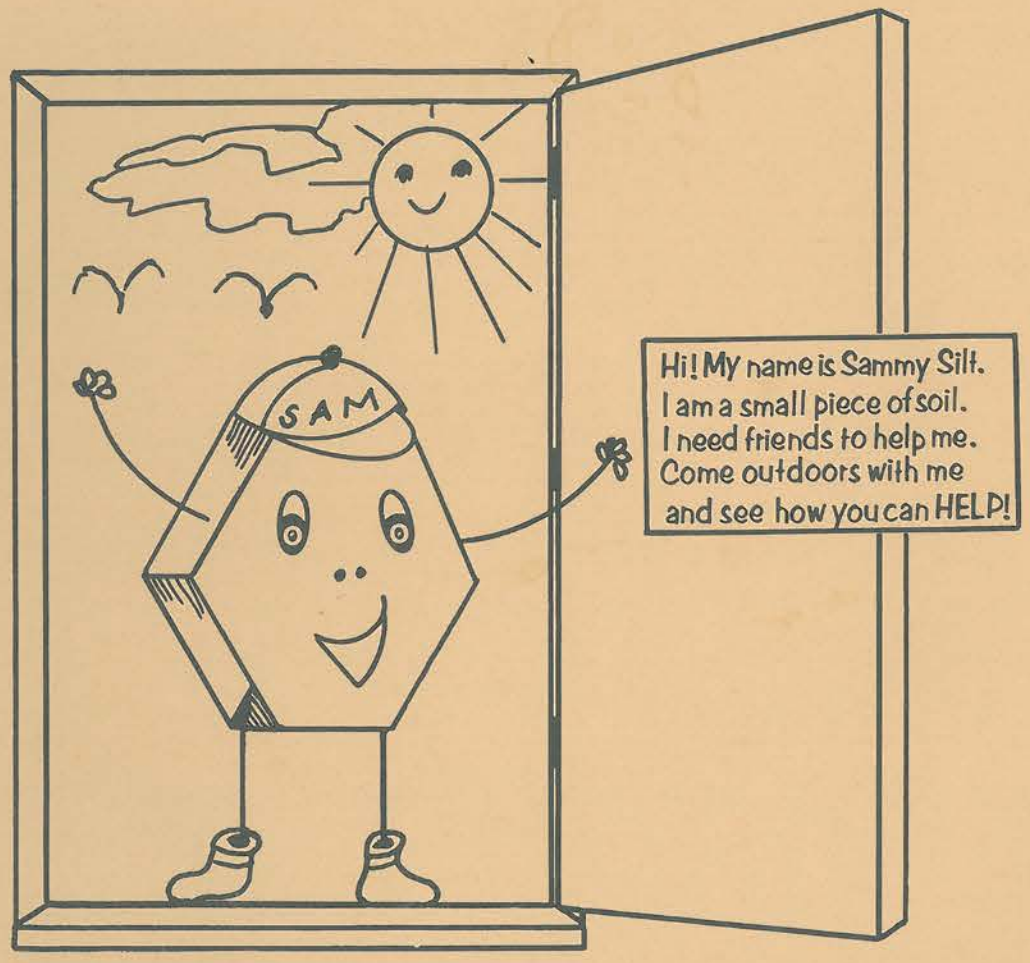
SOIL and WATER in NORTH CAROLINA



Activity Book for 4-H'er and Family

Dear 4-H Family,

This booklet is designed to encourage your 4-H'er to seek your help with soil and water activities.

We know you are the most important people in your child's life. We believe that helping with these activities will be a good way for kids and parents to get together.

Soil and Water are two of the most important natural resources in North Carolina. We are faced, however, with a huge soil erosion problem in this state. Every year, millions of tons of topsoil are washed off the land and into streams, creeks and rivers.

Soil Erosion causes, by far, the largest water pollution problem in North Carolina. The sediment in the water interferes with fish life, fills in reservoirs and increases the cost of drinking water. With loss of topsoil, crop yields are slashed and property values drop.

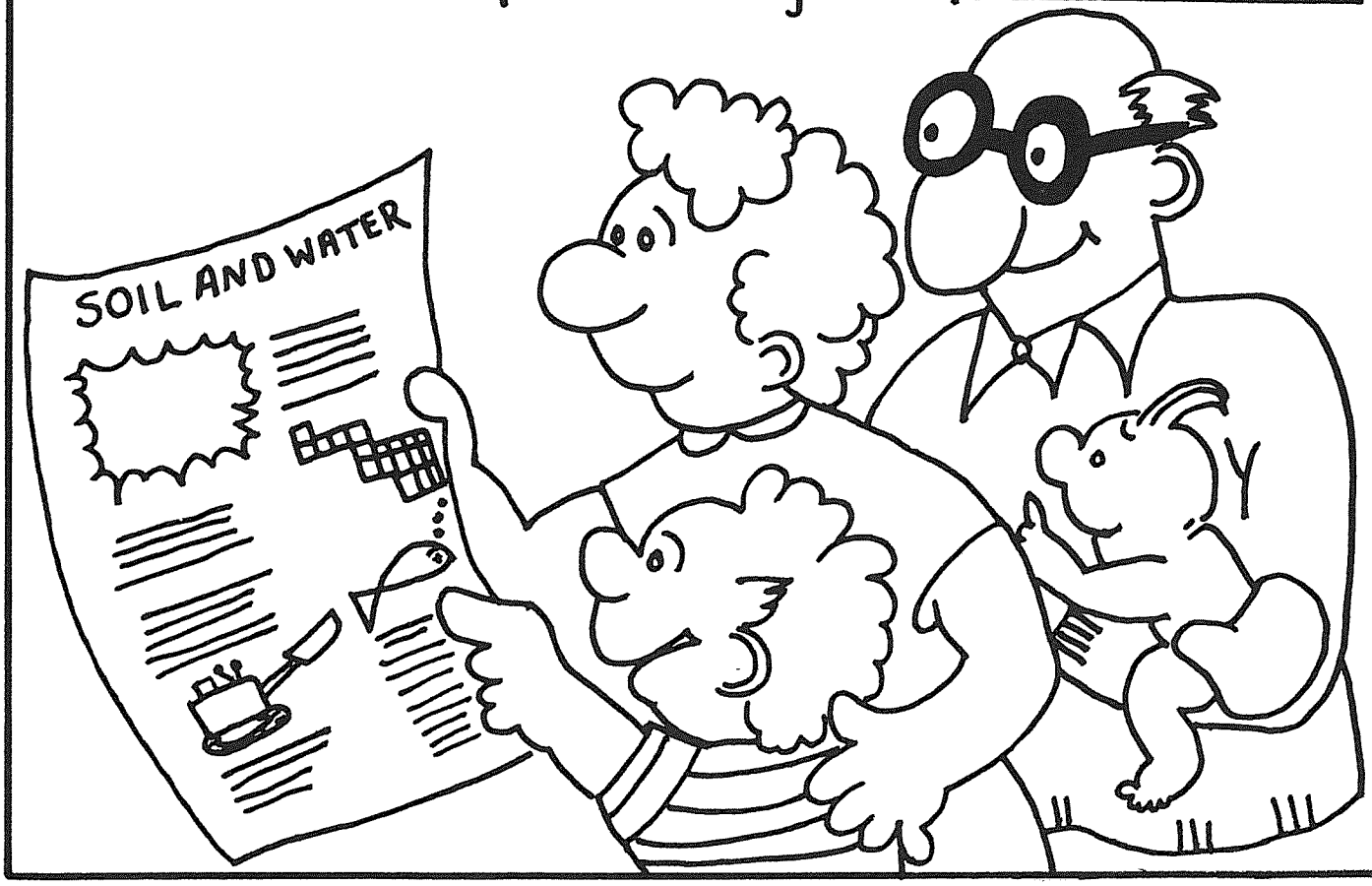
Everyone listens to reports of hazardous wastes polluting our water. It is difficult,

however, to get people to understand what an enormous problem soil erosion is for all of us. Meanwhile, the land is quietly leaving.

Just as importantly, once the beauty of our state is gone... it is gone for good. It helps little to tell our children 'how it used to be.'

We would like to challenge you as a family to learn about soil and water issues and what <u>can be done</u>. As you will see, one is never <u>too young</u> or <u>too old</u> to help take care of the environment.

I am glad _____ is learning about soil and water.
I would like to help. (Adult's signature) _____



Dear 4-H'er,

This booklet is yours because kids are special people. You have the energy and know how to get things done!

North Carolina needs your help. Our soil is washing away and polluting rivers and streams. You and your friends can do something about it.

In this project, you will get to learn about the following things:

What soil erosion does to water quality.

How muddy water affects you.

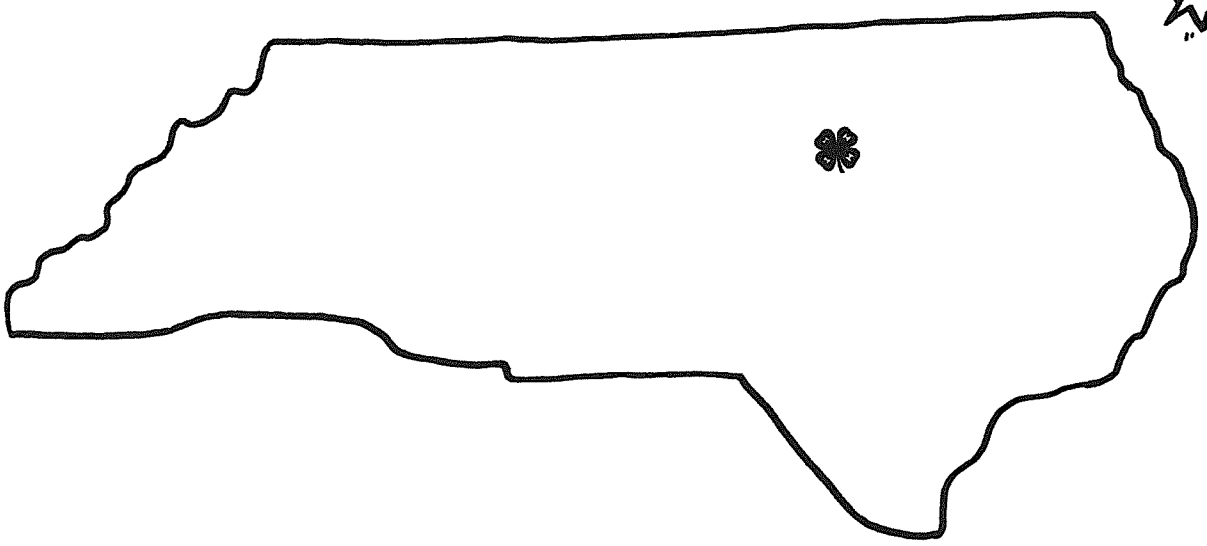
How to take care of soil and water.

I would like to learn about soil and water!

Signed _____ Date ____

We Live in North Carolina

It's a Great State!

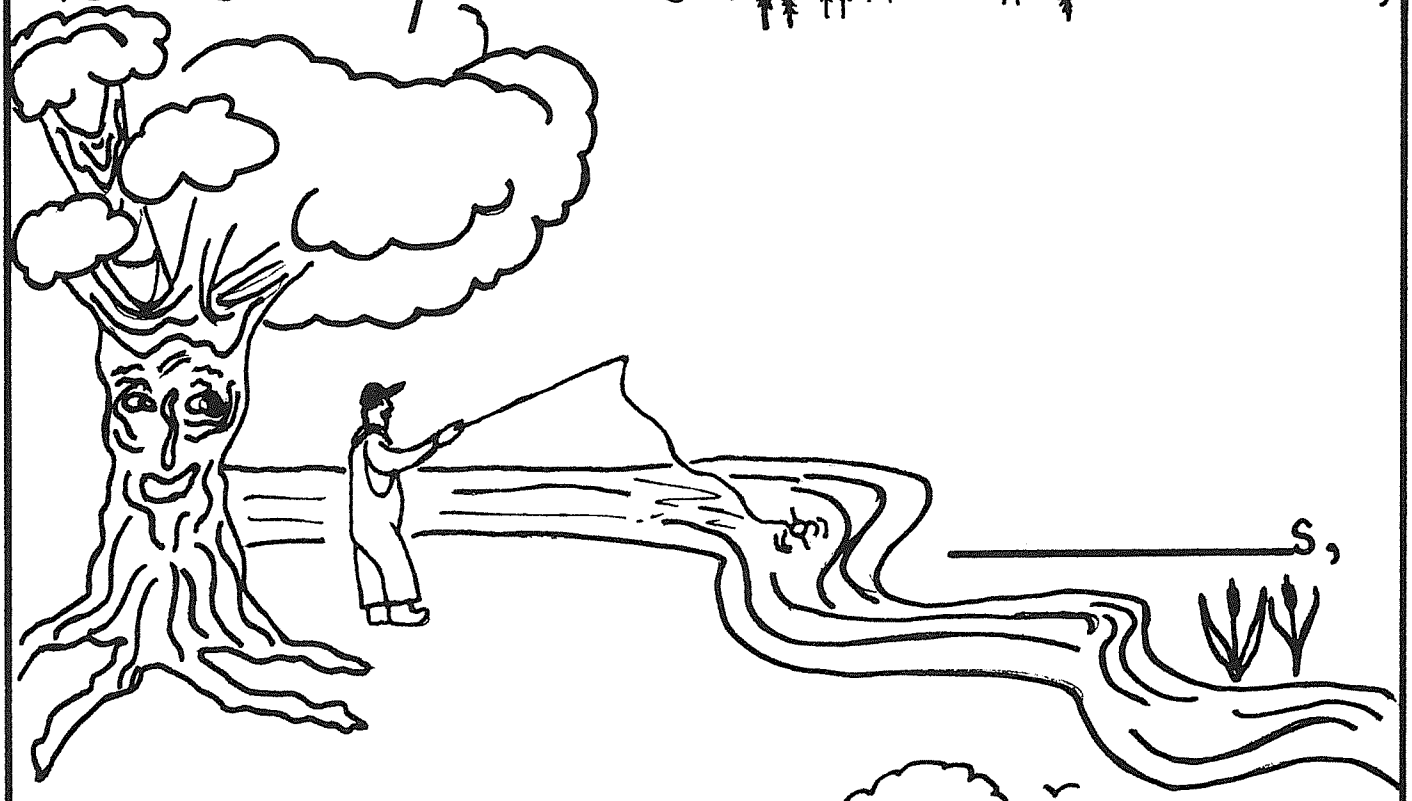


Put a star where you live in North Carolina.

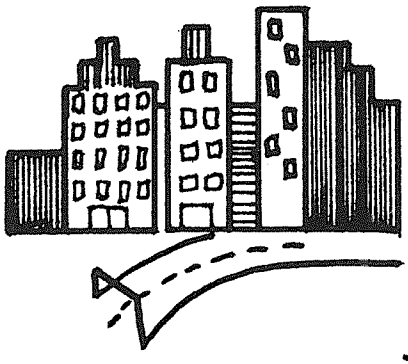
Draw in the river closest to your house.

Draw pictures of your favorite things to do and places to go in North Carolina.

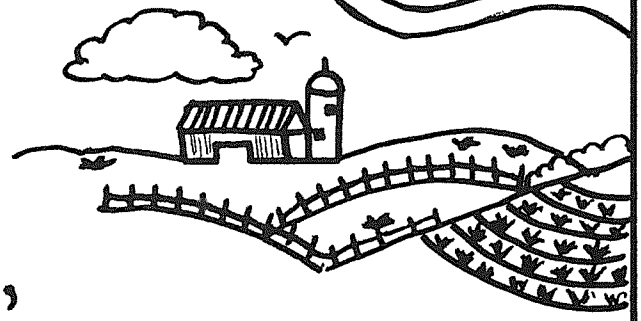
We are lucky to have  _____s,



_____s,



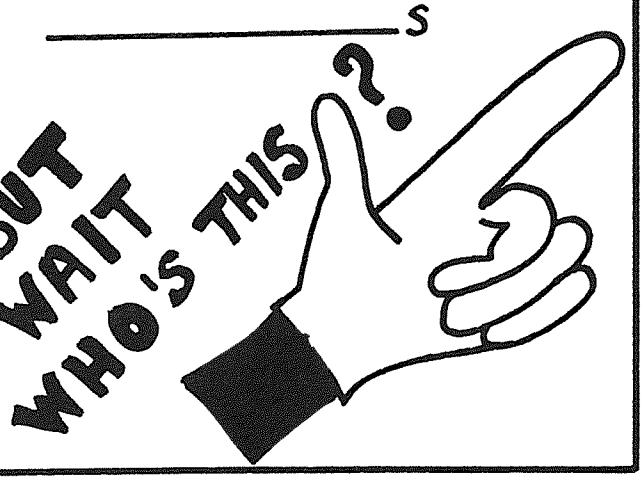
_____s,

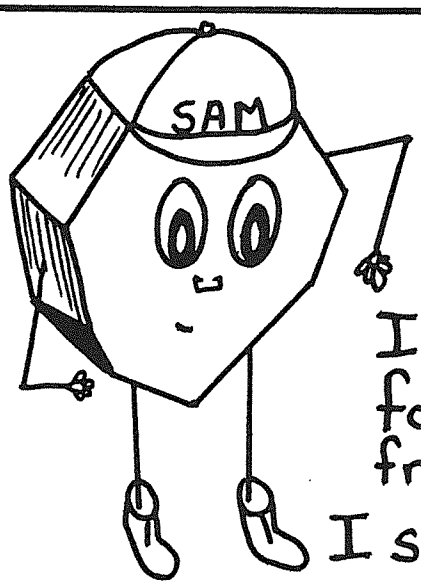


_____s,

and _____s

in North Carolina.

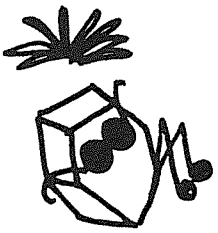




Hi! My name is Sammy Silt.
I am a small piece of soil.

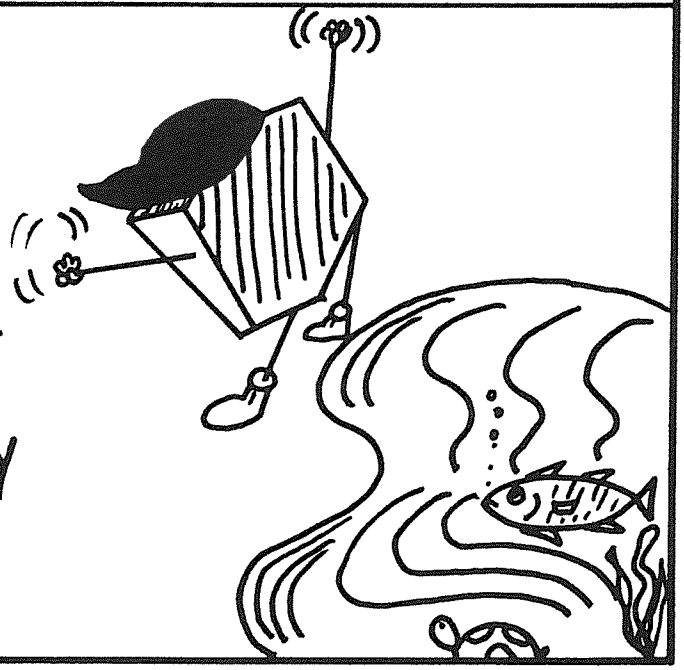
I am making big problems for you and your family and friends.
I sure don't mean to and don't want to....

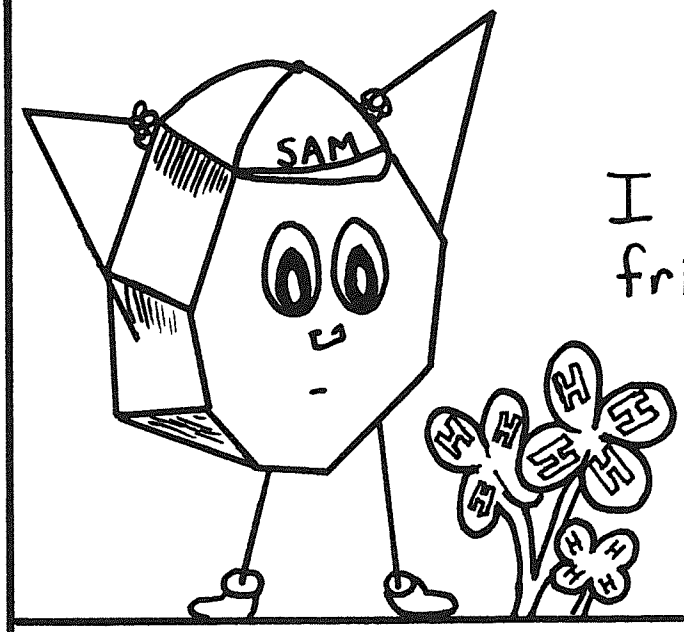
I'd rather be lying around taking it easy on the land.
Ya' know. Catch a few rays.
Grow some plants. That sort of thing.



But people keep pushing me around and then I end up where I don't belong.

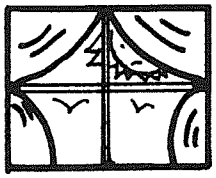
That's what this story is about.

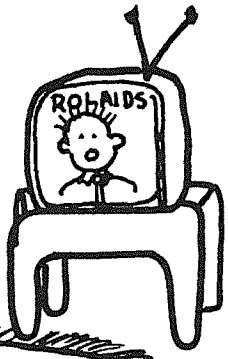


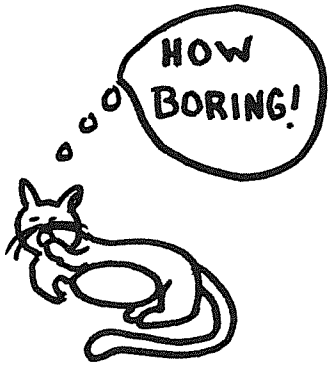


I really need some friends to help me.

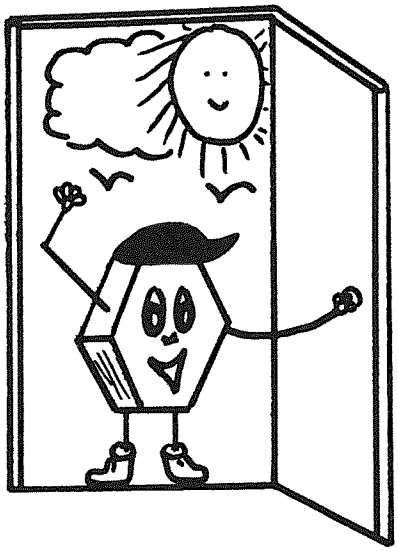
I know it is fun to watch T.V. after school.



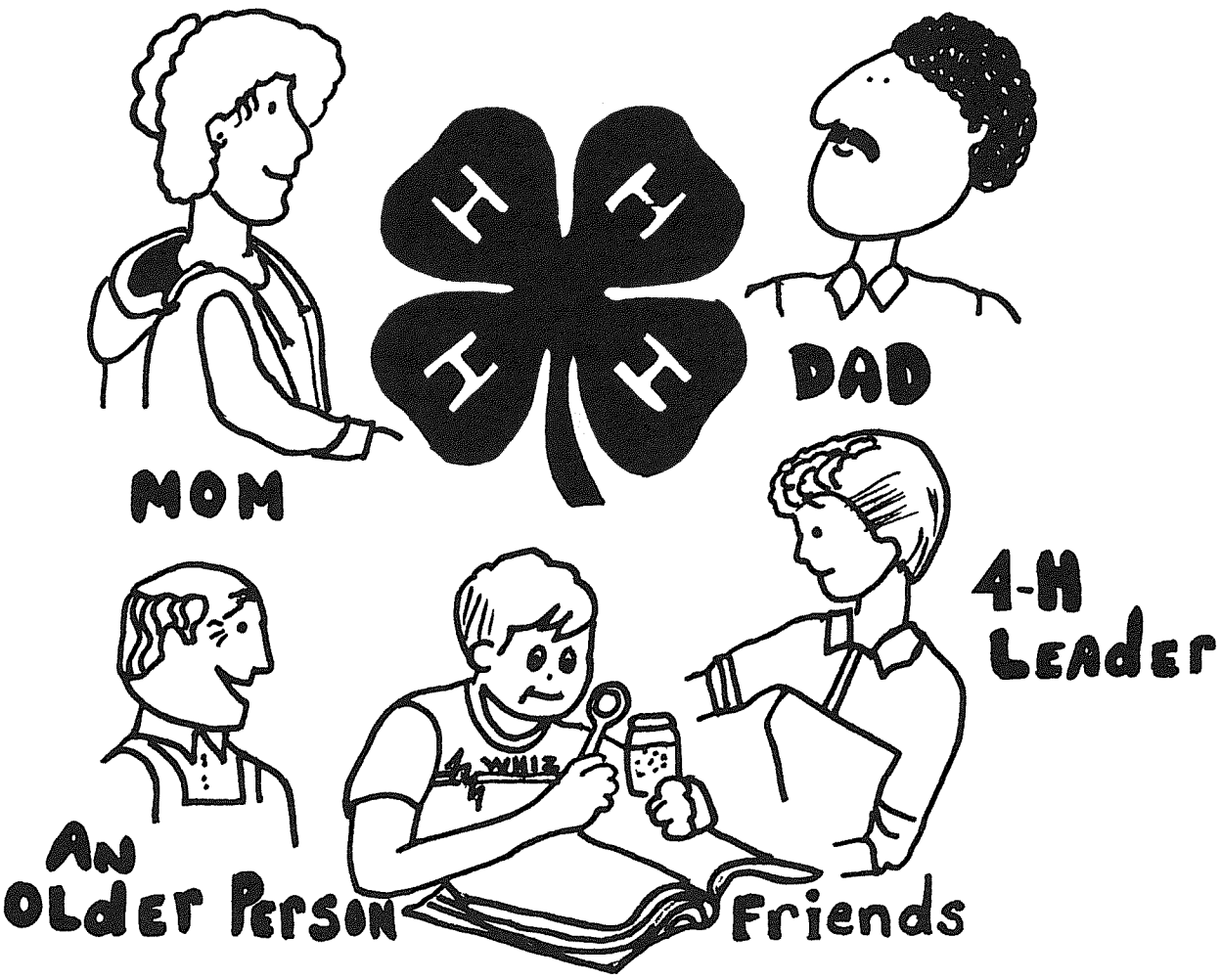




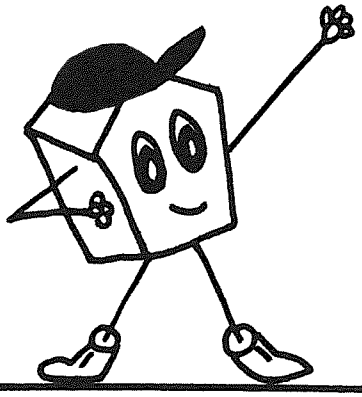
But would you come on an outdoor adventure with me and see how you can help?

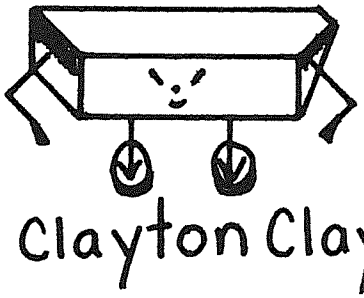


You may need a helper for some things we do. Your helper could be . . .

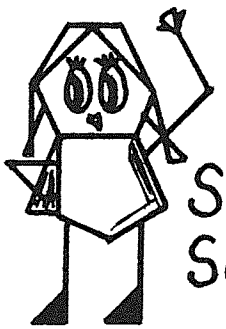


First, I would like you to meet my friends.

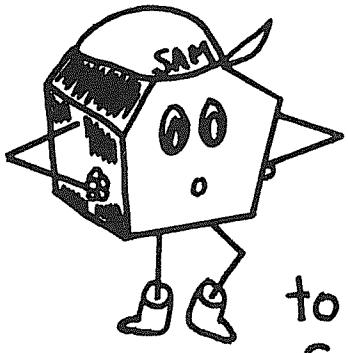




Clayton Clay

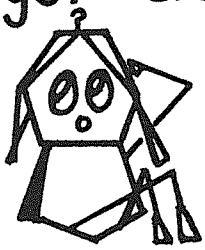


Sandra Sand



Sandra, Clayton and I are all soil particles.

It takes hundreds of years to build up just one inch of soil. So it took us a long time to get here.



DO YOU KNOW HOW SOIL IS MADE?

Soil is formed from rocks very slowly. Here are some of the ways nature does its job of making soil.

Glaciers. Glaciers are huge blocks of ice on land. During thousands of years, the glaciers moved over land and rubbed off vast amounts of rock particles. The rock particles became soil.

HEAT AND COLD. The  warms rocks during the day. This makes the rocks get bigger. At  night the rocks cool and get smaller. Small pieces of rock break off as the rock expands and shrinks. The small pieces of rock become soil.

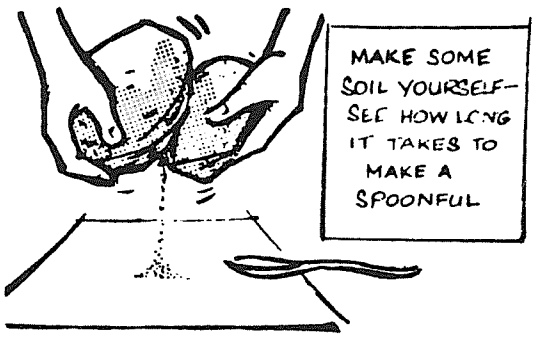
WIND. The wind breaks rocks into smaller pieces.

WATER. gets into small cracks in rocks. When the water freezes it expands and and breaks rocks into small pieces. Rocks also tumble into streams. The moving water rubs rocks and pebbles together. The rubbed off pieces become soil.

LIVING THINGS. When plants and animals die, they decay and turn into soil particles.

Try making a compost pile with your family. Use the soil you make on a garden.

YOU CAN MAKE SOIL!



Get two pieces of stone.
If you do not have natural stone, pieces of building brick or concrete will do.
Rub the stones together to make one teaspoonful of soil.

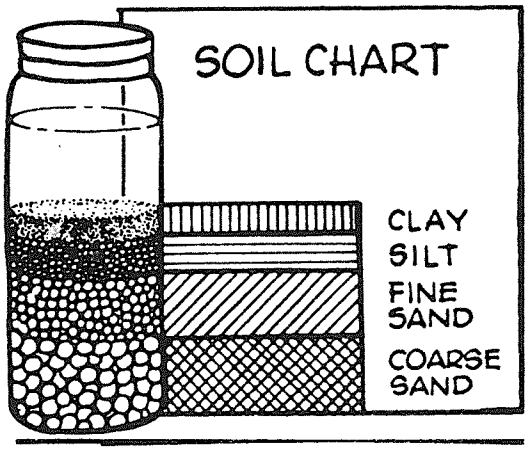
How long did it take?_____

Can You Find Clayton Clay, Sandra Sand, and Sammy Silt Near Your House?

TRY THIS!

Get some soil from a garden, flowerbed or field. Remove trash, rocks AND roots. Fill a tall glass jar two-thirds full with water. Pour in soil until the jar is almost full. Replace the lid and shake very hard. Then put the jar on a table and let the soil settle. Allow lots of time - at least 1 hour - because small particles are very slow to settle.

When the soil has settled, hold a piece of paper against the side of the jar and mark off the layers of soil.



Draw a picture and label each layer.

Try this in several jars with soils from different places.

Are the soils different?

Clay particles are the smallest type of soil. Clay causes soil to feel sticky.

Silt is material larger than clay and feels soft like flour.

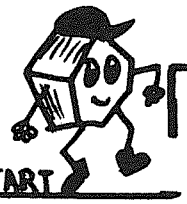
Sand is gritty and large enough so you can see each grain.

RUBBING SOIL BETWEEN FINGERS

Take some soil from your yard and rub it between your fingers. What kinds of soil do you feel in your sample?

LET'S FIND OUT HOW IMPORTANT SOILS ARE TO YOU!

Lead Sammy through the maze.

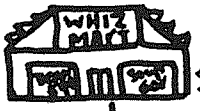


START

in Soil

We build our

homes



AND stores on Soil.

Paper and Other Wood Products come from

grown in Soil.

We mine Minerals like phosphate and crushed stone from beneath the Soil.

FINISH

TRY THIS!

Make a list of all the foods found in your kitchen including those in the refrigerator and freezer (Hey, keep out of those cookies!). Now divide them into three groups as follows:

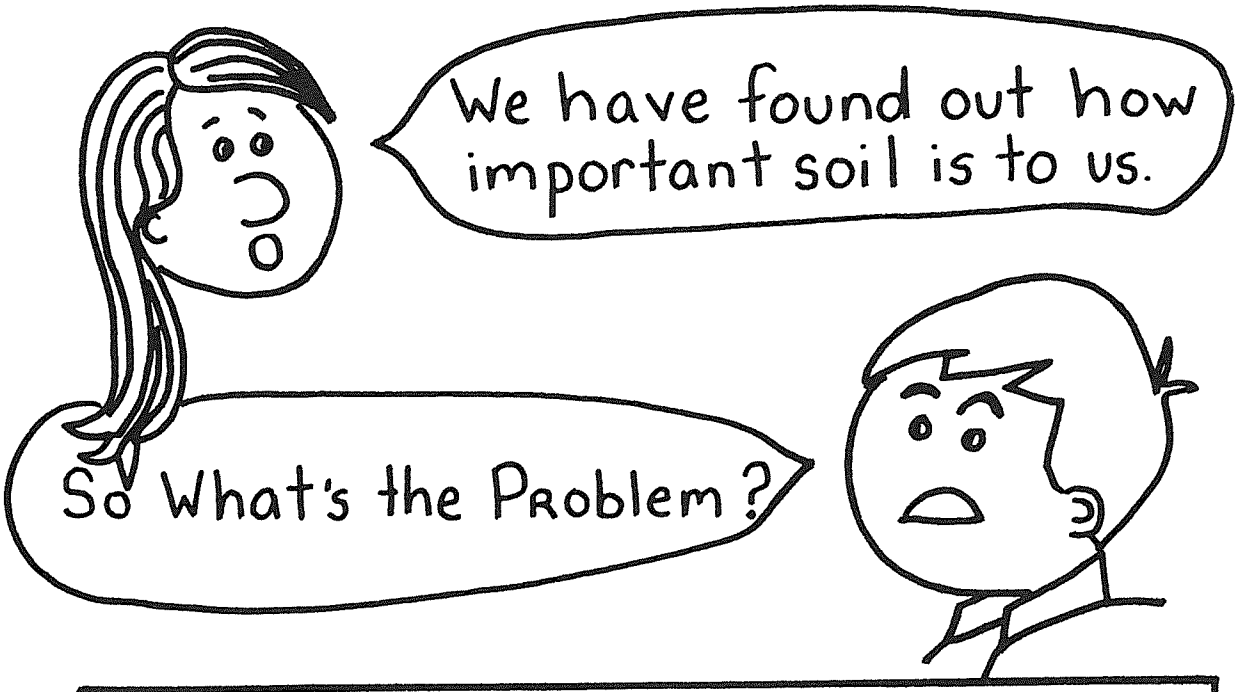
FOODS DIRECTLY FROM SOIL (LIKE APPLES, CARROTS AND POTATOES)

FOODS INDIRECTLY FROM THE SOIL (LIKE BREAD, MEAT AND CHEESE)

FOODS NOT FROM THE SOIL

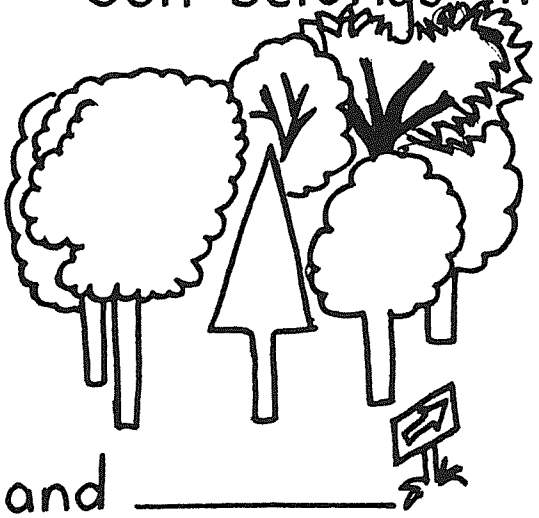
LOOK AROUND YOU!

List all the ways soil is used around your neighborhood. Try to come to your next 4-H meeting with a soil use nobody else could think of!



Soil is good to us only when it stays where it belongs.

Soil belongs in  _____



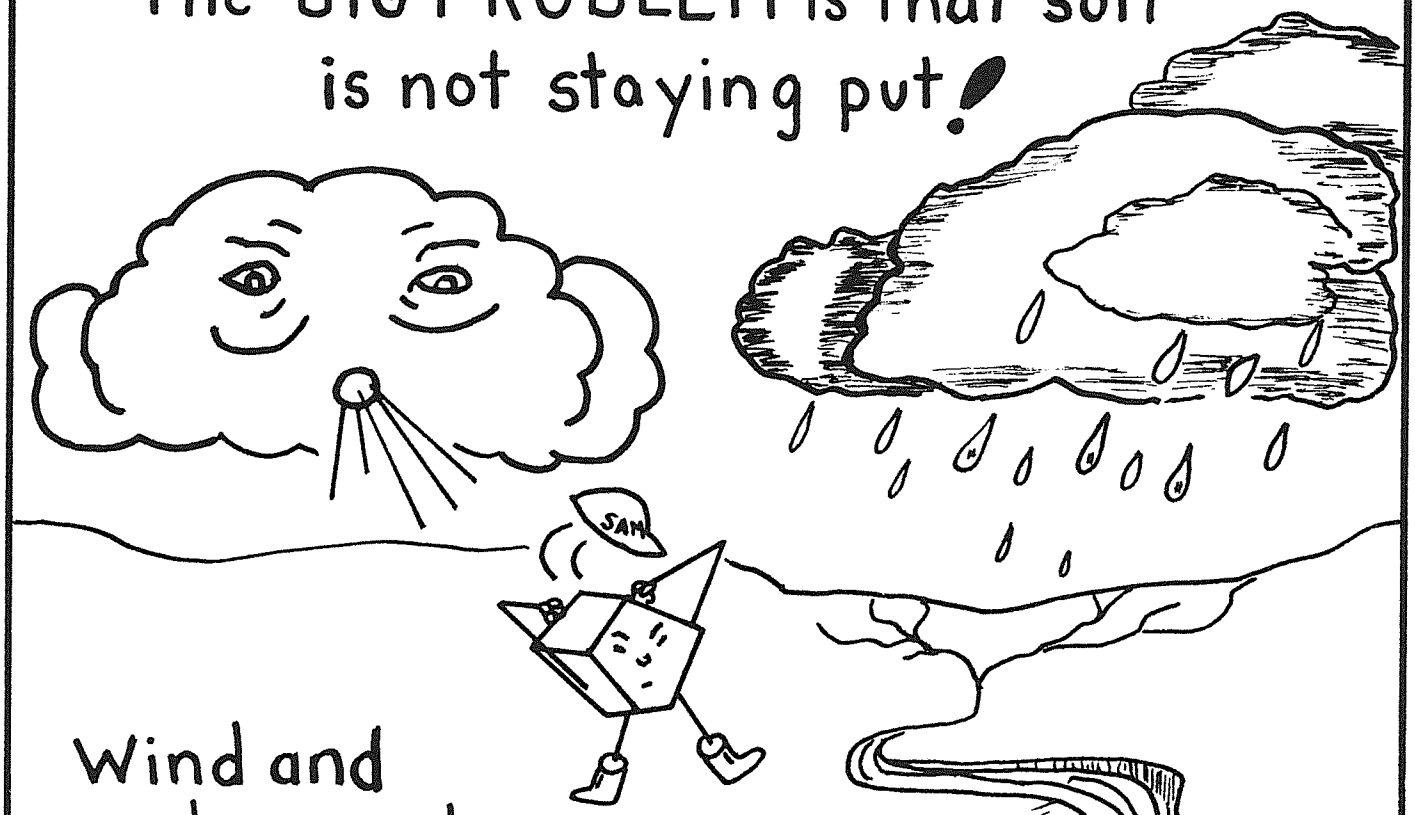
and _____

and under 

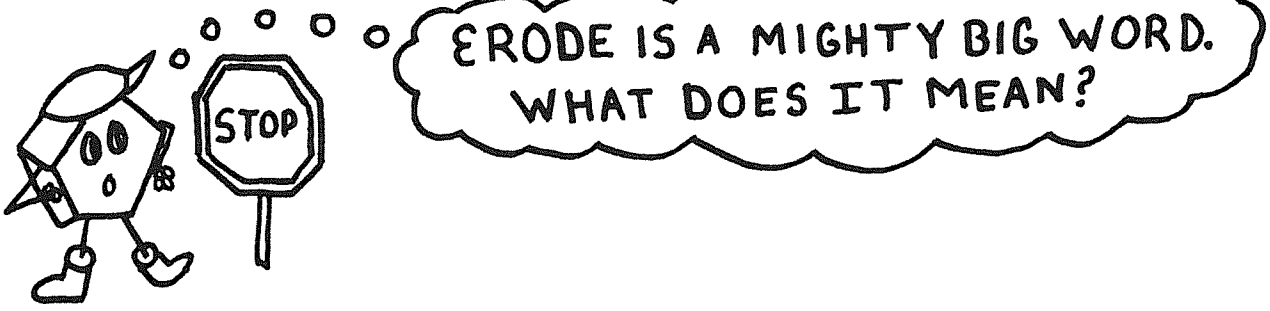
_____s

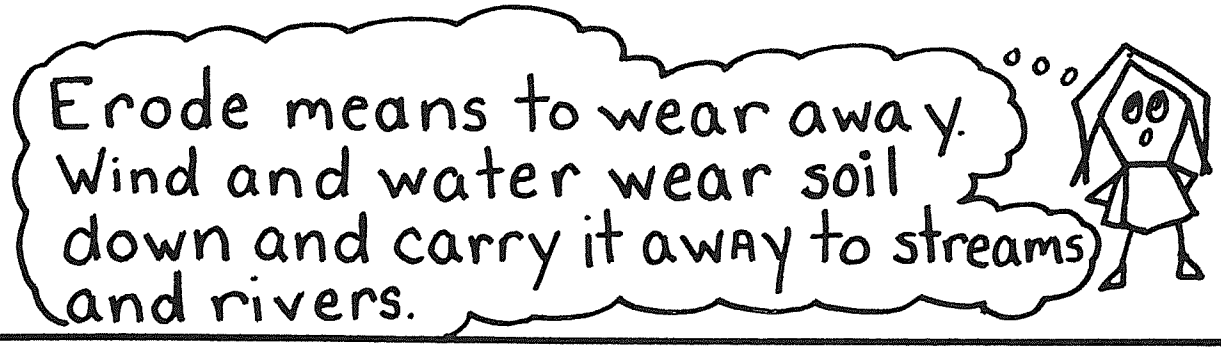
and _____s.

The BIG PROBLEM is that soil is not staying put!



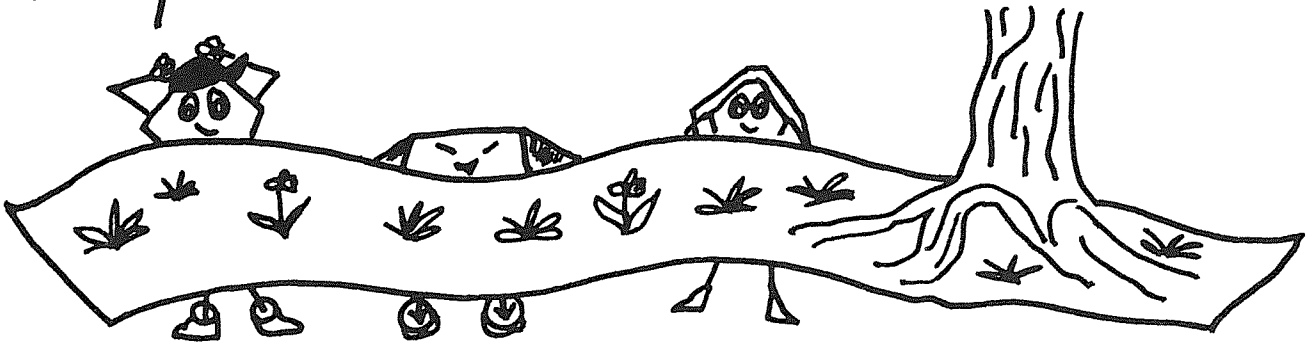
Wind and water erode soil and carry it away.



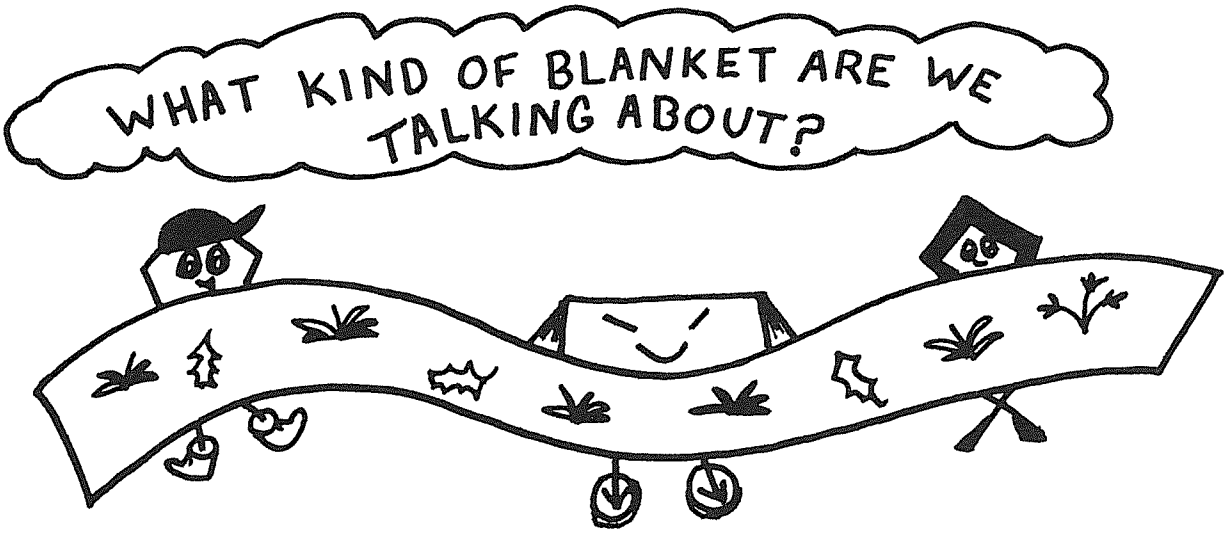


Soil erosion happens all the time in Nature.

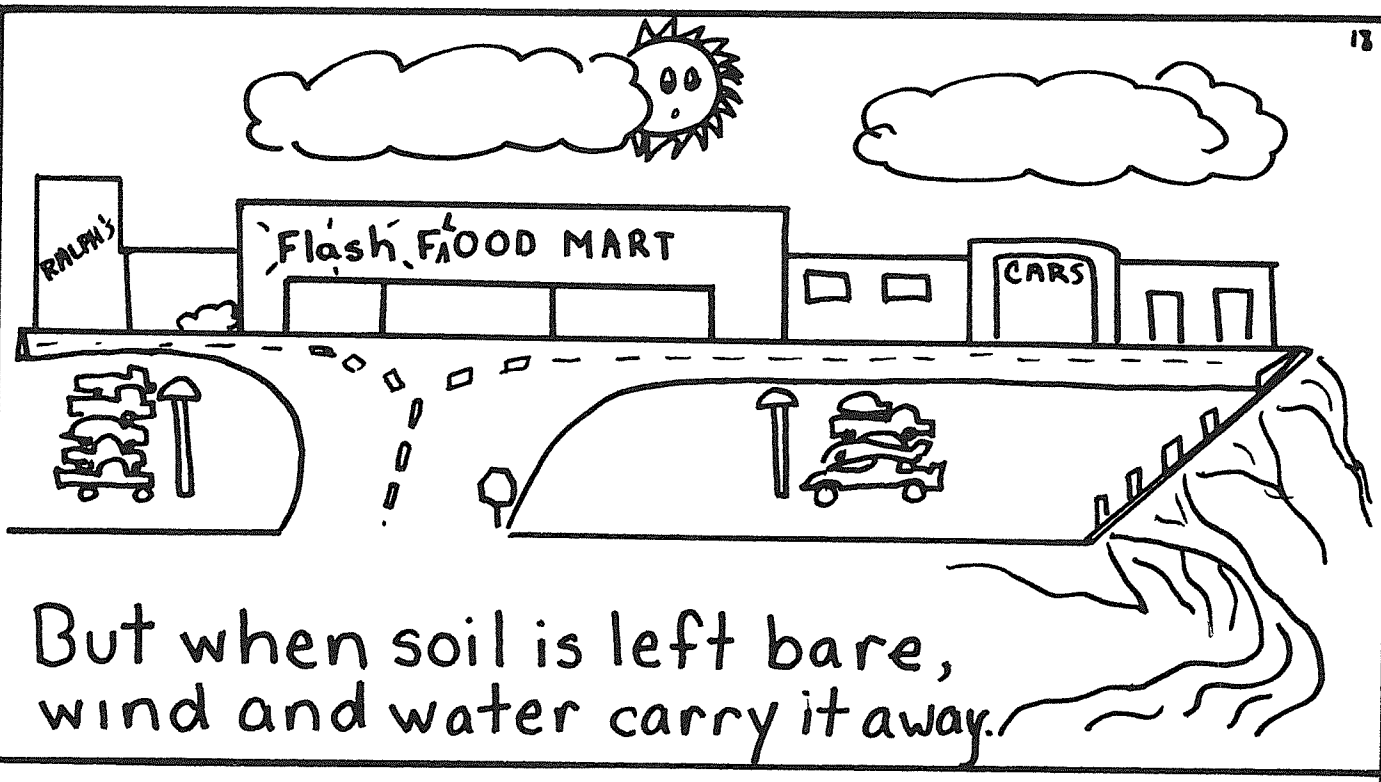
But people make erosion worse when they do not take care of the soil.



Soil stays where it belongs when it has a cover. It sounds funny that soil needs a blanket, but it is true.

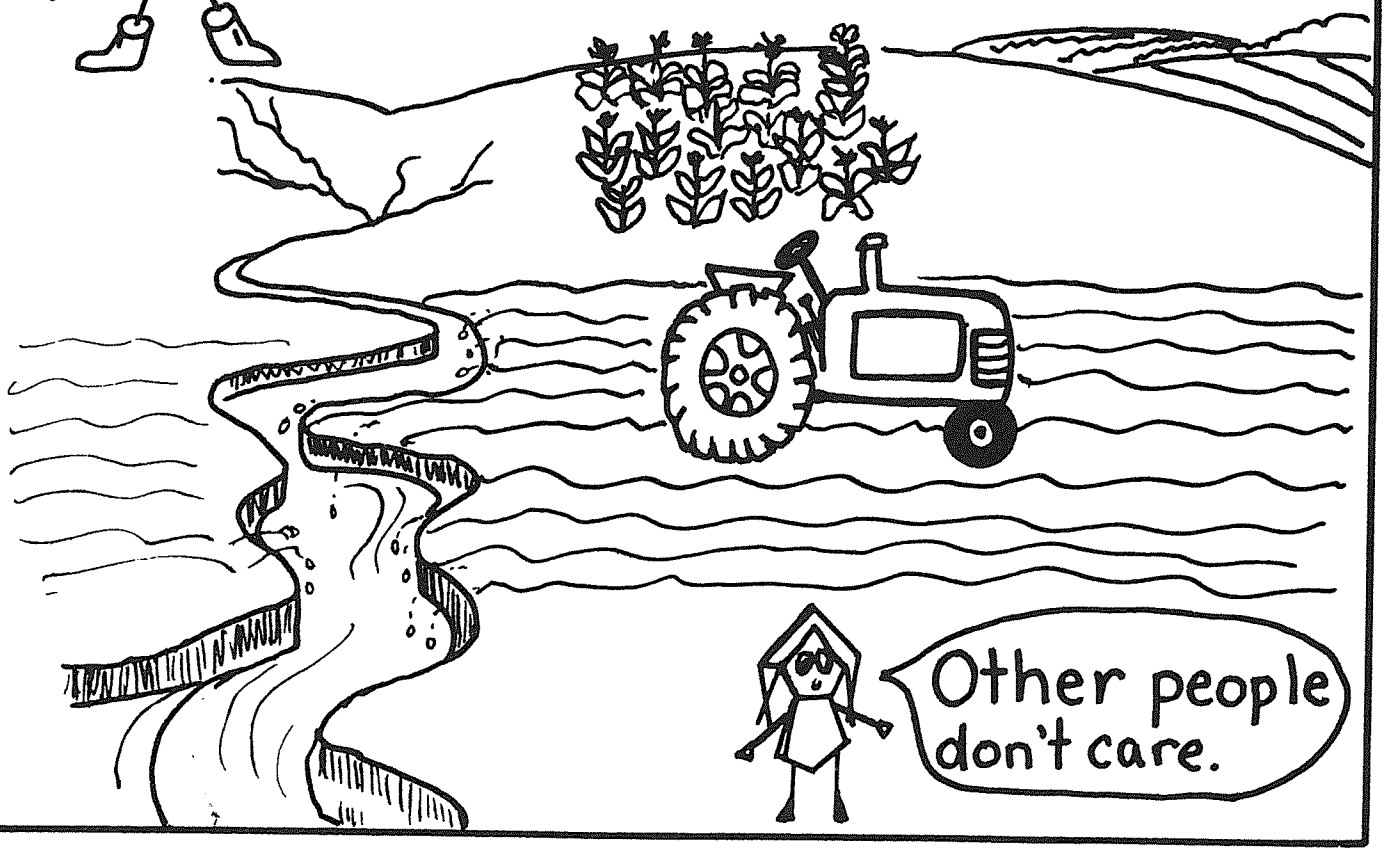


Grasses, old crops, leaves, stones and trees all make good blankets! Ground cover is another name for the protective blanket.

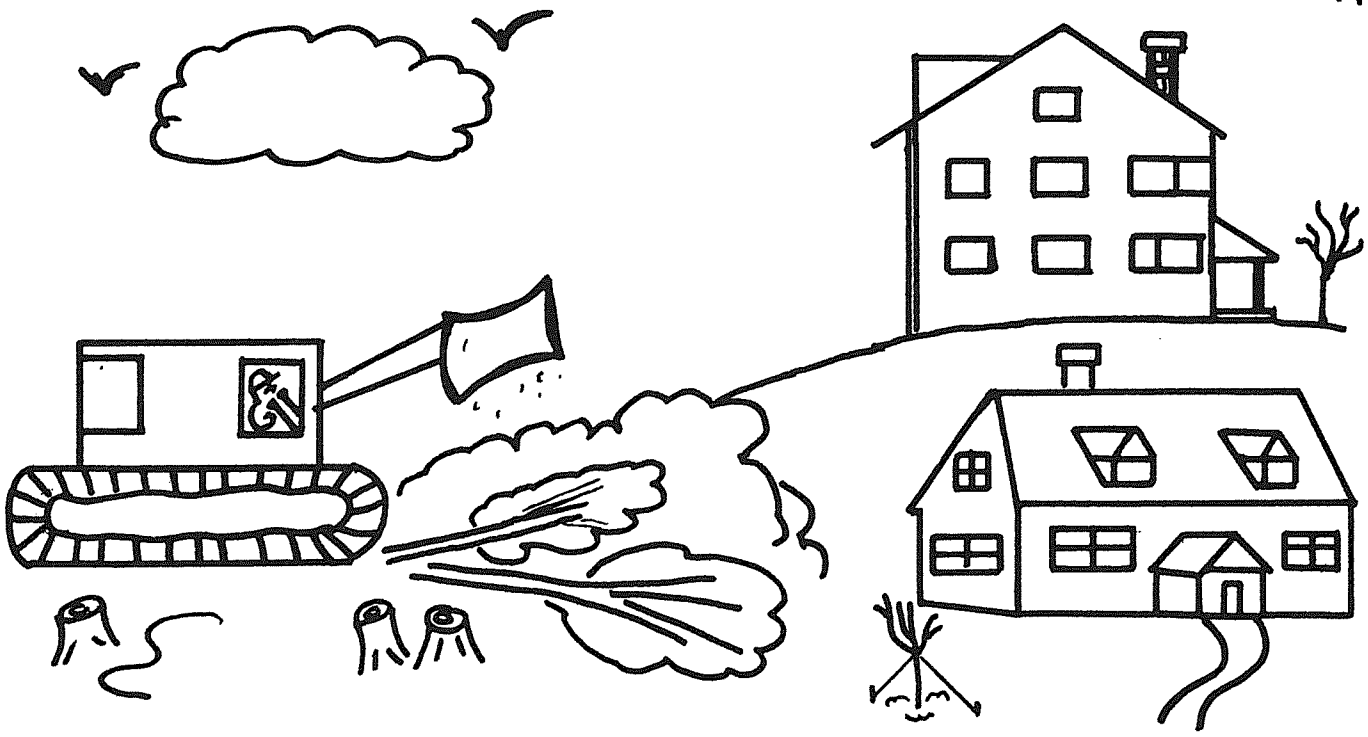


But when soil is left bare, wind and water carry it away.

Many people do not know what happens when they leave soil UNCOVERED.



Other people don't care.



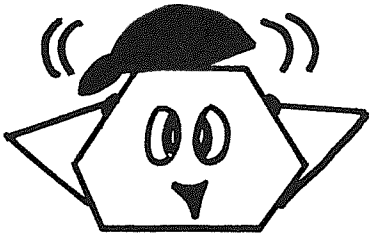
People take the blanket off soil when they build houses and shopping centers.

Bulldozers knock down trees and dig up the blanket of grass.

Farmers who plow up their fields and leave them bare also take off the land's protective cover.

This is O.K. if people are careful to replace the land's ground cover.

SOIL SCRAMBLE



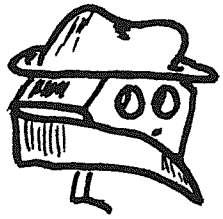
Unscramble the words below. All the words can be found in this story.

nordgu vecro _____ _____ tisl _____

serooni _____ riseclag _____

ylca _____ sorck _____

troNh lanroaCi _____ _____



SECRET CODE

Can you break this secret code? The only clue we have is that z = 1.

8 12 18 15 24 26 9 9 18 22 23 26 4 26 2 25 2

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

22 9 12 8 18 12 13 11 12 15 15 6 7 22 8 12 6 9

_ _

9 18 5 22 9 8 26 13 23 8 7 9 22 26 14 8.

_ _.

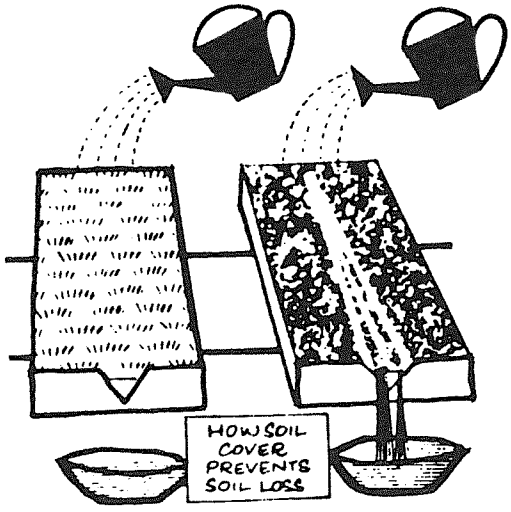
Do Plants Really Prevent Soil Loss?

TRY THIS and See!

Things you will need -

- A HELPER
- 2 boxes, 16 x 12 x 4 each
- 2 large plastic trash bags
- 2 watering cans
- soil and sod
- 2 bowls
- 2 sticks, one inch thick
- scissors

Find or make two small boxes about 16 inches long, 12 inches wide and 4 inches deep. At one end of each box cut a V 1½ inches deep in the center. Line each box with a plastic trash bag to make it watertight.



Cut a piece of sod (grass) to fit one of the boxes. Trim the grass with scissors to about 1 inch high. Fill the other box with

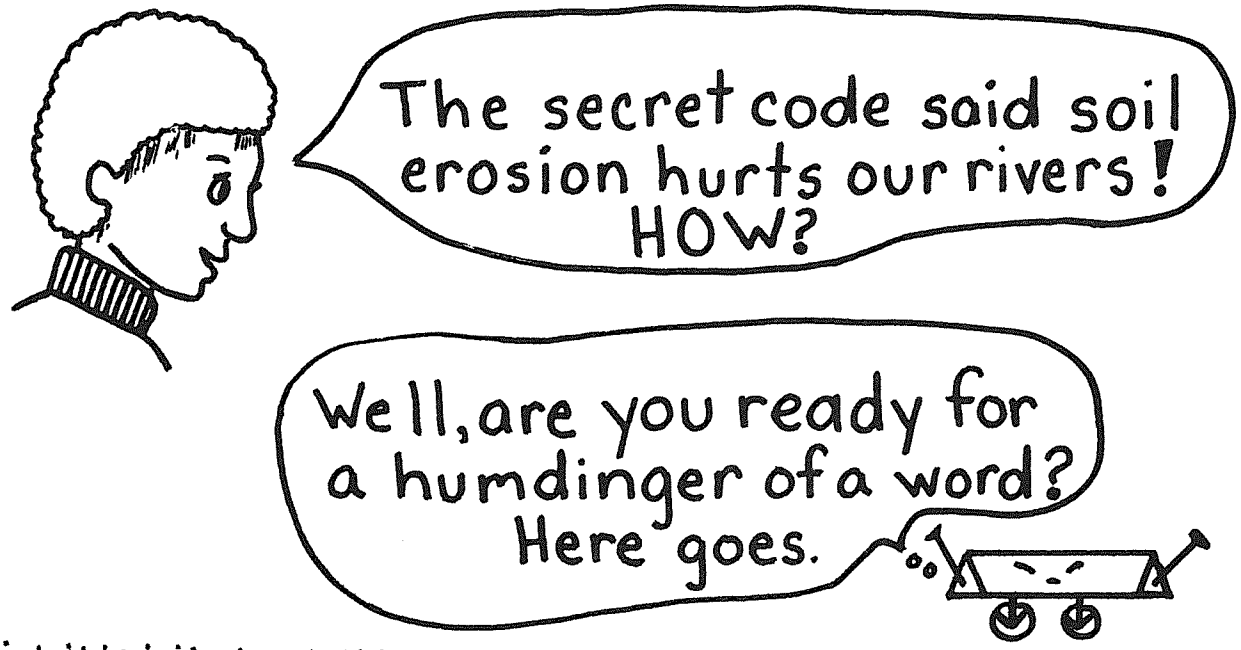
soil from the same place -- no grass, just soil. The idea is to have the same kind of soil in the boxes, one with grass, the other bare.

Set the boxes on an old table so the V-cut ends extend over the edge. Place the sticks under the other end to tilt the boxes.

Put the bowls beneath the V-cuts of each box. Fill the two sprinklers with water and pour the water on both boxes at the same time. Hold the cans about 12 inches above the box. Pour the water steadily and at the same speed.

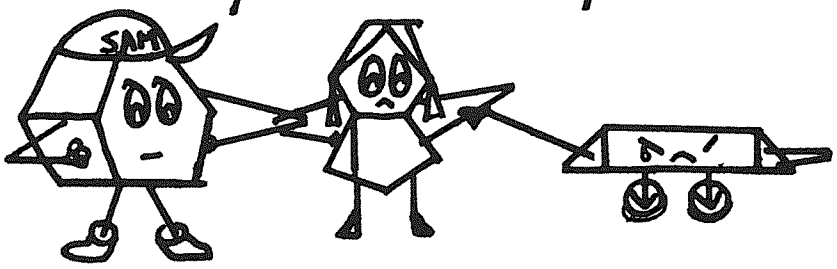
	In Sod	In Bare Soil
1. How long before water flowed into the bowl?		
2. How long did the flow into the bowl last?		
3. How much water flowed into the bowl?		
4. Was the water in the bowl clear, partly clear or muddy?		

Do you think plants help prevent soil erosion? Explain. ➡



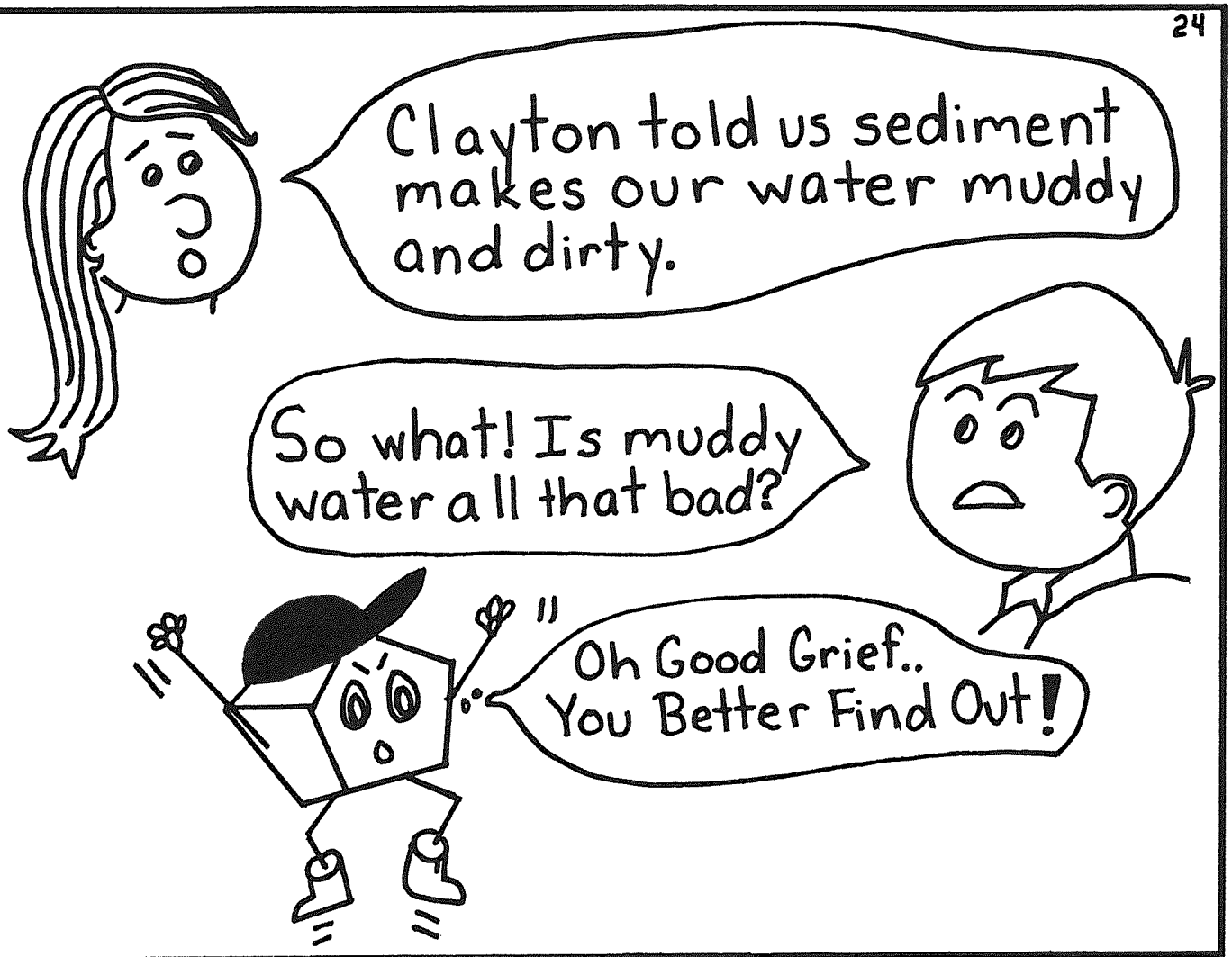
SEDIMENT

Sediment is soil that has been carried to where it does not belong. It makes water muddy and dirty.



This is where Sammy, Sandra and Clayton get in trouble.

When they get carried away as sediment, they cause problems for everybody.



What's So Great About Water?

Find the ways in which water is used in this picture.

List your ideas here

_____

_____

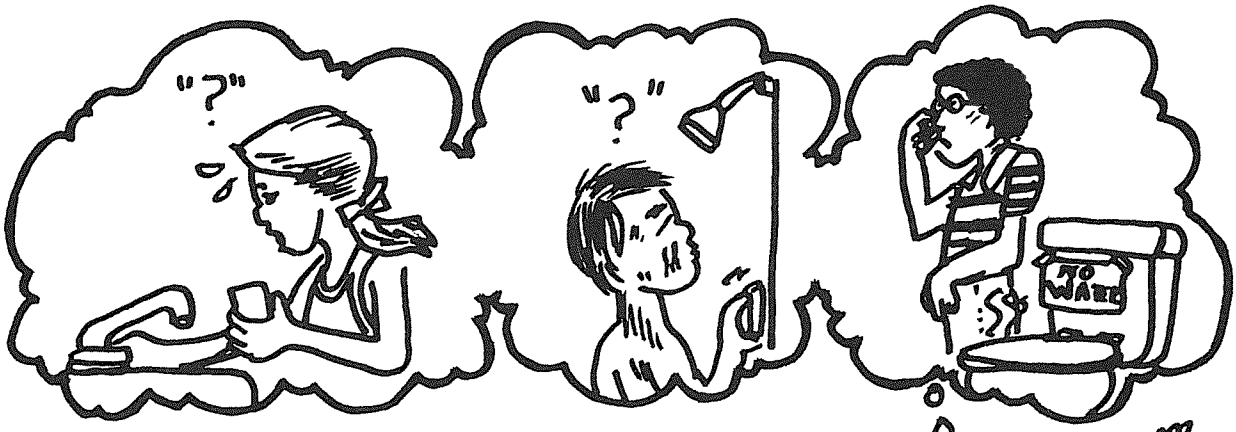
_____

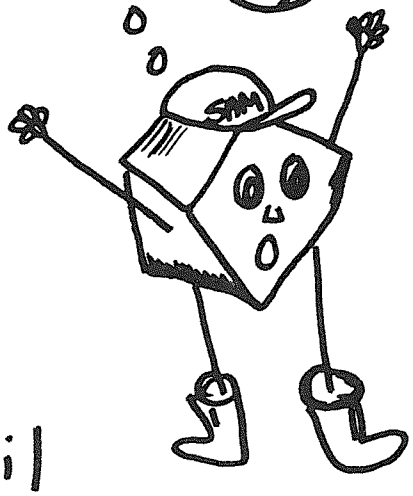
_____

_____

_____

Imagine your home without water for one day.





TRY THIS!

Get a small notepad and a pencil and put it in your pocket.

Everytime you use water or see something made or used with water.. WRITE IT DOWN.

Do this for one day.

Come to your next 4-H meeting with your notepad.

How many water uses did you find? _____.
How about your friends? _____.

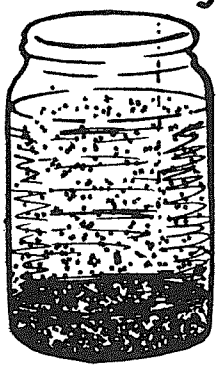
Get a partner and try this again. Can you find more water uses? Hurray for you!! How many? ____.

Find out for yourself if muddy water is a problem:

Can You Filter Sediment from Muddy Water?

Things you will need:

- quart jar
- clean rags
- gravel (handful)
- sand (handful)
- colander 



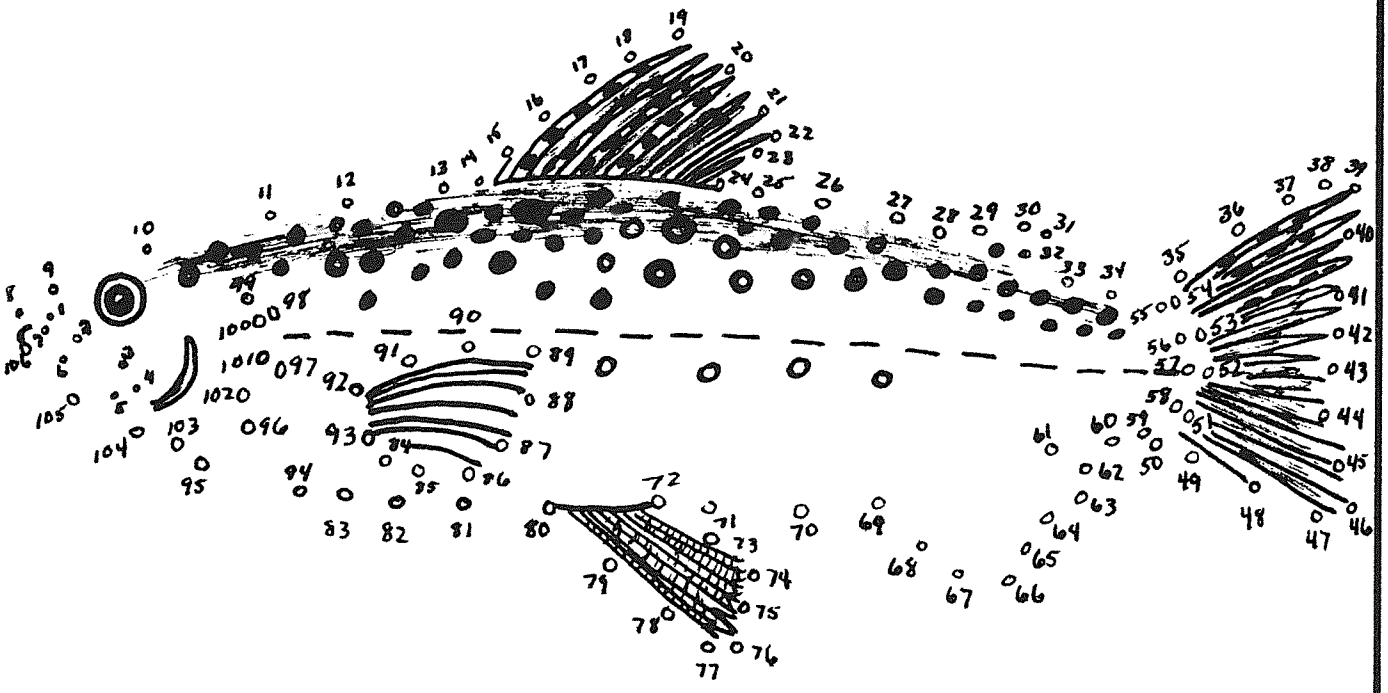
Fill the quart jar with water from a nearby stream.
Is it muddy? YES ☐ NO ☐
Take your jar back to your 4-H club meeting. Tell everyone where you got your water.

Invent a way to remove sediment from the water using the things listed above.
Could you get your water clear? CLEAR ☐ PARTLY CLEAR ☐ MUDDY ☐

How did you do it? _____

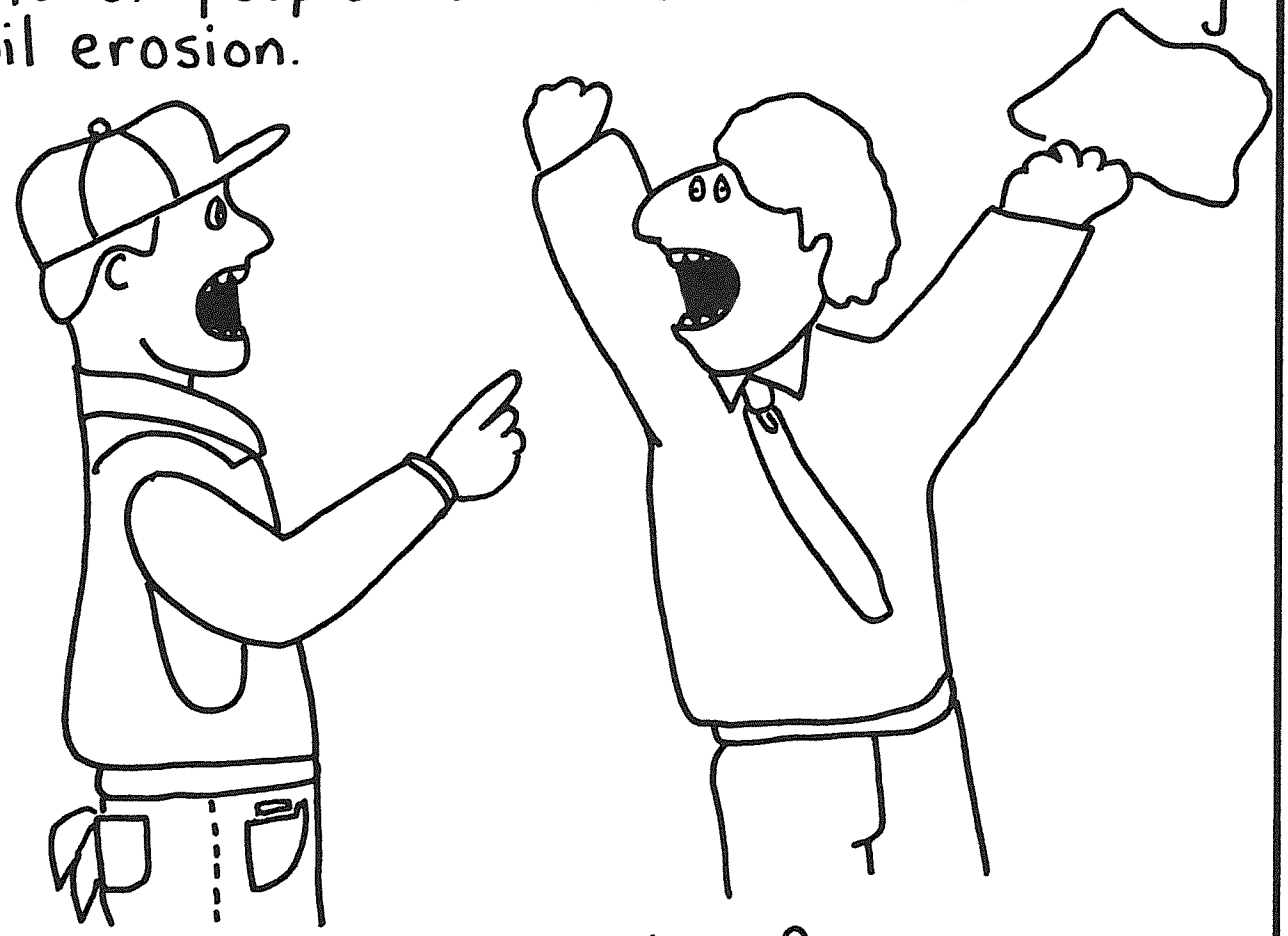
Your Mom and DAD have to pay for clean drinking water. What if you had to spend your money on filtering water? How would you feel? _____ How do you think your Mom and DAD feel about it? Ask them.

Connect the dots to find an animal that is hurt by sediment in streams.



Sediment makes it hard for _____ to breathe. Many _____ lay their eggs on the bottom of streams, ponds and rivers. Sediment covers up and suffocates the _____ eggs. Not many people know that muddy water hurts _____.

Lots of people fuss about who is causing soil erosion.

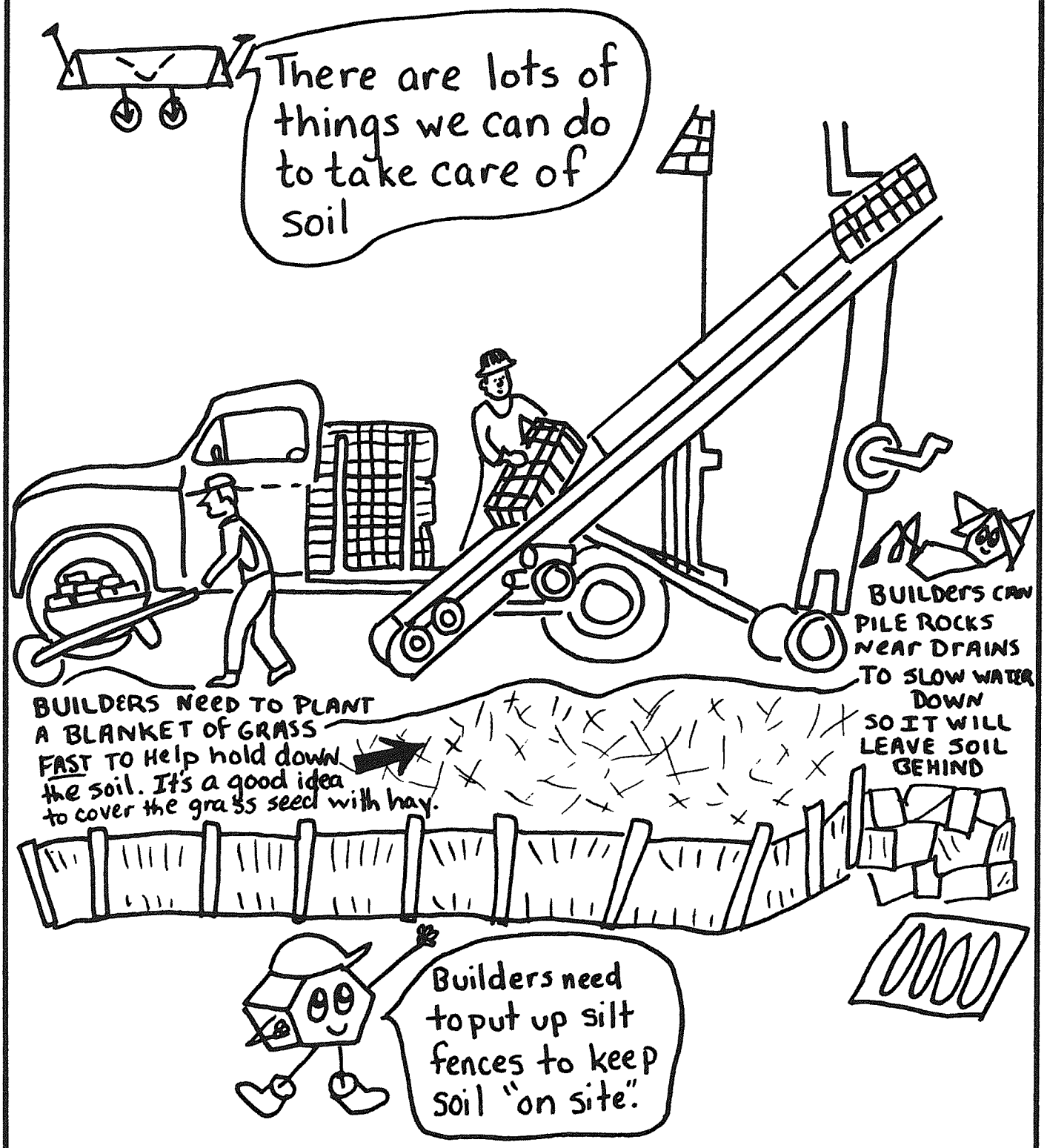


Small farmers blame big farmers.

Big farmers blame small farmers.

Builders blame other builders.. and on and on

SO.... WHAT CAN WE DO?



LOOK AROUND YOU

See how many new stores and houses are being built in your neighborhood. Draw a map of your neighborhood. Put all the new buildings on your map.

Are people trying to cut down on soil erosion in your neighborhood? How can you tell?

Put a star on your map where people are taking care of their soil. Put X's where the soil is leaving.

TRY THIS!

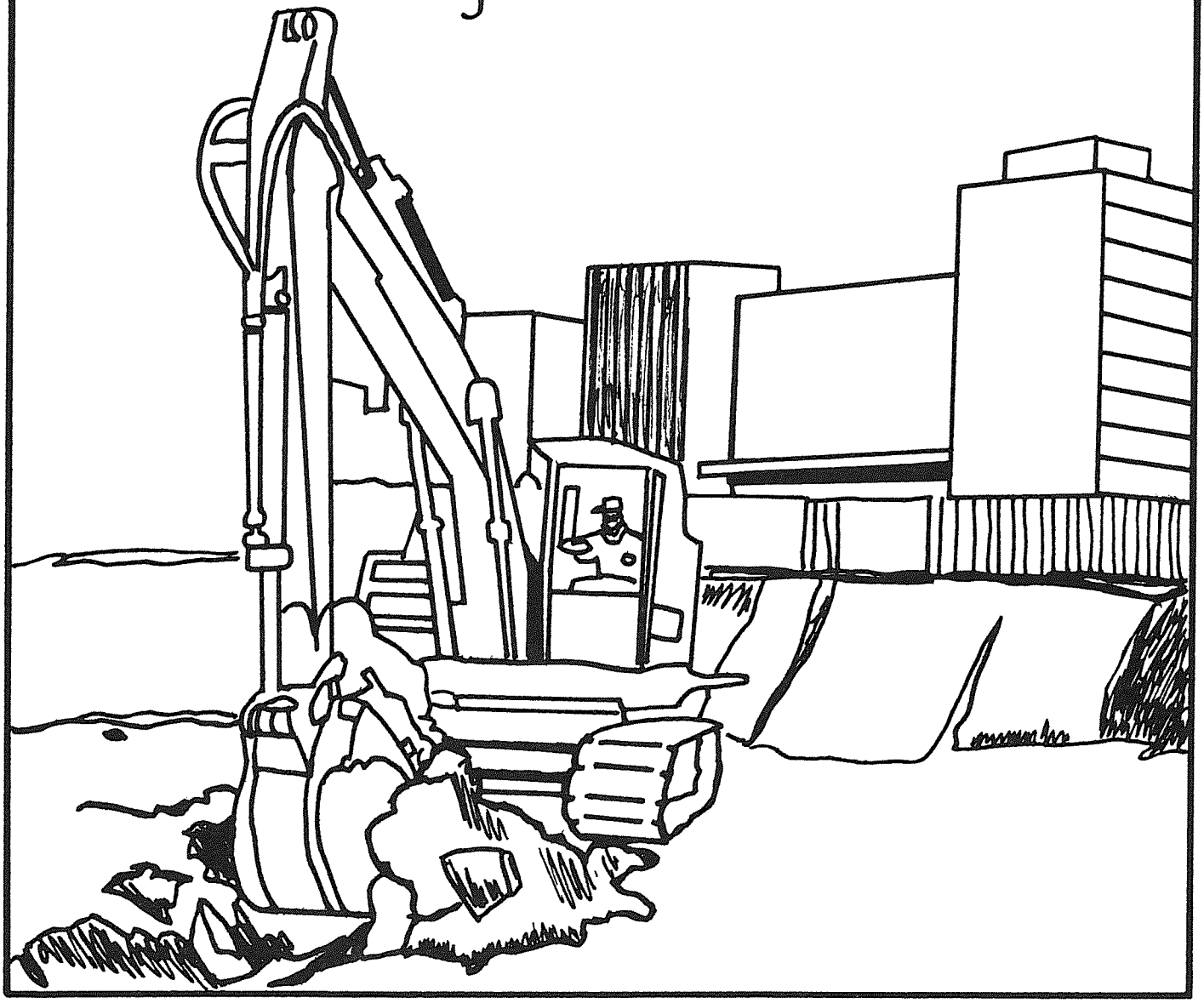
Visit a construction site with your HELPER
(☆Do not go on any property without permission☆)

Talk with the builder. Ask him/her how erosion affects business. What steps does the builder take to reduce erosion?

Construction Site Visit

The following practices help cut down on erosion. On your visit, see if good soil conservation is being practiced.

Has the contractor bulldozed the land to make it more level? YES ☐ NO ☐ This helps keep water from running downhill so fast and taking soil with it.



Has the builder piled rocks near drains or creeks to slow down rainwater that runs off the site? YES ☐ NO ☐ (When water slows down it "drops" its load of dirt. This keeps soil on the construction site.)

Has the builder put up silt fences to slow rain water down so it will drop its load of dirt? YES ☐ NO ☐

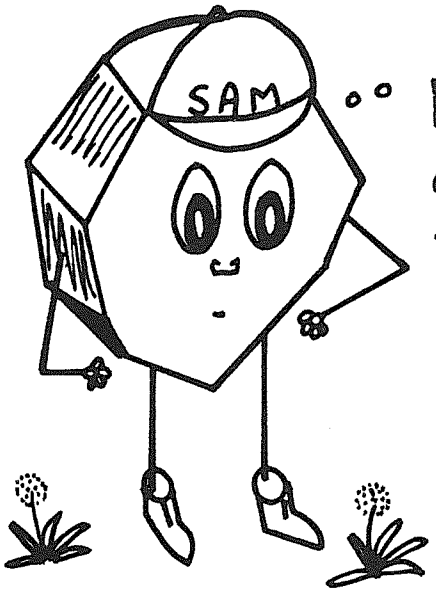
Has the builder planted grass seed for ground cover?
YES ☐ NO ☐

Do you see evidence of soil erosion? Explain here_____

_____.

Are the streams or ditches near the site muddy? What caused this?_____

If you were the builder, what would you do to save the soil?_____

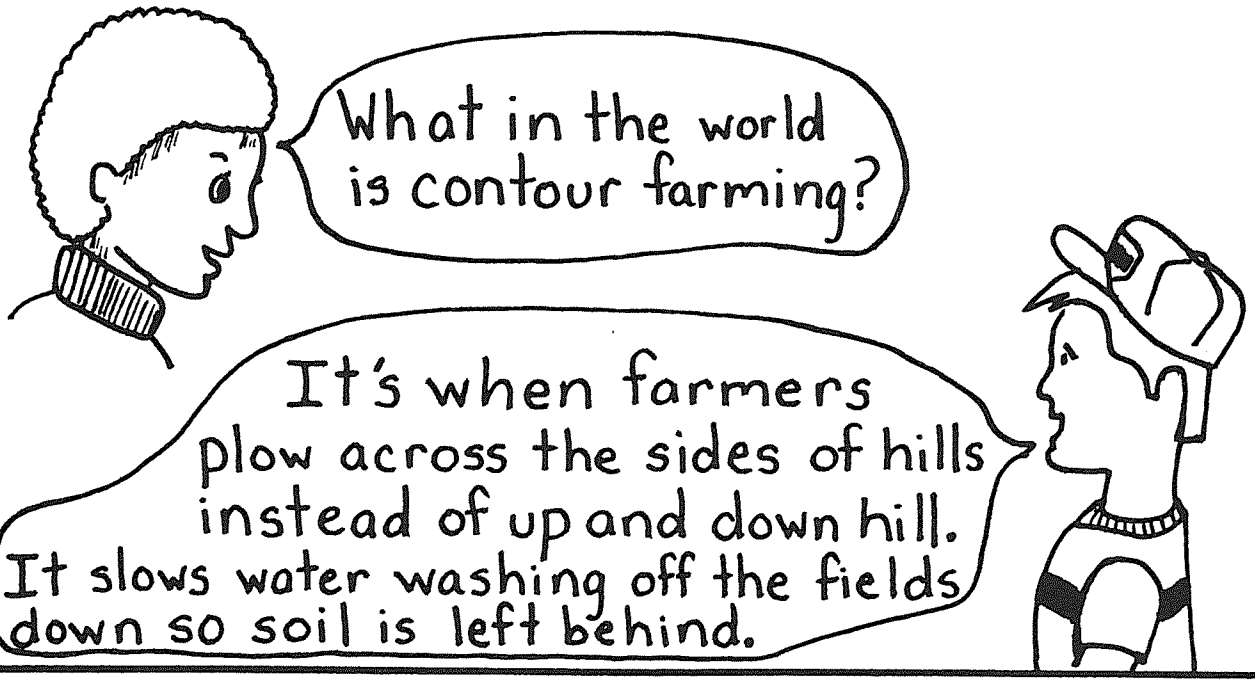


Builders and contractors are not the only people that need to take care of the soil.

The biggest cause of soil erosion and sedimentation in North Carolina is farming.

This is because farming is the State's biggest land use. There are six-and-a-half million acres of cropland in North Carolina. Just a little erosion from each field adds up to a big problem.

Farmers can take care of their soil in many ways. One way is contour farming.



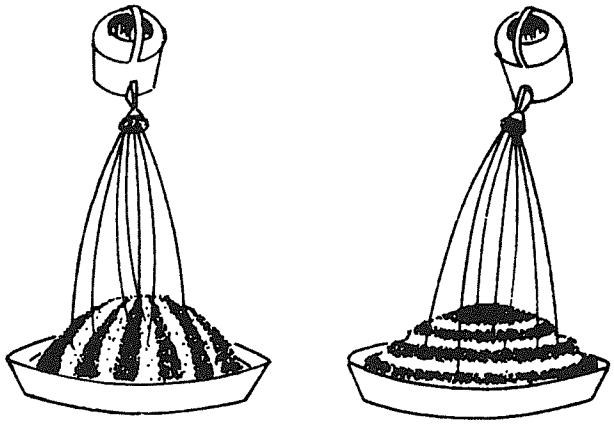
Does Contour Farming help stop soil erosion?

TRY THIS AND SEE!

Things You Will Need-

2 large round low dishpans
2 watering cans
soil
pencil

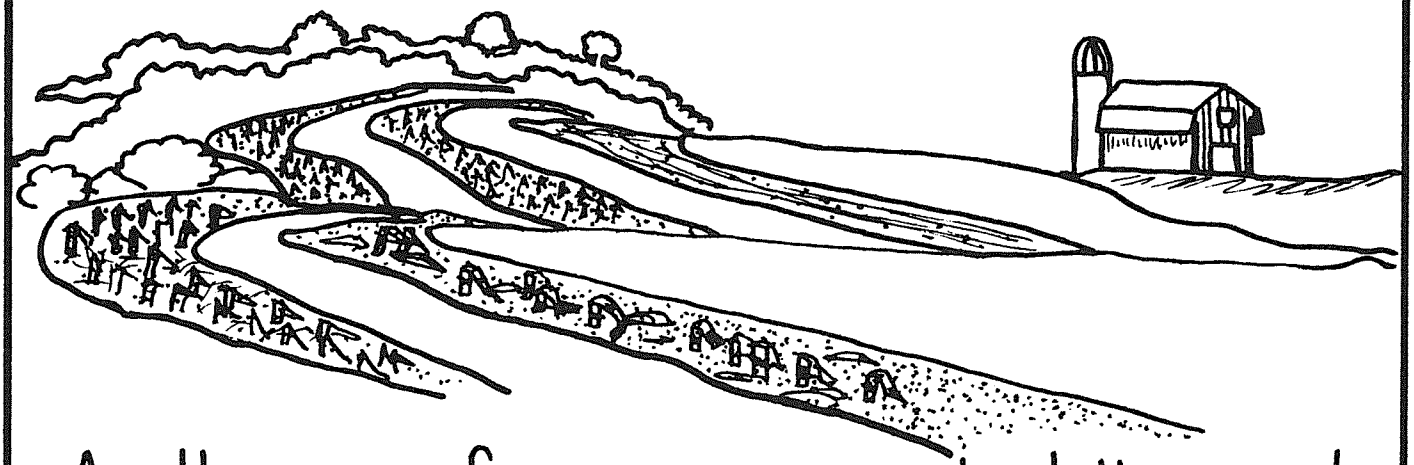
Put an equal amount of soil in the dishpans and form a mound (hill) in each.



With a pencil or finger make rows up and down one hill and circles around the other hill.

Sprinkle an equal amount of water (from the same height) on each hill. Look at the water at the bottom of the hills.

Which hill had the least erosion?
Why? _____.



Another way farmers can protect their soil is to practice conservation tillage. This means the farmer harvests only the grain from a field and leaves the rest of the plant in the soil. The plants left behind serve as a blanket for the soil.

Some farmers plant winter wheat or rye on their fields in the fall. The bright green blanket of grass holds the soil to the land during cold winter rains.

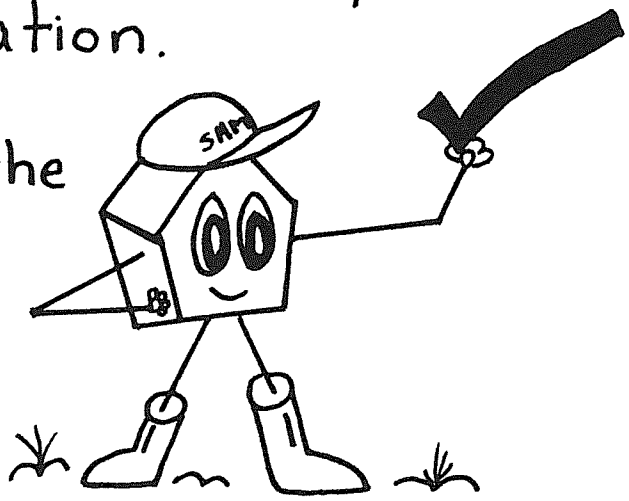
LOOK AROUND YOU

On your way to school or on a family trip look at the farmland around you.

Can you find fields plowed on the contour? YES ☐ NO ☐ Can you find fields plowed up and down hill? YES ☐ NO ☐. Which fields are more eroded?

Fall, winter and early spring are good times to check for soil erosion on farms. On a family trip ask a helper to point out farms that show the farmer practices good soil conservation.

Put a ✓ beside the soil conservation practices you see.



A HEALTHY FARM

___ has fields plowed on the contour.

___ has grassed waterways or ditches for rainwater to drain off the fields. (The grass slows water down so it will drop its load of dirt back on the land.

___ has fields with plant remains left on the soil to protect the land from soil erosion in the winter. (The plant remains may be corn stubble, tobacco stalks or hay).

___ has streams and ponds that are not muddy.

✓ what you 👀 see

A Sick Farm...

_____ has soil leaving the land. The farm has gullies and ditches crisscrossing fields.

_____ has soil that is left bare in the fall and winter. This farm has no protective cover from winter rains.

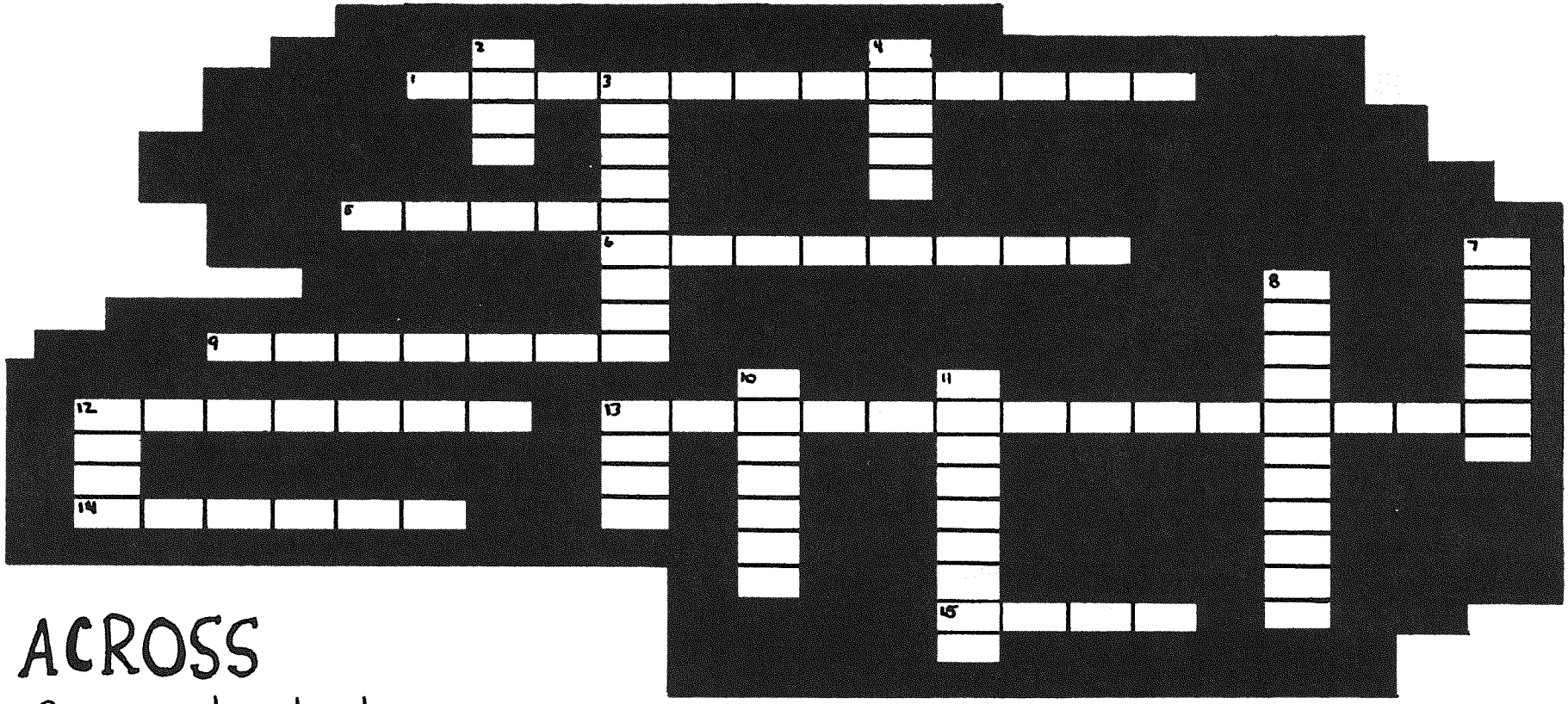
_____ has fields planted up and down hill. This farmer is just asking for rain to carry away his soil.

_____ has no trees or grasses planted to break the force of the wind. You can see the wind pick up the soil and carry it across roads and fields.

_____ has muddy ponds and streams.

Go to your next 4-H meeting and tell your friends what you have seen.

Ask a farmer to talk to your club about soil and water.

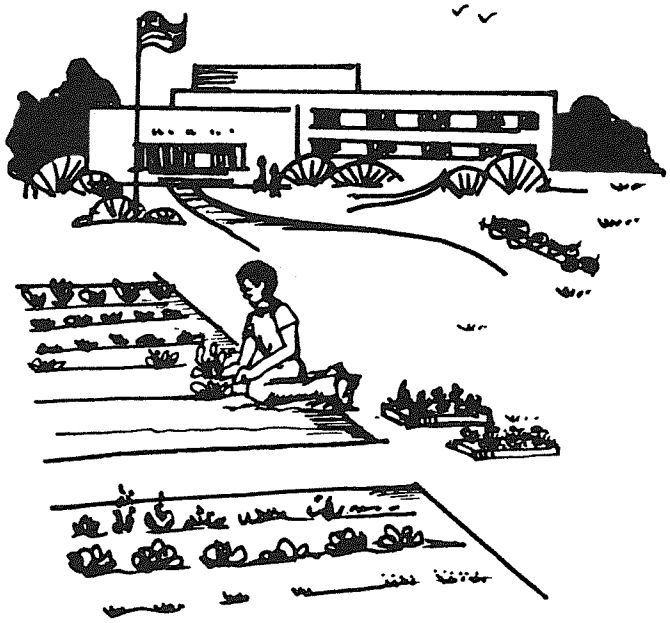


ACROSS

1. Saving soil and water.
5. Sediment makes streams look this way
6. Soil that has been carried where it does not belong.
9. Old crops, leaves and grass make this for soil.
12. The biggest cause of soil erosion in North Carolina.
13. A large group of stores built together.
14. Places where we live. We can all stop soil erosion in our yards.
15. The smallest type of soil particle.

DOWN

2. We grow our food in it.
3. First character in this book.
4. We have to have this liquid to live.
7. Neat people who can assist you in 4-H projects.
8. Everyone should provide soil ____ to protect it from erosion.
12. Animals that are hurt by sediment in water.
10. A type of farming on the sides of hills.
11. Something builders put up to keep soil on a construction site.



You may not be a farmer or a builder, but you can <u>still</u> help take care of soil.

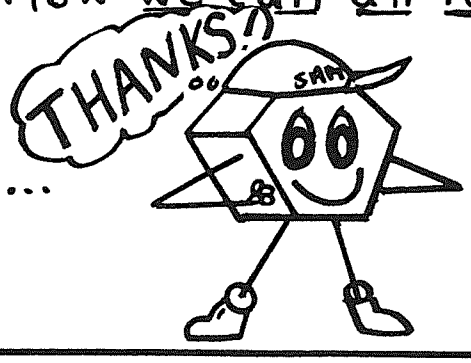
Find an area where "soil is leaving."
It may be -
in your yard
at school
at church
or at your bus stop.

Get together with your HELPER and friends and stop erosion at that site.
Your Extension Agent and Soil Conservation Office can help you with this project.

YOU CAN MAKE A DIFFERENCE!

People listen to what kids have to say. This is especially true when you find out all you can about your subject and carefully prepare your message.

Why not do a 4-H presentation on soil and water? Any of the activities in this booklet would make a nice presentation. People need to learn more about soil erosion and sediment. You can help protect our natural resources by telling other people how <u>we can all take care of soil and water</u>.



GOOD LUCK and...

~ Notes ~

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