

# Living Systems

## INVESTIGATIONS GUIDE



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## Investigation 1 - Systems

### PART 4: Recycling

NGSS Standards:

5-PS3-1

5-LS2-1

5-ESS2-1

4 sessions

# LIVING SYSTEMS—Investigation 1, Part 4

## Investigation 1, Part 4: *Recycling*



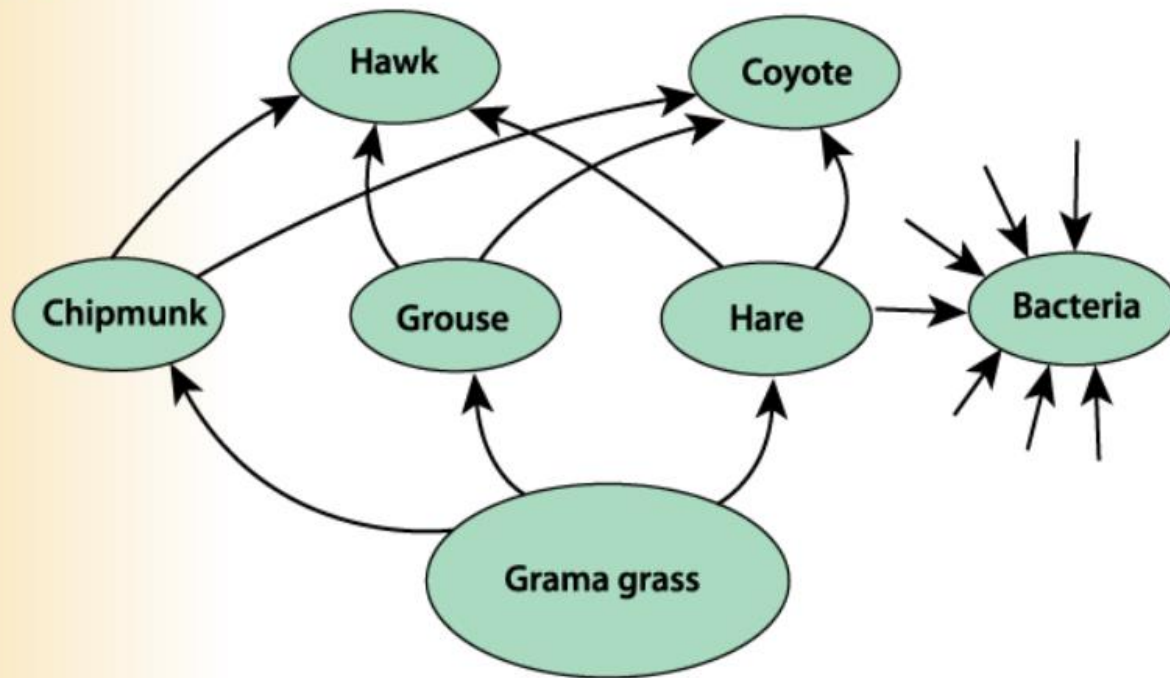
**What happens when compost worms  
interact with organic litter?**



# Reviewing Food Webs



Which organisms in this woods ecosystem food web are producers, which are consumers, and which are decomposers?



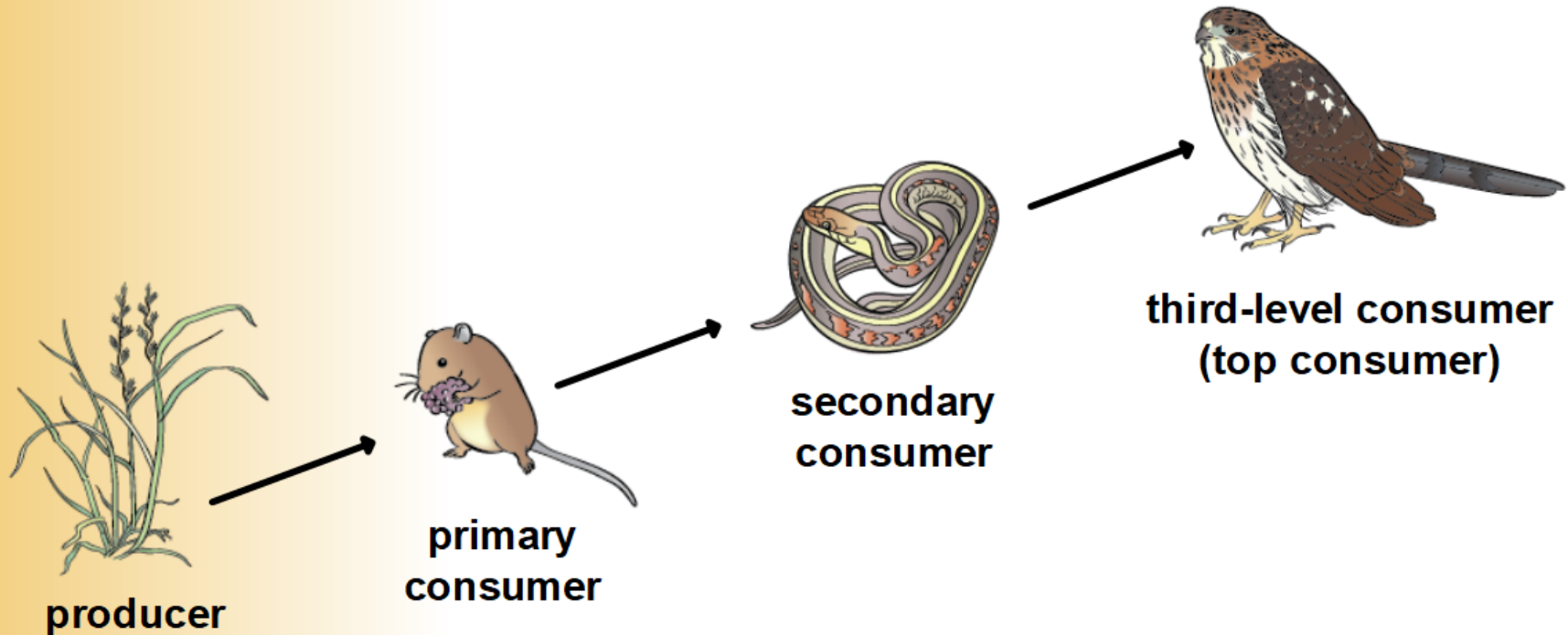
Why do animals eat other organisms?

**NOTES:** Most food webs start with plants. Because plants make their own food, using energy from the Sun, they are called **producers**.

# Consumers



- Animals that eat plants only are primary consumers.
- Animals that eat primary consumer animals are secondary consumers.
- Animals that eat plants and animals are third-level consumers.
- Animals at the top of the food web are top consumers. They are rarely taken and eaten for food.



**NOTES:** Animals can't make their own food, so they get their food by eating producers or other animals. Animals are **consumers**.

# Decomposers



What happens to the system when the top consumers and individual members of other food levels are not eaten?

What happens to organisms that are not eaten by other animals when the organisms die?

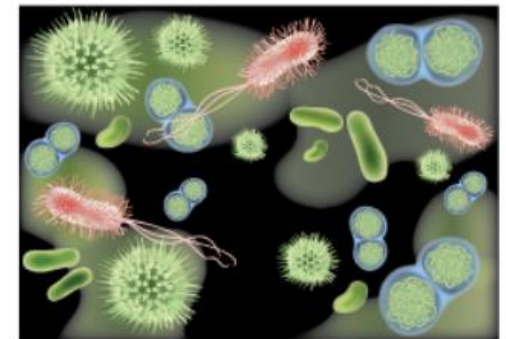


The organisms that clean up the ecosystem are called decomposers. There are two groups of decomposers:

## Grinders



## Finishers



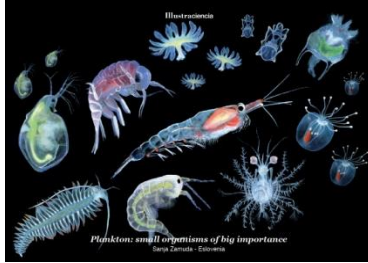
**NOTES:** The organisms that clean up the ecosystem are called **decomposers**. Decomposers consume all the waste and dead plant and animal material in an ecosystem.



# Producers, Consumers, Scavengers, Decomposers



**Producers** (*grass, plants, trees, plants*)  
*Organisms that make their own food*



**Primary Producers (1<sup>st</sup>)** (*plankton and algae*)  
*The main producers in oceans and lakes  
created by photosynthesis*



## Types of Consumers:



**Herbivores:** *consumers that eat ONLY plants*

**Carnivores:** *consumers that eat ONLY animals*



**Omnivores:** *consumers that BOTH plants & animals*

# Producers, Consumers, Scavengers, Decomposers

## Order of Consumers:



**Primary Consumers (1<sup>st</sup>):** *herbivores, consumers that eat plants*



**Secondary Consumers (2<sup>nd</sup>) :** *carnivores, animals that eat plant-eating animals*



**Tertiary Consumers (3<sup>rd</sup>):** *carnivores, animals that eat meat-eating animals*



**Scavengers:** *animals that eat dead organisms*

# Producers, Consumers, Scavengers, Decomposers



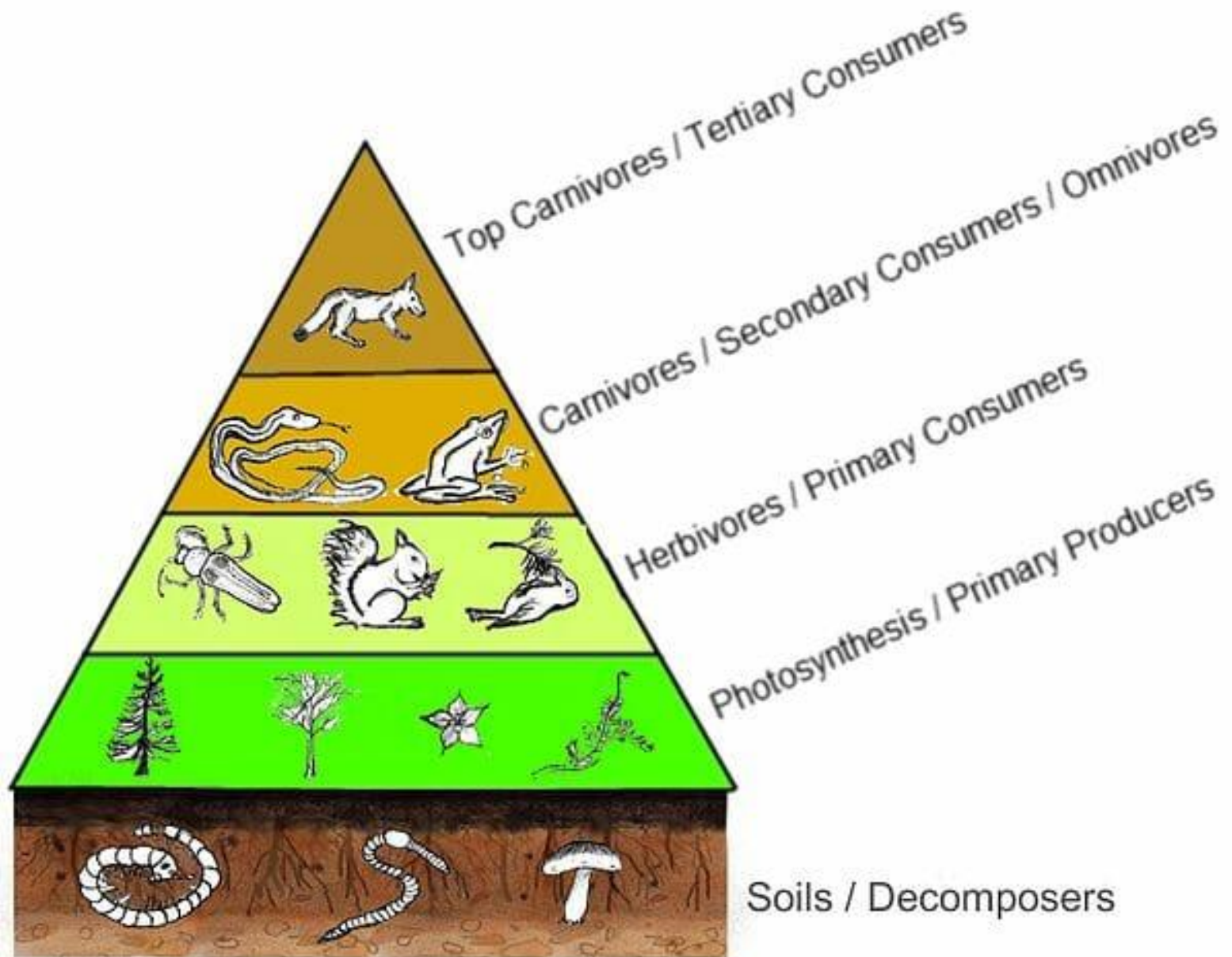
## Decomposers:

*Organisms that break down the wastes or remains of other organisms*





# Producers, Consumers, Scavengers, Decomposers



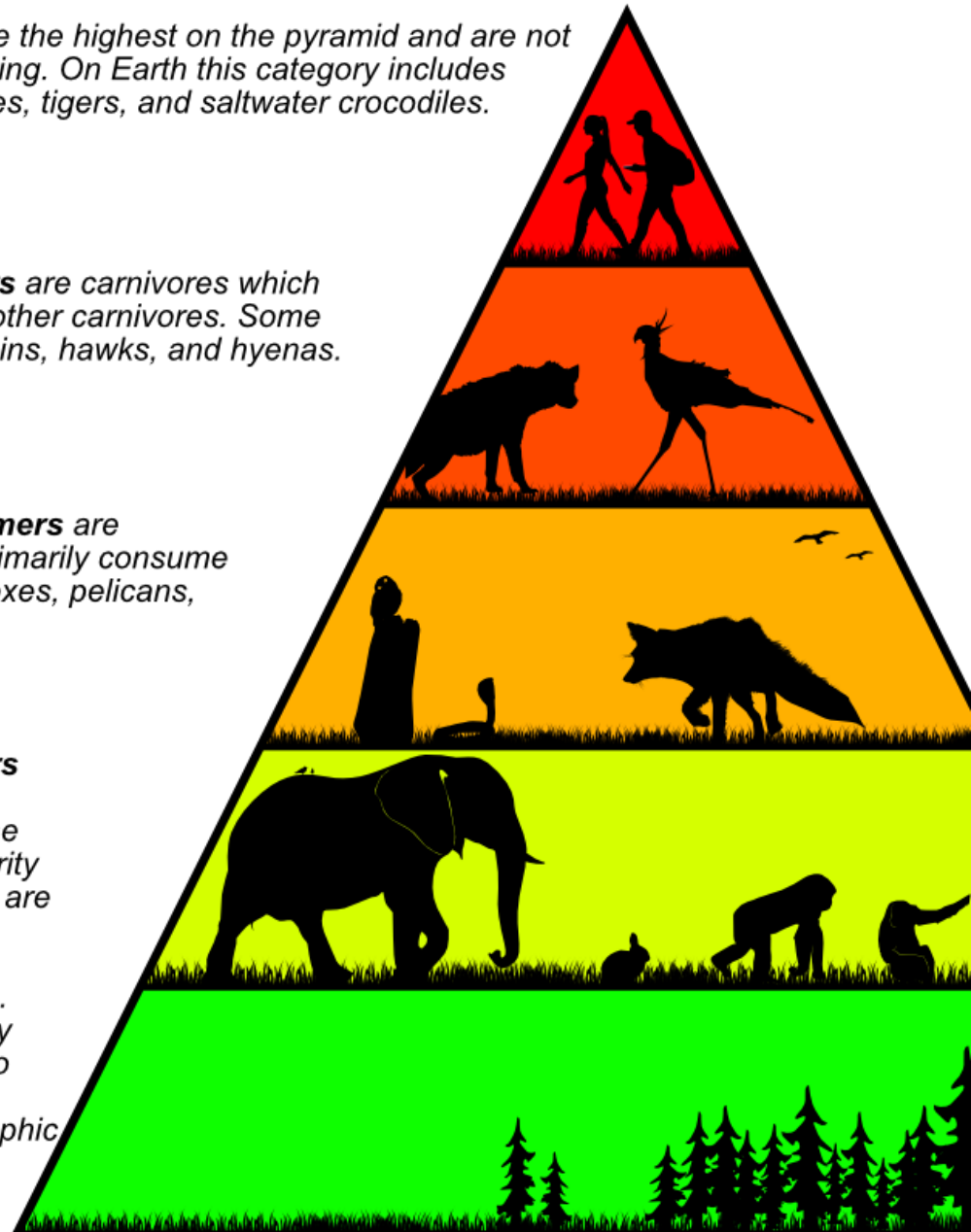
# Producers, Consumers, Scavengers, Decomposers

**Apex predators** are the highest on the pyramid and are not consumed by anything. On Earth this category includes humans, orca whales, tigers, and saltwater crocodiles.

**Tertiary consumers** are carnivores which primarily consume other carnivores. Some examples are dolphins, hawks, and hyenas.

**Secondary consumers** are carnivores which primarily consume herbivores. Think foxes, pelicans, snakes.

**Primary consumers** are herbivores. Percentage wise, the overwhelming majority of animals on Earth are primary consumers (ants, rabbits, phytoplankton, etc.). They convert energy from **producers** into energy that the remainder of the trophic levels consume.

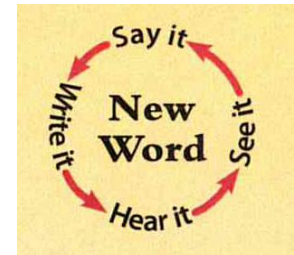


# Compost Worms

**Compost** worms live in the ecosystem in the space between the soil's surface and the top of the layer of leaf litter.



“**Compost**” is decaying organic material.



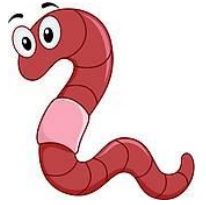
What happens when compost worms interact with **organic** litter?



**NOTES:** “Organic” means from living or once living organisms. Example: Newspaper is nonliving but was derived from trees that were once living, so it is organic!



# Redworm Habitat Teams (HR257)



<b>Garden Soil &amp; Container</b>	name	name	name	name
<b>Newspaper &amp; Spray Bottle</b>	name	name	name	name
<b>Eggshells, Carrots &amp; Lettuce</b>	name	name	name	name
<b>Coffee Grounds &amp; Tea Leaves</b>	name	name	name	name
<b>Apple core &amp; Banana Peels</b>	name	name	name	name
<b>Twigs &amp; Leaves</b>	name	name	name	name



## Video Prep:

How to set up compost worm habitat.

[https://www.youtube.com/watch?v=V8miLevRI\\_o](https://www.youtube.com/watch?v=V8miLevRI_o)

### *Investigation 1, Part 4*

# A Redworm Habitat

1. Put about 1 to 2 cm of garden soil in the jar.
2. Tear two sheets of newspaper into strips and moisten the paper.
3. Fill the jar with the damp newspaper strips until it is almost full.
4. Add some natural leaf litter and a small amount of fresh household waste.
5. Once everything is in the jar, screw on the lid and give the jar a good shake—but not a violent shake—to mix the contents.
6. Moisten the contents if needed.
7. Count 15 to 18 **redworms** and put them into the container.



# Blocking the Light

In their natural habitat, worms live under layers of dead leaves where it is dark.

Create a light barrier on the worm habitat.

- a. Open a black plastic bag.
- b. Place the worm habitat in the bag.
- c. Draw the mouth of the bag around the neck of the jar.
- d. Secure the mouth of the bag with a rubber band.





**TASK:** In your notebooks, answer the following five questions.....

*Investigation 1, Part 4*

# The Worm System



**1** Is the worm habitat a system? Why or why not?



**2** Write a list of the parts of the system in your notebook.



**3** How is your worm habitat like a subsystem?

**4** What do you think will happen in your worm habitat?

**5** What questions do you have about this system?



End session

Read “**Nature’s Recycling System**”. (Article posted on our **classroom website**). Pages 18 - 20

Answer “Thinking About” questions #1-3



## Nature’s Recycling System

**T**hink of a tree. Like any organism, the tree will eventually die and fall to the forest floor. What happens to it? Does it pile up with other dead trees, plants, and animals, year after year?

When a tree falls in the forest, it is used for food by decomposers.

Organisms that feed on dead trees are called **detritivores**. Some detritivores, such as beetle larvae and worms, dig into the trunks and eat the dead bark and wood. As they eat through the wood, the tree starts to fall apart. Other detritivores, such as termites, dig in and consume more of the wood. As the wood is exposed, fungi and bacteria move in. They consume the last of the wood and the waste left behind by the first decomposers. After several years, all that remains is minerals.



Animal bones, dead leaves, twigs, and fruit are organic matter called **detritus**.

Let’s look more closely at the recycling system. In the deciduous forest of the eastern United States, **detritus** is most visible in fall. Then you are sure to see a layer of dead leaves and twigs, a few large tree limbs, and whole fallen trees. You might see a feather or a clump of fur left behind by a bird or raccoon, or scat (a pile of animal waste). You might find seeds and fallen fruit. You could find a piece of snake skin, or the bones of an animal. All of these bits of organic matter are detritus, and detritus is part of every healthy ecosystem.

You might think that detritus is waste and trash. But decomposers use this accumulation as food. The first decomposers to use the detritus are the detritivores. They concentrate on the largest parts of the detritus layer. Animals like termites, beetle larvae, isopods, and worms start to eat the fallen leaves, and dead wood. As they eat the dead matter, the mass of detritus decreases slowly. The detritivores leave waste of their own, which becomes detritus.



Termites eat wood and other detritus.



## The Dirt on Decomposers

<https://www.youtube.com/watch?v=uB61rfeeAsM>





# BIG IDEAS

Look back at your notebook, tag the 3 most important things you have learned in this investigation.

- What is a system?
- What is a subsystem?
- How is Earth a system?
- What are the four main subsystems of the Earth system?
- What are food chains and food webs?
- What organisms make up the different levels of a food web?
- What is the role of decomposers?



**compost** – decaying organic material.  
*One kind of decomposer organism is  
the **compost worm**.*

**organic** – “from living or once living  
organisms”. Newspaper is nonliving  
but was derived from trees that were  
once living, so it is organic.

redworms – *a decomposer organism.*  
*They are **grinders**.*