# Assignment Summary

In this assignment, you and your partners will design a plan for how a city can use a piece of land. You will begin by conducting Internet research on soil erosion. The information you collect should be recorded in the table provided on your Student Guide Worksheet. Then, you will read about a fictional city and how it would like to develop a piece of land. The city wants to use the land wisely so they can maintain the soil and increase biodiversity. Your background research on soil erosion will help you learn why soils are valuable, what human activities increase soil erosion, and what things can be done to sustain soils. With your partners, you will brainstorm a list of possible ways the city can develop this land. You will then evaluate each way based on how it will affect the environment, how much money is needed to develop the land and how the developed land will benefit the citizens of the city. Finally, you will create a presentation summarizing your ideas and present your design plan to the class.

Background Information

Biodiversity refers to the total number and variety of organisms in a particular area. The greater the biodiversity of a region the more stable that environment is considered. If species are lost and biodiversity declines, it is not only the feeding relationships that are impacted. Nutrient cycling and air, water, and soil quality may also be affected. These ecosystem services may further impact the living parts of the ecosystem.

Human beings use land in a variety of ways. We may develop a local park for recreation and appreciation of nature. We may spread outward from an urban center to create new space for home construction, stores, and businesses. Our decisions about how to use land affect the environment, living creatures in these areas, and the resources we use.

Materials

* A computer with Internet access
* Presentation software (PowerPoint, Prezi, Keynote, SlideRocket, SlideDog, Articulate, Camtasia, etc.)

# Assignment Instructions

**Step 1: Prepare for the project.**

Read steps 2 through 8 so you know what you are expected to do during this project. If there is anything that is not clear to you, be sure to ask your teacher.

**Step 2: Gather background information to help you create your design plan.**

In this step are links to websites which provide information on the importance of soils, what happens in soil erosion, and how humans can prevent soil erosion. You are provided with 4 links. Some of these pages provide a more general overview and others go into much more detail. As you read and gather information for your design plan do not become overwhelmed with the different types of water erosion or soil textures. Stay focused on the answers to the following questions:

* Why is soil important?
* What is soil erosion?
* What human activities are responsible for soil erosion happening at advanced rates?
* What are some of the effects of soil loss?
* What can be done to prevent soil erosion?

Remember to record answers to these questions in Table 1 of the Student Guide Worksheet. Keep in mind that not all websites will cover all 5 topics equally.

<http://www.nda.agric.za/docs/Infopaks/Soilerosion.pdf>

[http://www.ehow.com/info\_8102534\_soil-erosion.html](http://www.ehow.com/info_8102534_soil-erosion.html-)

[http://education.nationalgeographic.com/education/encyclopedia/erosion/?ar\_a=1](http://education.nationalgeographic.com/education/encyclopedia/erosion/?ar_a=1-)

<http://soils4teachers.org/files/s4t/soil-erosion-conservation.pdf>

**Step 3: Learn about the design goal for Diversitopia.**

Diversitopia is a mid-sized city. It has recently bought a piece of land from a private owner. The previous land owner farmed the land, but the land has now been abandoned for over a decade. The farmland is approximately 500 hectares, or 2 square miles, and sits on top of a hill that overlooks a river.

The office of city planning and the mayor are accepting proposals for how the land should be used. They are interested in sustainable planning and consider themselves a “green” city. They would like a project that encourages a diverse community of organisms, protects nutrient cycling, and maintains soil stability. Although the government is very interested in the scientific benefits of the project, it is not their only focus. They must also consider the cost to the city and the value it will provide to the citizens.

**Step 4: Create a design plan.**

**Part One- Discussion and Planning**

1. Your teacher will now announce your group assignments. Relocate to a space where you and your partners can work together. Take your copy of the Student Guide Worksheet with you.
2. In your group, take turns sharing what you learned about soil erosion and what you know about biodiversity and ecosystems.
3. As a group, brainstorm a list of all the possible ways that this land could be used. You can use the space after Table 1 in your Student Guide Worksheet to record the list of possible uses. At this point in this assignment, include every idea you can think of. Do not worry about the “right” decision.
4. Look over your list of ideas for land design projects. As a group, discuss which of them would be best for soil stability and supporting biodiversity. You may want to go through each option one by one and consider how these types of land use would affect soils and living things. These questions might help you evaluate your ideas:
   1. Does this idea include a way to cover the soil so it cannot wash or blow away?
   2. Does this idea include a way to bind the soil below the ground?
   3. Does this idea include a way that the soil will be enriched with additional nutrients?
   4. Does this idea propose a way for stopping eroded soil from washing into the river?
   5. Does this idea propose a variety of structures that could provide habitat to a diversity of life?

Use the space on your Student Guide Worksheet to record your group’s top three ideas that are best for the environment.

1. Now look at your list of ideas and evaluate them based upon costs. Be sure that you are working as a group and evaluating each option. You do not need to provide exact expenses for everything you suggest. You may need to do some online research to learn about materials and equipment. Use these questions to help you evaluate the cost of your project:
   1. What building materials will this project require? Wood? Concrete? Asphalt? Wire? Rebar? How expensive are those materials in relation to others you could use?
   2. How much heavy equipment will you need to complete your project? Backhoes? Concrete mixers? Bulldozers? Compactors? Drills? Cranes? Excavators?
   3. How many people will you need for the construction? Just a few small crews? Entire crews of landscapers and construction workers? Architects?
   4. How long do you think the work will take? A few weeks, months, more than a year?
   5. What are the expected costs for maintaining the project? Is it a project that will require little maintenance after completion? Or will there be additional costs throughout the year?

Use the space on your Student Guide Worksheet to record your group’s top three ideas that are the most affordable.

1. Finally, examine your ideas in terms of how they provide social value to the citizens of Diversitopia. Be sure that you and your team are considering the various ways that humans interact with their environment. Use these questions to help you evaluate the social benefit of your project:
   1. Does this idea include a space for humans to gather with one another?
   2. Does this idea include a space where humans can go to view and appreciate nature?
   3. Will the proposal be considered pleasing for humans to look at?
   4. Are there any negatives to this project? Such as increased traffic, increased pollution, or strange smells?
   5. Is the proposal unique enough that it is something the city could market to promote tourism?
2. Use the space on your Student Guide Worksheet to record your group’s top three ideas that are the most pleasing for the citizens of Diversitopia.
3. Now that you and your team members have evaluated the design options from multiple perspectives, select a single design plan that you all agree provides the best overall benefits to the city.

**Part Two- Building Your Presentation**

Now, you and your partners will create a presentation to deliver to your class. You should use a combination of text and images to explain your design plan and support your explanations. Your presentation should be at least 6 slides long. It may end up longer than 6 slides if you find you need more space to list examples and explanations. Your presentation should not be shorter than 6 slides. Ask your teacher where to save your presentation as you work on it. Your teacher may have specific guidelines about the file name you should use.

Although the presentation mirrors the work that you did during the background part of this task and contains the same information that you recorded on your Student Guide Worksheet, be sure that you do not simply move all of your written text onto your slides. Keep in mind that the text and images selected for your slides should be summary information that you use as talking points. You should not plan to read directly from your slides to your audience. You should be able to use these summary ideas and expand upon them as you give your presenation.

All of the members of your team should participate in the development of this presentation. Your group may decide how to divide up the work. For example, you may want to have one person create the introductory slide and the slide that shows the ideas you considered, a second person create the slides for the description of the benefits of your design plan, and the third person create some kind of closing slide or focus on the images you want to use in your presentation. Another way you can do this is by dividing up your group so that one person creates the slides and gathers the images to describe the environmental benefits, a second person creates the slides and gathers the images for the economic impacts, and the third person creates the slides and gathers the images for the social benefits provided to humans. In this division, you might all pair up on the remaining slides and images.

Use these bullets to build your slides.

1. Slide 1: Your first slide should introduce your project.
   1. Provide a title for your design project.
   2. Also, list the names of the members of your team.
   3. Remember to save your work as you go!
2. Slide 2: This slide should include the design ideas you and your group brainstormed. Save your work to this point.
   1. List all the ideas you were able to come up with.
3. Slide 3: On this slide, describe the design plan you and your team are recommending. Save your presentation before moving on to the next slide.
4. You may use text and bullet points to describe your plan.
5. You should also feel free to use images. You can create your own images with presentation tools or you can use clip art images. If you use images from websites, be sure you provide the URL you obtained the image from.
6. You may need more than one slide to completely explain your design plan.
7. Slide 4: Use this slide to organize your explanation on how this design is beneficial for the environment.
   1. Include an explanation of how your design plan will help to stabilize and conserve the soil.
   2. Describe how your design plan will support biodiversity.
   3. As mentioned above, use additional slides, if necessary, to express your ideas.
8. Slide 5: The purpose of this slide is to describe the financial costs associated with your design plan.
   1. Be sure to include the materials you plan to use.
   2. Explain whether any special kinds of equipment will be required.
   3. Mention how long you believe it might take to do this work and how often you might need to make updates.
   4. Use additional slides if needed.
9. Slide 6: On this slide, explain how your design plan will provide social benefits to humans.
   1. Include information on how humans may use the area.
   2. Supplement your description with images as needed.
   3. Feel free to use multiple slides.

**Step 5: Evaluate your work using this checklist.**

If you can check each criterion below, you are ready to submit your project.

* Did you complete the necessary background search on soils and soil erosion?
  + Did you fill in Table 1?
* Did you complete all of the steps in the design plan, part one?
  + Do you have a list of possible ways to use the land?
  + Have you identified your top three ideas for maintaining soil structure and promoting biodiversity? Do you have descriptions for how maintenance of soil structure and promotion of biodiversity is accomplished in each way?
  + Do you have a list that shows your top three ideas based upon general costs and predicted materials? Are those ideas supported with descriptions?
  + Do you have a list of your top three ideas based upon how humans will use the land? Do you provide explanations for each of these ideas?
  + Is your Student Guide Worksheet complete and ready to be submitted to your teacher?
* Did you create the presentation that you will use to share your ideas with your class?
  + Is the presentation at least six slides long?
  + Does your first slide introduce your team members names and include a name for your project?
  + Does your second slide list all the possible ideas your team came up with?
  + Do you have at least one slide that lists and explains the design idea that your team selected?
  + Do you have at least one slide that lists and explains the environmental benefits of your design plan?
  + Do you have at least one slide that lists and describes that possible costs associated with your design plan?
  + Do you have at least one slide that lists and describes the ways that the citizens of Diversitopia would benefit from the design plan?

**Step 6: Revise and submit your project.**

1. If you were unable to check off all of the requirements on the checklist, go back and make sure to complete that work.
2. Save the edits to your Student Worksheet before you submit it.
3. When you have completed your worksheet, return to the Virtual Classroom and use the “Browse for file” option to locate and submit your presentation.

**Step 7: Clean up your workspace.**

1. Clean up your workspace making sure to throw away any trash! Follow your teachers instructions for logging off or shutting down your computer. Congratulations! You have completed your project.

**Step 8: Present your design plan to the class.**

Your teacher will decide an order for your classroom presentations. When it is your turn to present, remember that an effective presentation is built upon interaction with your audience not reading directly off of your slides. You want to make eye contact with your audience, project your voice, and speak clearly. Your slide presentation is the basis for your presentation, but you should understand your subject enough that you can expand upon your ideas and provide additional description while presenting. Be sure that ALL members of your team speak during the presentation. You may want to divide up the material by having each of you present one of the main ways you evaluated your design- one person speaks about environmental benefts, the second person speaks about economic benefits, the third person speaks about social benefits. You could also choose to have one person present the introduction, one person present the analysis, and one person provide a creative closing. It is up to you to decide how to divide the information, but be sure that you all participate and are prepared to present.

Planning for Biodiversity and Ecosystem Services

Student Worksheet

**Table 1.** Use this table to organize what you read about soil erosion. You were provided 4 websites from which to gather information. Be sure to visit at least 3 of the websites. You may not find answers to each of these question at each location, but collect responses from 2 of the sources.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Source 1 | Source 2 | Source 3 | Source 4 |
| Why is soil important? |  |  |  |  |
| What is soil erosion? |  |  |  |  |
| What human activities are responsible for soil erosion happening at advanced rates? |  |  |  |  |
| What are some of the effects of soil loss? |  |  |  |  |
| What can be done to prevent soil erosion? |  |  |  |  |

Brainstorm possible uses for the land.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Top 3 ideas for maintaining soils and supporting biodiversity. Include a description of why this plan is good for the soil and how it promotes biodiversity.

1.

2.

3.

Top 3 ideas based upon affordability. Include a description of the general costs of this plan and why it is less expensive than others.

1.

2.

3.

Top 3 ideas based upon benefits to the citizens of Diversitopia. Include a description of how you believe people would use the land.

1.

2.

3.