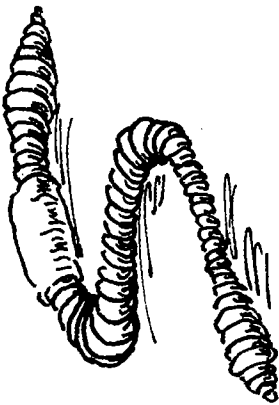
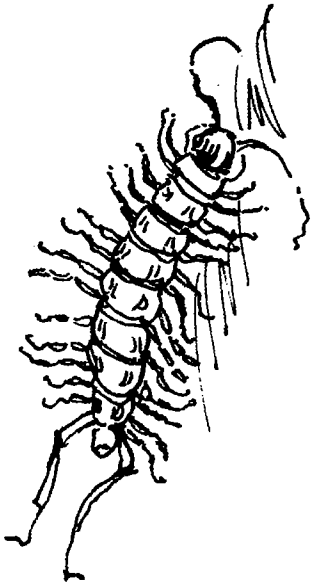


Soil Critter Chart



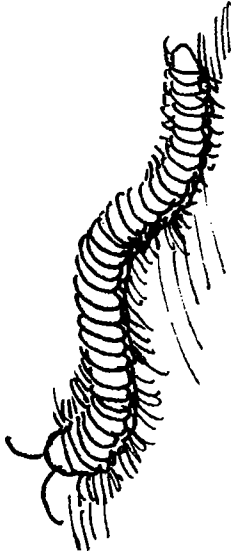
EARTHWORM

Segmented soil critters without legs that move by expanding and contracting their bodies like an accordion. As earthworms eat, they break down plant materials into smaller pieces, aerate the soil, and add nutrients in the form of castings.



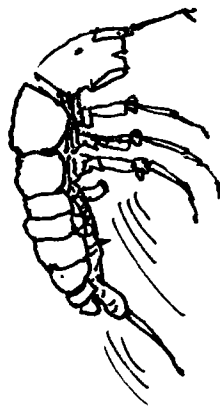
CENTIPEDE

Predatory soil critters that move about quickly on many legs. Their bodies are flattened and each body segment has only one set of legs. Gloves should be worn when handling these critters as they have a poisonous bite.



MILLIPEDE

Long, rounded soil critters that have hard segmented bodies with many legs. Each body segment has two pairs of legs. As vegetarians, millipedes eat holes in fallen leaves (among other things), thus enabling smaller decomposers to continue the decay process.



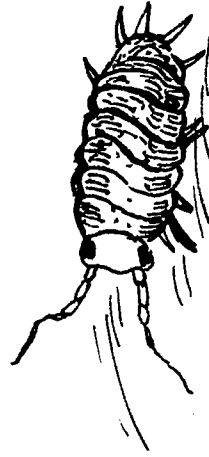
SPRINGTAILS

These soil critters literally spring to life when approached. A pointed projection folded inward at the tip of their abdomens can be quickly extended, acting like a spring to propel them into the air, hence their name. Springtails feed on fungi and other molds, bacteria and decaying matter. They are important producers of humus.



MITE

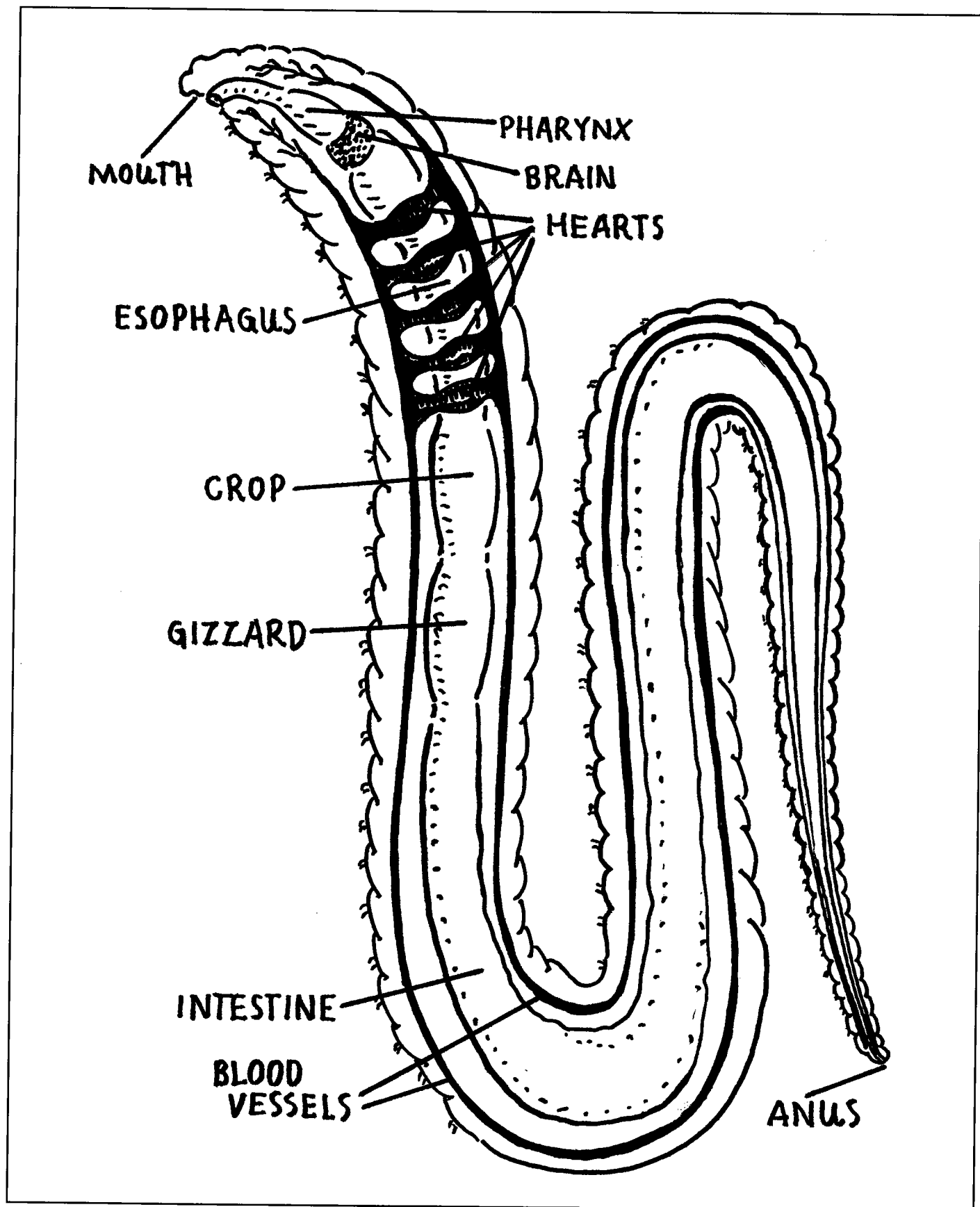
These very small soil critters look like minute dots moving about in the soil. There are thousands of species and they range in color from white to bright red. Mites are related to spiders and have eight legs and a round body. They eat fungi, other molds, and decaying wood and leaves.



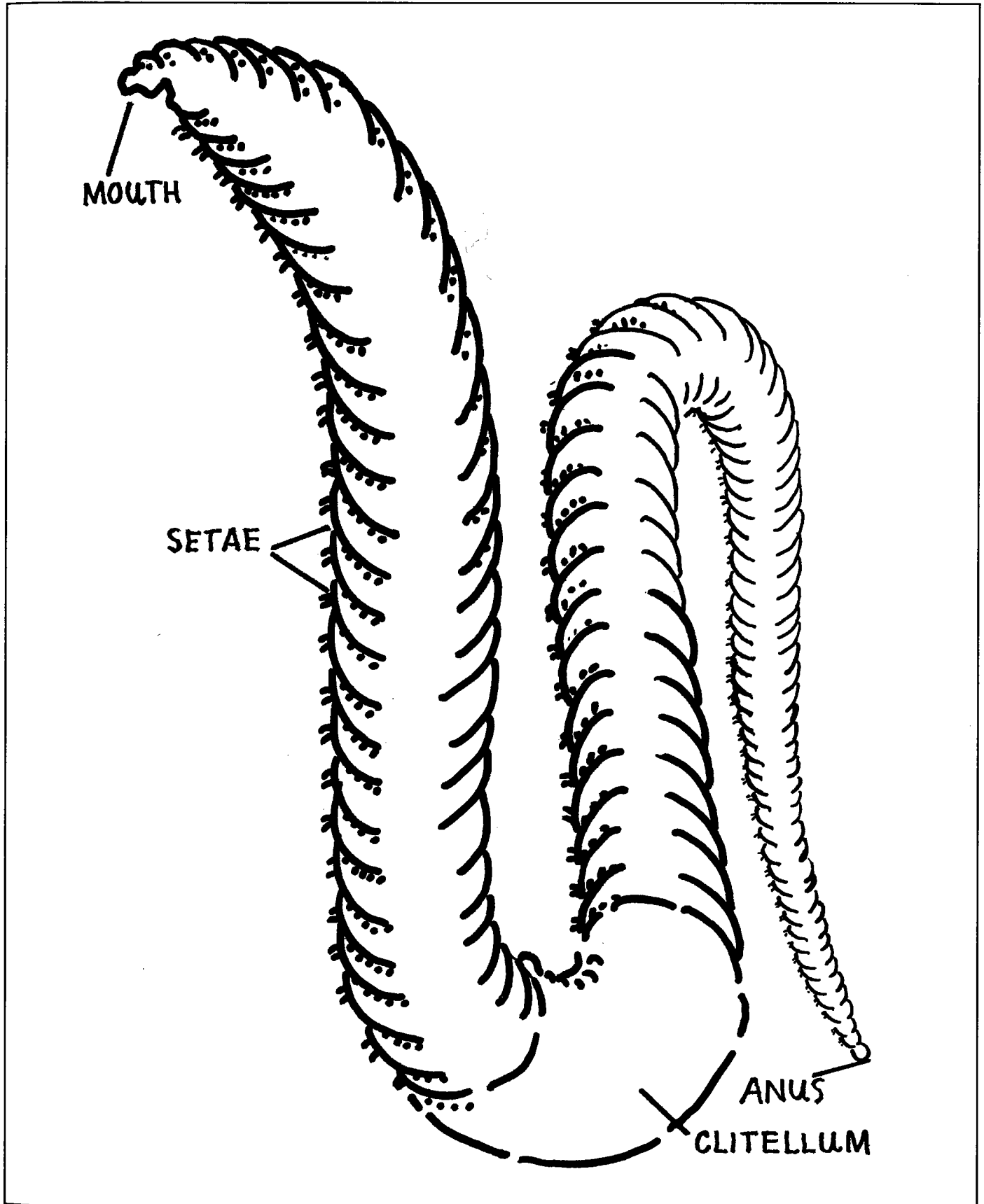
ISOPOD

These soil critters are covered with flattened plates of armor, resembling tiny armadillos. They are brown or gray in color. Isopods eat decaying leaves and wood and are often found in damp leaf litter and rotting wood. They are commonly called sowbugs or, if they roll into balls when disturbed, pillbugs.

The Inside of a Worm

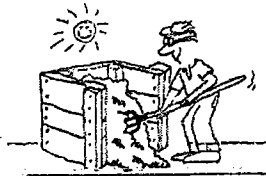


The Outside of a Worm



Name _____

Date _____



CELEBRATE COMPOSTING!

Find each of the following words:

FOODSCRAPS

CASTINGS

OXYGEN

BEDDING

PEELS

WORMS

GARBAGE

RECYCLE

LANDFILL

DECOMPOSE

WASTE

FLOWER

AEROBIC

DIGESTION

GARDEN

ORGANIC

COMPOST

BIN

REDUCE

FERTILIZER

FRUITFLY

ROT

SOIL

E A I S N B I R L D E C O M P O S E A D T D Y
E W A S T E X A O L E E S G R I S O I F D E E
D D B I G E R Y E I I E A R A M S G G D N L L
T N I L E P I I L O L F E Y O C E O O O N C R
L E E F L O W E R R N Z D M N S L C A L E Y O
O G O Y R E D U C E I G G N T E E D I B D C E
R Y I E W O R M S L O E Y I A R S O E Y R E C
T X T L S E E C I D E I O F S L S D Y L A R E
Y O R T O S O T C S N N D D E M D L S S G T C
A M O Y E P R R L L C A M C W I W R G O C W O
S N D A N E O E L G T C Y R N A Z W N C I D R
L U N O F R E O R O T R F G S C O A I O N A E
M O F L O P C O M P O S T R E B I N T R A C L
E G A R B A G E E F O O D S C R A P S W G I S
I S O R R D P P A E R O B I C F R D A R R F A
T N F L O F R U I T F L Y C F A E F C A O R D
C T S S Y G E Y O E E I I U O R A R E E I Y A
O F D O L E T E P I S E W U N A M L P T S O E



Compost is Fun!

Composting Words

Words can be found down, across, diagonal and backwards.

G	C	I	N	A	G	R	O	K	T	R	E	E	S	A
R	N	M	A	T	U	R	E	A	S	C	H	T	N	O
O	G	I	K	L	L	A	M	S	E	O	I	R	E	D
W	R	X	T	U	R	F	N	U	T	R	D	I	G	W
W	E	E	D	S	E	E	D	S	S	K	I	M	O	O
M	E	O	G	E	O	R	G	A	N	I	S	M	H	R
R	N	I	T	A	E	P	B	R	O	W	N	S	T	M
I	S	A	E	T	A	E	M	A	M	E	N	D	A	B
O	I	U	N	T	N	E	G	O	R	T	I	N	P	I
C	O	N	T	A	I	N	E	R	C	A	R	B	O	N
U	X	F	E	Z	I	S	E	L	C	I	T	R	A	P
R	Y	U	Q	W	S	E	R	U	N	A	M	U	H	L
E	G	Y	D	O	O	W	I	G	G	L	E	R	S	O
L	E	V	A	R	G	O	S	D	N	A	L	T	E	W
L	N	Y	T	I	L	A	U	Q	R	E	T	A	W	V

These 37 words are hidden in the box above:

TEA
 GREENS
 BROWNS
 CARBON
 NITROGEN
 WORM BIN
 ORGANISM
 VERMICOMPOSTING
 TURF
 RED
 WIGGLERS
 MATURE
 WOODY

TREES
 GRAVEL
 SOD
 WATER QUALITY
 pH
 PARTICLE SIZE
 TEST
 STIR
 MEAT
 WEED SEEDS
 OXYGEN
 MANURE
 PLOW

AMEND
 WETLANDS
 PATHOGENS
 ORGANIC
 HOT
 COIR
 CURE
 GROW
 PEAT
 SMALL
 CONTAINER
 MIX

Why do redworms* **C - R - A - W - L** off ?

C - *Change of habitat*

If worms have been raised with a particular feedstock or bedding material and are then transferred to a system that uses completely different material and feed, the worms may crawl away from the new, shockingly different habitat.

A few good questions to ask the grower that you purchase worms from are :
What species of worm they raise, what bedding are they raised in, and what is their primary feedstock? It would be best if a buyer gets worms that are raised in a similar environment that they intend to use.

To keep worms in the bin so they'll adapt to a new environment, keep them in a place where you can leave a light on. Since worms are sensitive to light, they'll stay in the bin to avoid the light. It is imperative that the light stay on at night or you may wake up to a mass vermicide.

If you've had your system in operation for a while and the worms crawl off, perhaps you've changed their habitat by adding too much salty, oily or acidic material. Some people have used lime to adjust the pH and caused more harm than good. Crushed eggshells work very well to help balance your system and provide grit for the worm's digestion.

A word of caution... Be aware that there are some growers that call their worms "redworms" but are actually the "India Blue" (*Perionyx excavatus*), which is a thinner worm that is red but has a translucent blue sheen to it when observed in bright sunlight. The "India Blue" worm is less tolerant of temperature and moisture variations and is prone to migrate out of bins en-masse for no apparent reason. The P.E. is a worm you don't want for lots of reasons!! Stick with the *Eisenia fetida* and you and they will be happy campers.

R - *Rain*

Just before and during a thunderstorm or any low-pressure system, it is natural for worms to crawl up, down and around a plastic worm bin. Worms are great natural barometers.

A - *Absence of Air*

Overfeeding, too much moisture, poor bin design, or not enough ventilation can severely reduce the amount of air available to the worms. Anaerobic bacteria live in the absence of oxygen. If there is a foul smell in the bin it may indicate the presence of large numbers of anaerobic bacteria. If this occurs, the environment may lack enough oxygen for the worms to breathe and they may crawl outside of the bin seeking air or die. Be sure there are enough ventilation and drainage holes in your system and aerate the bedding promptly if a bad smell occurs.

W - *Water - too much or too little*

Too much water can cause the bedding to become so compacted that there aren't enough pockets of air for the worms to breathe. Putting wood chips, strips of cardboard, straw, etc., within the bedding can ensure that there is enough air throughout their environment.

Not enough water can cause your worms to die or try to escape. Lack of water will cause your castings to dry out and harden. The population of important microorganisms is lower when the castings dry out, thus diminishing the castings' effectiveness. In order to produce the most useful castings, be sure to manage your moisture carefully. Bedding should have the moisture of a wrung out sponge.

Don't pour water through your vermicomposting system to make worm tea.
To make worm tea: take a cup of well processed castings, soak overnight in a gallon of water, shake to aerate, and use within 12 to 24 hrs.

L - *Lack of food*

If you don't feed your worms regularly they may go looking elsewhere for needed sustenance or starve. Feed in thin layers, no thicker than 1¼ inch, to avoid heating up of waste. Bury the food in the bedding or top feed and cover with shredded moist newspaper. Worms can eat 3 times their weight a week.

But please - **DO NOT OVER FEED !!!**

Under what conditions do redworms* **T - H - R - I - V - E ?**

T - Temperature – optimum is between 68° - 77°F

At 40° F the worms are less active, they can survive in the mid 30's for short periods. Worms become stressed at 85° F.

Feeding too much can cause bin to heat up and kill worms or cause them to escape!

H - H₂O - Moisture – 75%-85% moisture

Bedding should have the same moisture as a wrung out sponge. Squeeze a handful of bedding, 1 or 2 drops should be released. Drainage is extremely important in any vermicomposting system.

R - Recycle organic material only (anything that was once alive and is now dead)

Fruits	Cereals	Pastas
Egg shells	Coffee & Filters	Tea bags
Paper – shredded	Limited citrus	Beans
Breads	Aged manures	Vegetables

No dairy, fish or meat products.

Worms will eat it but these items can smell bad and attract pests.

Oily or salty foods can harm worms.

Recycle pet waste in a separate system.

➔ **Add more food only when you see that the worms are completely involved in the food that is already there.** ←

Feed in layers no thicker than 1 ¼ inch to avoid heating up. DO NOT OVERFEED!!

I - Invertebrates & Microbes found in a healthy system

Beneficial creatures that are harmless to you, your worms, and your plants:

Enchytraeids or pot worms	Flies and their larvae	Fungi
Bacteria (Aerobic)	Spiders & Mites	Springtails
Gnats and their larvae	Millipedes	Protozoa
Molds (beware of allergies to spores)		Beneficial Nematodes

Invertebrates and Microorganisms to avoid:

Anaerobic Bacteria – characterized by a bad smell, caused by too much moisture & or overfeeding (lack of oxygen) - aerate bedding ASAP

Ants - bedding too dry

Centipedes - carefully remove

Beetles – remove

Planarians or flat worms - remove & destroy

V - Ventilation – All the creatures in the system need AIR and lots of it!

E - Environment - pH 5.5 is preferred

Worms tolerate a range from pH 4 to pH 9.

The worms are sensitive to light so keep it dark.

Good bedding can be any combination of aged manures, shredded paper products, coir (coconut fiber), decomposing leaves, straw, wood chips, peat moss, a handful of soil to seed bin with microorganisms, etc. Worms can eat about 3 times their weight a week.

Redworms mature in 8 weeks & double in biomass every 3-4 months under ideal conditions
1 mature worm could produce 96 worms in 6 months (2 cocoons X 24 weeks X 2 hatchlings)

*The more you know about worms and what they need,
the more you'll enjoy the vermicomposting experience.*

Find worms, worm bins, books and lots of information at www.happydranch.com.

**Eisenia fetida* & *E. hortensis*

Courtesy of Happy D Ranch

www.happydranch.com

Caring For Your Worms Take Home Sheet

Maintaining Your Worm Bin

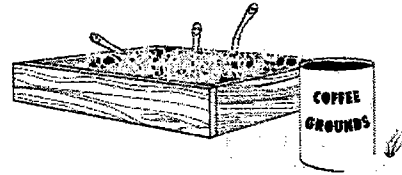
Red worms can eat ½ to 1 times their own weight in food each day, so add food scraps according to how many worms you have. The smaller the food scraps, the faster the worms will digest them, so try breaking up large items, like whole apples, before adding them to the bin. To avoid fruit flies and odors, always bury food under the bedding, keeping a 4" to 6" layer of bedding over the worms and food in your bin. Add fresh bedding every 1-3 weeks. Don't dump and run! Keep bedding as moist as a wrung-out sponge, adding water when necessary. Add dry bedding to absorb excess moisture. Remember that worms are allergic to sunlight, so keep the lid on!

Do Compost	Don't Compost
Vegetable scraps	Meat, fish or poultry
Fruit rinds & peelings	Bones
Bread, grains & pasta	Dairy products
Tea bags	Greasy or oily foods
Crushed eggshells	Dog and cat waste
Coffee grounds and filters	Non-organic materials
Paper napkins	i.e. plastic, metal, glass

Harvesting and Using Worm Compost

Harvest worm compost at least once each year to keep your worms healthy. You can start harvesting 2-3 months after you set up your bin. Simply reach in and scoop out the brown crumbly compost; worms and all. You can also move the contents of your bin to one side, place fresh bedding and a handful of soil in the empty space and bury food there for a month or two. Harvest the other side after the worms have migrated to the new food and bedding.

Using worm compost will help your plants thrive by adding nutrients and humus to the soil. Sprinkle a ¼" to 1" layer at the base of indoor or outdoor plants, or blend no more than 20% worm compost into potting mix or garden soil.



PROBLEMS	CAUSES	SOLUTIONS
Worms are dying, disappearing, or crawling out of the bin	Food and bedding all eaten	Harvest compost, add fresh bedding and food
	Too dry	Add water until slightly damp
	Extreme temperatures	Move bin so temp. is between 40-80 degrees F (ideally 60-70 degrees)
	Too acidic	Remove citrus scraps, add ¼ cup baking soda
Bin attracts flies and/or smells bad	Food exposed/overfeeding	Add 4"-6" layer of soil or bedding & stop feeding for 2-3 weeks
	Non-compostables present	Remove meat, pet feces, plastic, metal, etc:
Sowbugs, beetles in bin	These are good for your worm compost!	

For more info go to: <http://www.anr.state.vt.us/compost>
or call the VT ANR Compost Hotline: 1-800-932-7100

MORE COMPOST POETRY

This Compost

By Walt Whitman 1819-1892

Something startles me where I thought I was safest,
I withdraw from the still woods I loved,
I will not go now on the pastures to walk,
I will not strip the clothes from my body to meet my lover the sea,
I will not touch my flesh to the earth as to other flesh to renew me.

O how can it be that the ground itself does not sicken?
How can you be alive you growths of spring?
How can you furnish health you blood of herbs, roots, orchards,
grain?
Are they not continually putting distemper'd corpses within you?
Is not every continent work'd over and over with sour dead?

Where have you disposed of their carcasses?
Those drunkards and gluttons of so many generations?
Where have you drawn off all the foul liquid and meat?
I do not see any of it upon you to-day, or perhaps I am deceiv'd,
I will run a furrow with my plough, I will press my spade through
the sod and turn it up underneath,
I am sure I shall expose some of the foul meat.

2.
Behold this compost! behold it well!
Perhaps every mite has once form'd part of a sick person--yet
behold!
The grass of spring covers the prairies,
The bean bursts noiselessly through the mould in the garden,
The delicate spear of the onion pierces upward,
The apple-buds cluster together on the apple-branches,
The resurrection of the wheat appears with pale visage out of its
graves,
The tinge awakes over the willow-tree and the mulberry-tree,
The he-birds carol mornings and evenings while the she-birds sit
on their nests,

The young of poultry break through the hatch'd eggs,
The new-born of animals appear, the calf is dropt from the cow,
the colt from the mare,
Out of its little hill faithfully rise the potato's dark green leaves,
Out of its hill rises the yellow maize-stalk, the lilacs bloom in
the dooryards,
The summer growth is innocent and disdainful above all those
strata of sour dead.
What chemistry!
That the winds are really not infectious,
That this is no cheat, this transparent green-wash of the sea which
is so amorous after me,
That it is safe to allow it to lick my naked body all over with its
tongues,
That it will not endanger me with the fevers that have deposited
themselves in it,
That all is clean forever and forever,
That the cool drink from the well tastes so good,
That blackberries are so flavorful and juicy,
That the fruits of the apple-orchard and the orange-orchard, that
melons, grapes, peaches, plums, will none of them poison me,
That when I recline on the grass I do not catch any disease,
Though probably every spear of grass rises out of what was once
catching disease.

Now I am terrified at the Earth, it is that calm and patient,
It grows such sweet things out of such corruptions,
It turns harmless and stainless on its axis, with such endless
successions of diseas'd corpses,
It distills such exquisite winds out of such infused fetor,
It renews with such unwitting looks its prodigal, annual,
sumptuous crops,
It gives such divine materials to men, and accepts such leavings
from them at last.