Cycling of Biomass

TEKS 7.5B: THE CYCLING OF MATTER WITHIN LIVING SYSTEMS SUCH AS THE BIOMASS DECAY IN A COMPOST BIN
What is the difference?
What is Biomass?

- Is the **organic material** made from **plants and animals**.  
  *(Organic means it contains the element carbon and is made from plant or animal products)*
- contains **stored energy** from the **sun**.
- This energy is from plants when they capture the sun's **radiant energy** in a process called **photosynthesis**.
- The **chemical energy** in plants gets **passed on to animals and people** that eat them.
Biomass Pyramids

- Demonstrate how matter is distributed.
- It expresses the total dry weight (without the water) of the organisms existing in each trophic level.
- Each species is limited in its total biomass by its trophic level.
- Each level has less and less biomass. Think about it: the number of individuals in the predator population is much smaller than that in the prey population.
Example biomass pyramid
All organic matter is known as biomass, and the energy released from biomass when it is eaten, burned or converted into fuels is called biomass energy.
Biomass

- Renewable Energy Source

**WHY?**

because we can always grow more trees and crops, and waste will always exist. Some examples of biomass fuels are wood, crops, manure, and some garbage.
Where does biomass (for energy) come from?

- Biomass is obtained from any plant, human or animal derived organic matter.
- Wood from trees, agricultural crops, wood factory waste, and the construction industry
- Burned wood from forest fires
- Animals and animal droppings
HOW WAS BIOMASS USED IN THE PAST?

- Biomass was the first fuel mankind learned to use for energy.
  - Burning wood for warmth and cooking and keeping wild animals away.
- Some of the earliest power plants in the US were fueled by wood material
- Many cultures used animal dung to burn as fuel, and some are still doing this today
Composting

- In 1960 the average American threw away 2.7 pounds of trash a day.
- Today each person throws away about 4.5 pounds a day. (That comes to about 2000 lbs or 1 ton of trash/year!)
- Composting can reduce our waste to landfills.
- Composting is a way to recycle organic solid waste.

[Composting Video Clip]
Energy and Biomass Packet

- You will have class time to read through this packet and answer the questions.
- The last 20-30 min. of class we will be setting up a multi-day experiment, both in your journal and in the class room.
“Take Aways” about Biomass:

Students will know that -

• Biomass is all plant and animal material on the earth’s surface.
• Biomass energy is a form of stored solar energy.
• Biomass can be used for heating, power (electricity) generation or transportation.
• The process of sustainably producing energy with biomass is carbon neutral.
Get your science journals out:

• Title the next clean page: “From Garbage to Gas”
• Put it in your table of contents as well.
Lab set up - Journal:

- Write on your journal pg. under the title these two questions. Leave 3-4 spaces under each question so that you can answer them.

1. “Can you make gas from decaying garbage?”
2. “Can you control the amount of gas made from decaying garbage?”
Lab set up - Journal:

Write the materials next -

Materials:
• 36 dried peas or beans,
• 6 plastic bags,
• water,
• bowl
Lab set up - Journal:

- Take the half page “Procedures” – glue it into your journal under the questions.
Lab set up - Journal:

- Write the word **Hypothesis** – And then write a hypothesis.

- Remember, use “If ______ then______”

- Hint – which bag do you think will produce the most gas?
Lab set up - Experiment:

- Let’s make the Data table. Make yours look like this, make sure to leave enough room to write observations!

<table>
<thead>
<tr>
<th>Bag in Sunny Place</th>
<th>Bag in warm, shady place</th>
<th>Bag in dark place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1 (observations)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lab Conclusion Questions:

• Answer the following questions:

1. Was your hypothesis correct?
2. Did the decaying beans produce a gas?
3. Which environment was best for producing gas?
4. How can plants create energy?