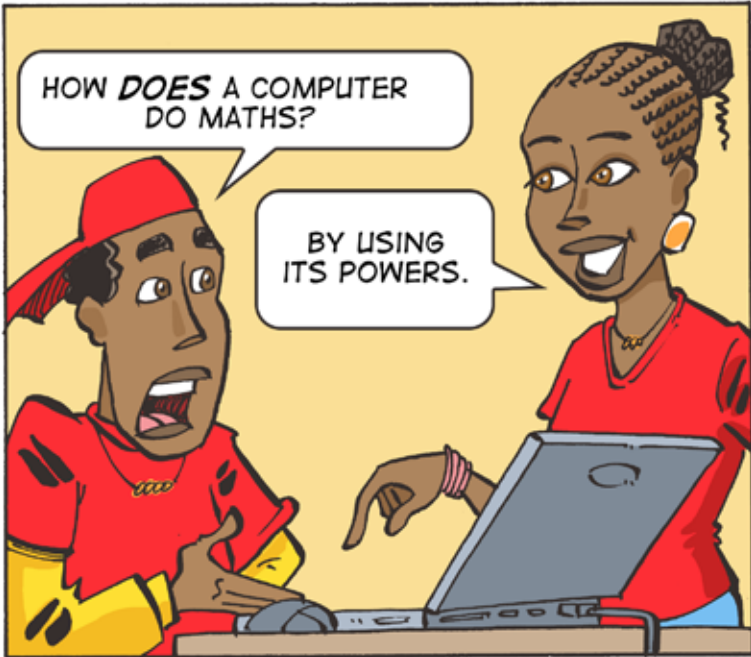




SUPER POWERS



ACTIVITY

1 DIVIDE EACH PIECE OF PAPER INTO 5 ROWS AND 10 COLUMNS.



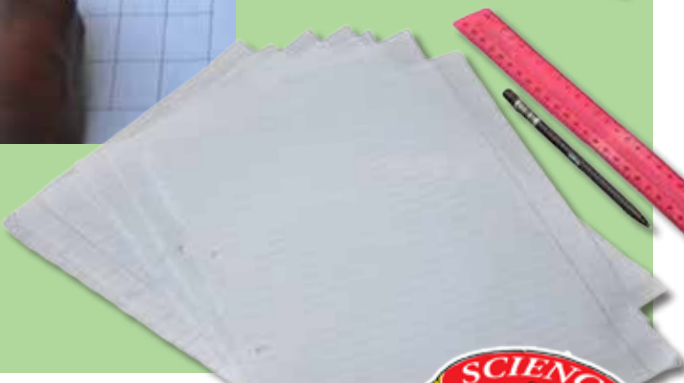
2 COPY THE NUMBERS FROM THE BACK PAGE OF THIS RESOURCE ONTO THE PIECES OF PAPER. DO YOU NOTICE ANYTHING ABOUT THE NUMBER PATTERNS?



YOU WILL NEED:

- 7 SHEETS OF PAPER
- A PEN
- SOME FRIENDS TO TRY THIS OUT ON

3 TELL SOMEONE YOU'RE ABOUT TO READ THEIR MIND. ASK THEM TO THINK OF A NUMBER BETWEEN 1 AND 100.



4 ASK THEM TO TELL YOU WHICH CARDS THEIR NUMBER APPEARS ON. PRETEND TO CONCENTRATE FIERCELY ON THEIR HEAD... JUST BETWEEN THEIR EYES.

5 ADD UP THE NUMBERS AT THE TOP LEFT OF EACH OF THE CARDS THEIR NUMBER IS ON.

6 WHEN YOU ARE SURE YOU HAVE ADDED UP CORRECTLY TELL THEM THE ANSWER (WHICH WILL BE THE NUMBER THEY WERE THINKING OF!)

WHAT'S GOING ON HERE?



THERE ARE 7 POWERS OF 2 FROM 1 TO 100:
 $2^0 (=1)$, $2^1 (=2)$,
 $2^2 (=4)$, $2^3 (=8)$,
 $2^4 (=16)$, $2^5 (=32)$
 AND $2^6 (=64)$

ALL THE NUMBERS FROM 1 TO 100 CAN BE WRITTEN USING SOME OR ALL OF THESE POWERS OF 2.

FOR EXAMPLE 9 CAN BE WRITTEN AS $2^3 (8)$ PLUS $2^0 (1)$



$$2^3(8) + 2^0(1) = 9$$

EACH OF THE 7 CARDS STARTS WITH A DIFFERENT POWER OF 2. SO 9 ONLY APPEARS ON THE CARD STARTING WITH 1 (THE 2^0 CARD) AND CARD STARTING WITH 8 (THE 2^3 CARD).



ADD THESE UP AND YOU GET TO 9!
 TRY SOME OTHER NUMBERS!
 FOR EXAMPLE:
 $97 = 64 + 32 + 1 = 2^6 + 2^5 + 2^0$



CAREERS

THERE ARE GREAT JOB OPPORTUNITIES, SUCH AS:

- COMPUTER SCIENTIST
- ELECTRONICS AND ELECTRONIC ENGINEERING
- MATHEMATICIAN
- STATISTICIAN

CURRICULUM LINKS

EXPONENTS (POWERS) ARE FORMALLY INTRODUCED IN GR 7 AND CONTINUE TO BE VERY IMPORTANT IN LATER MATHEMATICS. GOOD MATHS STUDENTS HAVE A GOOD GRASP OF EXPONENTS.



SUPER POWERS AT WORK

COMPUTERS WORK WITH NUMBERS BY ADDING UP POWERS OF 2!

INSIDE A COMPUTER ARE ELECTRIC WIRES. IF THEY ARE ON (CURRENT FLOWING) WE GIVE THEM A VALUE OF 1.

IF THEY ARE OFF (NO CURRENT), THEN WE GIVE THEM A VALUE OF 0.

IMAGINE 8 WIRES. EACH WIRE REPRESENTS A POWER OF 2. THE FIRST WIRE REPRESENTS 2^0 (OR 1), THE SECOND WIRE REPRESENTS 2^1 (OR 2), THE THIRD WIRE REPRESENTS 2^2 (OR 4) ... THE EIGHTH WIRE REPRESENTS 2^7 (OR THE NUMBER 128).

BY TURNING ON DIFFERENT WIRES (WHICH IS LIKE ADDING UP THE DIFFERENT CARDS), COMPUTERS CAN MAKE ANY NUMBER WE WANT!

DO YOU GET IT?

EXPONENTS OR POWERS ARE USED ALL OVER MATHS BECAUSE THEY ARE SO POWERFUL!

1 3 5 7 9 11 13 15 17 19
21 23 25 27 29 31 33 35 37 39
41 43 45 47 49 51 53 55 57 59
61 63 65 67 69 71 73 75 77 79
81 83 85 87 89 91 93 95 97 99

2 3 6 7 10 11 14 15 18 19
22 23 26 27 30 31 34 35 38 39
42 43 46 47 50 51 54 55 58 59
62 63 66 67 70 71 74 75 78 79
82 83 86 87 90 91 94 95 98 99

4 5 6 7 12 13 14 15 20 21
22 23 28 29 30 31 36 37 38 39
44 45 46 47 52 53 54 55 60 61
62 63 68 69 70 71 76 77 78 79
84 85 86 87 92 93 94 95 100

8 9 10 11 12 13 14 15 24 25
26 27 28 29 30 31 40 41 42 43
44 45 46 47 56 57 58 59 60 61
62 63 72 73 74 75 76 77 78 79
88 89 90 91 92 93 94 95

16 17 18 19 20 21 22 23 24 25
26 27 28 29 30 31 48 49 50 51
52 53 54 55 56 57 58 59 60 61
62 63 80 81 82 83 84 85 86 87
88 89 90 91 92 93 94 95

32 33 34 35 36 37 38 39 40 41
42 43 44 45 46 47 48 49 50 51
52 53 54 55 56 57 58 59 60 61
62 63 96 97 98 99 100

64 65 66 67 68 69 70 71 72 73
74 75 76 77 78 79 80 81 82 83
84 85 86 87 88 89 90 91 92 93
94 95 96 97 98 99 100



Science Spaza is grateful to Dave Ryan, Royal Bafokeng Maths Specialist for his contributions to this resource.



LOCAL KNOWLEDGE IS LEKKER!

ZULU PEOPLE IN SOUTH AFRICA HAVE A METHOD FOR **COUNTING TO 9 USING ONLY ONE HAND**. FOR 1 TO 5 THE FINGERS ON ONE HAND ARE USED, STARTING WITH THE SMALLEST AND ADDING FINGERS TILL THE WHOLE HAND IS SHOWN. FOR 6 THE THUMB (OR **ISITHUPA** - MEANING 6 IN ISIZULU) IS USED. FOR 7 THE THUMB AND FOREFINGER ARE USED AND THE MIDDLE AND RING FINGERS ARE ADDED FOR 8 AND 9!



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 OR WWW.SAASTA.AC.ZA

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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!

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ID Number: _____

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