

GALAXY SCOUTS



With Stella and Riley BOOK 3

WHAT HAPPENED ON MARS?



PUBLISHED BY UW-MADISON
ASTRONOMY DEPARTMENT
SNEŽANA STANIMIROVIĆ



STORY BY
ROBERT TETZNER

ART BY
JAN LIN



Acknowledgement

Galaxy Scouts Space-Ventures with Stella and Riley is a comic book series designed to get kids excited about astronomy and physical sciences in general.

The comic book series strives to improve societal literacy of STEM (Science, Technology, Engineering, Math) subjects and share the excitement and importance of STEM discoveries with younger generations. The comic books feature space adventures of Stella and Riley and involve cutting-edge STEM topics to engage youth in science learning and discovery.

Who is the Galaxy Scouts Comic Book Series for?

The comic book series is mainly for youth with a 4th to 8th grade reading level, or who are about 9 to 13 years old. Still, we welcome people of all ages to explore these pages!

Youth educators, including science teachers, librarians, and science museum program managers, may find the material useful for working with individuals or groups.

Funding for Galaxy Scouts was provided by the Research Corporation for Science Advancement and the University of Wisconsin Madison.

The comic idea was developed by Cottrell Scholars: Snežana Stanimirović (University of Wisconsin, Madison), Karen Bjorkman (University of Toledo), Michael Gladders (University of Chicago), Bo Hammer (American Institute of Physics), Sarbajit Banerjee (ETH Zurich and the Paul Scherrer Institut), Yadong Yin (University of California, Riverside).

The story for this volume was developed from the NASA NIAC funded research by Drs. Anita Fnu and Sarbajit Banerjee.

To access the electronic versions of Galaxy Scouts comic books and the activity books, please go to:
<https://galaxyscouts.wisc.edu>





WE MADE IT!

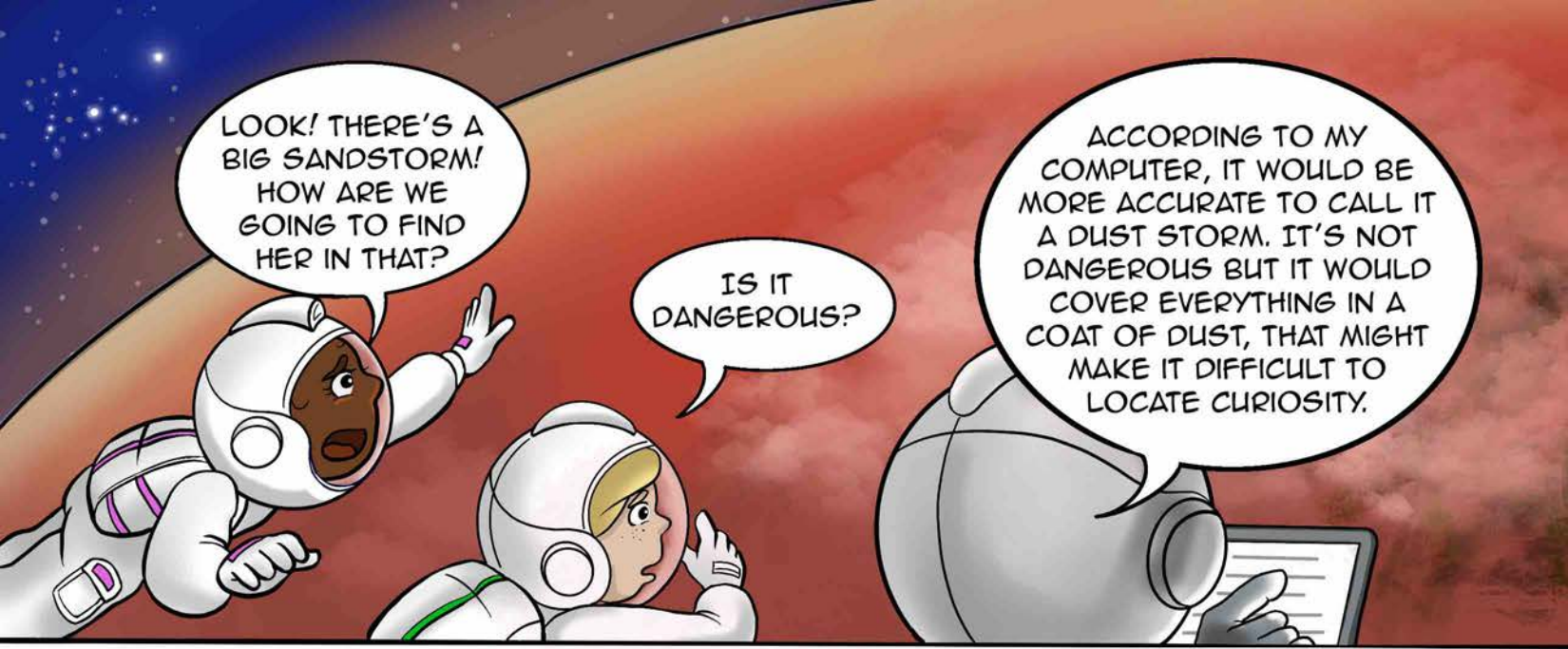
WOW! THIS ZAPPING AROUND THE GALAXY IS COOL! I'M STARTING TO GET THE HANG OF SURFING THE ZAP!

LET'S GO FIND CURIOSITY!

THAT WAS, AS YOU SAID, VERY COOL! WE ARE NOW FLYING ABOVE THE SURFACE OF MARS.

WE NEED TO SAVE HER!

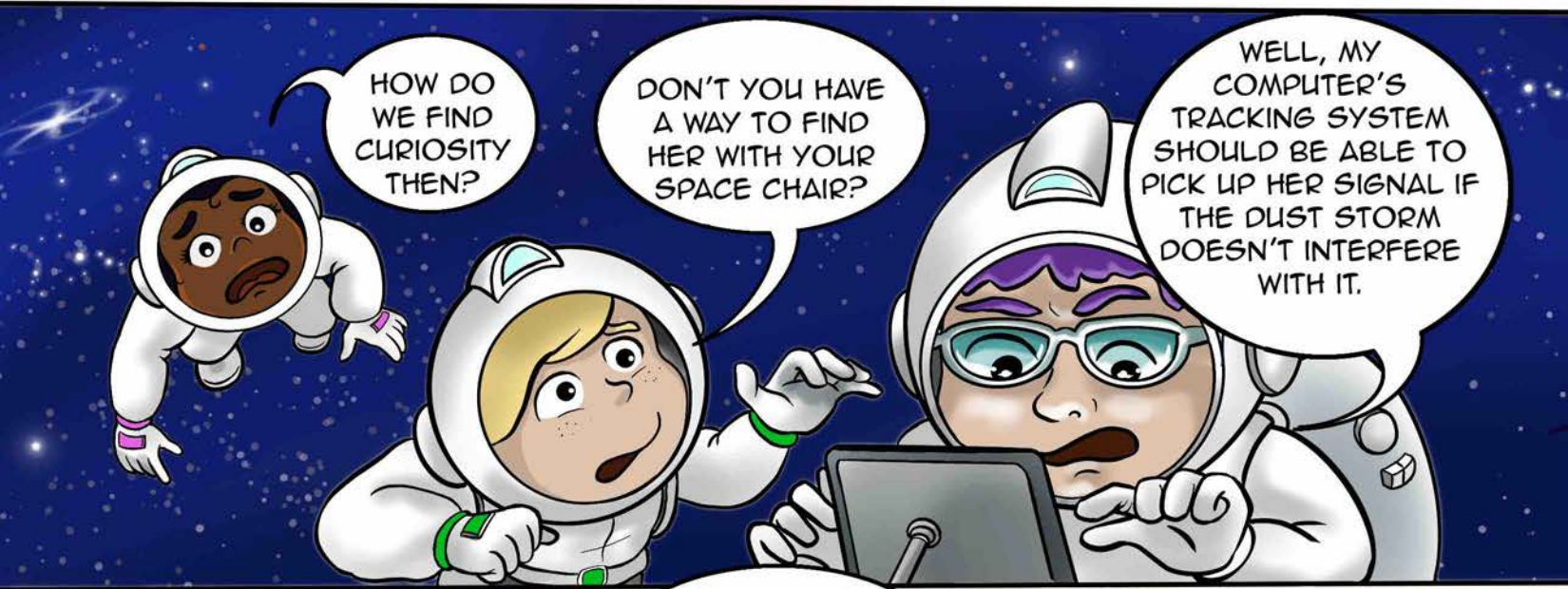




LOOK! THERE'S A BIG SANDSTORM! HOW ARE WE GOING TO FIND HER IN THAT?

IS IT DANGEROUS?

ACCORDING TO MY COMPUTER, IT WOULD BE MORE ACCURATE TO CALL IT A DUST STORM. IT'S NOT DANGEROUS BUT IT WOULD COVER EVERYTHING IN A COAT OF DUST, THAT MIGHT MAKE IT DIFFICULT TO LOCATE CURIOSITY.



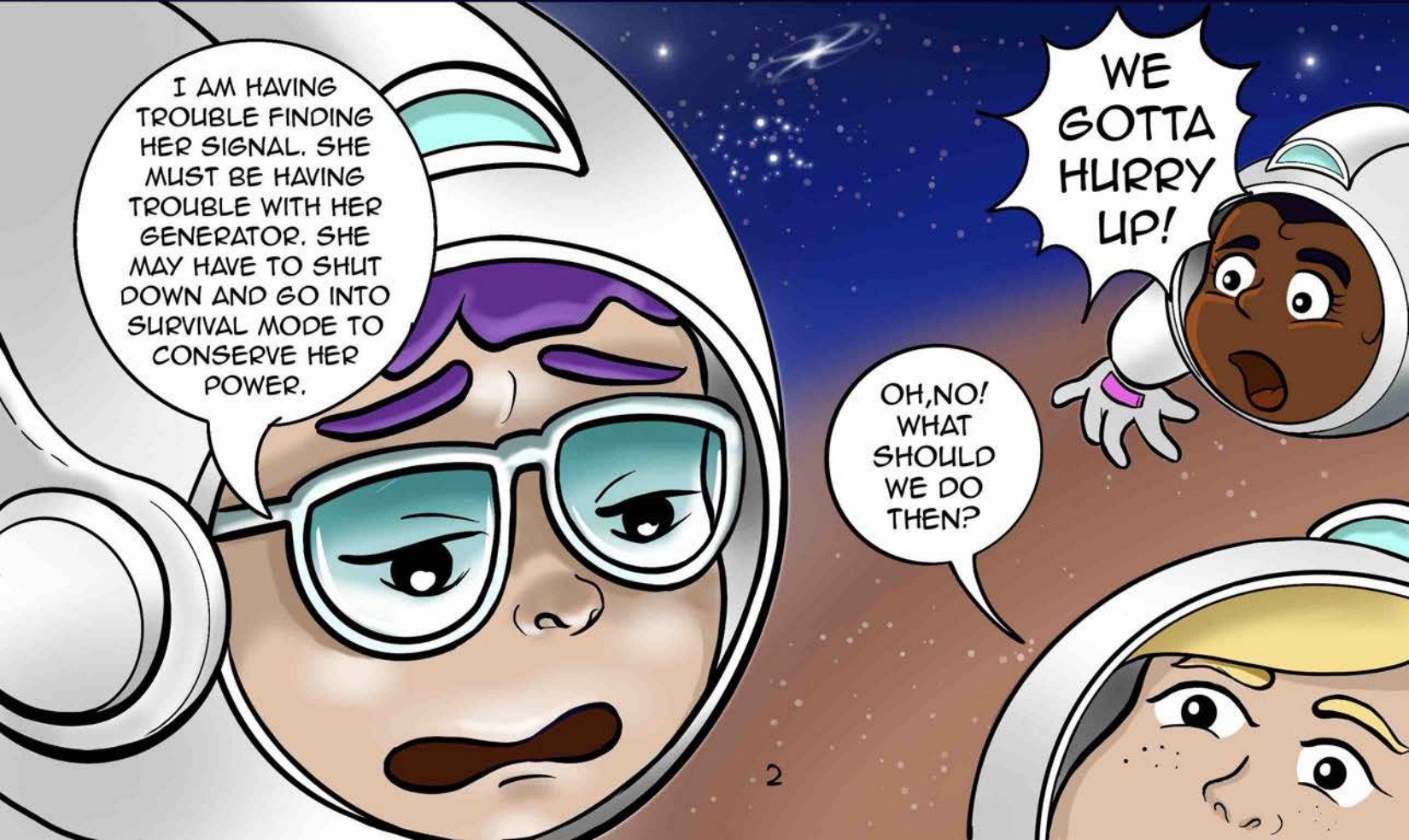
HOW DO WE FIND CURIOSITY THEN?

DON'T YOU HAVE A WAY TO FIND HER WITH YOUR SPACE CHAIR?

WELL, MY COMPUTER'S TRACKING SYSTEM SHOULD BE ABLE TO PICK UP HER SIGNAL IF THE DUST STORM DOESN'T INTERFERE WITH IT.



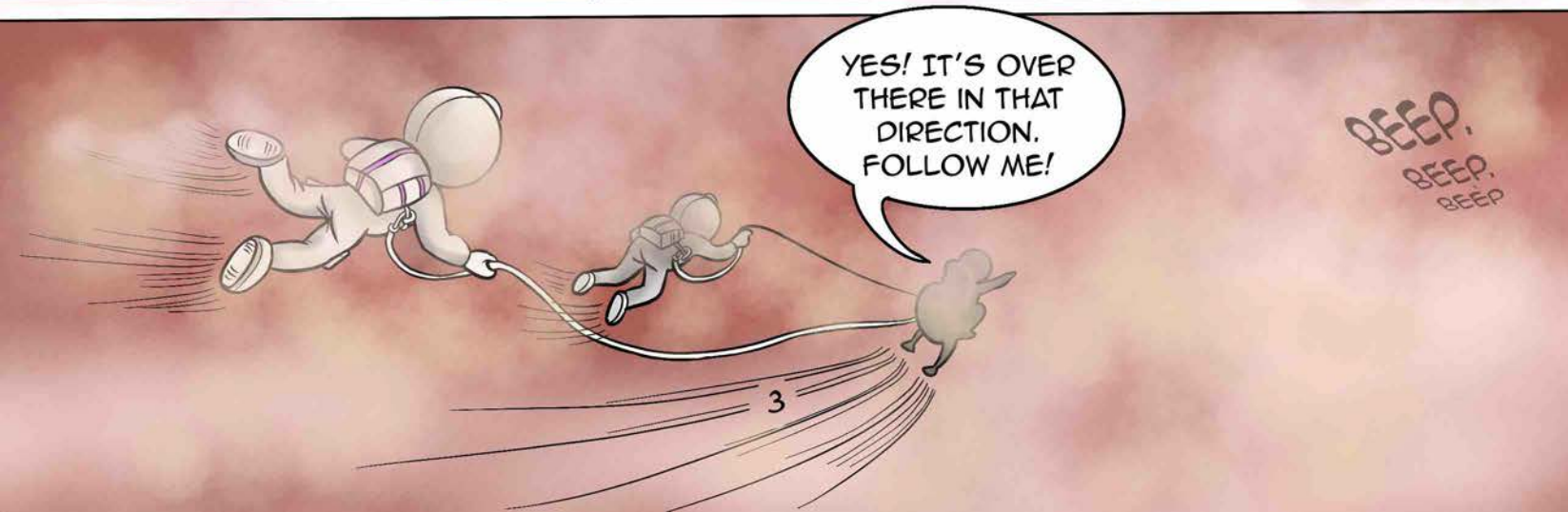
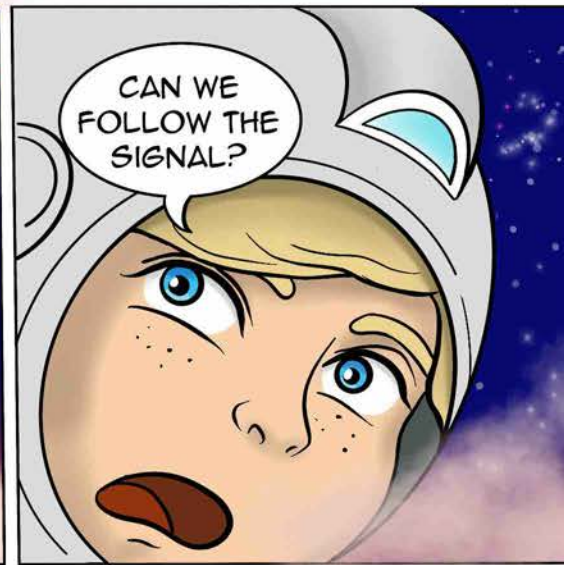
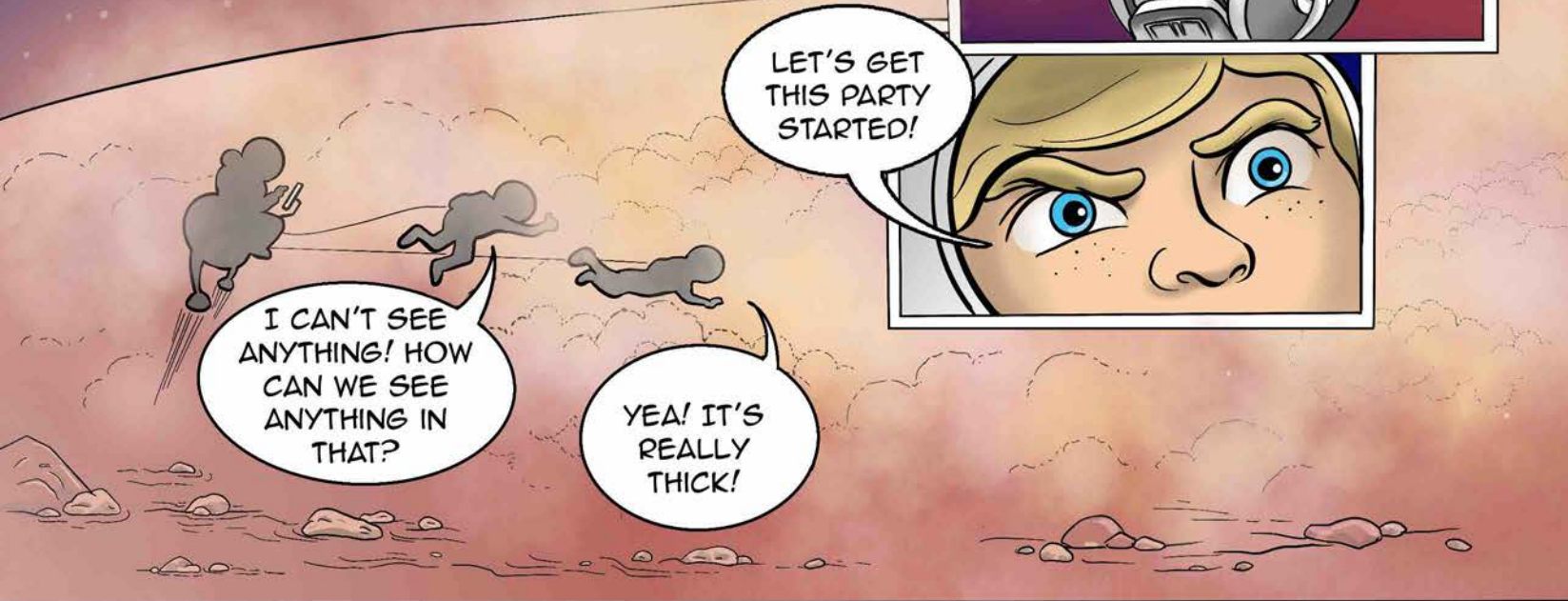
I HOPE WE FIND HER IN TIME.



I AM HAVING TROUBLE FINDING HER SIGNAL. SHE MUST BE HAVING TROUBLE WITH HER GENERATOR. SHE MAY HAVE TO SHUT DOWN AND GO INTO SURVIVAL MODE TO CONSERVE HER POWER.

WE GOTTA HURRY UP!

OH, NO! WHAT SHOULD WE DO THEN?

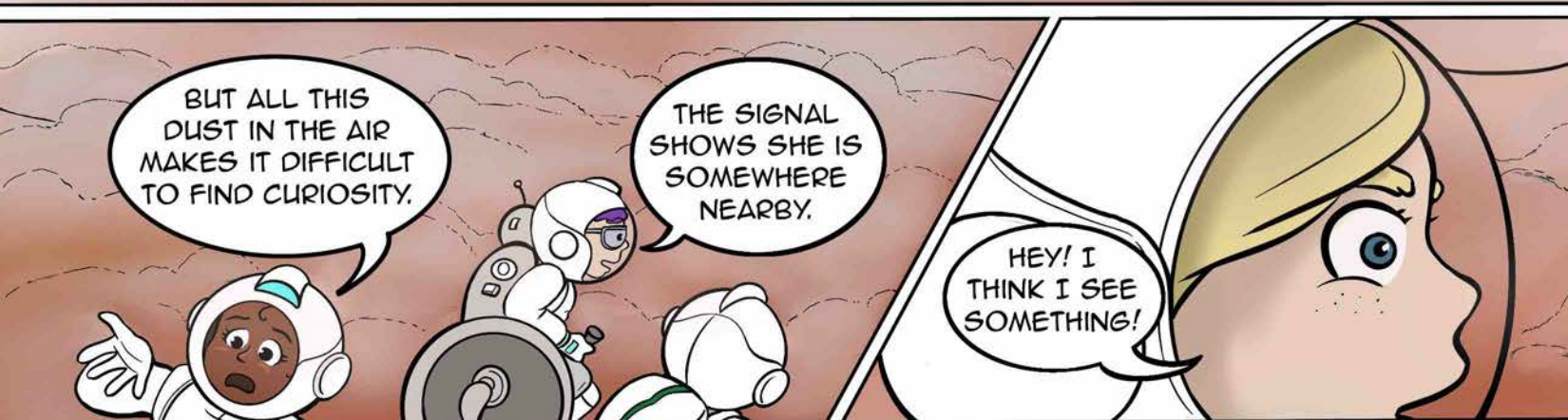




THE WIND ISN'T VERY STRONG.

THE WIND CAN REACH 60 MILES PER HOUR AT ITS STRONGEST. WE SHOULD BE OK.

THE STORM SEEMS TO BE MOVING AWAY FROM US.



BUT ALL THIS DUST IN THE AIR MAKES IT DIFFICULT TO FIND CURIOSITY.

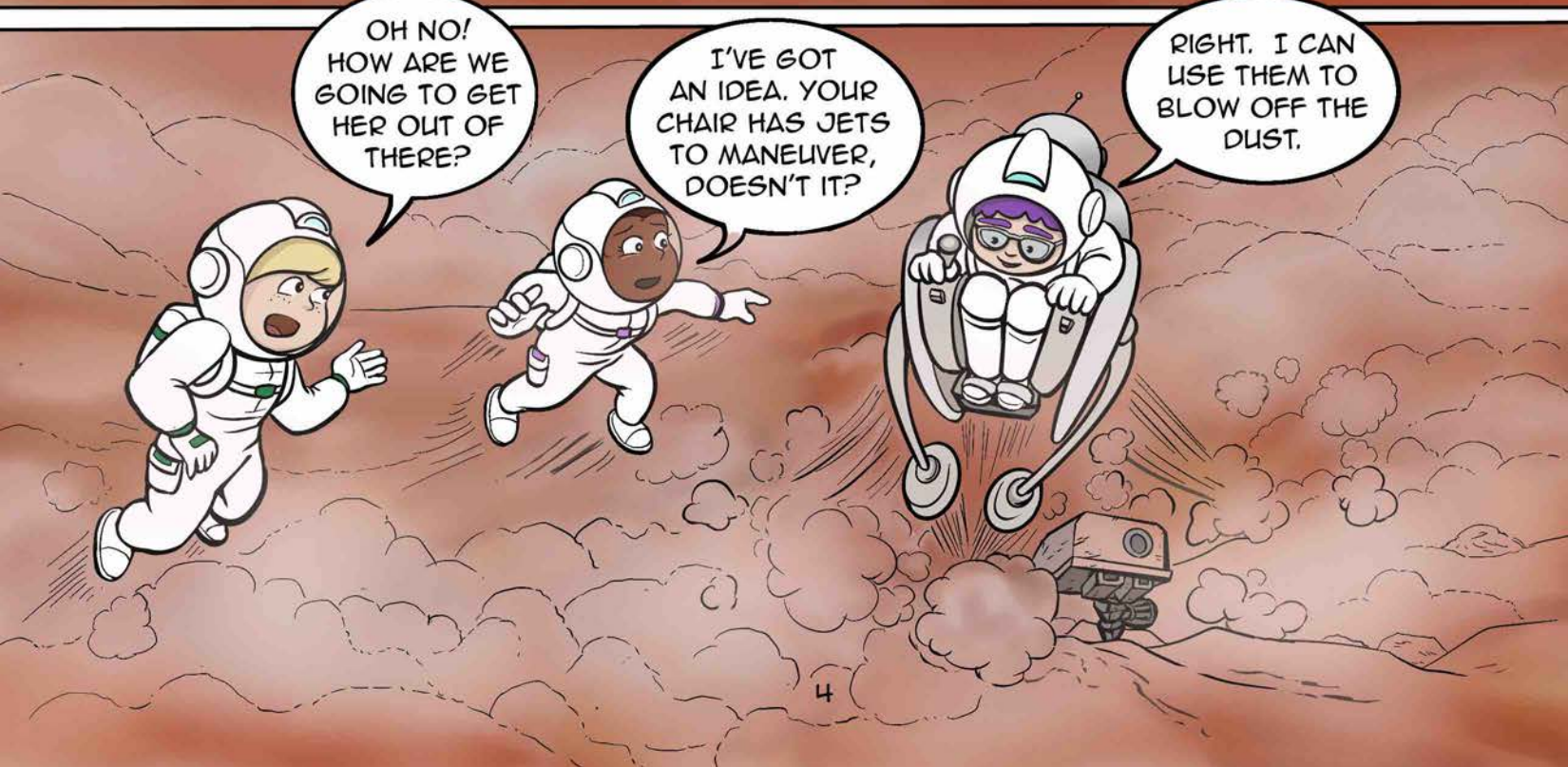
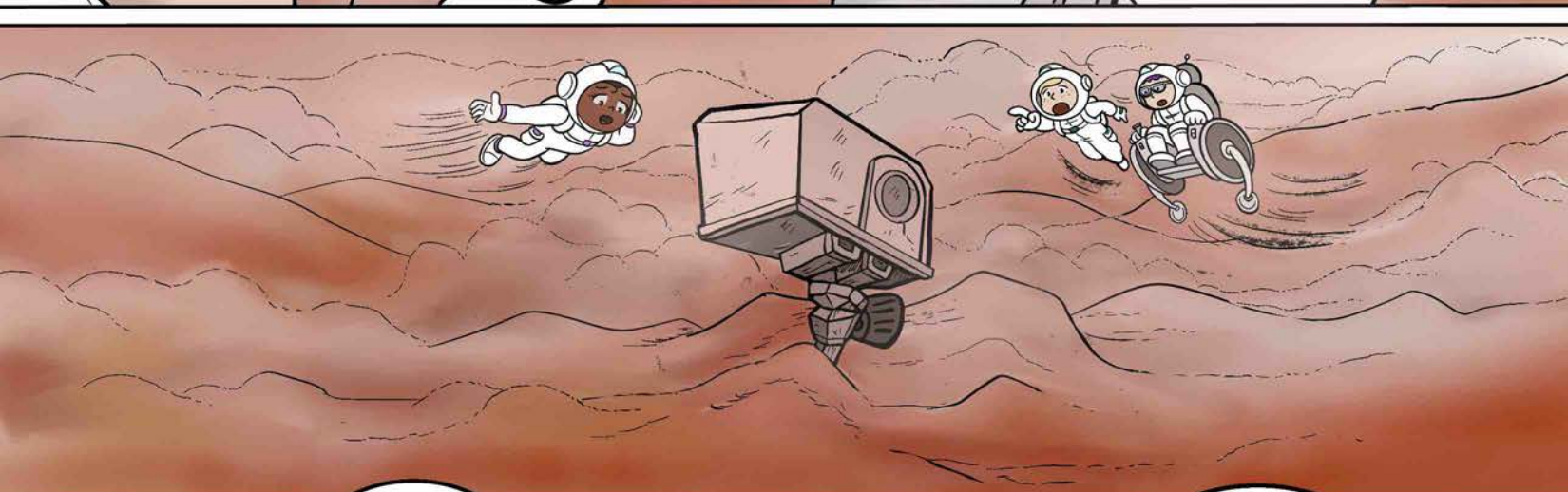
THE SIGNAL SHOWS SHE IS SOMEWHERE NEARBY.

HEY! I THINK I SEE SOMETHING!



OVER THERE! THAT SMALL HILL HAS SOMETHING STICKING OUT OF THE SAND.

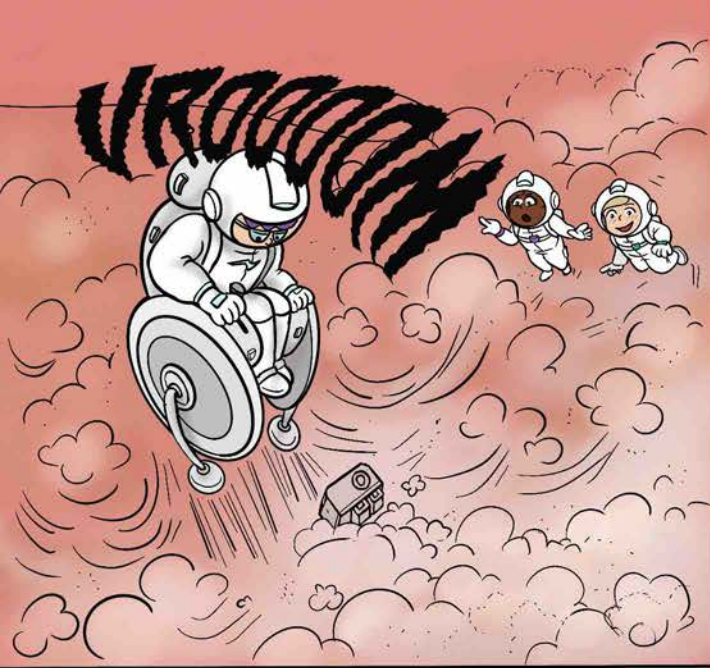
I SEE IT! I THINK YOU'RE RIGHT!



OH NO! HOW ARE WE GOING TO GET HER OUT OF THERE?

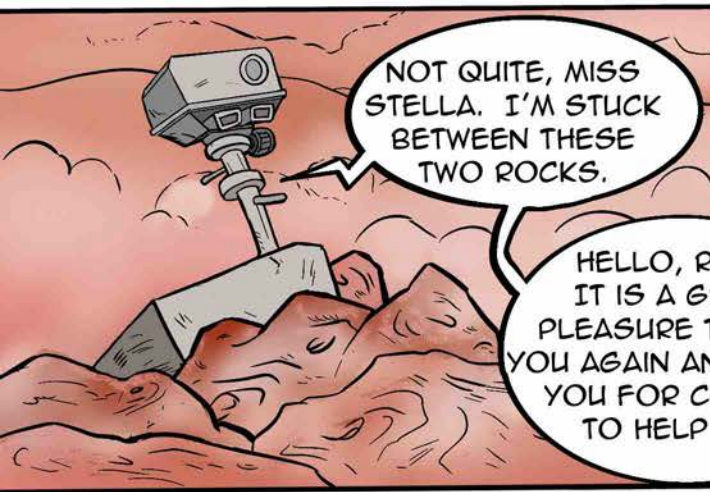
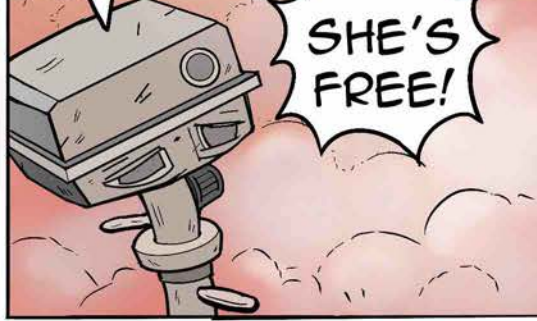
I'VE GOT AN IDEA. YOUR CHAIR HAS JETS TO MANEUVER, DOESN'T IT?

RIGHT. I CAN USE THEM TO BLOW OFF THE DUST.



IT'S GREAT TO SEE YOU ALL. YOU'RE JUST IN TIME!

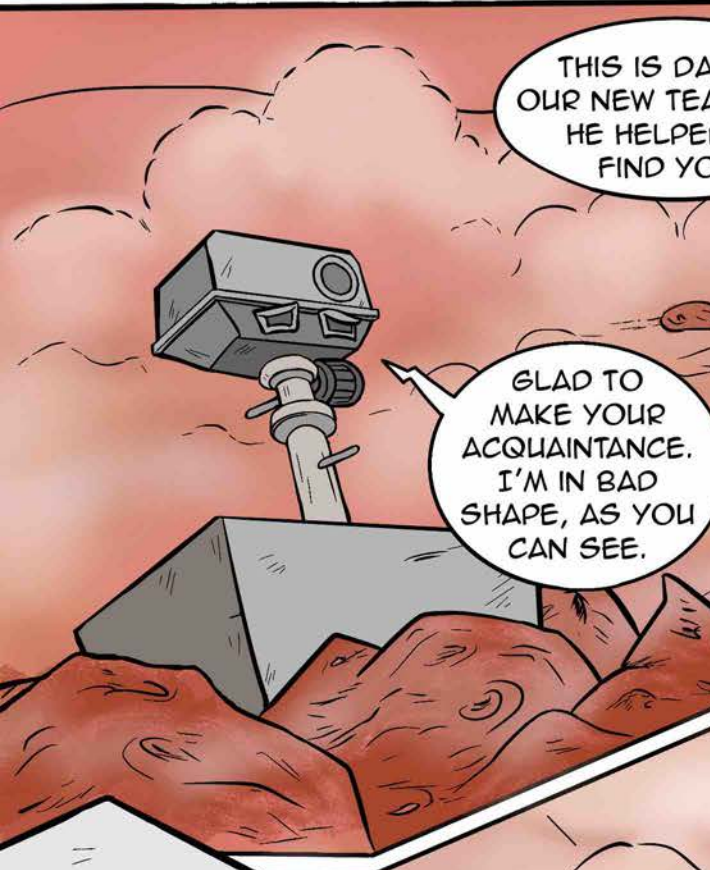
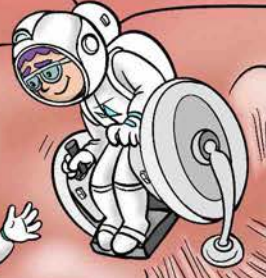
SHE'S FREE!



NOT QUITE, MISS STELLA. I'M STUCK BETWEEN THESE TWO ROCKS.

HELLO, RILEY. IT IS A GREAT PLEASURE TO SEE YOU AGAIN AND THANK YOU FOR COMING TO HELP ME!

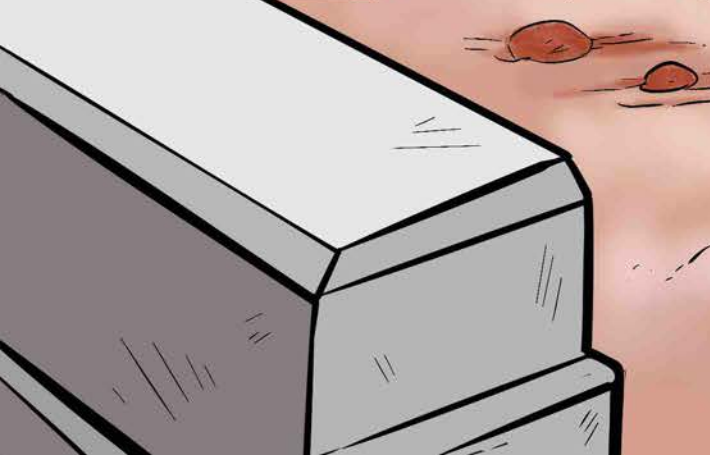
HI, CURIOSITY.



THIS IS DANIEL, OUR NEW TEAMMATE! HE HELPED US FIND YOU!

GLAD TO MAKE YOUR ACQUAINTANCE. I'M IN BAD SHAPE, AS YOU CAN SEE.

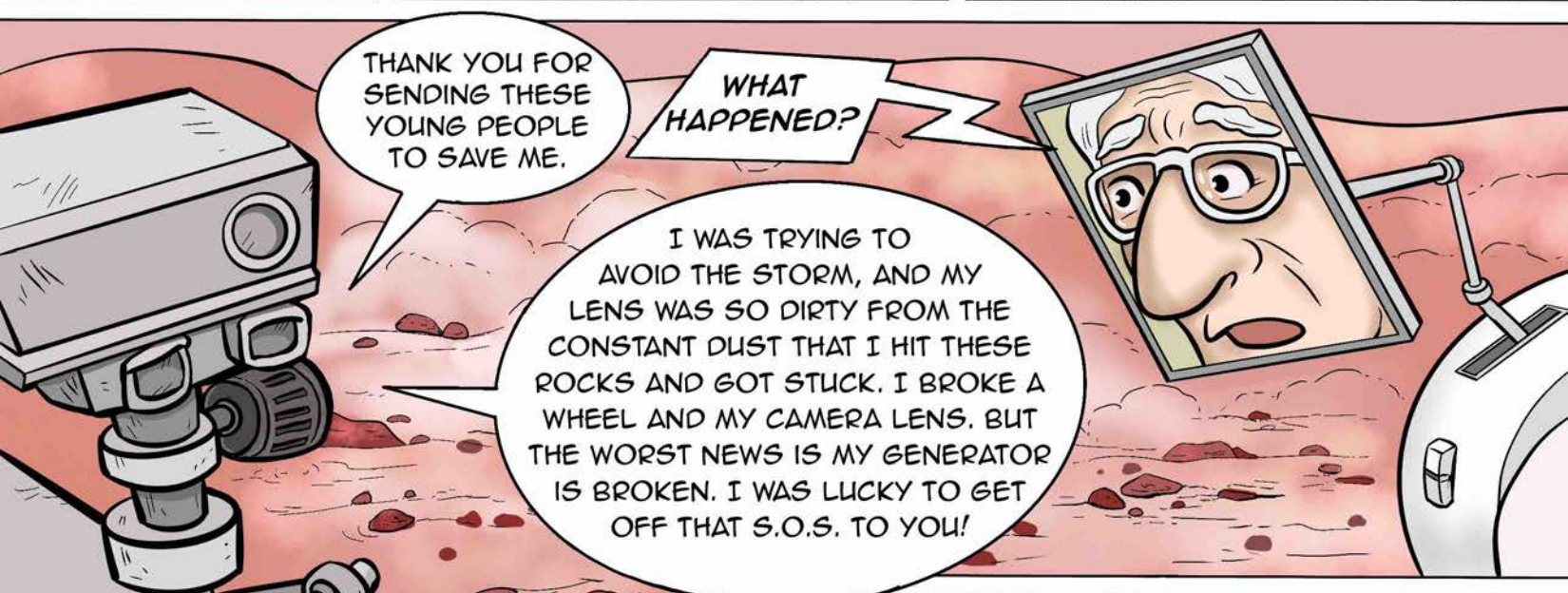
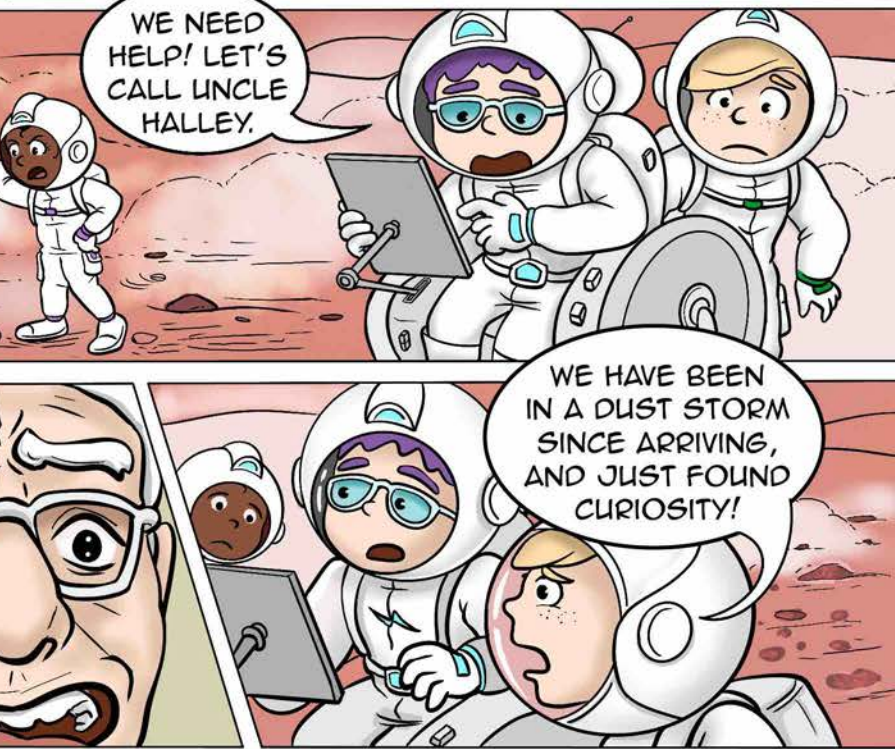
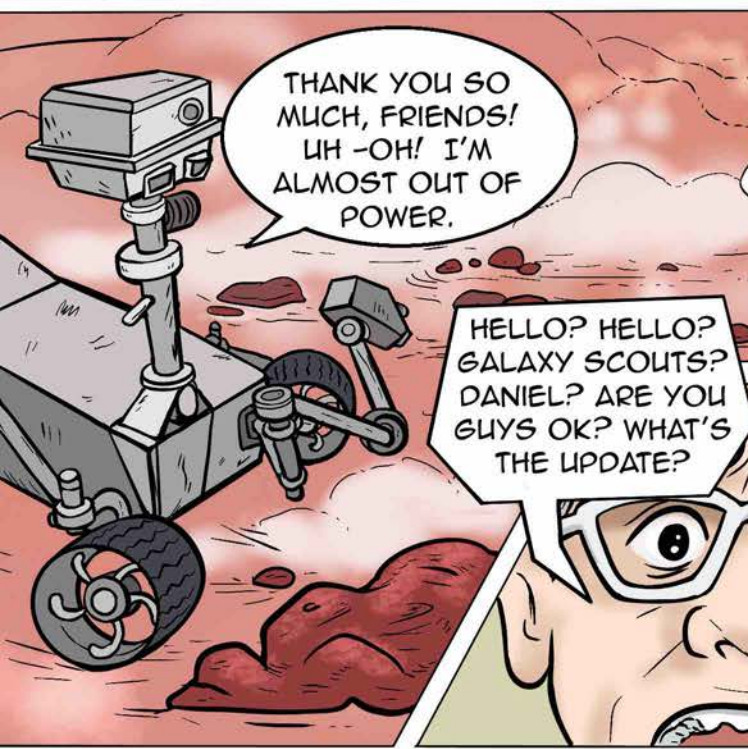
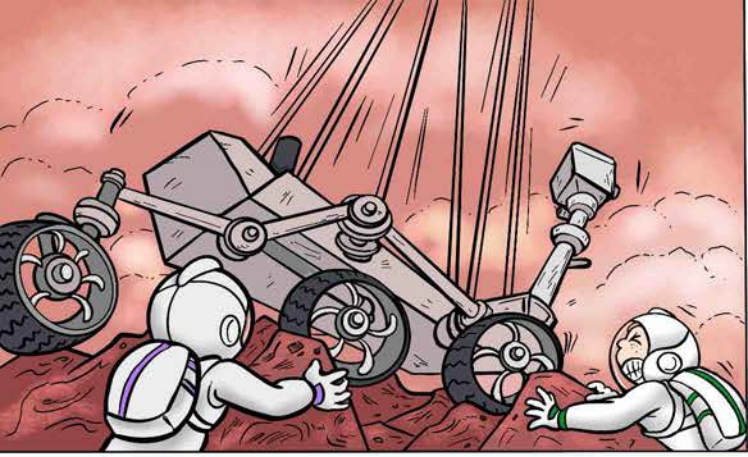
NICE TO MEET YOU, CURIOSITY!



HOW ABOUT WE TIE THE SAFETY LINE AROUND YOU AND I'LL PULL YOU UP WITH THE JETS ON MY CHAIR?

YES! WE CAN PULL YOU OUT TOGETHER!





YOU SHOULD SEE HER ANYTIME NOW.

SEE WHO?

SWOOOSH

AHHHH

I'M YOUR NEW TEAMMATE, LUNA.

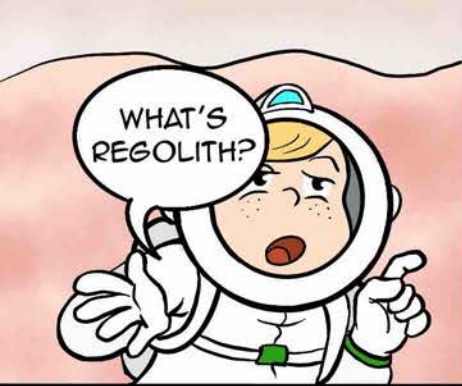
IS THAT A TALKING DOG?

COOL!!

MR. HALLEY GAVE ME THIS COLLAR, WHICH TRANSLATES MY DOG'S SPEECH INTO HUMAN SPEECH.

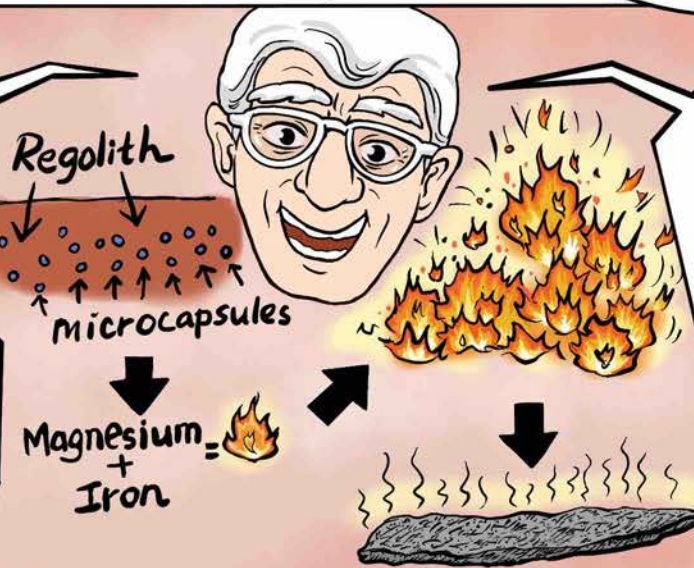
LUNA HAS BROUGHT SOME EQUIPMENT TO HELP CALM THE STORM AND SOME FRIENDS TO BUILD A SHELTER IN WHICH WE CAN REPAIR CURIOSITY.

OUR AIM IS TO TAME THE REGOLITH ON THE SURFACE OF MARS SO IT WON'T FLY UP INTO THE ATMOSPHERE AS WE CLEAN UP CURIOSITY AND FIX HER.

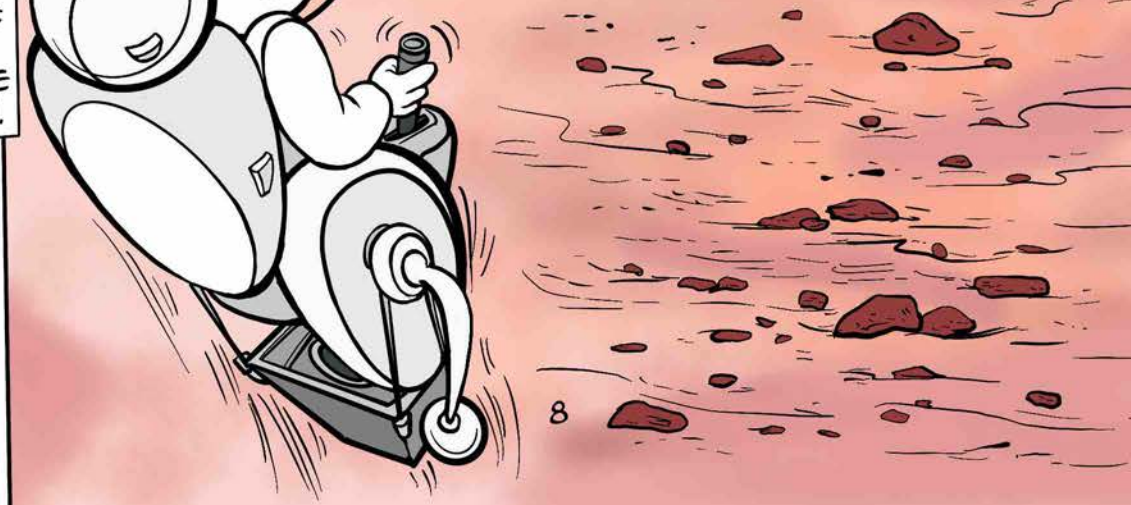
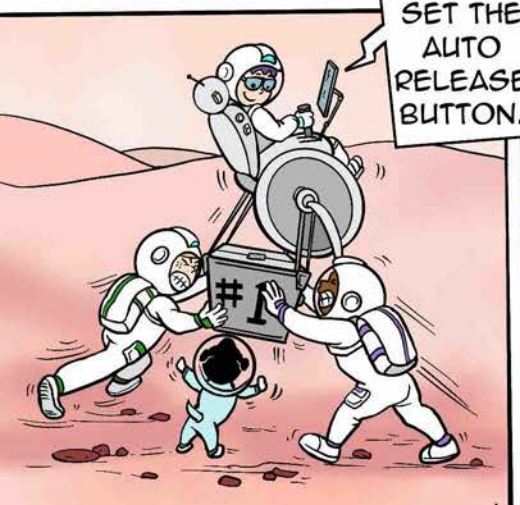
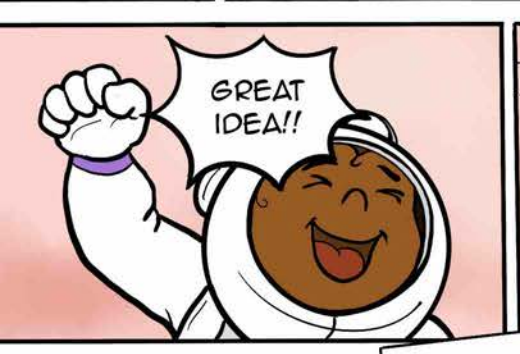
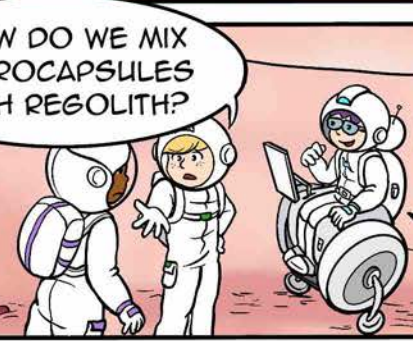
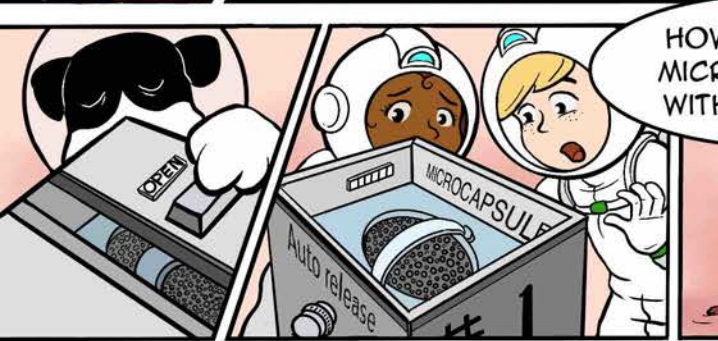
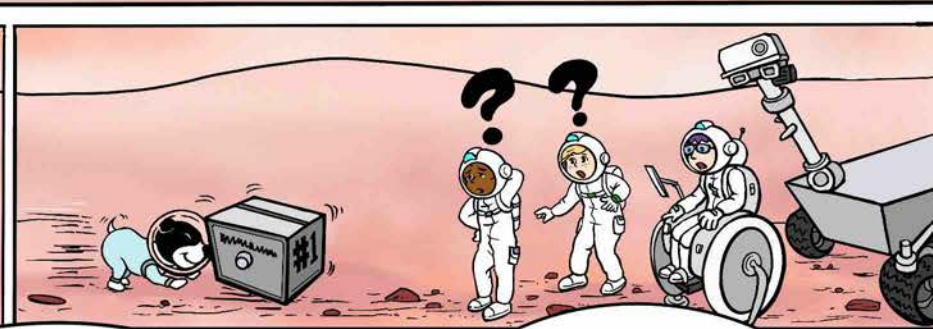


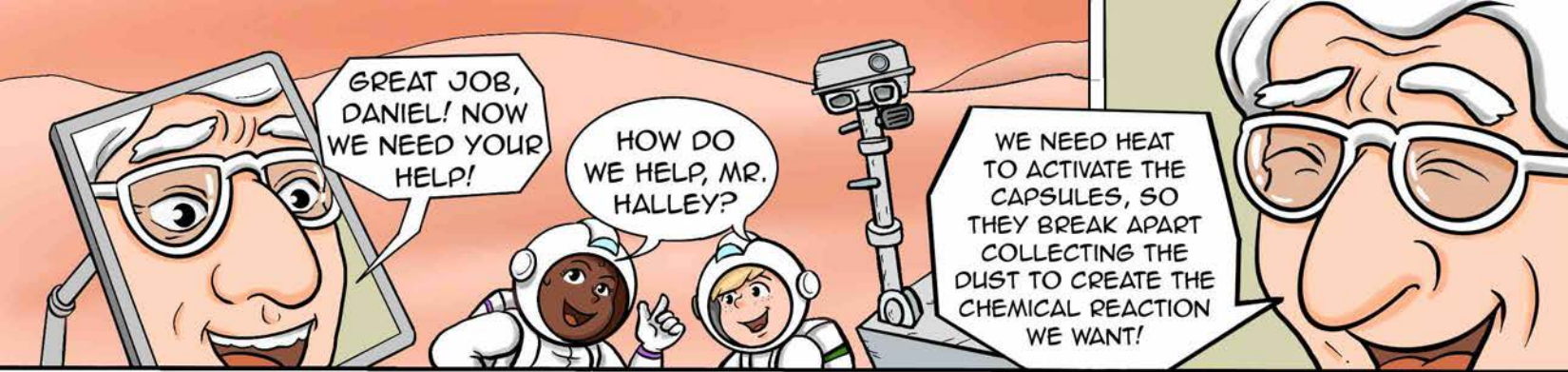
CORRECT! AND TO BUILD A PLATFORM, WE NEED TO CREATE A CHEMICAL REACTION WITH THE REGOLITH AND MY SPECIAL MICROCAPSULES.

THE CAPSULES CONTAIN MAGNESIUM THAT REACTS WITH THE IRON IN THE REGOLITH. IN THE ABSENCE OF OXYGEN, THE INTERACTION RELEASES A LOT OF HEAT.



WHEN THE REACTION IS COMPLETE, WE END UP WITH A STRONG METAL MATERIAL WE CAN USE TO BUILD A HARD SURFACE.

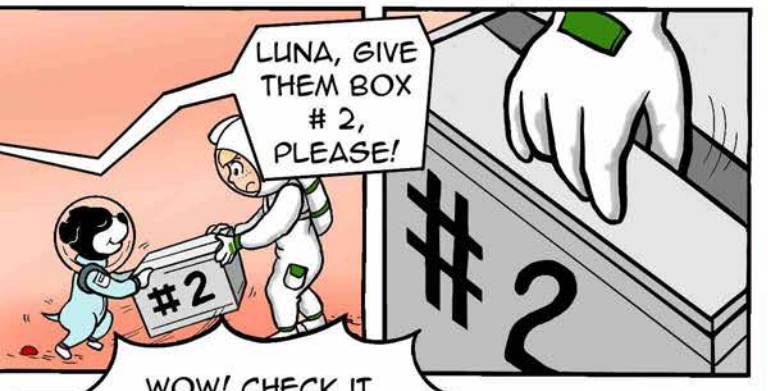




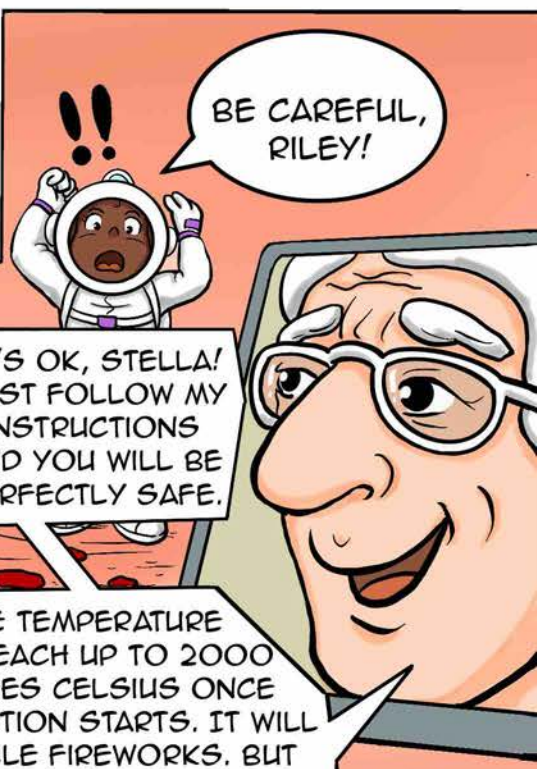
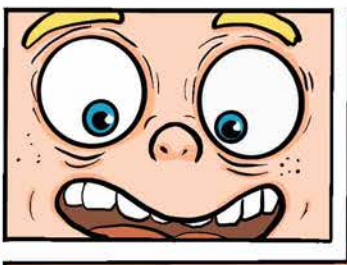
GREAT JOB, DANIEL! NOW WE NEED YOUR HELP!

HOW DO WE HELP, MR. HALLEY?

WE NEED HEAT TO ACTIVATE THE CAPSULES, SO THEY BREAK APART COLLECTING THE DUST TO CREATE THE CHEMICAL REACTION WE WANT!

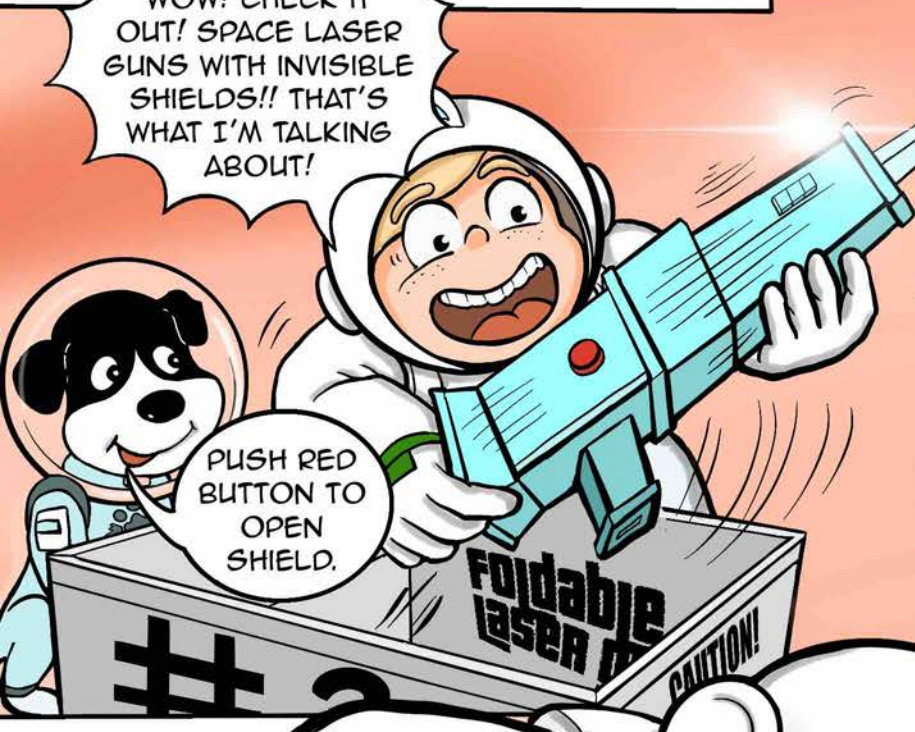


LUINA, GIVE THEM BOX #2, PLEASE!



BE CAREFUL, RILEY!

IT'S OK, STELLA! JUST FOLLOW MY INSTRUCTIONS AND YOU WILL BE PERFECTLY SAFE.

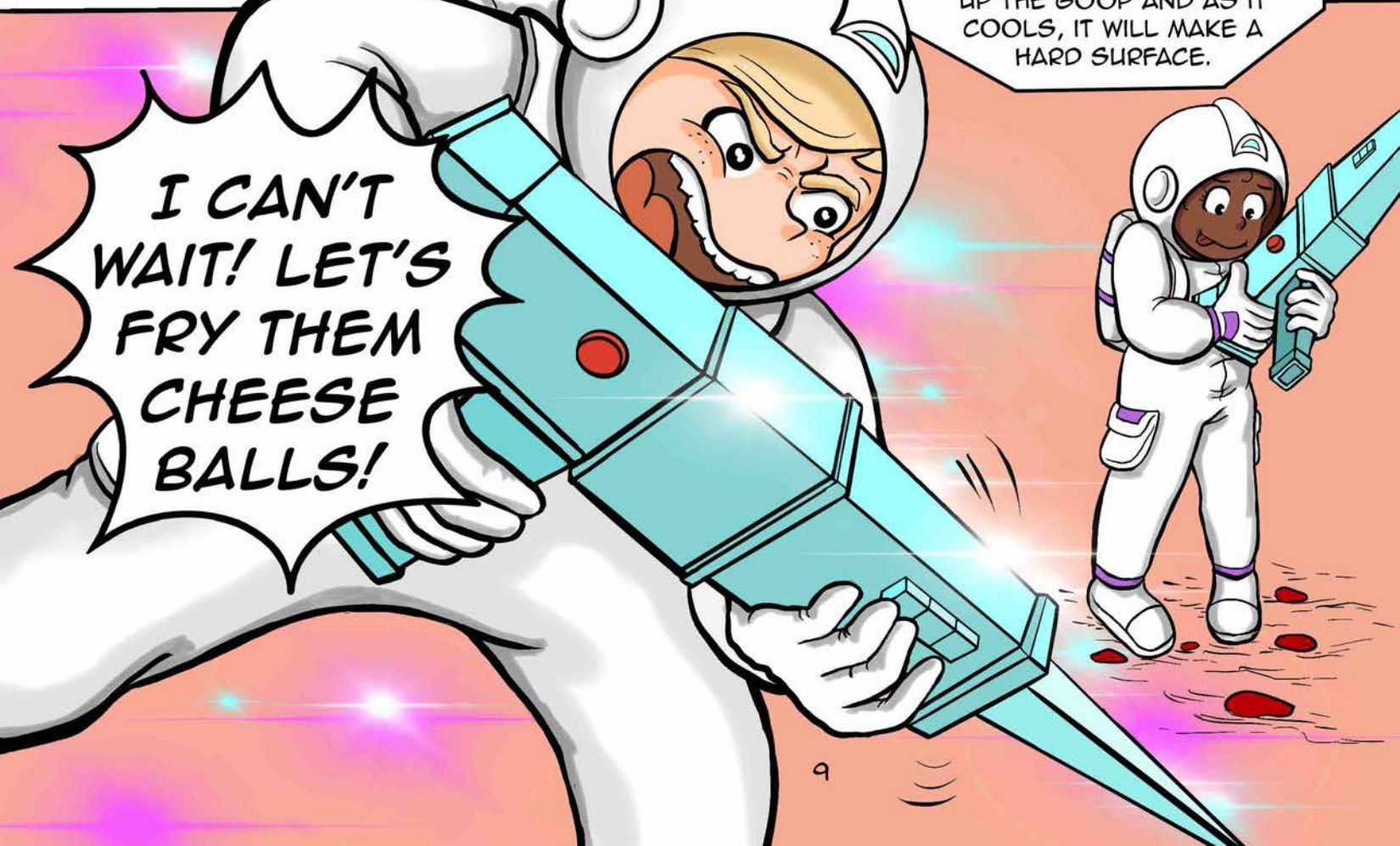


WOW! CHECK IT OUT! SPACE LASER GUNS WITH INVISIBLE SHIELDS!! THAT'S WHAT I'M TALKING ABOUT!

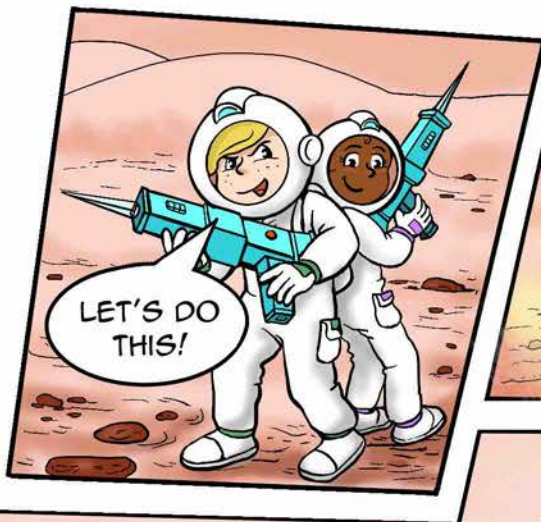
PUSH RED BUTTON TO OPEN SHIELD.

THE TEMPERATURE CAN REACH UP TO 2000 DEGREES CELSIUS ONCE THE REACTION STARTS. IT WILL RESEMBLE FIREWORKS. BUT DON'T WORRY, THE SHIELDS ARE SPECIALLY DESIGNED AND YOUR SPACESUITS WILL PROTECT YOU.

YOU AND RILEY WILL FLY ABOVE THE AREA AND HEAT UP THE MICROCAPSULES USING THESE LASERS. THAT WILL HEAT UP THE GOOP AND AS IT COOLS, IT WILL MAKE A HARD SURFACE.



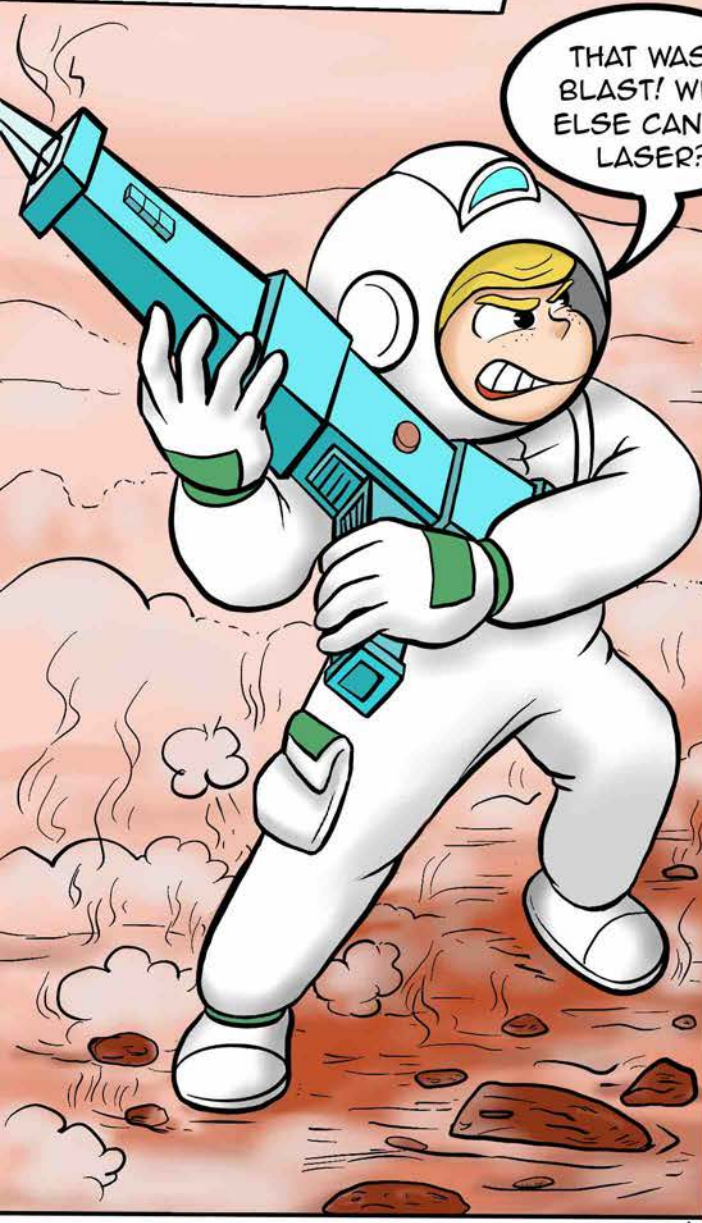
I CAN'T WAIT! LET'S FRY THEM CHEESE BALLS!



LET'S DO THIS!



YAY! WE MADE THE TARMAC!

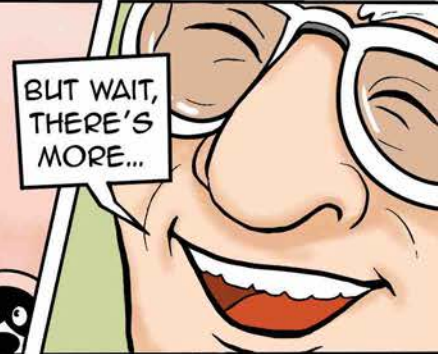


THAT WAS A BLAST! WHAT ELSE CAN WE LASER?

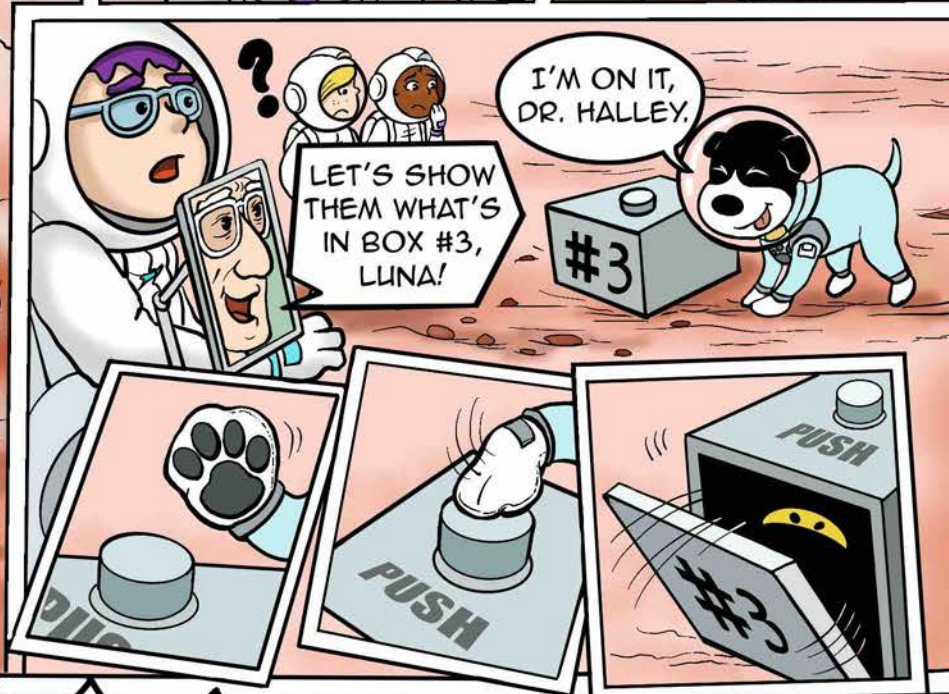


RILEY!!

IS THAT IT, MR. HALLEY?



BUT WAIT, THERE'S MORE...



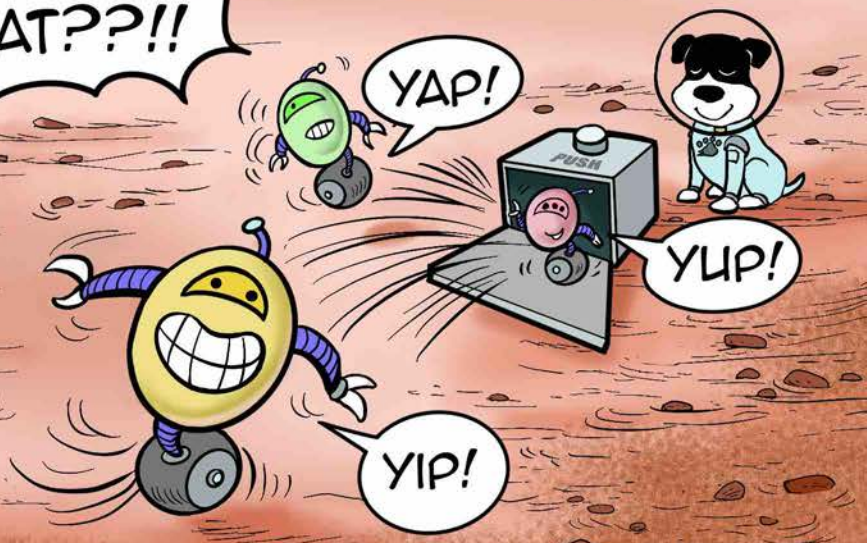
I'M ON IT, DR. HALLEY.

LET'S SHOW THEM WHAT'S IN BOX #3, LUNA!



LET ME INTRODUCE YOU TO YOUR NEWEST FRIENDS. THESE ARE ROBOTS 1, 2 & 3.

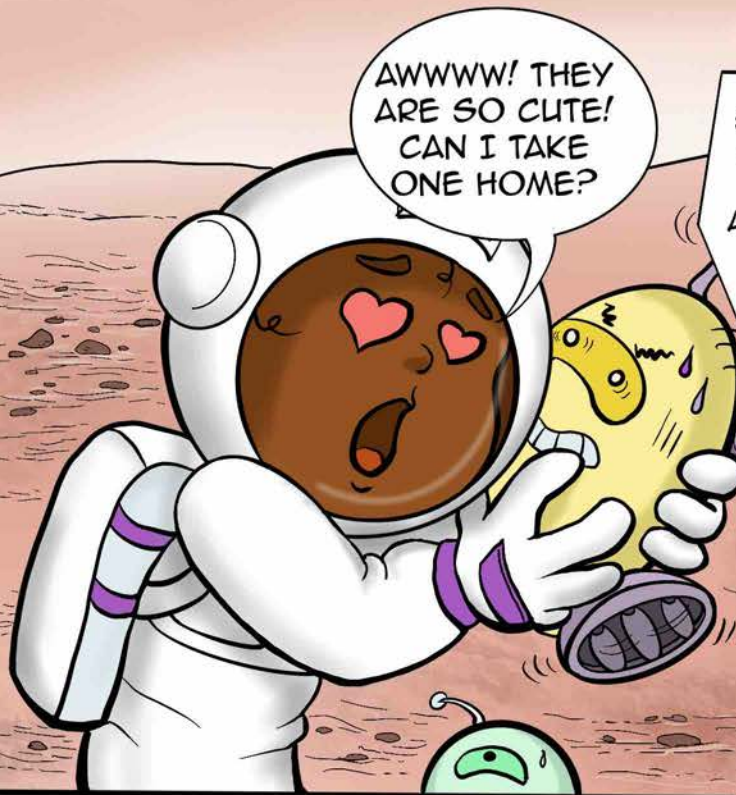
THEY ARE PROGRAMMED TO BUILD HABITATS AND MAINTAIN CURIOSITY.



YAP!

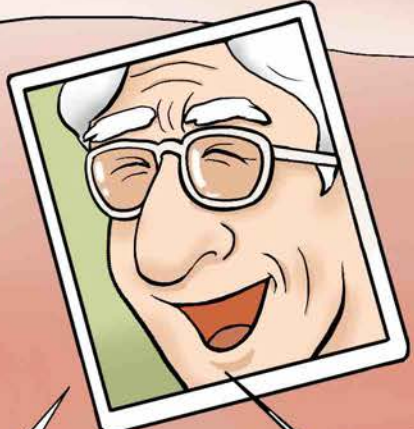
YIP!

YIP!

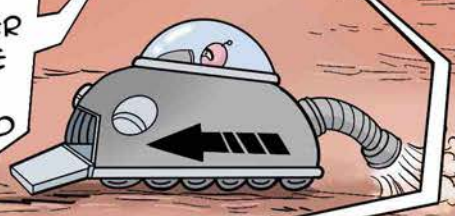


AWWWW! THEY ARE SO CUTE! CAN I TAKE ONE HOME?

SORRY, STELLA. THEY ARE GOING TO STAY HERE TO HELP CURIOSITY. AS YIP AND YAP SMOOTH OUT THE TARMAC, YUP WILL FEED THE 3D PRINTER WITH REGOLITH AND OTHER MATERIALS TO BUILD SHELTERS.



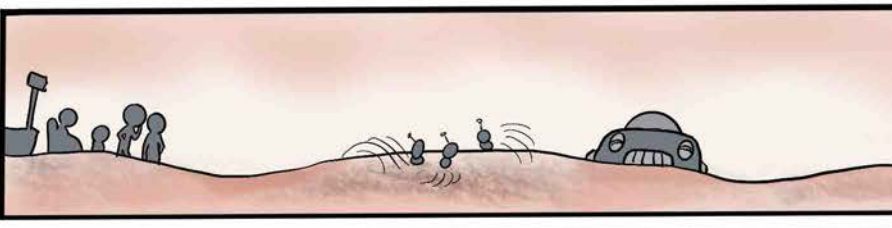
AND THIS IS THE LATEST 3D PRINTER THAT CAN CREATE HABITATS FROM MATERIALS FOUND ON MARS.



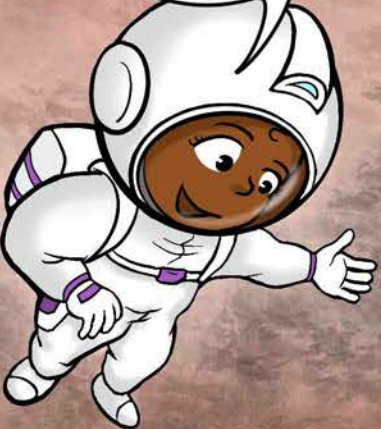
YUP!

YOU MEAN CURIOSITY AND THE BOTS WILL BUILD MORE HABITATS ON MARS?

THAT'S RIGHT! THESE TARMACS CAN BE MADE INTO HABITATS AND WILL BE USED FOR ASTRONAUTS WHO COME TO WORK ON MARS. THESE TARMACS WILL ALSO MAKE THE SPACESHIPS LANDING MUCH EASIER AND SAFER.

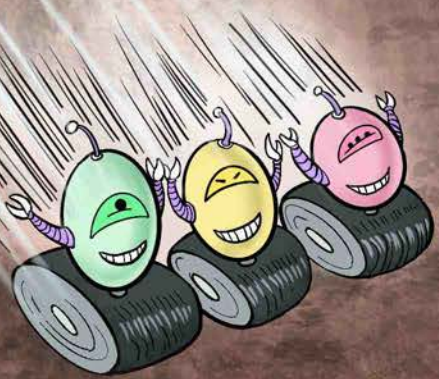


LOOKS LIKE THEY ARE DONE!



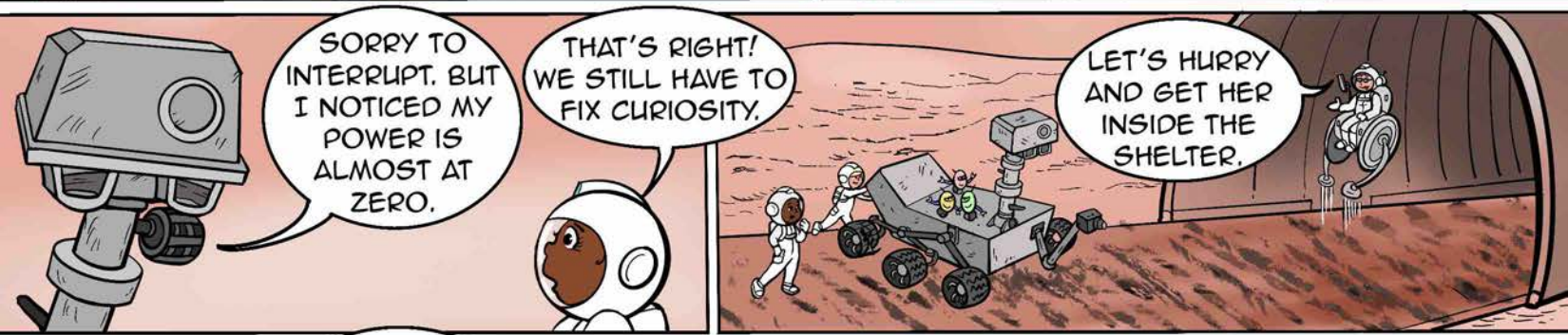
THAT WORKS GREAT! IT LOOKS LIKE A BASKETBALL COURT! CAN THE GOBOTS PLAY BASKETBALL?

AND THAT SEEMED TO ERADICATE THE DUST STORM.





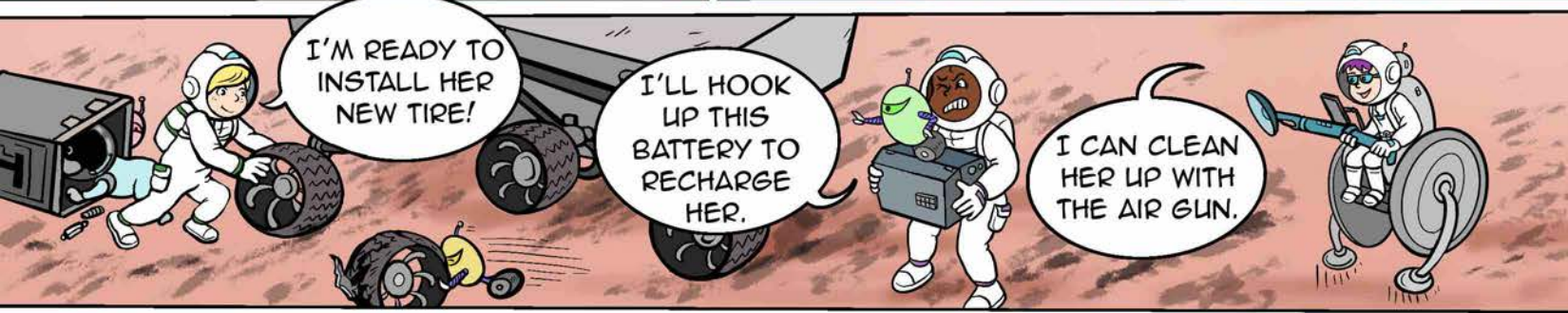
THE SHELTER IS DONE!



SORRY TO INTERRUPT, BUT I NOTICED MY POWER IS ALMOST AT ZERO.

THAT'S RIGHT! WE STILL HAVE TO FIX CURIOSITY.

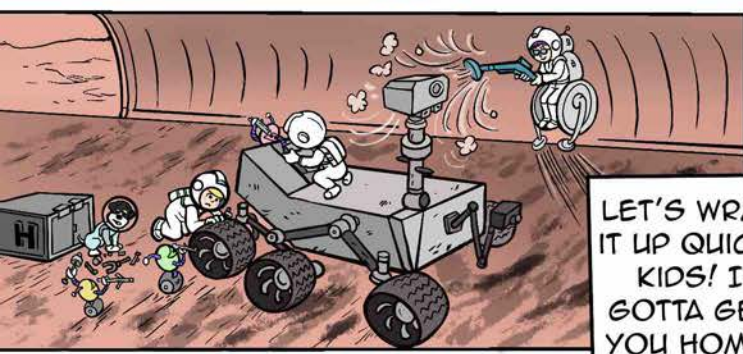
LET'S HURRY AND GET HER INSIDE THE SHELTER.



I'M READY TO INSTALL HER NEW TIRE!

I'LL HOOK UP THIS BATTERY TO RECHARGE HER.

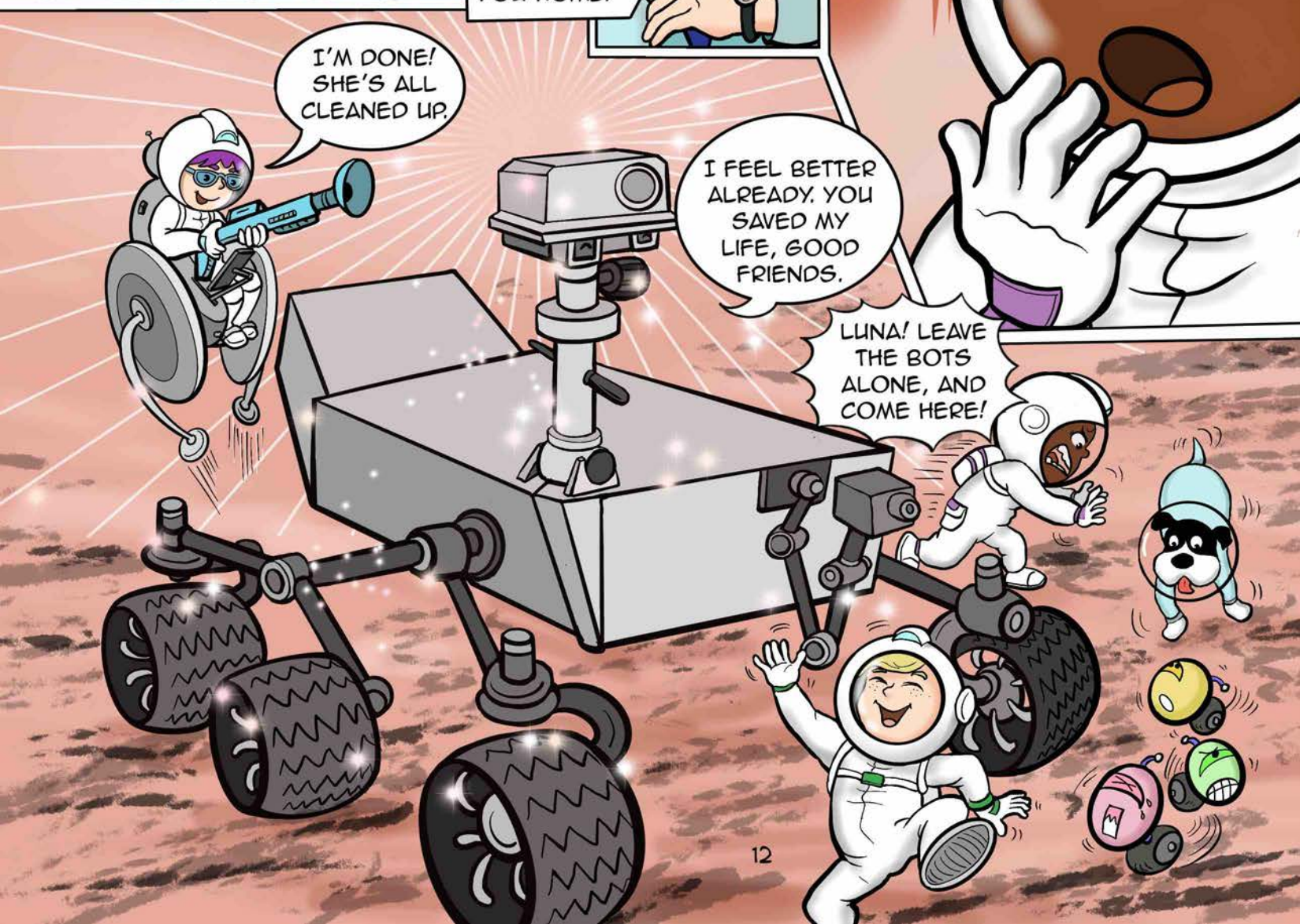
I CAN CLEAN HER UP WITH THE AIR GUN.



LET'S WRAP IT UP QUICK, KIDS! I GOTTA GET YOU HOME.



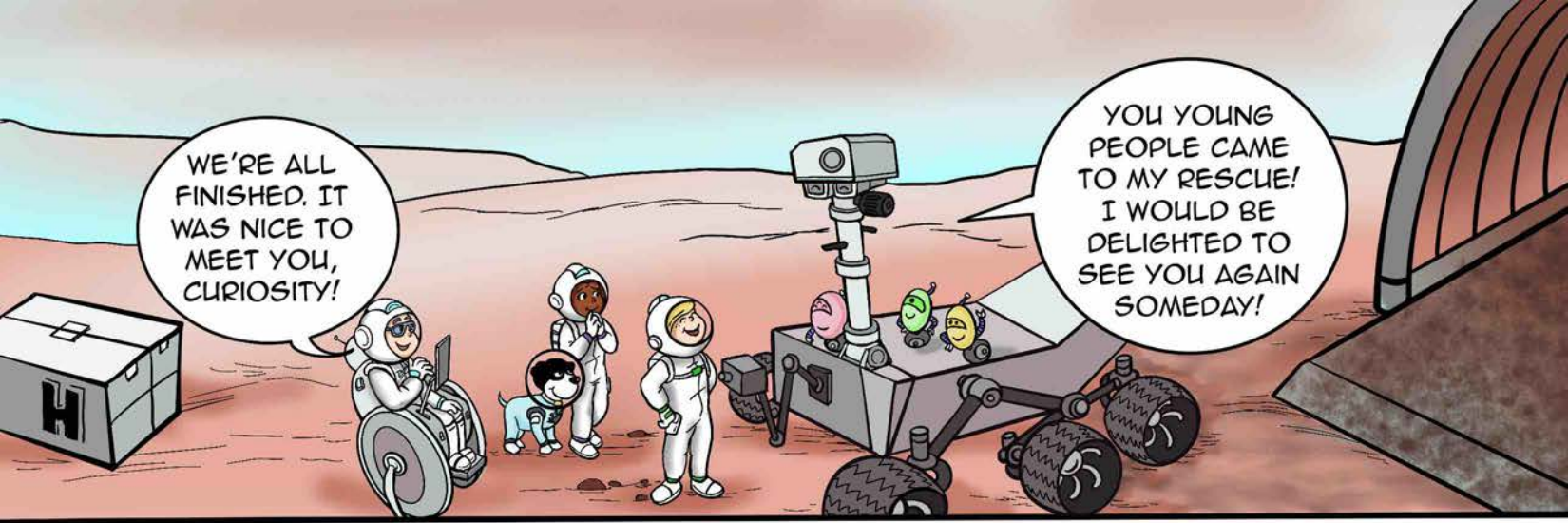
OH MY GOSH! THAT'S RIGHT!



I'M DONE! SHE'S ALL CLEANED UP.

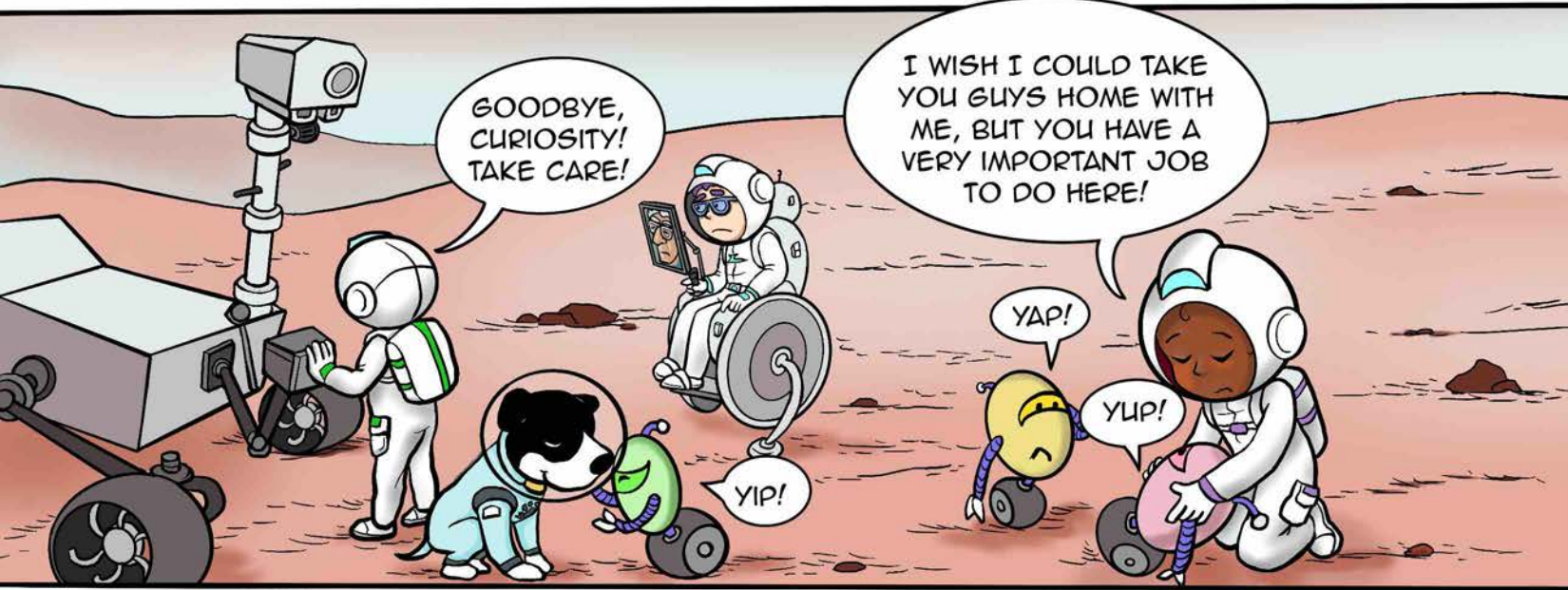
I FEEL BETTER ALREADY. YOU SAVED MY LIFE, GOOD FRIENDS.

LUNA! LEAVE THE BOTS ALONE, AND COME HERE!



WE'RE ALL FINISHED. IT WAS NICE TO MEET YOU, CURIOSITY!

YOU YOUNG PEOPLE CAME TO MY RESCUE! I WOULD BE DELIGHTED TO SEE YOU AGAIN SOMEDAY!



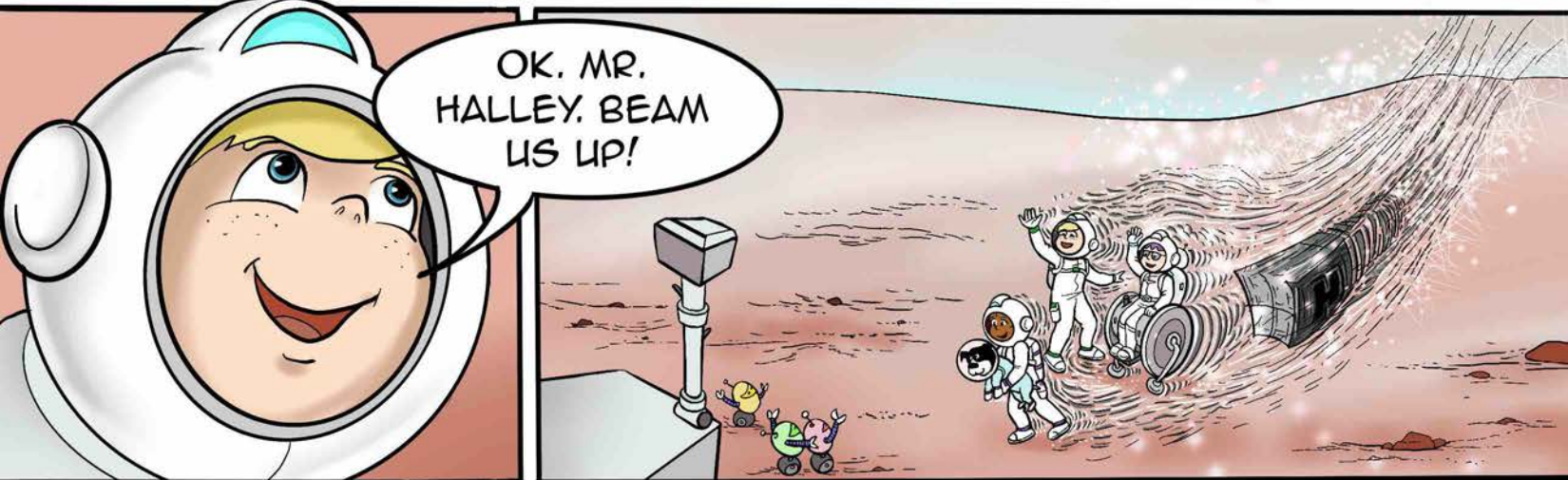
GOODBYE, CURIOSITY! TAKE CARE!

I WISH I COULD TAKE YOU GUYS HOME WITH ME, BUT YOU HAVE A VERY IMPORTANT JOB TO DO HERE!

YAP!

YUP!

YIP!



OK. MR. HALLEY. BEAM US UP!



SWOOOSH



THAT WAS THE COOLEST TRIP EVER!

AND WE LEARNED SO MANY NEW THINGS.

HI, UNCLE HALLEY!

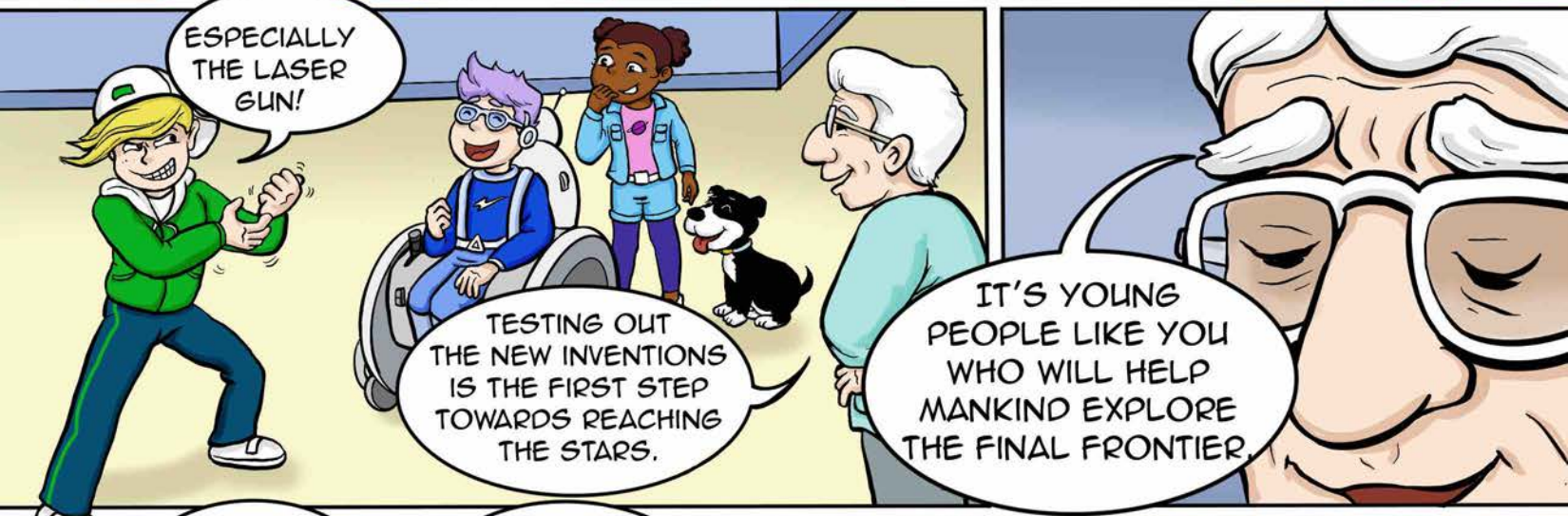
WELCOME BACK, MY YOUNG HEROES.



HEROES?

NOT ONLY DID YOU SAVE CURIOSITY, BUT YOU ALSO HELPED TEST MY NEW INVENTIONS.

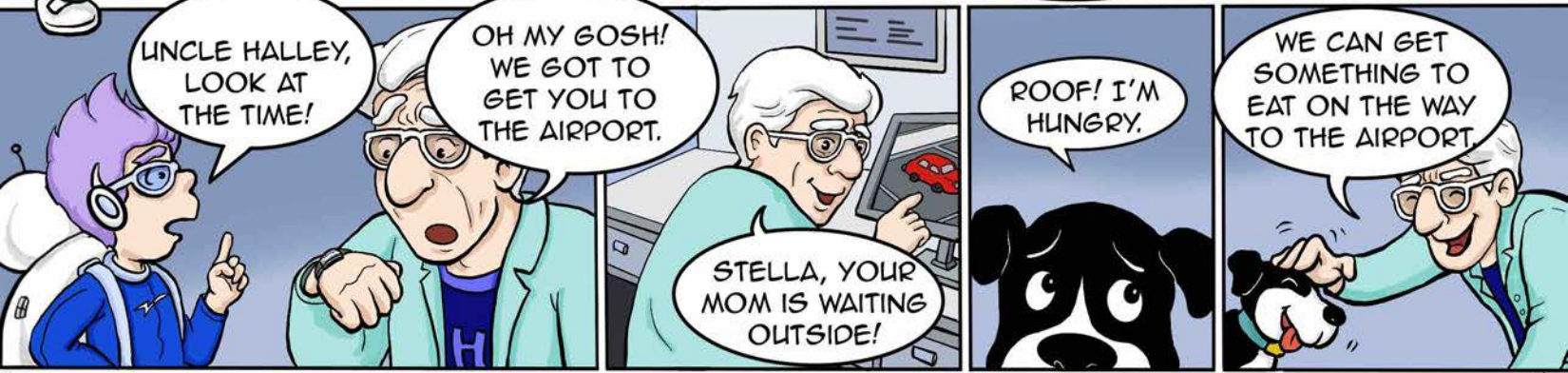
THEY WORK GREAT, MR. HALLEY.



ESPECIALLY THE LASER GUN!

TESTING OUT THE NEW INVENTIONS IS THE FIRST STEP TOWARDS REACHING THE STARS.

IT'S YOUNG PEOPLE LIKE YOU WHO WILL HELP MANKIND EXPLORE THE FINAL FRONTIER.



UNCLE HALLEY, LOOK AT THE TIME!

OH MY GOSH! WE GOT TO GET YOU TO THE AIRPORT.

STELLA, YOUR MOM IS WAITING OUTSIDE!

ROOF! I'M HUNGRY.

WE CAN GET SOMETHING TO EAT ON THE WAY TO THE AIRPORT.



LUNA, I'M GOING TO MISS YOU!

DANIEL, I CAN'T WAIT FOR OUR NEXT ADVENTURE TOGETHER!

DON'T FORGET NEXT TIME I GET TO TAKE YOUR CHAIR FOR A SPIN!

IT WAS EXHILARATING. HOPE WE CAN DO IT AGAIN!

LET'S GO!



GLOSSARY

- CURIOSITY IS A MARS ROVER LAUNCHED IN 2011 AS PART OF NASA'S MARS SCIENCE LABORATORY. THIS CAR-SIZED ROVER CONTINUES TO EXPLORE THE ROCK RECORD MORE THAN A DECADE AFTER ITS ORIGINAL TWO-YEAR MISSION.

- MARTIAN ATMOSPHERE IS MOSTLY MADE OF CARBON DIOXIDE AND SMALL AMOUNTS OF NITROGEN, OXYGEN AND WATER. IT IS ABOUT 100 TIMES LESS DENSE THAN EARTH'S ATMOSPHERE AND CAN NOT TRAP HEAT FROM THE SUNLIGHT. BECAUSE OF THIS, MARS IS A VERY COLD PLANET. ITS AVERAGE DAILY TEMPERATURE IS ABOUT -67 F.

- MARTIAN WINDS ARISE WHEN THE AIR THAT IS WARMED UP NEAR THE PLANET'S EQUATOR RISES AND MOVES TOWARDS THE POLES. DUST RAISED BY THESE WINDS REMAINS IN THE ATMOSPHERE LONGER THAN ON EARTH AS THERE IS NO RAIN TO WASH IT OUT. WHILE MARTIAN WINDS ARE GENERALLY GENTLE, SEASONALLY AND NEAR THE POLES THEY CAN BECOME GALES WHICH PICK UP LARGE AMOUNT OF DUST FROM THE SURFACE.

- REGOLITH IS A BLANKET OF LOOSE MATERIAL COVERING THE SURFACE OF PLANETS, MOONS, AND EVEN SOME ASTEROIDS. IT IS MADE OF DUST AND BROKEN ROCKS.

- IRON OXIDE IS A CHEMICAL COMPOUND COMPOSED OF IRON AND OXYGEN. IT HAS A REDDISH-BROWN COLOR, IS ABUNDANT ON EARTH AND IS USED IN MANY APPLICATIONS. THE MOST COMMON EXAMPLE OF IRON OXIDE IS RUST.

- A CHEMICAL REACTION IS A PROCESS THAT LEADS TO THE CHEMICAL TRANSFORMATION OF ONE SET OF CHEMICAL SUBSTANCES TO ANOTHER. DURING THE REACTION, ATOMS WITHIN REACTANTS ARE REARRANGED AND THE NEW PRODUCTS ARE ACCOMPANIED BY AN ENERGY CHANGE.

- A LASER IS A DEVICE THAT EMITS CONCENTRATED LIGHT THROUGH A PROCESS THAT STIMULATES ATOMS AND MOLECULES TO EMIT RADIATION. THE WORD LASER IS AN ACRONYM FOR LIGHT AMPLIFICATION BY STIMULATED EMISSION OF RADIATION.

- A TARMAK REFERS TO TARMACADAM, A TAR-BASED MATERIAL USED FOR FINISHING ROAD SURFACES.

- CHECK OUT THE VIDEO ABOUT PROFESSOR BANERJEE'S NASA-FUNDED RESEARCH ON REGOLITH ADAPTIVE MODIFICATION SYSTEM HERE:
[HTTPS://TINYURL.COM/2A7W9PY2](https://tinyurl.com/2A7W9PY2)

JOIN STELLA AND RILEY ON THEIR GALAXY SCOUTING ADVENTURES!

Galaxy Scouts Space-Ventures is a comic book series for kids, introducing astronomy and other sciences in a fun-filled ride that is full of adventures combined with cutting edge STEM topics and discoveries. Take a journey to the stars with Stella and Riley and many other characters. The journey is just beginning. So fasten your seatbelts. It's time to blast off!

GALAXY SCOUTS TEAM

Snežana Stanimirović is a professor at the University of Wisconsin Madison who studies how molecules and stars form in the interstellar medium. She is the creator and an advisor for the comic.

Rebecca Cors is a social scientist and evaluator at Wisconsin Center for Education Research who studies how people learn about, and co-exist with, science and nature. She is the evaluator and an advisor for the comic.

Kay Kriewald is an outreach specialist at the University of Wisconsin Space Place in Madison. She is the field tester and an advisor for the comic.

Amy Gaeta is a social science researcher, practicing poet, professional editor, and disability rights activist. She's the editor and proofreader for the comic.

Jan Lin has illustrated many children's educational books in Taiwan. She is the illustrator and art director for the comic.

Robert Tetzner is the director of an ESL school in Taiwan. He also writes and illustrates children's books and magazines. He is the chief writer and activity designer for the comic.



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<https://galaxyscouts.wisc.edu>



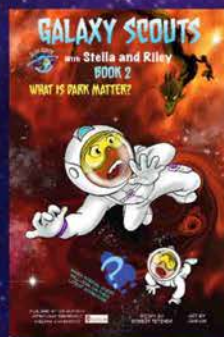
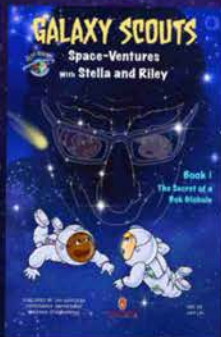


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