All of the interconnected and overlapping predator-prey relationships in an ecosystem—including producers, consumers and decomposers—make up a food web. As one organism eats another, a food chain is formed. Each step along a food chain is known as a trophic level or feeding level, and every organism can be categorized by its trophic level.

- The most basic trophic level is **producers**—plants such as underwater bay grasses and free-floating algae that make their own food through photosynthesis. Producers are the basis of all food and influence the production of all other organisms.
- **Consumers** are organisms that eat plants, algae or other animals.
- **Decomposers** digest the bodies of dead plants and animals. They appear throughout the food web, breaking organic matter back down into nutrients for producers to use once again.

**An example of a food chain:**
The food chain starts with phytoplankton converting sunlight and nutrients into living tissue. Phytoplankton are then eaten by copepods, which are members of the microscopic animal community called zooplankton. Copepods are eaten by bay anchovies, which are eaten by large fish such as bluefish and striped bass. These large fish can then be harvested and eaten by humans. This is just one example of many that make up the Bay habitat.

**Food Webs and Maintaining Balance**
Each organism within a food web is connected to and depends on others for food. Filter feeders such as oysters, clams and menhaden must have enough plankton available to sustain themselves. Striped bass and bluefish, part of a higher trophic level, rely on menhaden and bay anchovies as their primary food source. A healthy ecosystem is one with a balanced food web—not too much production or consumption of any one of the producers or consumers. An ecosystem must be enormously productive to support substantial populations of species at the highest trophic levels; for example, every pound of commercial fish taken from the Bay requires almost 8,000 pounds of underlying producers and consumers. However, an overabundance of algae can be harmful, reducing oxygen in the water and blocking sunlight from reaching underwater grasses.

**Pressure on the Bay:**
There are several complex problems facing the Chesapeake Bay: from excess nutrients and sediment that pollute our waters, to the invasive species that crowds out native plants and animals, to changing climate that is already affecting our land, air, and water.

*Agriculture:* Agriculture is essential to all people: farms provide us with food and fiber, natural areas, and aesthetic and environmental benefits. But **agriculture is also the single largest source of**
nutrient and sediment pollution entering the Bay. Unfortunately, some agricultural practices—including over-irrigating farmland, over-tilling soil and over-applying fertilizers and pesticides—can push pollution into the Bay and its local waterways.

Agriculture is the single largest source of nutrient and sediment pollution entering the Chesapeake Bay. But well-managed agricultural lands can offer the Bay watershed a number of benefits and services: sustained crop yields, restored rivers and streams, and valuable insect, bird and animal habitat.

*Blue Crabs:* There is nothing more “Chesapeake” than the blue crab. The Bay’s signature crustacean is one of the most recognizable critters in the watershed, and supports commercial and recreational fisheries. But blue crabs are vulnerable to pollution, habitat loss and harvest pressure, and their abundance has fluctuated over time. As both predator and prey, blue crabs are a keystone species in the Chesapeake Bay food web. Blue crabs use underwater grass beds as nurseries and feeding grounds. A drop in underwater grass abundance—due to warming waters, irregular weather patterns and pollution—has been linked to the decline of blue crabs. Research has shown that grass beds protect crabs from predators and boost their growth rates. By making water quality improvements, restoring underwater grasses and creating proper harvest management regulations we can protect blue crab populations and maintain the resource into the future.

*Invasive Species:* Invasive species are plants and animals that have been introduced, whether accidentally or on purpose, into their current habitat. They can cause harm when they establish themselves at the expense of native plants and animals, encroaching on their food or habitat.

Although some invasive species removal projects have seen success, once established, populations of invasive species can be difficult to remove. Invasive species’ new environments often lack the natural controls—like predators or disease—that might otherwise keep them in check. Controlling invasive species takes time, money, cooperation and commitment, which is why it is crucial to prevent them from being introduced in the first place.

*Stormwater Runoff:* What happens to a drop of rain when it falls onto the ground? It may land on a tree and evaporate; it may land on a farm field and soak into the soil; or it may land on a rooftop, driveway or road and travel down the street into a storm drain or stream. Precipitation runs across the land and into the nearest waterway is considered stormwater runoff. Increased development across the watershed has made stormwater runoff the fastest growing source of pollution to the Chesapeake Bay. To lessen the impacts of stormwater runoff on the Bay, consider reducing the amount of precipitation that can run off of your property. Install a green roof, rain garden or rain barrel to capture and absorb rainfall; use porous surfaces like gravel or pavers in place of asphalt or concrete; and redirect home downspouts onto grass or gravel rather than paved driveways or sidewalks.
Modified Science Assignment Week 9 Grade 7

What is at trophic level?

What is the role of a decomposer?

Name One way that food webs help maintain balance within the Chesapeake Bay:

Use the text to provide a description of how each of the following puts pressure on the Bay and provide tips or suggestions on how we can help fix these issues:

<table>
<thead>
<tr>
<th>Issue putting Pressure on the Bay</th>
<th>Why do we care? How is it affecting the Bay?</th>
<th>What can we do to help?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>It can be harmful to the organisms in the bay killing or poisoning different species causing habitat loss. Over-irrigating farmland, over-tilling soil and over-applying fertilizers and pesticides seep into our waterways and the Chesapeake Bay causing pollution.</td>
<td>We can improve making water quality improvements, restoring underwater grasses and creating proper harvest management regulations we can protect blue crab populations and maintain the resources for the future.</td>
</tr>
<tr>
<td>Blue Crabs:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invasive Species:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stormwater Runoff:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As you have read, humans can hurt the Bay but we can also make choices to help protect and save the Bay. It is your turn to create awareness and to inform others about the balancing act between humans actions and the health of the Chesapeake Bay.
Write to inform others how human activity can have both a positive and negative impact on the health of the Chesapeake Bay. You must include at least two pieces of evidence and reasoning from the text for support FOR EACH (That means two ways humans hurt the Bay and 2 ways humans can help the Bay):

Graphic organizer to assist your writing use textual evidence from the article above:

<table>
<thead>
<tr>
<th>Name 2 ways Humans hurt the bay</th>
<th>Name 2 ways Humans can help the bay</th>
</tr>
</thead>
</table>

Write your answer in paragraph form with complete sentences:

**To get started:**

Human activity can have both a positive and negative impact on the health of the Chesapeake Bay. One way humans hurt the bay is by...........