

Protecting the Beach

Directions: Fatima lives in a town near the ocean. As she grows up, she notices changes to the land. The wind is strong and wears down the land near the ocean. The ocean waves and rainstorms wear down the land, too. Fatima is worried that one day, the beach will be gone.



Over the next few days, you will help Fatima design a solution that will help her keep wind or water from breaking down the beach near her home. Think of some ways you can stop wind or water from changing Earth's surface. What are some ways to solve this problem?

Brainstorm

Answer each question to complete the brainstorm step of the engineering design process:

1. List ways that people can protect land from wind or water.

2. Pick two of these ideas. How could you use them to protect the beach near Fatima's home?
3. What problems do you need to solve to create your two solutions?
4. Describe in detail how your solutions can help Fatima protect the beach near her home.

Design

Answer each question to complete the design step of the engineering design process. You will create two possible solutions to the problem:

1. Think back to the brainstorm step. Choose the idea you feel is the best design solution and describe it. Explain how it can be used to protect the beach from erosion.
2. List all of the materials that you need to create your design.
3. Write the steps for creating your design. Ask yourself if someone else could follow your steps.

4. Create a detailed drawing or write a detailed description of your design. The drawing or description does not have to be perfect. Be sure to label each part of the design. If you make a drawing, take a picture of it, transfer it to your computer, and upload it here using the image tool.

5. Now think back to the brainstorm step again. Choose another idea to solve the problem and describe it. Explain how it can be used to protect the beach from erosion.

6. List all of the materials that you need to create your second design.

7. Write the steps for creating your second design. Ask yourself if someone else could follow your steps.

8. Create a detailed drawing or write a detailed description of your second design. The drawing or description does not have to be perfect. Be sure to label each part of the design. If you make a drawing, take a picture of it, transfer it to your computer, and upload it here using the image tool.

Create

Answer each question to complete the create step of the engineering design process.

1. Gather any materials you need to build a model of your two designs. Do you need to change any of the materials you will use? Why or why not?
2. Follow your plan and create the models of your designs. Is your plan easy to follow? Why or why not?
3. Were you able to build your models the way you designed them? Explain.
4. Did you need to make changes to the designs while building? If so, what changes did you make?
5. Did your models turn out the way you expected? Explain.

Test

Answer each question to complete the test step of the engineering design process:

1. How will you know if your designs will solve the problem of erosion?

Improve

Answer each question to complete the improve step of the engineering design process. You only need to do this for your best design.

1. Which design worked best?
2. How is that design different from your other design?
3. How could you make your design better?
4. List the steps you will take to improve your design.
5. Make the improvements to your design. Describe any new problems.
6. Test the improved design. Use the same testing process that you used before. Record your observations.
7. What did you learn about design after completing the five engineering steps?