

# 11780A PNINS T-VEX

HELLO, WE ARE 4 (1 GIRL AND 3 BOYS) 12 YEAR OLD 7TH GRADERS FROM NEW ZEALAND. FOR OUR VEX IQ MAKE IT REAL CHALLENGE ENTRY THIS YEAR WE HAVE, AFTER PONDERING UPON IT, DECIDED TO MAKE **THE RAMPOSAUROUS** SO WE CAN PICK UP CUBES WITH EASE IN THE GAME THAT WE PLAY, VEX IQ SQUARED AWAY! WE WILL NOW EXPLAIN WHAT IT CAN DO, ITS PURPOSE AND HOW IT WAS BUILT, IN A BRIEF DESCRIPTION.

THE RAMPOSAUROUS WORKS ESSENTIALLY LIKE AN UPWARDS SLIDE WHERE THE OBJECT IN QUESTION, IN THIS CASE A CUBE, SLIDES ON TO THE RAMPOSAUROUS AND FALLS INTO THE BOX AREA SO THAT IT CAN BE TRANSPORTED. THE RAMPOSAUROUS CAN BE USED WITH A FUNCTIONING "ARM" ON TOP OF IT SO USERS CAN EASILY PUT ON AND TAKE OFF CUBES. THE RAMPOSAUROUS'S MAIN FUNCTION HOWEVER IS TO SIMPLY RAM INTO CUBES QUICKLY SO THAT THEY SLIDE ON TOP, AND, TO TAKE THE CUBE OFF, YOU WOULD JERK YOUR ROBOT FORWARD SLIGHTLY SO THE CUBE WOULD FALL OFF.

THE RAMPOSAUROUS WOULD CONSIST OF NUMEROUS EXISTING VEX IQ PIECES (SHOWN AS GREY IN TINKERCAD) WITH THE UNIQUE PIECE BEING THE RAMP ITSELF (SHOWN AS PURPLE IN TINKERCAD). THE CYAN AREAS INDICATE ANOTHER PIECE WE DESIGNED IN VARIOUS SIZES. THE 3D PRINTED MODEL HOWEVER SHOWCASES THE FULL RAMPOSAUROUS WITH A COMPLETE SET OF PIECES.

WE STARTED DESIGNING THE RAMPOSAUROUS BY LOGGING ONTO TINKERCAD (VERSION 4.10) AND PLAYING WITH THE DIFFERENT SHAPES TO SEE WHAT WE COULD COME UP WITH. THROUGH THIS PROCESS WE WATCHED AS OTHER TEAMS IN OUR CLUB STRUGGLED TO PICK UP THE CUBE AND PUSH IT. SO, IN TURN,

WE DECIDED TO DESIGN SOME SORT OF PART WHICH WOULD PICK UP THE CUBE WITH EASE, WITHOUT AN "ARM". ONCE WE HAD THE DESIGN FOR THE RAMPOSAUROUS, WE UPLOADED THE TINKERCAD DESIGN TO FUSION 360 (VERSION 2.0.7046) SO THAT WE COULD RENDER IT AND GET A CLEARER MODEL. AFTER WE UPLOADED THE PROJECT TO FUSION 360 WE STARTED TO SEE THE LITTLE IMPERFECTIONS THAT THE DESIGN CONTAINED. SO, TO FIX THIS PROBLEM, WE MADE SMALL ALTERATIONS IN THE TINKERCAD DESIGN AND TRIED UPLOADING TO FUSION 360 AGAIN, WE REPEATED THIS PROCESS SEVERAL TIMES.

AFTER GETTING TO A POINT WHERE WE WERE HAPPY WITH THE QUALITY OF OUR DESIGN WE WENT TO A LOCAL MAKERSPACE WHERE WE HAD ACCESS TO SEVERAL 3D PRINTING MACHINES. WE UPLOADED OUR TINKERCAD DESIGN TO ONE OF THE IN-HOUSE COMPUTERS AND STARTED THE 3D PRINTING PROCESS. WE RETURNED THE NEXT DAY TO SEE THAT THE TOP OF OUR MODEL (WE PRINTED IT UPWARDS) HAD SPLIT OFF THE BOTTOM DUE TO THE FACT THAT THE COLOURS HAD BEEN SWITCHED HALF WAY (THE FIRST RAN OUT). TO FIX THIS ISSUE, WE USED QUICK SET EPOXY RESIN TO BOND THE TWO PARTS TOGETHER. AFTER THIS WE SHAVED OFF THE EXCESS WITH A BOX CUTTER.

FROM THIS PROJECT WE HAVE LEARNED THAT WHEN DESIGNING AND 3D PRINTING ANY TYPE OF MODEL, TRIAL AND ERROR SHOULD ALWAYS BE EXPECTED. WE HAVE REALISED DURING THIS PROCESS THAT WHEN TRYING TO CREATE SOMETHING FROM SCRATCH, IT IS EASIER TO FIRST AND FOREMOST THINK ABOUT THE PROBLEM YOU WANT TO SOLVE. IF THERE ARE NO PARTICULAR PROBLEMS YOU WANT TO SOLVE, THEN IT IS BEST TO THINK ABOUT ALL THE LITTLE INCONVENIENCES YOU FACE DAY TO DAY TO DO WITH THAT PROJECT, AND THINK OF WAYS YOU CAN PARTIALLY OR FULLY SOLVE THE PROBLEM. EVEN BEFORE WE STARTED WORKING ON THIS CHALLENGE WE WOULD USE TINKERCAD QUITE OFTEN FOR SCHOOL PROJECTS.

WE WILL CONTINUE USING TINKERCAD AS OUR PRIMARY SOFTWARE AND WE WILL START TO INCORPORATE FUSION 360 INTO THE PROCESS AS WELL. WE ARE PLANNING TO KEEP USING FUSION 360

FOR SCHOOL, COMMUNITY AND PERSONAL PROJECTS TO THE POINT WHERE WE CAN ADOPT IT AS OUR NEW PRIMARY SOFTWARE. TINKERCAD AND FUSION 360 ARE GREAT SOFTWARE PROGRAMS TO LEARN IF ONE IS EVER INVOLVED WITH A ROBOTICS PROGRAM OR CLUB. THEY ARE GREAT ASSETS TO HAVE SINCE THEY PROVIDE SUCH A VAST RANGE OF SKILLS TO LEARN. WE THINK THAT LEARNING HOW TO USE ANY TYPE OF 3D MODELING SOFTWARE IS A GOOD IDEA IF YOU ARE PLANNING ON IMPLEMENTING ROBOTICS INTO ANY PART OF YOUR CAREER, AS WE ARE. OUR PLANS DIFFER FROM EACH OTHER BUT WE ARE ALL PLANNING TO HAVE AT LEAST A TOUCH OF ROBOTICS IN OUR CAREER PATHWAYS IF NOT OUR WHOLE CAREERS. WE HOPE TO KEEP STUDYING ROBOTICS AND SLOWLY START THINKING ABOUT WAYS TO ADD IT IN TO OUR LIVES. OVERALL, WE HAD A LOT OF FUN DOING THE VEX IQ MAKE IT REAL CHALLENGE AND WE HOPE OTHERS DID TOO!