

Forestry-exploring the wood waste issue

Overview: Students will investigate how waste wood can be used from sawmills that produce lumber. They will report on how the different products are made and the challenges faced in creating useful things from sawdust, board ends and shaving residues.

Curriculum Links: Gr11 ES20-IN1 Integrative Nature of Environmental Science

Materials: access to the computer lab and library for research
Peer and self-evaluation form (included)

Explore: Bring up the topic of environmental sustainability with the students. Environmental sustainability is about making responsible decisions that will reduce your business' negative impact on the environment. Businesses are expected to lead in the area of environmental sustainability as they are considered to be the biggest contributors to the problems and are also in a position where they can make a significant difference. Environmental sustainability forces businesses to look beyond making short term gains and look at the long term impact they are having on the natural world. You need to consider not only the immediate impact your actions have on the environment, but the long term implications as well.

It can be claimed that forestry is environmental friendly as trees are a renewable resource. That does not mean that large amounts of waste are acceptable. The goal should be to use as much of the harvested tree as possible. Annually, sawmills and other wood-processing factories generate a significant amount of scrap materials which were sent to landfills or incinerated. Only around half of a log gets turned into lumber at a sawmill.

As new technologies are developed the possibilities for using scrap materials have increased. The by-products of the timber industry which were once simply burned for convenience has the potential to not only increase the sustainability of the industry but to boost its bottom line.

Ask the students if they can think of ways waste wood and sawdust can be used to save or make money for a working sawmill.

If students are struggling guide them with hints like: energy is needed to power the mill, where does cardboard come from, what is particleboard, what can mulch be used for, what is charcoal..

The markets for these products and their value depend largely on where the sawmill is located and the condition of the economy and forest products industry in the area. The volume of wood waste created is another factor to consider.

Project assignment:

Teams of three students will be assigned a use for wood waste that will be researched and reported on. Your report must answer the following questions:

1. How is the product created? (steps need to be included)
2. Will you be able to use all the waste wood from the sawmill or just parts of it?
3. How does the waste wood have to be changed to use it in creating the new product?
4. What is the market for this product?
5. What other products exist that are in competition with your product?

6. What does the future look like for your product?
7. If possible provide pictures of the product and diagrams of the process of creating it.

Research products to be assigned are:

1. Biomass energy
2. Pulp
3. Particle board
4. Fuel Pellets/ Briquettes (explore both options and show differences)
5. Mulch/Natural fertilizers (explore both options and show differences)
6. Animal bedding/pet shavings (explore both options and show differences)
7. Charcoal
8. Biotechnology (check this video out to get a good idea as to what this is about
<http://www.fpl.fs.fed.us/products/presentations/video-nanocellulose-rethinkpaper.php>)

This assignment will include peer and self-evaluation of how well you complete it as a team. The group will present their findings and then hand in the typed report for marking. Access will be given for the computer lab as well as the library.

Suggestions for teams: Divide the work of the project up so that each member knows their responsibility. Have the member that finishes their part report to the others and show their work so that it can be evaluated and a new assignment added. Continually communicate with each other to know what the other is doing.

Marking key

Written report – answering all the questions	40%
-- neat and well organized	10%
 Presentation – all members participated	 20%
-ability to answer logical question	10%
Evaluation sheet filled in fully and with care	<u>20%</u>
Total	100%

Have a hand out of the questions and the marking key for each group of students.

The research and report writing could take the rest of this class plus one more class. The presentations of what each group learned could be part of another class.

The peer and self-evaluation form is given below.....

Peer and self-evaluation:

Assigned product: _____

Group members: _____

Rate your contribution to the group and evaluate the group on a scale from 1-10 with 10 being the highest.

1. **Individual evaluation:** Your name: _____

- _____ Following teacher's instructions
- _____ Asking for help if needed
- _____ Researching information, pictures
- _____ Helping the group stay on task
- _____ Contributing materials
- _____ Sharing responsibilities
- _____ Respecting others
- _____ Communicating what you are working on
- _____ Doing your part on time
- _____ Doing your best

I could improve on _____

I rank my contributions to the group as (number) _____
because _____

2. **Group evaluation:** _____ Following teacher's instructions

- _____ Asking for help if needed
- _____ Researching information, pictures
- _____ Staying on task
- _____ Contributing ideas and information
- _____ Sharing responsibilities
- _____ Respecting others
- _____ Communicating and solving problems
- _____ Consistent effort
- _____ Producing a quality product

I rank our group's efforts at working together as (number) _____

because _____

Peer Evaluation:

Group member _____ ranking (1-10) _____

Group member _____ ranking _____