



## FUN WITH ROBOTS



### HOW DO ROBOTS WORK?

ROBOTS ARE MECHANICAL DEVICES THAT DO SPECIFIC TASKS - FOR EXAMPLE JOBS THAT ARE REPETITIVE OR DANGEROUS. ROBOTS CAN BE CONTROLLED BY HUMANS OR BY A COMPUTER.



THEY NEED SENSORS TO GIVE THE COMPUTER INFORMATION SO IT KNOWS WHAT TO DO NEXT - THIS IS CALLED **FEEDBACK**.



### DESIGN AND BUILD YOUR OWN ROBOT

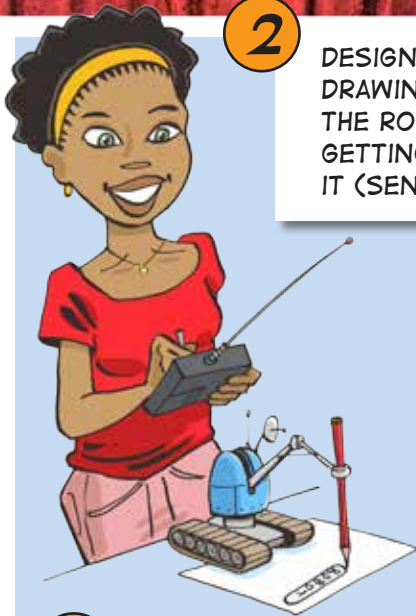
**1** THINK OF A TASK THAT IS BORING OR UNSAFE FOR HUMANS, THAT COULD BE DONE BY A ROBOT. WHAT STEPS (OR PROCESSES) MUST THE ROBOT DO? WRITE THE STEPS DOWN ON A SHEET OF PAPER WITH THE ORDER OF TASKS.



- YOU WILL NEED:**
- A CLEAN SHEET OF PAPER AND A PENCIL
  - ANY USEFUL MATERIALS, SUCH AS PLASTIC BOTTLES AND LIDS, OLD BOXES, TIN FOIL, ICE CREAM CONTAINERS, OLD CLOTHING, STRAWS, GLUE, STAPLES, PAPER AND CRAYONS

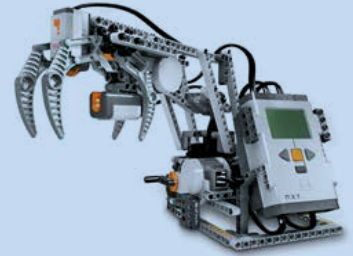
2

DESIGN A ROBOT TO DO THIS TASK. START BY DRAWING IT ON A CLEAN SHEET OF PAPER. HOW IS THE ROBOT CONTROLLED? DOES IT HAVE A WAY OF GETTING INFORMATION ABOUT THE WORLD AROUND IT (SENSORS).



3

NOW BUILD A MODEL OF YOUR ROBOT USING THE MATERIALS THAT YOU HAVE GATHERED.



4

EVALUATE YOUR ROBOT CONSTRUCTION USING THE FOLLOWING QUESTIONS:

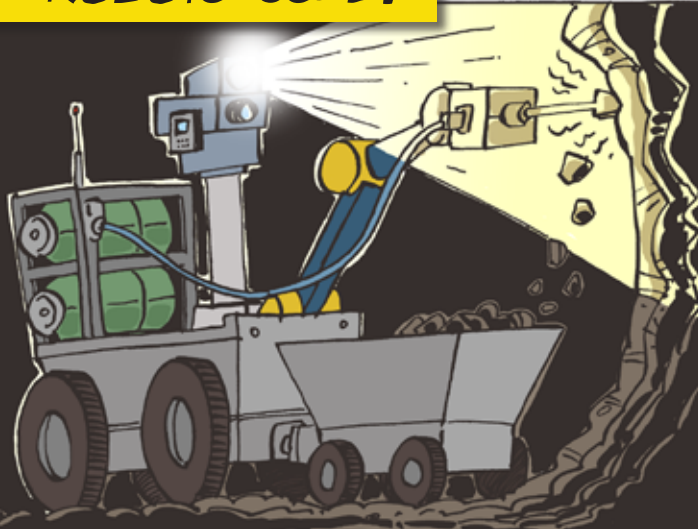
- A. IS YOUR CONSTRUCTION STURDY AND STRONG?
- B. DOES THE **DESIGN** LINK WITH THE **PURPOSE** OF THE ROBOT?

5

PRESENT YOUR ROBOT TO OTHER MEMBERS OF YOUR SCIENCE CLUB. DESCRIBE HOW YOUR ROBOT CAN BE USED TO DO THE TASK YOU DESIGNED IT FOR. DISCUSS WHETHER THE STEPS ARE THE RIGHT ONES.

## SO WHERE ARE ROBOTS USED?

IN SOUTH AFRICA, SCIENTISTS ARE DESIGNING ROBOTS TO HELP WITH GOLD MINING IN DANGEROUS PLACES.



SCIENTISTS AT THE UNIVERSITY OF KWAZULU-NATAL HAVE DESIGNED A ROBOT TO SEARCH FOR AND RESCUE PEOPLE IN DANGEROUS PLACES.



ROBOTS CAN EVEN BE USED TO FIGHT FIRES!



DID YOU KNOW THERE ARE EVEN ROBOTS THAT ARE SO SMALL THEY CAN MOVE AROUND INSIDE YOUR BODY? THEY ARE DESIGNED TO TREAT ILLNESSES.



SOME ROBOTS ARE DESIGNED TO BE AUTONOMOUS, MEANING THEY OPERATE BY THEMSELVES. OTHERS CAN BE CONTROLLED BY PEOPLE IN DIFFERENT WAYS, SUCH AS VOICE CONTROL OR BY REMOTE CONTROL.



THEY ARE CALLED NANOBOTS, AND CAN BE A THOUSAND TIMES SMALLER THAN THE WIDTH OF A HAIR.



## PUZZLE YOUR MIND!!!

FIND THE LISTED WORDS IN THE PUZZLE BLOCK, AND DRAW A RING AROUND EACH WORD. THE WORDS RUN IN ALL DIRECTIONS, SO LOOK CAREFULLY!

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

ROBOT  
 MECHANICAL  
 COMPUTER  
 ELECTRONIC  
 MARS  
 MINING  
 DESIGN  
 NANOBOT  
 MEDICINE  
 DEVICE  
 BUILD  
 MATERIALS  
 AUTONOMOUS  
 CONTROL  
 FEEDBACK  
 SENSORS  
 REMOTE



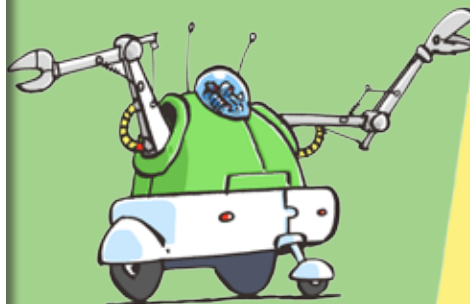
WHEN A ROBOT RESPONDS TO INFORMATION RECEIVED FROM ITS SENSORS, THIS IS CALLED \_\_\_\_?

Answer: feedback

## CAREERS

**THERE ARE GREAT JOB OPPORTUNITIES, SUCH AS:**

- MECHANICAL, ELECTRONIC OR COMPUTER ENGINEER
- IN THE FIELD OF AERONAUTICS
- MEDICAL TECHNOLOGIST
- MINING ENGINEER
- MECHATRONICS ENGINEER



### CURRICULUM LINKS

**GRADE 7 TO 9 TECHNOLOGY:**

- DESIGN PROCESS SKILLS
- MECHANICAL SYSTEMS AND CONTROL
- COMMUNICATION SKILLS



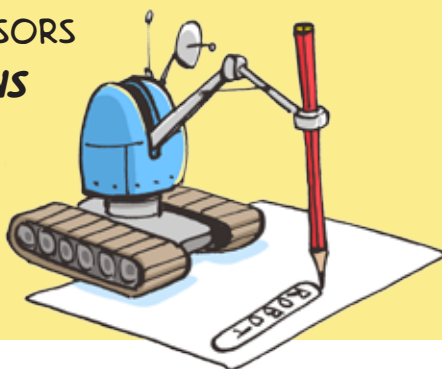
Knowledge is NCAW!





## DID YOU KNOW?

MATHEMATICS IS USED TO **CONVERT** INFORMATION GATHERED BY A ROBOT'S SENSORS INTO **INSTRUCTIONS** THAT THE ROBOT FOLLOWS.



SCIENCE SPAZA CELEBRATES **NATIONAL SCIENCE WEEK**, AN INITIATIVE OF THE DEPARTMENT OF SCIENCE AND TECHNOLOGY, IMPLEMENTED BY SAASTA, A BUSINESS UNIT OF THE NATIONAL RESEARCH FOUNDATION.



FOR MORE INFORMATION VISIT [WWW.DST.GOV.ZA](http://WWW.DST.GOV.ZA) OR [WWW.SAASTA.AC.ZA](http://WWW.SAASTA.AC.ZA)

## START YOUR OWN SCIENCE SPAZA

REGISTER NOW TO RECEIVE **FREE** RESOURCES AND SUPPORT. **YOU WILL NEED:**

**1** A GROUP OF FRIENDS WHO ARE EXCITED ABOUT SCIENCE!

**2** A PARENT OR TEACHER TO ASSIST YOU

**3** A TIME AND PLACE TO MEET



**4** SOME **CURIOSITY** AND AN INTEREST IN FINDING OUT MORE ABOUT THE WORLD!

### SCIENCE SPAZA APPLICATION FORM

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](mailto:info@sciencespaza.org) or submit your application online at [www.sciencespaza.org](http://www.sciencespaza.org)