

Garden Connections

Trace how parts work together in a hydroponic growing system.

7.5.D “examine and model the parts of a system and their interdependence in the function of the system;”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Circle each named part of the hydroponic garden, then number 1, 2, and 3 beside three sentences that explain how one part affects another.

Lettuce Without Soil

- ① A classroom hydroponic garden grows lettuce without soil. Beneath the plants sits a reservoir containing water and dissolved mineral nutrients. A small pump pushes this solution through tubes to channels that hold the plants. The solution flows past the roots and returns to the reservoir. A timer turns the pump on and off at set times. Each part has a role, but the garden works as a system because materials and energy move among connected parts.
- ② Plant roots absorb water and nutrients from the moving solution. Leaves use light energy to make sugars, which fuel plant growth. The pump needs electrical energy, and the timer controls when it operates. If the pump stops, fresh solution no longer reaches the roots. The roots may dry out or receive too few nutrients, so leaf growth slows. A change in one part can affect several other parts, and the harvest depends on those connections.
- ③ Students can use observations to test whether the system is functioning. They check the water level, inspect tubes for clogs, and look for healthy roots and leaves. When roots take up water, the reservoir level falls, so students add more nutrient solution. If algae grows in a channel, it can block light or water flow. Cleaning the channel helps keep the connections working. A system model can show these parts, arrows for flows, and the effects of a failure.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Name two parts that deliver nutrient solution to the roots. Explain how they work together.

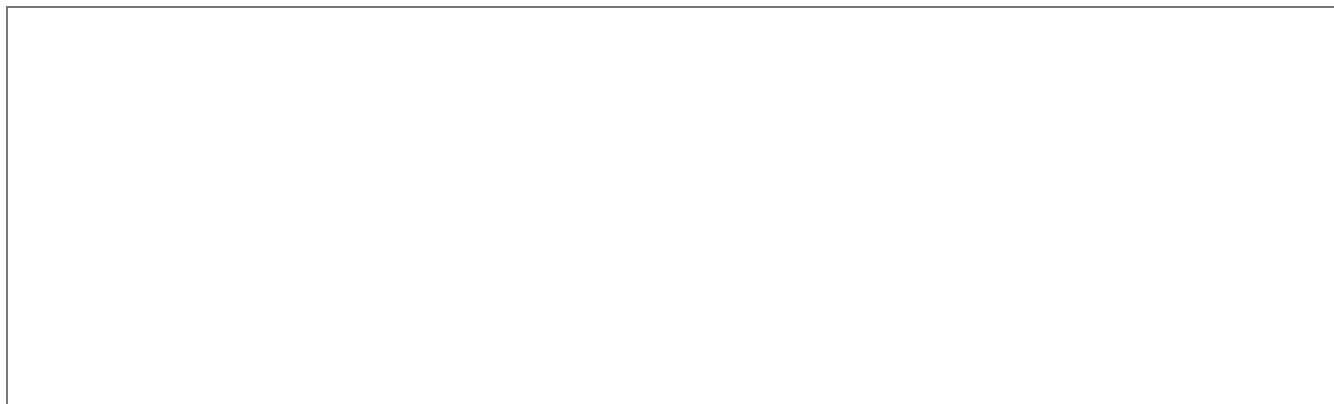
2 Make a cause-and-effect chain for what happens after the pump stops. Include the roots and the leaves.

3 What should a system model include to show the hydroponic garden's interdependence?

4 How can algae in a channel affect the garden system, and what action helps solve the problem?

3 YOUR TURN _____ Your own words

Draw a labeled model of a hand-washing sink system, including a water source, supply pipe, faucet, sink drain, and sewer pipe, and use arrows to show water movement. Write two sentences that explain how the parts depend on one another and predict what happens if one part fails.



PART 1 • READ AND MARK

Circle each named part of the hydroponic garden, then number 1, 2, and 3 beside three sentences that explain how one part affects another. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Name two parts that deliver nutrient solution to the roots. Explain how they work together.	The pump pushes nutrient solution through the tubes to the channels, where the solution flows past the roots.
2	Make a cause-and-effect chain for what happens after the pump stops. Include the roots and the leaves.	The pump stops, so fresh solution does not reach the roots. The roots may dry out or get too few nutrients, and leaf growth slows.
3	What should a system model include to show the hydroponic garden's interdependence?	It should show the parts, arrows for flows of materials or energy, and the effects of a failure.
4	How can algae in a channel affect the garden system, and what action helps solve the problem?	Algae can block light or water flow in the channel. Cleaning the channel helps keep the system's connections working.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Water source → supply pipe → faucet → sink drain → sewer pipe. The water source, supply pipe, and faucet depend on one another because water must pass through each part before it reaches the sink. If the supply pipe is blocked, water cannot reach the faucet, so people cannot wash their hands.

Accept equivalent descriptions of the pump, tubes, channels, roots, and nutrient solution. For the open task, accept any accurate labeled sink model with arrows, a clear dependency, and a logical failure effect.