	fishing sinkers
containers	coffee and film
cans	

(There are additional items listed on the next page. Read over ıe list to see which items fit your needs.)

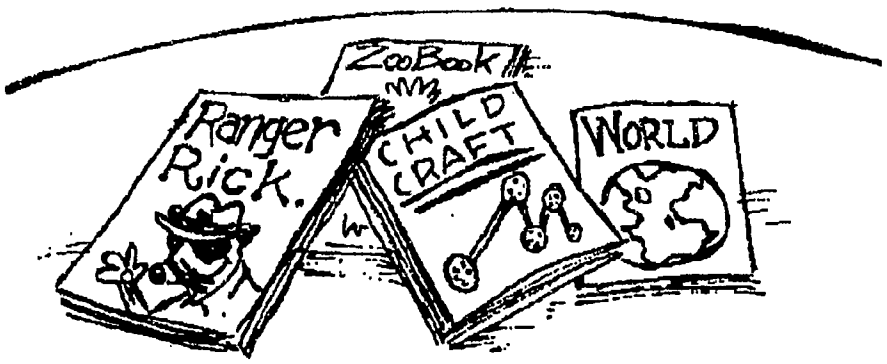


When you need:	Substitute:
wheels	skates, bikes, toy cars
mirrors	aluminum foil on cardboard
graduated cylinders	baby bottles/medicine cups
density objects	clay
copper tubing or pipe	iron or aluminum nails
measuring sticks	paint sticks, licorice, string, straws
wire or string	fishing line
screening	panty hose
stirring rods	tongue depressors, ice cream sticks
scoops or shovels	plastic bleach bottles
culture dishes	plastic margarine tubs
timers	alarm clocks
aquariums	gallon jars
crayfish homes	plastic dish pans



My daughter is having trouble reading her science book from school. She thinks it is difficult and boring. How can I help her develop an interest in reading about science?

By saying the book is difficult and boring, your daughter may be saying one and the same thing. Some people assume something is boring when it is very difficult to read. You might ask her if she is uninterested in the topic. If she says yes, you and her teacher can discuss ways of raising her interests—for example, by engaging in hands-on experiments. If, on the other hand, the book seems too difficult for her to read alone, you can help her tackle that problem by reading it with her.



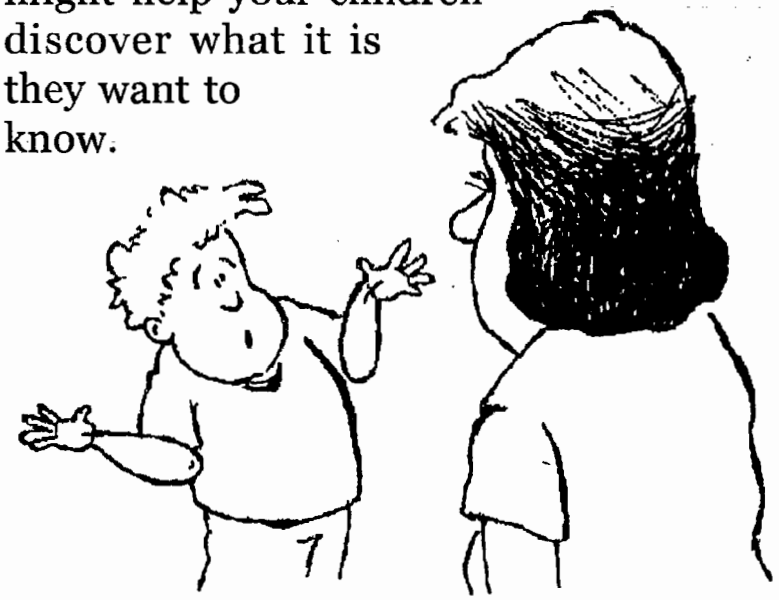
There are many children's books on the market today that focus on science activities and information. You can find books to explain scientific principles in easy-to-read, easy-to-understand formats. The library can provide her with numerous information books at her level. Children's encyclopedias, such as Child Craft, and children's magazines, such as Ranger Rick, ZooBook, and World, are all reliable sources that can help your child develop an interest in science.

Children acquire knowledge when they are actively engaged. You may want to help your child do some of the more simple experiments or activities in the science books. Science is much more than just reading about it. Hands-on activities and experiments help your child understand concepts that otherwise may be confusing or unclear.

My kids are very curious about the physical world, but sometimes their questions drive me crazy. How can I encourage this curiosity in a positive way?

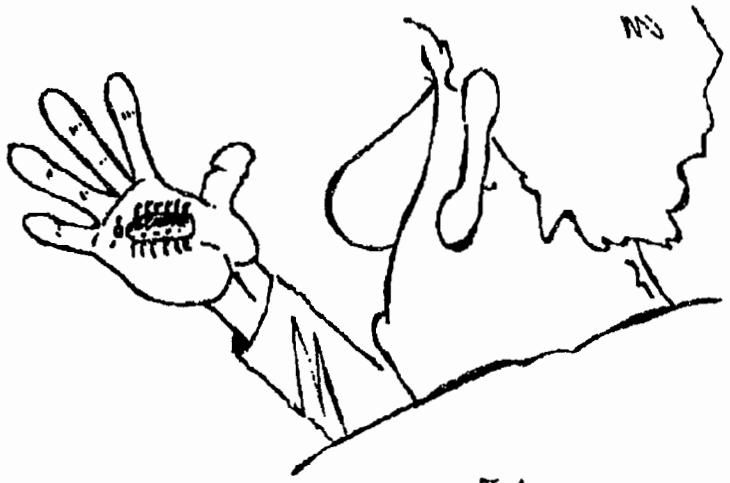
Children ask questions daily about the world around them. We constantly hear "Why did that happen?" "Why does it work that way?" and "What will happen if...?" It is unrealistic to think that we should be able to answer all their questions. Yet we want our children to ask questions and to be curious. The way we handle questions can influence whether or not children continue to ask about the things around them. At times we need patience, but mostly we need to be honest in saying "I don't know," or "Let's find out together—maybe later, at a more convenient time." Here are a couple of suggestions for handling persistent questions:

- Help your children learn to seek answers to their own questions. Instead of giving a verbal answer, suggest an activity that might help your children discover what it is they want to know.



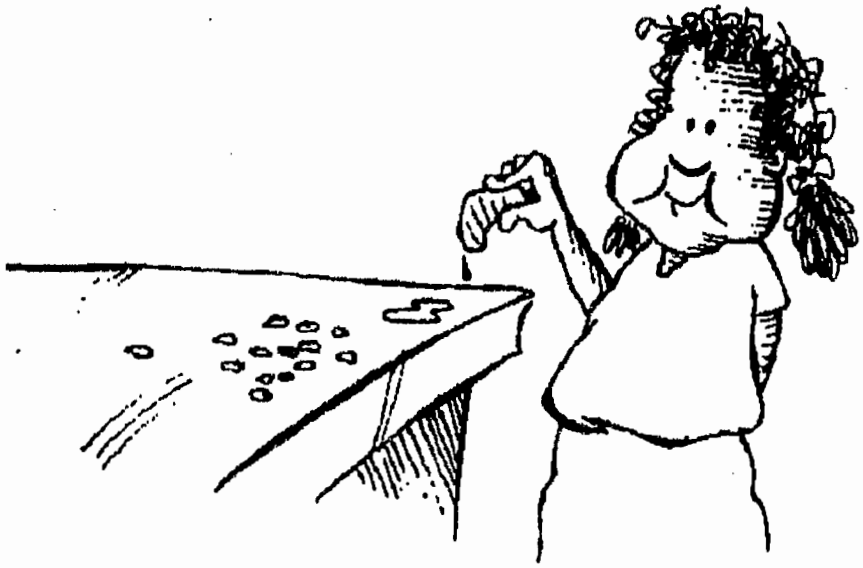
- To discover new things, encourage your children to use their own senses, like hearing, listening, tasting, touching, and smelling. Instead of telling your child how many legs a ladybug has, ask your child to take a closer look. "How many legs do you see on that ladybug?"
- Ask questions that lead children to answer some of their own questions. Good questions include "I wonder where we could find out more about that?" or "What do you think?" or "How can we solve this problem?"
- Show children sources of information, such as encyclopedias, *Child Craft* books, and magazines that can help them learn more about the things that interest them.

Questioning at home should not be directed solely by the need to train future scientists and engineers (although we actually may be doing this). Rather, it is an attempt in this complex world to equip children with basic survival skills. It is simply helping them figure things out on their own, to discover how to learn independently.



Activities for Science Learning

Your house is filled with everyday things you can use to help your child understand science. We have listed a month full of suggestions for some science activities you can do at home, and you don't have to purchase special kits or expensive equipment. Look at the calendar on the following pages and you will see that the activity for January 16 requires fresh fruit that your children can eat when they are finished with the activity. And on the 25th your child will draw a second picture of the moon to compare to the picture drawn on the 4th. Try this month full of activities and have fun.



Monday	Tuesday	Wednesday	Thursday
	1	2	3
	Obtain a discarded Christmas tree. Cut a piece of the end off and count the rings. The number of rings will tell you the tree's age. Recycle the tree by placing it in a yard as shelter for birds or by burying it in a forest to speed the tree's decomposition. 		
7	8	9	10
There is a saying that the colder the temperature is, the smaller the snowflakes will be. Find out if this is true by checking the size of the snowflakes and the temperature each day for a week and compare them. (Hint: A good way to look at snowflakes is to catch them on black construction paper.)			
Place two toothpicks in the middle of a sweet potato on opposite sides. Balance the toothpicks on the rim of a jar full of water. What will happen? 14	Find objects in your house that are different textures. Can you find five smooth things? Five rough things? 15	Buy fresh fruit that has seeds. Grapes, apples, or oranges work well. Guess how many seeds will be in each. Are they the same? 16	Look at the stars. Do you see any shapes or patterns made by them? Look for stars in this pattern. It's the Big Dipper.  17
21	22	23	24
Pour two teaspoons of water into a plastic bag that will seal securely. Blow air into the bag and seal it. Tape the bag to a window that is in a sunny location. What happens in a few days? (The water in the bottom represents a pond, the fog on the sides show how clouds form, and the drops represent rain.)			
28 Cut out pictures of different animals from old magazines. Sort the animal cards by size or color or where the animals live. Make up your own groups. 	29	Take a look at your favorite cereal. How much sugar is in it? Look for sugar, corn syrup, honey, and fructose. 30	Look at the sweet potato: how has it changed?  31

Friday	Saturday	Sunday
Draw a picture of the moon. (Save the picture for later.) 4 	5	6
Read and discuss *The Lorax*, by Dr. Seuss. Copies should be available at your local school or public library. 11	12 	13
Go to the library and watch a video. Ask for *National Geographic* videos about different animals or regions of the world. 18	19	20
Draw a picture of what the moon looks like tonight and compare it to the first picture you drew. How are the pictures different? Why? 25	26 	27

Take a walk or a ride through your community. Look for signs of pollution. Discuss them and how they occurred. Think of ways your family can help clean up and recycle in your area.

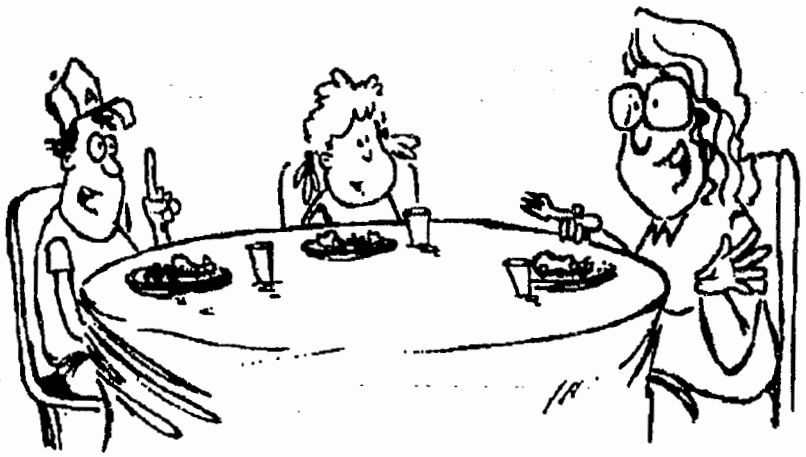
Check out a book from your local library about birds found in your area. Set up a birdfeeder by your window or go to a park that has one. Watch the feeder and when you spot a bird, look it up in your book and read about it.

Bert and the Science Fair

Joyce Martinez, a Chapter I director in Portage, Indiana, sent us this story about Bert's excitement for science.

Bert babbled into his mom's ear all the way home from the babysitter's house about the school science fair. He wanted to build a papier-mâché and clay volcano on the kitchen table and make it erupt by using vinegar, baking soda, and red food coloring. "What a mess!" Mom thought, as she pictured the kitchen floor covered with drops of glue and paint spatters. She wondered where they would eat dinner while Bert worked on the project, knowing it would take him days to construct the volcano. Before the vision of clutter in her kitchen could vanish, Bert started explaining the rules to her: "We have a month to do our project, but we have to turn in an entry form next week. We set up our projects in the gym on a Saturday morning for judging, then come back that night to show them off. Won't that be great!"

Mom shook her head. She was thrilled that Bert was actually excited about school, but how would she come up with the extra money to buy the volcano supplies when the car insurance payment was due? And since she worked all week, Saturday was the only day she had to do laundry and clean the house. Raising two kids by herself was never easy, but it always was more difficult when time and money were involved. There never seemed to be enough of either to go around. "I don't know, Bert. We'll see," was all she said.



As they ate dinner that evening, Bert and his little sister, Anna, chattered on about the volcano. It was the first time in a long time that Bert had been excited about school. Usually he talked about lunch and recess and ignored the rest of the day. Mom listened to them, sighed, and gave in. "Well, Bert, I guess that if you help me get the laundry done on Friday, we can squeeze in some time for this science fair. But you'll have to come up with a project that won't cost any money. I just don't have any extra to

spend. What are you interested in, besides messy, expensive models? You could grow mold, you know. That doesn't cost anything. There's probably some in the back of the refrigerator."

They all laughed. Bert and Mom and even Anna started to rattle off idea after idea to come up with a science project that wouldn't cost anything. "What things float? What grows mold? Which paper towel is best? Why does ice melt?"

"That's it," Bert shouted. "Why does ice melt? Could I keep it from melting? What do you think would work? We could try lots of things. What do you call it when you try and keep thing cold?"

The next few weeks were exactly as Mom knew they would be. They went to the library and read all about insulation. They rummaged through the cupboards and found 12 empty butter tubs with lids. Bert filled each one with something different: sand,

shredded paper, aluminum foil, cotton balls, and anything else he could find around the house. They all made guesses about which material would best keep the ice from melting For the official experiment, the whole family sat at the kitchen table with Bert's alarm clock, peeking inside each tub every minute. At 10:00 that night, Bert sleepily handed the record sheet to Mom, and stumbled off to bed. And there Mom sat, folding laundry, and timing an ice cube melting in a tub full of newspaper.

It's not really important whether or not Bert won the Science Fair. (He did, and won 2nd place at the regional science fair, too.) What is important, though, is that Bert's family learned that "hands-on" activities are great motivators, that the home is one of the best environments for learning, that science is all around us, and that sometimes you have to put off doing the laundry for a day!

Books for Parents and Children

On the following pages you will find a list of books for parents and children. The books are divided into different categories to aid your selection. Under *Books for Parents*, you will find books that will help you explore the world of science with your children.

Books to Read Together lists books that parents can read to their children. Those books and *Books for Children to Read by Themselves* have been divided according to age groups. The divisions are only general guidelines. You should be able to find these books in your local public library or at most bookstores.

Books for Parents

Nature for the Very Young: A Handbook of Indoor and Outdoor Activities by Marcia Bowden. Ideas for parents to help their younger children learn about and have fun with nature. Seasons, animals, plants, habitats, and different phenomena of nature are the basis for the activities in this book.

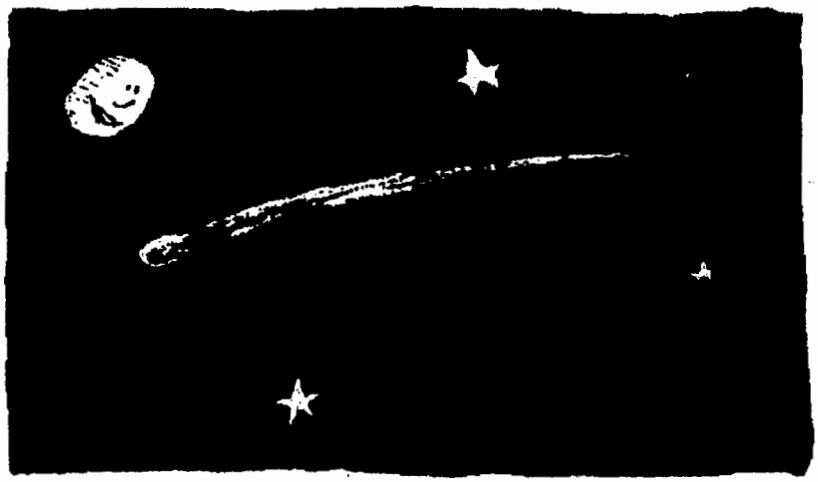
175 Science Experiments to Amuse and Amaze Your Friends by Brenda Walpole. Shows experiments parents can do with their children, gives examples of tricks that explain scientific theories, and illustrates things you and your child can make together. Some topics are light, color, sight, balance, air, wind, weather, water, gravity, sound, and motion.

Young Peacemakers Project Book by Kathleen Fry-Miller and Judith Myers-Walls. Gives guidelines for projects that help care for the environment and promote peace. Topics for the environmental projects are nature, art, outdoor adventure, birds, litterbugs, garbage, clean air and water, energy conservation, and recycling. Ways to understand people and get along better with others are also covered in the book.

Books to Read Together

Ages 4-6

Shooting Stars by Franklyn M. Branley. Explains what a falling star is, its origin, what it is made of, and what happens when it lands on the earth or the moon.



Rain and Hail by Franklyn M. Branley. Presents the water cycle that provides our earth with rain. Explains vapor condensation so that children can understand what makes rain and hail.

Things That Go by Seymour Reit. Each letter of the alphabet is shown in upper and lower case, along with a word for a vehicle that begins with that letter. Each vehicle is illustrated and described.

Ages 6-8

Why I Cough, Sneeze, Shiver, Hiccup, & Yawn by Melvin Berger. Introduces the body's nervous system, including the spinal cord, brain, and nerves. Shows how reflexes happen and how they work through the nervous system.

The Berenstain Bears' Science Fair by Stan and Jan Berenstain. The bears are having a science fair and are going to learn about machines, matter, and energy. They show how to do some science projects and experiments.

Desert Life by Ruth Kirk. Describes temperature, weather, animal and plant life, location, and landscape of a desert. Large illustrations accompany each topic.

Ages 8-10

How to Do a Science Project by David Webster. Gives suggestions for reporting, demonstrating, and researching science projects. Lists how-to steps for performing a successful project.

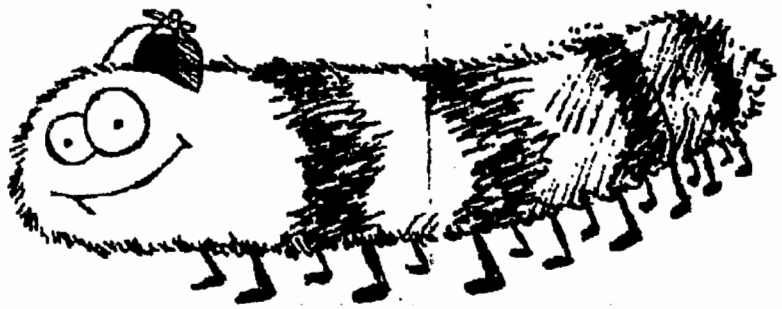
The Sunlit Sea by Augusta Goldin. An introduction to the underwater world. Describes marine plants and animals and shows how they depend on one another.

Tut's Mummy: Lost and Found by Judy Donnelly. Depicts the burial of Pharaoh Tutankhamen. Recounts the discovery of his tomb and many treasures by archaeologists. Illustrated by photographs and drawings.

Books for Children to Read by Themselves

Ages 4-6

The Caterpillar Who Turned into a Butterfly (A Chubby Board Book). Shows, in simple terms, with colorful illustrations, how a caterpillar changes into a butterfly. Pages are thick and easy for young children to turn by themselves.



Do You Want to Be My Friend? by Eric Carle. A lonely little mouse is looking for a friend. He meets a horse, alligator, lion, peacock, monkey, fox, and several other animals before finding a fellow mouse.

The Ear Book by Al Perkins. Shows what a dog and his friend can hear with their ears. They listen to people and animals, things indoors and outdoors, and even food!

Ages 6-8

Eclipse by Franklyn M. Branley. Explains what a solar eclipse is and how it happens. Shows how to safely watch an eclipse, and gives examples of stories people used long ago to explain this rare event.

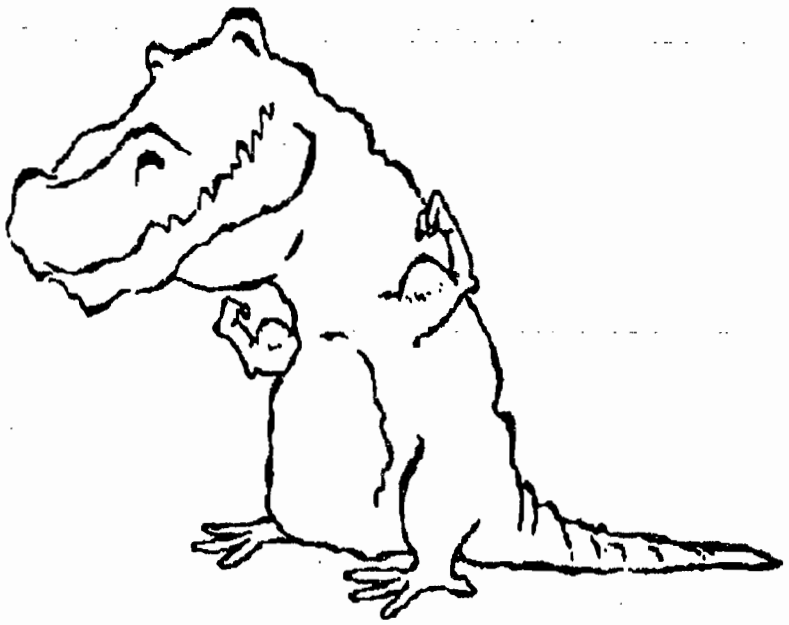
Down Come the Leaves by Henrietta Bancroft. Shows why leaves fall in autumn, what their role is for the tree, and how buds develop into new leaves in the spring. Gives examples of different kinds of trees and their leaves.

Fossils Tell of Long Ago by Aliki. Tells what a fossil is, the different ways in which fossils can be made, and how to make one-minute-old fossils.

Ages 8-10

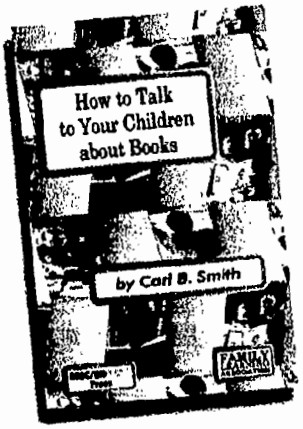
Junior Science Book of Water Experiments by Rocco V. Fervolo. Discusses what water is, how it seeks its own level, and how water pressure and water power work. Gives examples of water experiments kids can do at home.

How Big is a Brachiosaurus? by Susan Carroll. Suggests possible answers to questions about dinosaurs. Illustrations show what dinosaurs might have looked like. Gives information about dinosaur fossils that have been found.



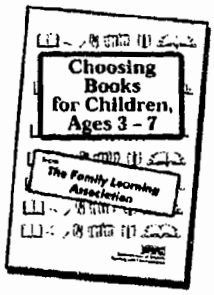
Science Club Super Motion by Philip Watson. Most of the happenings on earth involve motion of some kind. By trying some of the experiments in this book, children can get a better idea of motion, vibrations, balance, and natural rhythm.

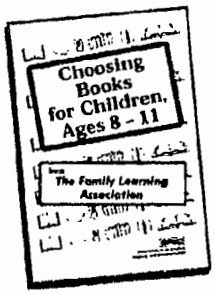
If you found this book useful, please try these other helpful books !



How to Talk to Your Children about Books *by Carl B. Smith*
Start a conversation that will last a lifetime. This book teaches you five easy techniques to prompt book discussions, guidelines for selecting books, how to make it a two-way exchange, plus motivation, values, and making it fun!

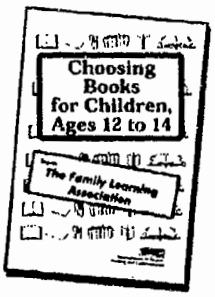
Choosing Books for Children, Ages 3 to 7
Use this resource to appeal to a variety of interests in your kindergarten to primary-age children. Filled with great tips for keeping book conversations going, this book pinpoints a vast array of age-appropriate reading materials.





Choosing Books for Children, Ages 8 to 11
Quick summaries of a huge collection of titles will make it easy to provide good reading for your pre-teens. Top-notch authors, relevant themes, and sensitive issues make this a good companion at the library or bookstore.

Choosing Books for Children, Ages 12 to 14
Let literature open up discussion about some of the difficult issues your teen is experiencing. Includes a special section on communicating about books though writing and journaling.



For information about these and other helpful books
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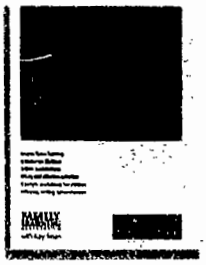
Other Resources Available



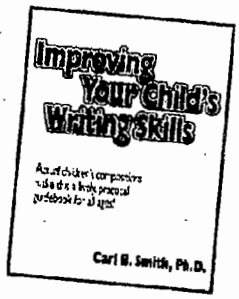
Tutoring Children in Reading and Writing

Book 1: Kindergarten
Book 2: Grades 1-2

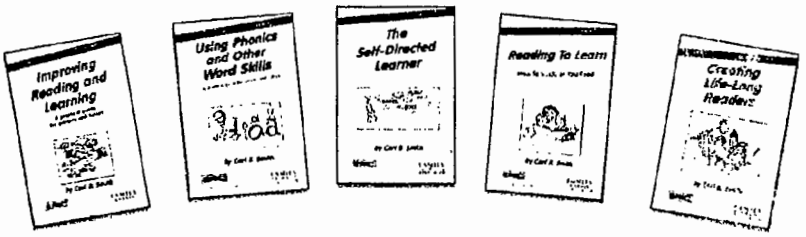
These guidebooks use a hands-on approach to helping children improve essential skills. Using easy and effective activities, they focus on the building blocks of reading and writing with sample worksheets that focus on letter recognition, spelling, phonics, and comprehension.

Improving Your Child's Writing Skills

Using actual children's compositions, this fun guidebook takes kids through the entire process of writing, from Pre-Writing and Drafting to Revising and Proofreading. The practical work sheets form a framework to hone the skills of any young writer.



Helping Children to Learn SERIES



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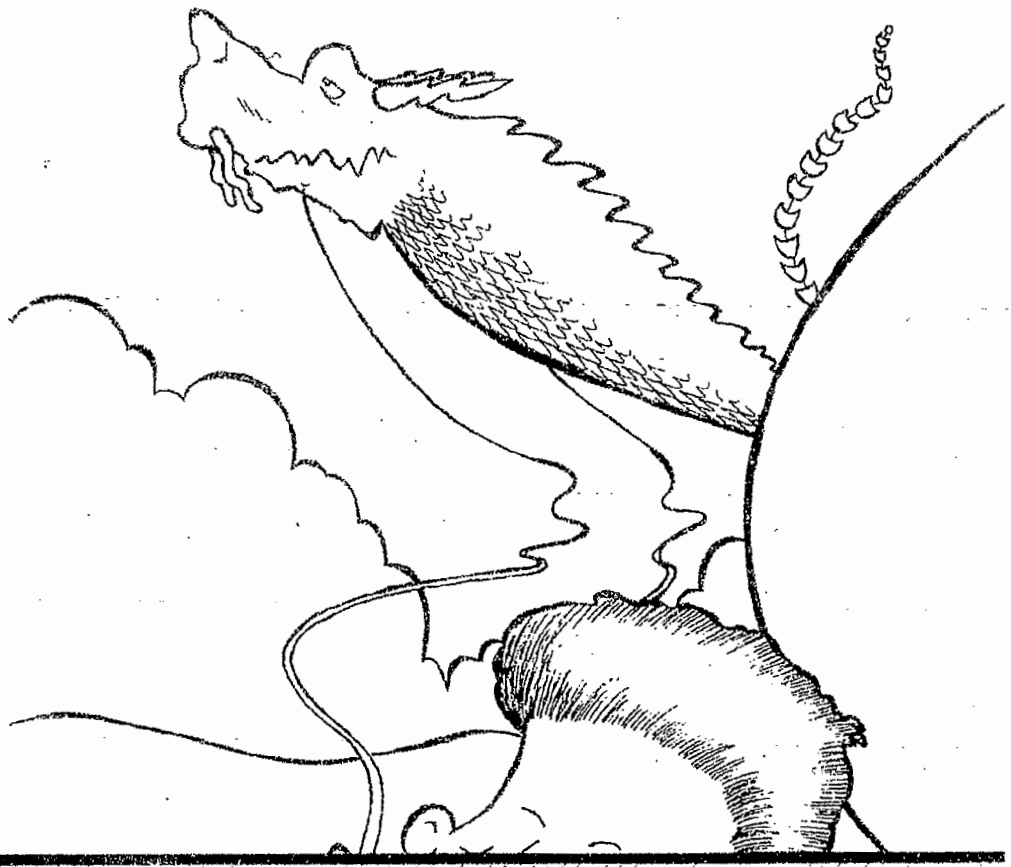

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