

Activity Guide for Students: Planning a Garden Plot

Directions: Garden types

Over the course of a year, your group will take scientific concepts from class and apply them in designing a garden for the benefit of your school and community. Brainstorm the variety of functions a garden can provide before answering the following questions. Then identify the type of garden that your group would like to design. Make sure to store this student worksheet and notes about your decision in your group's binder.

1. Identify and describe two environmental benefits provided by gardens.
2. How can plants mitigate climate hazards?
3. What benefits can come from adding green spaces to a community?
4. Are there any problems at your school or in your local community that a garden could solve? What are these problems?
5. Determine the type of garden your group will design. How will this garden fill a need for your school or community?

Sun and shade

Using the provided map of the school grounds and/or surrounding community, orient the map so that north is facing up. Mark where the sun rises and sets. On your map, mark areas that are in full sun almost all day, areas that are in shade almost all day, and areas that are in between, receiving consistent partial or indirect sunlight. The amount of sun an area receives determines which plants will thrive in the garden. After you answer the following questions, store your worksheet in the group binder for future reference.

1. Why is it important to consider the movement of the sun when planning a garden?
2. How is sunlight important?

5. Why do we measure nitrogen and phosphorus levels in soil?

6. Why is it important to measure soil pH?

7. Which locations had the best soil for plant growth?

8. How can soil composition be modified?

9. Select a location for your garden based on its visibility, accessibility, water supply, level of sunlight and soil quality. To meet the soil requirements for the type of garden you want to design, do you need to modify the site's soil?

Plant selection

Your group will use online resources to answer the following questions. The answers will guide your group in identifying the types of plants that could work in your garden design. After you finish your work, store the answers in your group's binder.

1. What are annual, biennial and perennial plants?

2. What are typical life spans for shrubs and trees in a garden?

3. Considering life span, how might including larger plants in a garden be beneficial?

4. What is the relationship between plant life span and garden maintenance?

5. What are the benefits of planting native species?

6. Under what circumstances might you plant nonnative species in your area?

7. What is the difference between planting a nonnative species and planting an invasive species? How can you tell if a plant species is invasive? What plants are invasive in your area?

8. What is the climate in your area? Include precipitation levels and low, average and high temperatures.

9. What is a plant hardiness zone? In what USDA hardiness zone is your school?

10. Why is it important to consider local climate and USDA hardiness zones when selecting plants?

11. What type of garden are you designing? What kinds of plants would this type of garden need?

12. Identify plants that would be suitable for your garden. Fill out the chart below.

Plant species	Native/ nonnative	Light needs	Water needs	Nutrient needs	Life span

13. In the garden, will the different kinds of plants be separated or planted together? Which plants will be placed near each other?

Pest and problems

In your group, use online resources to answer the following questions. These answers will guide your group in determining the type of pest control appropriate for your garden design. Store the completed worksheet in the group binder.

1. What is a biological pest control method? Identify a commonly used biological pest control method and describe how it works.

2. What are the pros and cons of using biological pest control methods?
3. Most chemical pest control methods use pesticides. What are the different kinds of pesticides?
4. What are the pros and cons of using a chemical pest control method?
5. What is a physical pest control method? Identify a commonly used physical pest control method and describe how it works.
6. What are the pros and cons of using physical pest control methods?
7. What is integrated pest management?
8. What are the pros and cons of using integrated pest management?
9. Identify a pest control method that is safe to use in a high-traffic area and that is safe for your type of garden. How do you recommend that this pest control be implemented?

Garden construction

Measure the area where your group is planning your garden. Record your measurements in meters and create a sketch of your garden design, including these measurements. You will need these measurements to create the 3-D model of your design.

After completing the sketch of your garden design, use a calculator to answer the following questions with your group. Store the worksheet in your group's binder.

1. Will plants be planted directly in the ground or in garden beds?
2. If using garden beds, will the garden beds be raised or sunk?

3. If using garden beds, what materials will you use to construct the garden beds?

4. If using garden beds, what size are the garden beds?

5. Will soil or soil amendments be added to the garden? If so, what soil and/or amendments will be added and in what quantities?

6. Will your garden include any seating or pathways? If so, what materials will be used and in what quantity?

7. Create a list of all materials needed for your garden, including construction materials (wood, stone, brick), soil, soil amendments and plants along with any optional inclusions, like seating or pathways. If you created a pest control plan for your garden, include the materials for your pest control method.

8. Calculate the cost of all materials listed in question 4.

9. Evaluate the cost of your garden. Does it feel like an appropriate budget? Make cost adjustments as necessary.

Conclusion

Work with your group to make any necessary adjustments to your garden design. Your teacher will provide a rubric for what is required in the plan and in the sketch. Use the worksheet you completed during the year to finalize your plan and sketch of the garden. Store the completed plan and sketch in your group's binder until you are ready to build the garden model and create your poster for presentation.

Feedback

Submit your garden plan and sketch for teacher feedback. Your teacher will check that that all necessary components are present and the project is feasible. Revise your work based on the feedback you receive.

Modeling and poster preparation

After your group completes the garden plan and final design sketch, create a 3-D model of your garden. Based on your measurements and sketch, scale your model. A possible scale could be 5 centimeters to 1 meter. Mark your scale on the model and make sure that the units and scale remain consistent across your model. Use the materials supplied to build the 3-D model; heavier models should be built on plywood. Also make a poster presentation of your garden plan that includes all components required in

the rubric provided by your teacher. If needed, use time outside of class to finish the project.

Presentations

Your group will present your model and poster at a science fair-style event. Be prepared to answer questions about your design and plant choices and take notes on any critiques that might improve your design. Think of this as your opportunity to convince your school or another organization to implement your design.

