

COMPREHENDING SCIENCE: BIOMASS PELLETS

The Comprehending Science series of resources uses extracts of Drax website articles, alongside comprehension questions, in topics relevant to the national curriculum. A longer version of this resource is also available, with more text plus additional questions and challenge tasks.

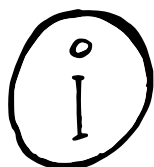
TEACHER NOTES

Most suited to	KS3
May be suitable for	KS2, KS4
Skills	Comprehension, scientific literacy
Subject	Science, English language
Topic	Sources of energy, electricity, resource use
Suggested use	Lesson activity, homework, remote provision, home learning
Resources needed	Optional internet access, paper or electronic copies of worksheet and questions
Mark schemes guidance	Suggested or model answers are provided

Feedback: <https://forms.office.com/r/VkQ6FF4xxJ>

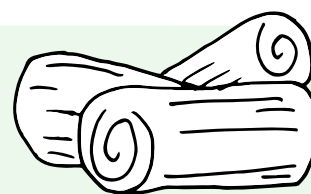
Contact us: educational.resources@drax.com

COMPREHENDING SCIENCE: BIOMASS PELLETS



- Read the text about how to make biomass pellets, edited from: www.drax.com/sustainable-bioenergy/this-is-how-you-make-a-biomass-wood-pellet
- Write the answers to the questions in your books/on paper, as instructed. Use full sentences. The numbers in brackets help you find the line numbers you need in the text.

THIS IS HOW YOU MAKE A BIOMASS WOOD PELLET



2 Wood arrives at the plant via truck and is sent to one of four places: the wood storage yard; the wood circle (where wood is primed for processing); the sawdust and woodchip piles; or straight into processing. Logs are fed into a debarker
4 machine that beats the logs together inside a large drum to remove the bark. The bark is put aside and used to fuel the woodchip dryer, used later in the process.
6 The logs – low-value fibre from sustainably managed working forests – need to be cut down into even smaller pieces. That's so they can then be shredded into
8 the fine material needed for creating pellets. Inside the wood chipper, multiple blades spin and cut the logs into chips roughly 10mm long and 3mm thick. The
10 resulting chips are fed into the woodchip pile, ready for screening.

12 Chipped down wood can include waste elements like sand, remaining bark or stones that can all affect pellet production. The chips are passed through
14 a screener that removes the waste, leaving only ideal-sized wood chips. The wood chips need to have a moisture level of between 11.5% and 12% before they
16 go into the pelleting process. Any other level of moisture could compromise the quality of the resulting pellets. The chips enter a large drum that's blasted
18 with hot air generated in a heater that's powered by bark collected from the debarker. The chips are moved through the drum by a large fan, ready for the
20 hammer mill. Inside the hammer mill, there's a spinning shaft mounted with a series of hammers. The wood chips are fed into the top of the drum and the
22 spinning hammers chip and shred them down into a fine powdery substance that's fed into the pellet mill. Inside, a rotating arm presses the powdered wood
24 fibre through a grate featuring several small holes. The intense pressure heats up the wood fibre and helps it bind together as it passes through the holes in a
metal ring die, forming the compressed wood pellets.

COMPREHENDING SCIENCE: BIOMASS PELLETS QUESTIONS

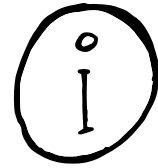


1. What's a 'debarker'? (3-4)
2. Where does the wood for the pellets come from? (6-8)
3. How is the woodchip dryer heated? (16-18)
4. What percentage of moisture do the chips need to have before the pelleting process can begin? (13-15)
5. What three contaminants need to be removed from the woodchip? (11-12)
6. Are any other additions made to the shredded woodchip powder before making the pellets? (18-23)

Feedback:



COMPREHENDING SCIENCE: BLACK START ANSWERS



1. A 'debarker' is a machine that breaks the bark off the outside of wooden logs.
2. The wood for the pellets comes from sustainably managed working forests.
3. The woodchip dryer is heated with hot air. This air is heated by burning bark.
4. The moisture content of the chips needs to be between 11.5% and 12% before they go into the hammer mill.
5. Sand, any bark still on the wood, and stones need to be removed from the woodchip.
6. There are no additions made to the shredded woodchip powder. The pellets are just made from compressed woodchip.