



SUN POWER

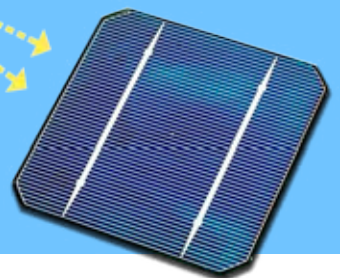


HOW DO WE GET ELECTRICITY FROM SUNLIGHT?

A **PHOTOVOLTAIC CELL (PV CELL)** IS A DEVICE THAT CAN TURN ENERGY FROM THE SUN (SOLAR ENERGY) INTO **ELECTRICAL** ENERGY. IT IS MADE FROM SEMI-CONDUCTOR MATERIALS, WHICH RELEASE TINY ELECTRICAL CHARGES CALLED **ELECTRONS** WHEN SUNLIGHT FALLS ON THEM.



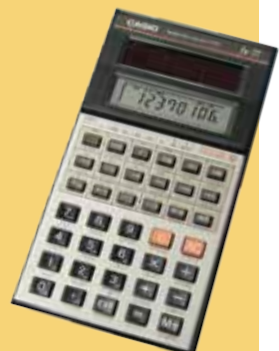
SUN



ACTIVITY: HOW ARE PV CELLS USED?

1 BRAINSTORM WITH YOUR GROUP:

- HAVE YOU SEEN ANY **PV PANELS** THAT USE **SUNLIGHT** TO PRODUCE ELECTRICITY?
- WHERE DID YOU SEE THEM? WHAT IS THE ELECTRICITY USED FOR?
- HAVE YOU SEEN PV PANELS ON TV? IN THE NEWSPAPER OR MAGAZINES?



2 MANY PV CELLS CAN BE **JOINED TOGETHER** TO MAKE A FLAT PANEL. IF YOU HAVE SEEN ANY PV PANELS IN YOUR AREA, TAKE PHOTOS AND SHARE THEM WITH YOUR CLUB.

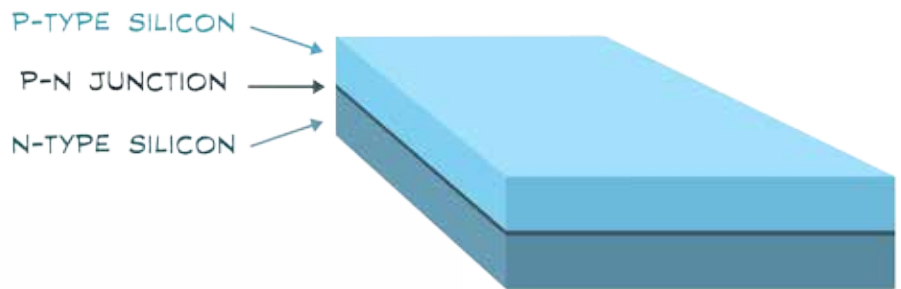


3 HAVE A DISCUSSION OR DEBATE ABOUT THE USE OF PV CELLS TO **GENERATE** ELECTRICITY. WHAT ARE THE **ADVANTAGES** OF USING PV CELLS? WHAT ARE THE **DISADVANTAGES**?

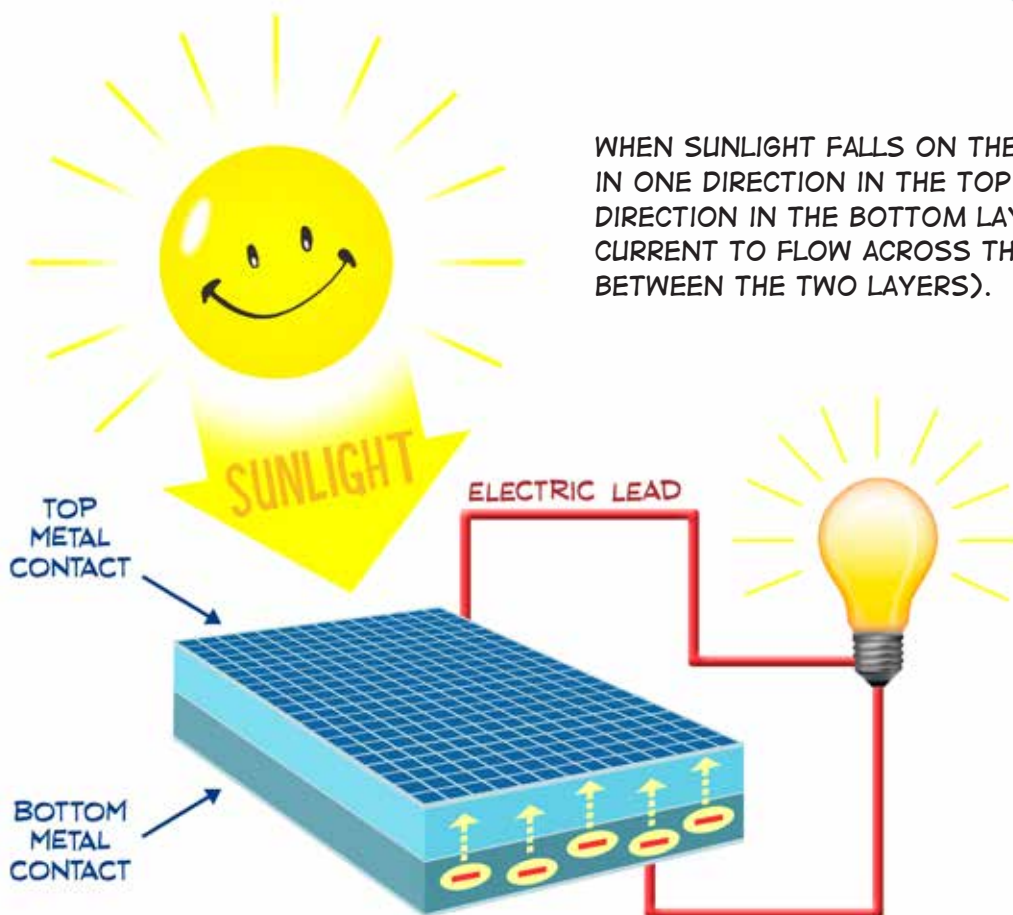


HOW DOES A PV CELL WORK?

A PV CELL IS LIKE A SANDWICH MADE OF TWO LAYERS OF SILICON. THE TOP LAYER IS P-TYPE SILICON, AND THE BOTTOM LAYER IS N-TYPE SILICON.



WHEN SUNLIGHT FALLS ON THE PV CELL, ELECTRONS FLOW IN ONE DIRECTION IN THE TOP LAYER, AND IN THE OPPOSITE DIRECTION IN THE BOTTOM LAYER. THIS CAUSES ELECTRICAL CURRENT TO FLOW ACROSS THE P-N JUNCTION (THE SURFACE BETWEEN THE TWO LAYERS).



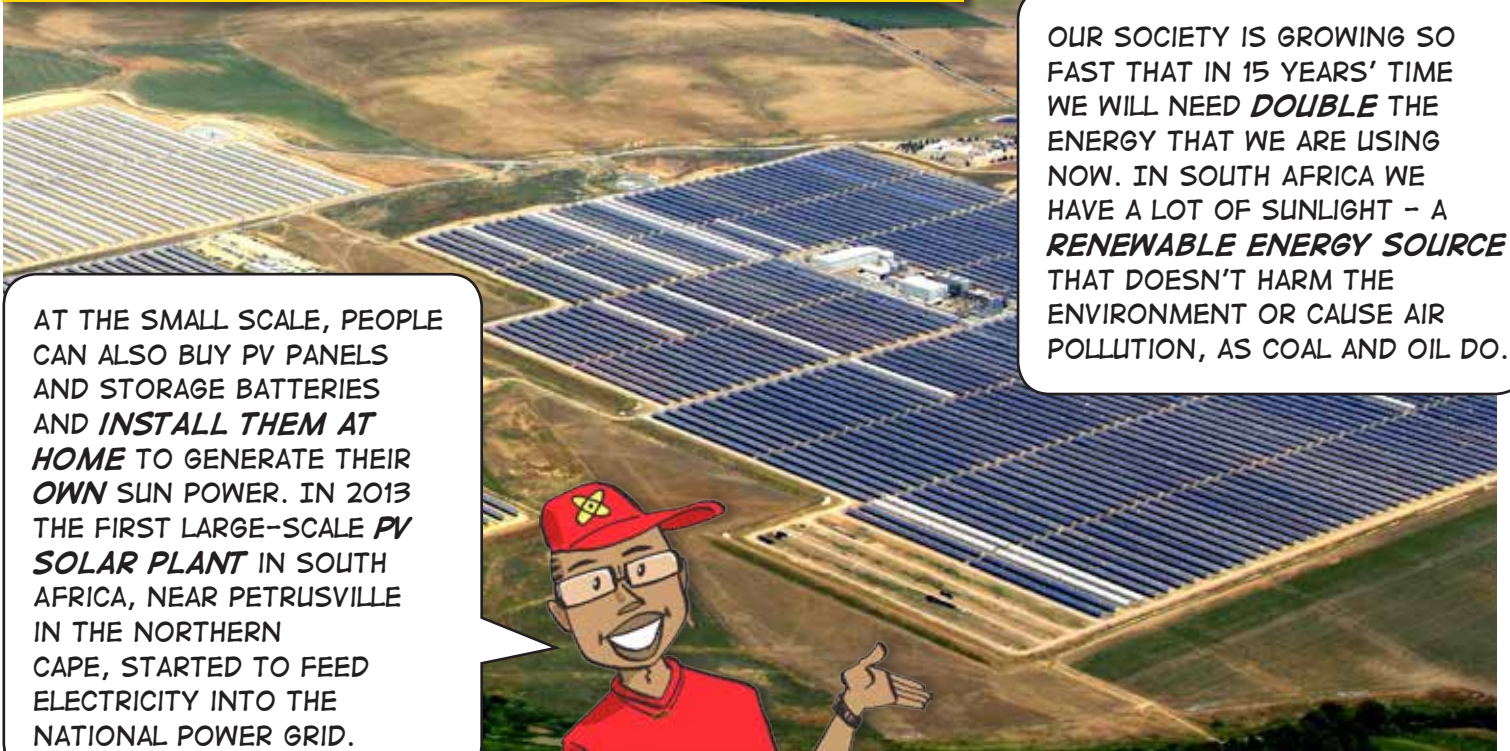
EACH LAYER HAS A METAL CONTACT, SO THAT IT CAN BE CONNECTED TO A CIRCUIT.

THE PV CELL CAN MAKE ELECTRICITY FLOW, LIKE A BATTERY. WHEN IT IS CONNECTED TO A LIGHT BULB, ELECTRICAL CURRENT WILL FLOW THROUGH THE LIGHT BULB.

A PV CELL CANNOT STORE ELECTRICITY, BUT THE ELECTRICITY FROM A PV CELL CAN BE STORED IN A RECHARGEABLE BATTERY AND USED LATER - AT NIGHT, FOR EXAMPLE.



PV SOLAR POWER IN SOUTH AFRICA



AT THE SMALL SCALE, PEOPLE CAN ALSO BUY PV PANELS AND STORAGE BATTERIES AND **INSTALL THEM AT HOME** TO GENERATE THEIR **OWN SUN POWER**. IN 2013 THE FIRST LARGE-SCALE **PV SOLAR PLANT** IN SOUTH AFRICA, NEAR PETRUSVILLE IN THE NORTHERN CAPE, STARTED TO FEED ELECTRICITY INTO THE NATIONAL POWER GRID.

OUR SOCIETY IS GROWING SO FAST THAT IN 15 YEARS' TIME WE WILL NEED **DOUBLE** THE ENERGY THAT WE ARE USING NOW. IN SOUTH AFRICA WE HAVE A LOT OF SUNLIGHT - A **RENEWABLE ENERGY SOURCE** THAT DOESN'T HARM THE ENVIRONMENT OR CAUSE AIR POLLUTION, AS COAL AND OIL DO.

A PV SOLAR PLANT

PUZZLE YOUR MIND!!!

FIND AS MANY "ENERGY WORDS" AS YOU CAN IN THE PUZZLE BLOCK, AND DRAW A RING AROUND EACH WORD. THE WORDS RUN IN ALL DIRECTIONS, SO LOOK CAREFULLY!



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

ENERGY WORDS

- | | |
|------------|---------------|
| BATTERY | JUNCTION |
| CELL | POLLUTION |
| CIRCUIT | RENEWABLE |
| COAL | SOLAR |
| ELECTRICAL | PHOTOVOLTAIC |
| ELECTRON | SANDWICH |
| ENERGY | SEMICONDUCTOR |
| FOSSIL | SOURCE |
| FUELS | SUNLIGHT |

Knowledge is NCAW!



CAREERS:



INTERESTED IN SOLAR POWER?

YOU COULD BECOME:

- A NANOTECHNOLOGIST MAKING PV CELLS
- AN ELECTRICAL ENGINEER
- AN ENVIRONMENTAL SCIENTIST
- A SOLAR POWER ENTREPRENEUR
- A PV TECHNICIAN
- A SOLAR PV INSTALLER

CURRICULUM LINKS

- GRADE 7: **ENERGY & CHANGE** (THE NATIONAL ELECTRICITY SUPPLY SYSTEM)
- GRADE 8: **ENERGY & CHANGE** (ENERGY TRANSFER IN ELECTRICAL SYSTEMS)
- GRADE 10: **ELECTRICITY & MAGNETISM** (ELECTRICAL CIRCUITS)

START YOUR OWN SCIENCE SPAZA

Name of school: _____

Municipality: _____

Province: _____

Name of your science club:

Name of contact person: _____

Telephone number: _____

Email address: _____

Postal address: _____

To be filled in by responsible adult (parent/teacher)

Name: _____

Surname: _____

Position: _____

ID Number: _____

Signature (parent/teacher):

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.



Science Spaza is an initiative of Jive Media Africa. *What moves you?*

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