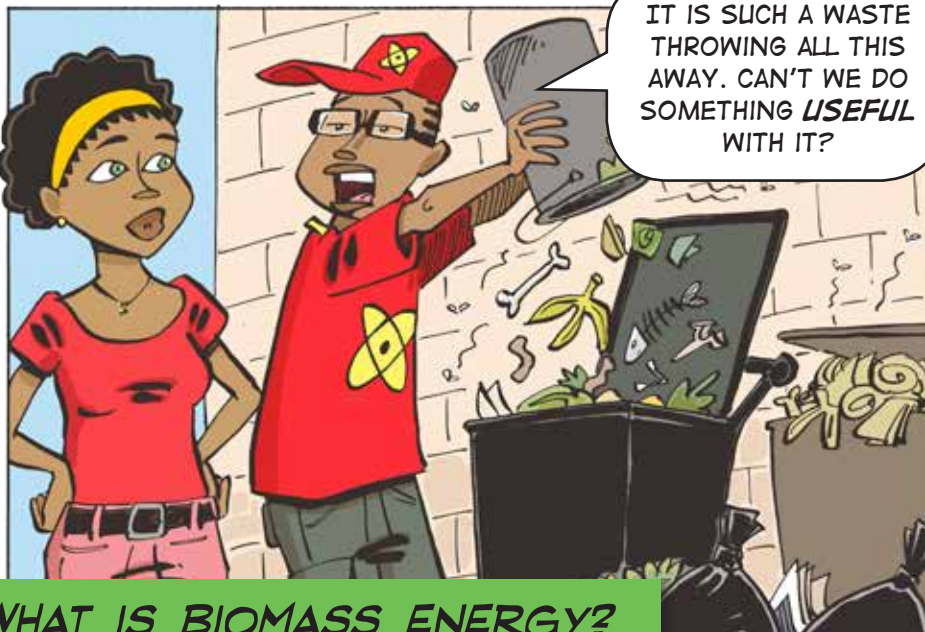




PRODUCING ENERGY FROM PLANT MATTER



IT IS SUCH A WASTE THROWING ALL THIS AWAY. CAN'T WE DO SOMETHING **USEFUL** WITH IT?



YES, IT CAN BE USED TO MAKE **BIOMASS ENERGY**.

WOW! I'D LOVE TO LEARN MORE ABOUT IT.

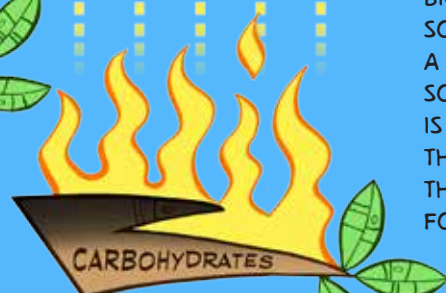
WHAT IS BIOMASS ENERGY?

BIOMASS ENERGY IS A RENEWABLE SOURCE OF ENERGY THAT IS FOUND IN PLANTS AND ANIMALS. PLANTS TAKE ENERGY FROM THE SUN THROUGH PHOTOSYNTHESIS AND USE IT TO PRODUCE CARBOHYDRATES. THE UNUSED CARBOHYDRATES ARE STORED AS BIOMASS. IN THIS WAY, ENERGY FROM THE SUN IS STORED IN PLANTS.

SUN



STORED ENERGY RELEASED



WHEN THE PLANTS DECAY OR ARE BURNED, THEY RELEASE THE STORED ENERGY. BIOMASS ENERGY IS SOMETIMES CALLED A "GREEN" ENERGY SOURCE, BECAUSE IT IS LESS HARMFUL TO THE ENVIRONMENT THAN NON-RENEWABLE FOSSIL FUELS.

PRODUCE YOUR OWN BIOGAS

FOR THIS ACTIVITY YOU WILL NEED:

- 30 DRIED BEANS
- 3 AIRTIGHT PLASTIC BAGS
- WATER, STICKY TAPE AND BOWL



WHAT TO DO:

1 SOAK THE BEANS IN WATER OVERNIGHT.



2 PUT 10 BEANS INTO EACH PLASTIC BAG. REMOVE ALL THE AIR FROM THE BAG, THEN SEAL IT WITH STICKY TAPE.



3 PUT ONE BAG IN A SUNNY PLACE ...



ONE IN A WARM SHADY PLACE ...



AND ONE IN A COOL DARK PLACE.



4 LEAVE YOUR BAGS FOR A WEEK ...

Mon	Tues	Wed	Thurs	Fri	Sat	Sun
X	X	X	X	X	X	X
X						



... AND THEN OBSERVE ANY **CHANGES** THAT HAVE HAPPENED.

DISCUSS THESE QUESTIONS:

IN WHICH PLACE DID THE BEANS PRODUCE THE **MOST** GAS? HOW CAN YOU TELL?
 IN WHICH PLACE DID THEY PRODUCE THE **LEAST** GAS?
 WHY DOES EACH PLACE PRODUCE MORE OR LESS BIOGAS COMPARED TO THE OTHERS?

WHAT'S HAPPENING HERE?

AS THE BEANS DECAY, THEY PRODUCE CARBON DIOXIDE AND METHANE GAS.

METHANE IS CALLED A **BIOGAS**, BECAUSE IT CAN BE USED AS A **FUEL** TO PRODUCE ENERGY.



BIOMASS ENERGY IN SOUTH AFRICA

SOUTH AFRICA HAS A WIDE RANGE OF **BIOMASS ENERGY PROJECTS**. FOR EXAMPLE, A BIOMASS ENERGY PLANT HAS BEEN BUILT NEAR MKUZE, WHERE **SUGARCANE** TOPS AND LEAVES ARE BURNT TO PRODUCE ELECTRICAL ENERGY.



IN A BIODIGESTER ORGANIC WASTE DECAYS AND PRODUCES BIOGAS. THE GAS IS COLLECTED THROUGH PIPES AND USED AS A FUEL TO PRODUCE HEAT.

BIOGAS IS GIVEN OFF WHENEVER **ORGANIC WASTE** PRODUCTS **DECAY**. SO RUBBISH CAN BE USED TO PRODUCE ENERGY BECAUSE IT CONTAINS A LOT OF ORGANIC WASTE.



HOW "GREEN" IS BIOMASS ENERGY?



WHEN BIOMASS IS BURNT TO PRODUCE ENERGY, THIS CAN PRODUCE HARMFUL AIR **POLLUTION** AND GREENHOUSE GASES. THE PRODUCTION OF BIOMASS ENERGY MUST THEREFORE BE CAREFULLY MANAGED.

BIOMASS ENERGY SOUNDS LIKE SUCH A FANTASTIC **SOLUTION** FOR OUR ENERGY NEEDS ... WHAT COULD POSSIBLY GO WRONG???



IF **TOO MUCH** LAND IS USED TO GROW CROPS FOR BIOFUELS, THIS COULD **DAMAGE** NATURAL ECOSYSTEMS. MORE WATER WILL BE USED AND THERE WILL ALSO BE LESS LAND AVAILABLE TO GROW FOOD. THIS WILL MAKE OUR FOOD PRICES INCREASE.

PUZZLE YOUR MIND!!!

FILL IN THE MISSING LETTERS TO FIND A WORD THAT IS LINKED WITH BIOMASS ENERGY.



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

WRITE THE WORD IN THIS BOX:

DISCUSS WHAT PEOPLE MEAN WHEN THEY USE THIS WORD.



Knowledge is NCAW!



CAREERS:

THERE ARE GREAT JOB OPPORTUNITIES, SUCH AS:

- CHEMICAL ENGINEER
- RENEWABLE ENERGY MANAGER
- MECHANICAL DESIGN ENGINEER



CURRICULUM LINKS

- GRADE 7: **ENERGY & CHANGE** (SOURCES OF ENERGY)
- GRADE 9: **LIFE & LIVING** (PHOTOSYNTHESIS AND RESPIRATION)
- GRADE 9: **ENERGY & CHANGE** (ENERGY AND THE NATIONAL ELECTRICITY GRID)

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ID Number: _____

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Date: _____

Send to PO Box 22106, Mayor's Walk, 3208 Fax to 086 610 5453 email: info@sciencespaza.org or submit your application online at www.sciencespaza.org



The South African Young Academy of Science (SAYAS) was launched in 2011 in response to the need for young scientists to contribute towards making a difference and solving issues faced by the country today. It allows young scientists to speak out and be heard, and to play a part in making decisions.



RECORD's mission is to be recognised as the foremost institution for renewable energy research coordination and collaboration in SA. Its vision is to facilitate renewable energy research coordination, collaboration and dissemination of national and international renewable energy knowledge contributing towards a sustainable low carbon energy future. This is achieved through 4 core activities: coordinating renewable energy research in SA; facilitating renewable energy research collaboration; contributing to energy skills development and targeted awareness regarding renewable energy in SA.



The South African National Energy Development Institute (SANEDI) is an organisation that promotes the development of renewable energy sources. They conduct research and promote, direct and monitor energy efficiency and green energy initiatives. Its vision is to promote sustainable energy innovation, transformation and technology diffusion in support of sustainable development that benefits everyone in South Africa.



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Puzzle answer: Green

