3.5 Case Studies

What Are Some Ways Erosion Can Be Managed?

You are probably aware that the problem surrounding your proposed basketball court has to do with eroding soil material due to water and gravity. You are now ready to start looking for ways to control the erosion. Knowing about erosion-control methods that have been used by others may help you solve your problem at the basketball court.

You will read about different erosion-control methods and see what you can find out. You may also have some ideas about how to control erosion based on what you have seen in your own neighborhood or around your community. Real-life examples that you are familiar with can be cases, too. You will have the opportunity to share these examples after everyone has read the cases that are coming up, and your class is ready to update the Project Board.

Coastal erosion is a natural process that results from precipitation, wind, and the constant movement of water, sand, and rock. Because communities have designed buildings very close to beaches and on cliffs above oceans, coastal erosion has damaged many structures and has put many buildings in danger of collapse.
On the next few pages, you will find pictures and text about erosion control. You will soon have the chance to model some of these techniques. Read all of the case studies, and work with your group to complete a Case Summary page as you review each case. Some of these cases deal with problems that are similar to the one you are facing at the basketball court. You should look for these similarities and pay attention to how the problem was solved.

**Case Study 1: Boggy Creek Tributary**
The storm discharge from Boggy Creek Tributary at the Poguito Street culvert (a drain passing under a road) had washed away a portion of the land on either side of the channel. The land was quickly eroding away, and the channel was getting very close to a nearby house. This project rebuilt and strengthened the bank, or side, of the channel, using limestone blocks to build a wall. The wall prevented the water from further eroding the soil. The yard was restored and the home is now protected.

You can see the damage due to erosion before the problem at the Poguito Street culvert was corrected.

Building a wall made of limestone blocks restored the area and prevented any further erosion.
Case Study 2: Tannehill Branch Creek
Water and gravity were eroding the banks of the Tannehill Branch Creek at Lovell Drive. The town needed to make 122 m (about 400 ft) of the bank more stable. They needed a way to prevent more soil from sliding downhill into the stream and being carried away by the water. They added structures that controlled the slope, or steepness, of the channel. The bank of the channel was rebuilt using limestone boulders and bundles of compacted soil and brush, called wrapped soil lifts. Both the boulders and wrapped soil lifts were used for terracing to build up the bank of the creek. Terracing, or building a series of steps into a slope, has been used for many years as a method of erosion control. Native grasses were also planted on the bank.

terracing: cutting a series of raised steps into a slope.

Water and gravity were wearing away the soil along the banks of the Tannehill Branch Creek.

Limestone boulders and wrapped soil lifts were terraced to build up the bank of the creek.

The roots of native grasses planted along the creek banks hold the soil in place.
Case Study 3: Shoal Creek

There were several problems along the Shoal Creek bank. High waters from storm flows, obstructions in the stream channel, and erosion along the hillside banks contributed to the erosion problem near Pembrook Drive. A large oak tree had slid down into the creek and rested on the bottom of the channel. Another live oak, as well as a house, was threatened by further erosion. In this situation, the creek bank was rebuilt with concrete, wrapped soil lifts, and native grasses. After the project was completed, the bank was stable, and the natural stream setting was attractive. A house and oak tree were also protected.

Shoal Creek before the channel was cleared and the banks made stable.

Erosion-control methods used at Shoal Creek made the stream banks stable, preventing further land loss.
Case Study 4: Little Walnut Creek

In the early 1980s, a property owner constructed a stone wall to hold back the soil and prevent it from sliding downhill into Little Walnut Creek. In December 2000, this retaining wall collapsed into the creek. This put two homes located near the stream and about 5 m (about 18 ft) above the creek bed in danger. The property next door also had a stone wall that was a concern. City leaders provided the money to rebuild the wall and protect the homes. About 107 m [350 ft] of stream bank was rebuilt with limestone boulders, plantings of native grasses and trees, and special soil reinforced with synthetic materials for strength. The completed project protected the three homes and made a beautiful, natural stream setting.
Case Study 5: Fort Branch Watershed

On the Fort Branch Watershed at Woodmoor Drive, there is a confined drainage channel. The sides of the channel were cut down, and the banks were eroded. The town reconstructed the bank and created a winding, more natural-looking channel using logs made of compressed natural materials, such as shredded coconut husks, and wrapped with rope webbing. The slope of the channel was controlled using rocks.

You can see the damage from erosion at the Fort Branch Watershed before the channel was rebuilt.

Effective erosion-control methods created a natural-looking channel and prevented further erosion.
Stop and Think

For each case study you read, answer the following questions:

• What erosion problem were they addressing?
• What erosion-control methods were used to address the problem?
• Why did they think the chosen method would be a good one to use?
• What happened?
• In what ways did the erosion control work as planned, and in what ways, if any, did it create new problems?

Discuss the answers in your group, and be prepared to share your answers with your classmates.

Reflect

Working with your group, identify ways of using some of the erosion-control methods you have just read about. Some of the Reflect questions will have you thinking about where you have seen these methods used. Others will help you think about what might be useful around the basketball court. Be prepared to discuss your answers with your class.

1. Which of the erosion-control methods you read about have you seen used in your neighborhood or community? How was each used? Why do you think each was used in that place? Draw a diagram to help you communicate how and why each was used.

2. For each of the erosion-control methods you have identified, which of them might be useful at the basketball court? Describe why and how it might be used. What do you think will result from using it? Think about good things and problems that might result. Draw a diagram to help you communicate.

3. Choose another erosion-control method you think might be useful around the basketball court. Describe how that erosion-control method is used in one of the case studies. Why do you think you could use this approach for the basketball court? How might you use it? What do you think will result from using it? Think about improvements and problems that might result. Draw a diagram to help you communicate how and why it might be used.
4. Are there any other erosion-control methods used in the case studies that might be useful for the basketball court? If so, answer the same questions about them.

**Update the Project Board**

Earlier, you began a Project Board centered on the idea of learning about what erosion is and how to manage it. Now you have read some case studies about how others have solved their erosion problems. You know more about the factors that cause erosion and different ways to stop it. You are now ready to fill in the Project Board more completely.

What is most important to add to the Project Board right now are your ideas about how you might control erosion in the What do we think we know? column. It is also important to add what you still need to find out about erosion control to address the challenge in the What do we need to investigate? column. Identify erosion-control methods you have read about. Then identify what else you need to know about each of those methods to design an erosion-control method for the basketball court.

The Project Board is a great place to start discussions. You may find that you disagree with other classmates about what you know about an erosion-control method. If so, put a question about it in the What do we need to investigate? column. Discussing disagreements is a part of what scientists do. Such discussions help scientists identify what they or others still do not understand well and what else they still need to investigate to understand more fully.

**What’s the Point?**

As you read each case study, you found some similarities between these situations and the basketball-court situation. You were able to see how others solved erosion problems caused by water and gravity. Retaining walls, terracing, and drainage systems can be used to direct the flow of water and keep water flowing in places where it cannot cause damage. Planting native grasses and trees has also been used to control erosion. Plant roots anchor the soil and other materials, preventing them from being carried away. In the cases you read, erosion-control methods were combined to solve erosion problems.