00:00:16,515 --> 00:00:17,216
>> THAT WAS AWESOME!

00:00:17,216 --> 00:00:21,253
JUST LIKE BEING IN NASCAR.

00:00:21,254 --> 00:00:22,589
>> Beth: MARTY, YOU HAVE TO GO

00:00:22,588 --> 00:00:23,489
FASTER TO GET THE NASCAR

00:00:23,489 --> 00:00:25,824
EXPERIENCE TO FEEL THE

00:00:25,824 --> 00:00:27,926
DOWNFORCE, DRAFT AND DRAG.

00:00:27,926 --> 00:00:30,562
>> THESE AREA DYNAMIC, THESE ARE

00:00:30,562 --> 00:00:31,663
RACE CARS.

00:00:31,664 --> 00:00:35,535
>> UF TO KEEP THE THREE D'S IN

00:00:35,534 --> 00:00:35,868
MIND.

00:00:35,868 --> 00:00:38,371
>> Marty: DO WE HAVE TIME TO

00:00:38,371 --> 00:00:39,739
RACE AGAIN?

00:00:39,738 --> 00:00:41,106
>> Beth: WE SURE DO.

00:00:41,106 --> 00:00:46,979
THIS IS "STEM IN 30".
♪ [ MUSIC ] ♪

>> THIS IS "STEM IN 30".

>> Beth: I MEAN BETH WILSON.

>> Marty: I'M MARTY KELSEY.

>> Beth: WE'RE COMING LIVE FROM THE NASCAR HALL OF FAME IN CHARLOTTE, NORTH CAROLINA.

>> Marty: WE'RE STANDING ON GLORY ROAD AND THE TRACK IS BANKED AT 33 DEGREES HERE JUST LIKE IN TALLADEGA.

GLORY ROAD IS A SNAPSHOT OF NASCAR HISTORY.

>> Beth: HERE YOU CAN SEE CARS
THAT HAVE BEEN DRIVEN BY KYLE BUSCH, JIMMIE JOHNSON AND JEFF GORDON.

>>> Marty: AND THE NUMBER THREE-CAR DRIVEN BY DALE EARNHARDT.

>>> Beth: THESE CARS CHANGE SO YOU NEVER NOAH YOU'LL SEE ON GLORY ROAD AT THE NASCAR HALL OF FAME.

WE WANT TO REMIND ALL OF YOU WATCHING ON LINE THAT YOU CAN SUBMIT QUESTIONS LIVE AND WE MAY TAKE THEM ON THE AIR.

Marty: WE HAVE GREAT STUDENTS FROM CANNON SCHOOL JOINING US TODAY.

WHOO.

>> Marty: HERE REVVED UP AND READY TO GO AND HAVE GREAT QUESTIONS FOR OUR EXPERTS.

Beth: BEFORE WE GET STARTED LET'S TAKE A QUICK TOUR OF THE NASCAR HALL OF FAME.

I'M SCALISE SCALISE.

THE NASCAR HALL OF FAME HOPED IN SWING OF 2010 AS PLACE OF CONVERSING.

CONVERSING.

40 LEGENDARY FIGURES FROM
DRIVERS AND TEAM OWNERS AND CREW CHIEF HAVE BEEN INDUCTED INTO
THE HALL OF FAME.
WE'RE PROUD TO SHARE THEIR STORIES WITH FANS FROM ALL OVER
THE WORLD.
>> OUR STATE-OF-THE-ART FACILITY FEATURES EXHIBITS LIKE VISITORS
CHANGING A TIRE AND FILLING GAS AS FAST AS THEY CAN.
OUR RACING STIMULATOR THAT PUTS GUESTS BEHIND THE WHEEL OF A
RACE CAR.
OUR HUGE HIGH OCTANE FEEDER
FEATURES A CURVE SCREEN, SURROUND SOUND AND AUDIO MAKING

IT GREAT TO WATCH A RACE.

POISING FOR A PICTURE IN FRONT OF GLORY ROAD IS A MUST.

THE TRACK INCREASES FROM ZERO TO 33 IT DEGREES, WITH TRACKS

REPRESENTED FROM AROUND THE NATION AND 18 CARS.

THE HALL OF HONOR, THE RECENT HALL OF FAME CLASS REPRESENTED

THROUGH VIDEOS AND ARTIFACTS

THAT PAINT THE PICTURE OF THEIR CAREERS.
WE'RE PROUD TO OFFER FUN, EDUCATIONAL OPPORTUNITIES: THERE'S SOMETHING FOR EVERYONE. WHETHER YOU FOLLOW A FAVORITE DRIVER FOR DECADES OR WITNESSED A RACE, WE ENCOURAGE YOU TO EXPERIENCE ALL THE HALL HAS TO OFFER. >> Beth: I'M JOINED BY KURT ROMBERG, CHIEF AERODYNAMICIST, ROUSH FENWAY RACING, THANK YOU SO MUCH FOR BEING HERE. >> MY PLEASURE. >> WHAT IS AN AERODYNAMICIST?
It's an engineer, I'm schooled as an engineer and work at Rouche Fenway to make the race cars go faster.

We can design the cars and shape them so when air goes over them it pushes down on the car. What that does is gives the tires more grip. When tires have more grip it allows the drivers to go around the racetrack faster.

We're trying to shape the cars such that we give the car more grip.
YOU USE ONE OF THESE, IS THAT CORRECT?

YES, WE DO, THIS IS A SCALE WIND TUNNEL AND THIS IS THE TEST ARTICLE IN THE WIND TUNNEL PROPER.

IN A MINUTE WE'LL FIRE THIS UP SO YOU CAN SEE.

WE'VE GOT STREAMERS TAPE TO THE SIDE SO YOU CAN SEE WHAT THE AIR DOES AS IT GOES OVER THE CAR.

LET'S HAVE CHLOE PUSH DOWN ON THE BACK AND TALK ABOUT WHAT'S GOING ON.
WE'RE MEASURING DOWN FORCE AT

THE FRONT AXLE AND HE REAR AXLE.

UNDERNEATH EACH AXLE WE HAVE A

METERED, MUCH LIKE A BATHROOM

SCALE AT HOMES.

IT MEASURES HOW MUCH FORCE IS

PUSHING DOWN.

AS KHLOE PUSHES DOWN, THIS GOES

UP.

IF SHE HAD LONG ARMS SHE COULD

PUSH DOWN ON THE FRONT AND THIS

WOULD GO UP TOO.

WHEN TUNING CARS, WE WANT TO

KNOW HOW MUCH DOWN FORCE ON THE
FRONT AND HOW MUCH IT PUSHING
down on the back.

>> Beth: SHOW US HOW THE WIND

WE'RE GOING TO HAVE GRAHAM

FIRE UP THE FAN AND IT BLOWS AIR

OVER THE CAR.

YOU CAN WATCH THESE NUMBERS

YOU CAN SEE THE NUMBERS ARE

ACTUALLY GOING UP BECAUSE THE

AIR IS PUSHING DOWN ON THE CAR.

OVER ON THIS SIDE ON REAR DOWN

FORCE, YOU CAN SEE THERE'S ABOUT
A LITTLE OVER .7 POUNDS OF DOWN FORCE THE AIR IS CREATING ON THE BACK OF THE CAR.

AT THE FRONT, YOU CAN SEE THERE'S A LITTLE OVER .2, CHLOE IS GOING TO HELP US BECAUSE WE'RE GOING TO CHANGE THE SHAPE TO MAKE MORE REAR DOWN FORCE, WE'LL ADD A LARGER SPOILER TO THE BACK OF THE CAR.

AND YOU CAN SEE THE REAR DOWN FORCE THAT USED TO BE ABOUT .7 IS NOW UP IN THE 1.1, ALMOST 1.2 RANGE.

WE INCREASED THE REAR DOWN FORCE.
Which makes the rear tires grip the racetrack and allow the car to go faster.

>> Beth: Down force is all about going faster.

>> Yes.

>> Recently we got chance to talk to Jacob Wallace, NASCAR K&N Series driver.

He talked about how down force affects driving conditions on different tracks, depending on the size.
ON A SMALL TRACK WHERE YOU HAVE

VERY TIGHT CORNERS, YOUR

STRAIGHT' WAYS AREN'T AS LONG SO

YOU DON'T FEEL THE SPEED AS YOU

WOULD ON A BIGGER TRACK.

THE CORNERS, WHERE YOU'RE

PRODUCING A LOT OF DOWN FORCE

AND SIDE FORCE, YOU GET PUSHED

DOWN INTO YOUR SEAT WHEN

CORNERING.

ON A BIGGER TRACK, SAY GOING

DOWN THE STRAIGHT AWAY, YOU

DON'T FEEL THAT FORCE PUSHING

INTO YOU.
WHAT YOU DO FEEL IS THE CAR --

IT'S ALMOST LIKE A DELAY TO THE LEFT.

YOU HAVE MORE AIR THAT'S RUSHING OVER THE CAR AND UNDER THE CAR

AND IDEALLY YOU WANT YOUR CAR PUSHED DOWN AS MUCH INTO THE TRACK BUT THERE'S GOING TO BE AIR COMING UNDER THE CAR AS WELL.

THAT STARTS TO LIFT THE CAR UP

DOWN FORCE HELPS DELIVER SPEED

AND SPEED IS GOOD.

ALONG WITH DOWN FORCE COMES
DRAG.

00:07:57,475 --> 00:08:02,113
DRAG IS A DRAG.

00:08:02,113 --> 00:08:04,182
>> I'VE GOT TO FRIEND THAT WILL

00:08:04,182 --> 00:08:05,951
HELP ME, CHASE, WAY UP AT THE

00:08:05,951 --> 00:08:07,620
TOP OF GLORY ROAD.

00:08:07,620 --> 00:08:09,254
I SAW CHASE WALK IN AND I WAS

00:08:09,254 --> 00:08:11,490
LIKE, THERE IS A FAST DUDE.

00:08:11,490 --> 00:08:12,992
AND HE'S SO FAST THAT HE'S GOING

00:08:12,992 --> 00:08:14,093
TO RUN FOR US.

00:08:14,093 --> 00:08:15,761
BUT WE DECIDED WE PROBABLY

00:08:15,761 --> 00:08:17,597
NEEDED TO SLOW HIM DOWN A LITTLE

00:08:17,596 --> 00:08:20,031
BIT SO WE ATTACHED A PARACHUTE

00:08:20,031 --> 00:08:21,032
TO HIS BACK.

00:08:21,033 --> 00:08:22,668
NICK IS HELPING HIM.

00:08:22,668 --> 00:08:24,336
HE'S LIKE THE PIT CREW.
I'M GOING TO TELL CHASE TO GO AND HE'S GOING TO RUN AS FAST AS HE CAN AND WE'RE GOING TO SEE WHAT HAPPENS WITH THE PARACHUTE.

CHASE, ARE YOU READY? ON YOUR MARK, GET SET, GO!

HERE HE COMES.

HE'S GIVING IT SOME GAS.

COME ON AROUND THE CURVE.

ALL RIGHT, NICE JOB.

COME ON BACK, CHASE.

THAT WAS REALLY GOOD.

HOW DID THAT FEEL?

>> IT WAS TOUGH WITH THE
PARACHUTE ON.

>> WHY?

>> BECAUSE THE FORCE OF THE AIR

IN THE PARACHUTE SLOWED ME DOWN.

>> YOU'VE RUN WITH A PARACHUTE

BEFORE?

>> YES.

FOR TRAINING.

>> BECAUSE YOU'RE A RUNNER.

>> YES.

KURT AND BETH, WHY IS THAT SO

MUCH HARDER TO RUN WITH A

PARACHUTE?

Beth: WHY?
LIKE JACOB SAID, DRAG IS DRAG.
YOU COULD SEE THROUGH CHASE THAT THAT PARACHUTE WAS PULLING HIM BACK AND THE FORCES PULLING HIM BACK IS AERODYNAMIC DRAMATIC.
WE ADDED DRAG TO CHASE, WHICH IS THE OPPOSITE-OF-WHAT WE WANT TO DO TO THE RACE CARS.
THE RACE CARS HAVE MOTORS THAT PRODUCE HORSEPOWER AND THAT HORSEPOWER IS USED TO OVERCOME THE AERODYNAMIC DRAG.
IF UF 300 POUNDS, YOU HAVE TO
HAVE MORE THAN 300 POUNDS GOING

00:09:39,778 --> 00:09:42,148
FORWARD CREATED BY THE THE

00:09:42,148 --> 00:09:42,715
ENGINE.

00:09:42,715 --> 00:09:45,918
IF WE MINIMIZE THE DRAG WE MAKE

00:09:45,918 --> 00:09:47,052
THE CARGO FASTER.

00:09:47,052 --> 00:09:48,553
>> Beth: IS THAT WHY WE DON'T

00:09:48,553 --> 00:09:53,326
HAVE SIDE VIEW MIRRORS AND

00:09:53,326 --> 00:09:54,060
HEADLIGHTS.

00:09:54,059 --> 00:09:54,526
>> EXACTLY.

00:09:54,527 --> 00:09:56,429
IF YOU LOOK ON YOUR MOM AND

00:09:56,428 --> 00:09:59,365
DAD'S CARS, YOU SEE SIDE VIEW

00:09:59,365 --> 00:10:00,865
MIRRORS, HEADLIGHTS RIGHT HERE,

00:10:00,865 --> 00:10:01,967
DOOR HANDLES IN HERE.

00:10:01,967 --> 00:10:03,668
THE RACE CARS DON'T HAVE THOSE.

00:10:03,668 --> 00:10:06,572
BUT FOR ONE REASON, IT'S TO
REDUCE THE AERODYNAMIC DRAG.

THERE'S A LOT OF THINGS ON THE CARS WE TAKE OFF SO IN CASE OF AN ACCIDENT, THOSE PARTS DON'T FLY INTO THE OTHER CARS. IN THIS CASE WE'RE LOOKING AT AERODYNAMIC DRAG AND REDUCING IT TO GO FASTER.

>> Beth: NASCAR NEEDS TO REDUCE DRAG BUT NASA HAS TO THINK ABOUT DRAGS.

IT OVER COMES DRAG TO GET OFF THE PLANET BUT USES TO LAND ON ANOTHER PLANET.
RECENTLY WE TALKED TO NASA SCIENTIST RICK DAVIS.

 HOW DOES DRAG AFFECT ROCKETS?

 IT'S ACTUALLY INCREDIBLY IMPORTANT TO DEAL WITH.

 IF YOU THINK ABOUT WHEN YOU DRIVE AROUND IN YOUR CAR AND YOU STICK YOUR HAND OUT THE WINDOW

 THAT'S THE FORCE OF DRAG.

 WITH ROCKETS WE SPEND -- THIS IS VERY SLEEK AND SPINDLE.

 THE TOP, THE FIRST PART HITTING THE AIR IS LITERALLY EASING THE
AIR AROUND HERE SO IT'S NOT A

BIG, FLAT SURFACE HITTING THE

AIR STRAIGHT ON.

THAT'S CRUCIAL FOR ALLOWING US

TO SUCCESSFULLY GET INTO SPACE.

THERE ARE A COUPLE WAYS WE USE

DRAG.

I'M GOING TO TALK ABOUT LANDING

ON MARS.

WHEN WE APPROACH MARS WE'RE

GOING 13,000 MILES AN HOUR,

SCREAMING.

WE HAVE TO SLOW THAT SPACECRAFT

FROM THAT SPEED TO ZERO.
AND SO THERE ARE ESSENTIALLY

00:11:35,628 --> 00:11:37,629
THREE WAYS THAT WE CURRENTLY USE

00:11:37,629 --> 00:11:39,564
DRAG TO MAKE THAT POSSIBLE.

00:11:39,565 --> 00:11:41,267
FIRST OF ALL, WHEN WE COME INTO

00:11:41,267 --> 00:11:42,668
THE ATMOSPHERE SOMETIMES WE CAN

00:11:42,668 --> 00:11:44,602
EVEN GO DI PP ING INTO THE

00:11:44,602 --> 00:11:45,503
ATMOSPHERE SEVERAL TIMES AND

00:11:45,504 --> 00:11:47,605
EVERY TIME WE PASS THROUGH THE

00:11:47,605 --> 00:11:49,375
ATMOSPHERE, IT’S AMAZING, IT

00:11:49,375 --> 00:11:51,677
HELP S SLOW THE SPACECRAFT DOWN.

00:11:51,677 --> 00:11:53,479
FINALLY WHEN WE’RE READY TO

00:11:53,479 --> 00:11:57,283
LAND, THE NEXT THING WE DO IS

00:11:57,283 --> 00:11:59,685
WE -- THESE -- TYPICALLY WE HAVE

00:11:59,684 --> 00:12:01,820
A CAPSULELIKE STRUCTURE WITH A

00:12:01,821 --> 00:12:03,322
BOTTOM SIDE WHICH IS A SHIELD.
343
00:12:03,322 --> 00:12:05,890
THE SHIELD IS DESIGNED TO BE

344
00:12:05,890 --> 00:12:06,424
BURNT.

345
00:12:06,424 --> 00:12:07,926
AND WHEN IT IS COMING DOWN

346
00:12:07,927 --> 00:12:10,196
THROUGH THE ATMOSPHERE, AND THAT

347
00:12:10,196 --> 00:12:11,529
ENERGY -- THE ENERGY COMING ON

348
00:12:11,529 --> 00:12:13,665
TO THIS WILL SLOW IT DOWN AND

349
00:12:13,666 --> 00:12:15,634
IT'S -- IT GETS ITS SPEED

350
00:12:15,634 --> 00:12:16,836
COMPLETELY UNDER CONTROL.

351
00:12:16,836 --> 00:12:18,537
THAT IS NOT THE ONLY THING WE

352
00:12:18,537 --> 00:12:19,705
USE DRAG FOR, THOUGH.

353
00:12:19,705 --> 00:12:21,440
THE NEXT THING WE DO IS WHEN WE

354
00:12:21,440 --> 00:12:23,709
GET THIS THING SLOW ENOUGH WE

355
00:12:23,708 --> 00:12:27,879
RELEASE THESE ENORMOUS CHUTES,

356
00:12:27,879 --> 00:12:30,048
PARACHUTES, THAT HELP SLOW IT
DOWN AND GENTLE DROP IT ON THE SURFACE.

ALL THOSE THINGS ARE USING DRAG FUNDAMENTALLY TO ALLOW US TO DO SOMETHING COOL LIKE LAND ON ANOTHER PLANET.

>> Beth: KURT, SHOULD WE TAKE QUESTIONS?

>> SURE.

>> Beth: LET'S START WITH A VIDEO QUESTION.

>> I'M ELLA AND I'M WONDERING HOW MANY MEMBERS ARE ON A PIT CREW AND WHAT ARE THEIR ROLES?
GOOD QUESTION.

HOW MANY MEMBERS ARE ON A PIT CREW?

WHAT WE HAVE IS WE'VE GOT SEVEN MEMBERS GOING OVER THE WALL.

THERE'S A SHORT WALL ON PIT ROAD.

WHEN THE CAR COMES IN, SEVEN CARS GO OVER THE WALL.

A REAR TIRE CHANGER AND REAR TIRE CARRIER, A FRONT TIRE CHANGER AND FRONT TIRE CARRIER

THAT CHANGE THE FRONT TIRES. A JACK MANBACKS THE CAR UP AND A
FUEL MAN PUTS GAS IN THE CAR,

THE SEVENTH MEMBER IS FOR DRIVER

WE SEND HIM OVER THE WALL TO

WE HAVE PLASTIC WRAP ON THE

WE HAVE TIRE AND DEBRIS THAT COMES OFF THE TRACK

AND GETS ON THE WINDSHIELD SO WE

PULL A TEAROFF OFF.

ALL THAT IN LESS THAN 12 SECONDS.

>> Beth: YOU TALK ABOUT SEVEN
MEN, WHAT IS THE WALL FOR?

THE WALL IS TO SEPARATE THE RACE CAR FROM THE TEAMS.

IT'S A SAFETY DEVICE.

SO IF A CAR COMES SPINNING, IT HITS THE WALL AND DOESN'T GET INTO THE GUYS.

>> Beth: OKAY.

>> IT'S REALLY THERE TO PROTECT THE PEOPLE BEHIND THE WALL.

>> Beth: LET'S TAKE AN ONLINE QUESTION.

WHY NOT USE A DESIGN SIMILAR TO F1 CARS?
WOULD THEIR SLEEK DESIGN CUT DOWN ON WIND RESISTANCE?

>> THAT'S A GREAT QUESTION.

IF YOU FOLLOW FORMULA ONE YOU CAN SEE THE HUGE DIFFERENCE BETWEEN FORMULA ONE CARS AND WHAT WE CALL STOCK CARS, THESE OVER HERE.

FORMULA ONE CARS HAVE OPEN WHEELS. WHILE THESE AREN'T FORMULA ONE THEY LOOK LIKE THAT.

THE WHEELS ARE NOT COVERED.

BY THE WAY THEY HAVE GOT MORE
DRAG THAN OUR CARS DO.

SIGNIFICANTLY MORE DRAG.

THEY'VE GOT MORE HORSEPOWER BUT

MORE DRAG.

THEY ALSO PRODUCE MORE

DOWNFORCE.

THE WINGS IN THE FRONT AND BACK,

WE HAVE A SPOILER AND A VALANCE.

THE REASON THESE CARS LOOK THAT

WAY IS BECAUSE THIS RACING WAS

BASED ON PRODUCTION CARS, THE

CARS YOUR MOTHER AND FATHER

WOULD DRIVE YEARS AGO.

SO THE MANUFACTURERS AND NASCAR

WOULD DRIVE YEARS AGO.
WANTED TO MAINTAIN THE JUMP

00:14:56.528 --> 00:14:57.629
BETWEEN A PRODUCTION CAR AND

00:14:57.629 --> 00:14:58.697
RACE CAR.

00:14:58.697 --> 00:15:00.633
SO THE RULES FOR FORMULA ONE

00:15:00.633 --> 00:15:02.701
CARS ARE WIDE OPEN IN SHAPES.

00:15:02.701 --> 00:15:05.370
BUT THE RULES FOR STOCK CARS,

00:15:05.370 --> 00:15:06.938
THEY WANT TO MAINTAIN THE

00:15:06.938 --> 00:15:07.772
CONNECTION BETWEEN A PRODUCTION

00:15:07.773 --> 00:15:09.207
CAR AND RACE CAR.

00:15:09.207 --> 00:15:11.644
>> Beth: DO THE SAME PEOPLE WHO

00:15:11.644 --> 00:15:13.044
BUILD MY CAR THAT I DRIVE TO

00:15:13.044 --> 00:15:16.014
WORK, DO THEY BUILD THE NASCAR

00:15:16.014 --> 00:15:16.682
CARS?

00:15:16.682 --> 00:15:19.752
>> THE ORIGINAL MANUFACTURER --

00:15:19.751 --> 00:15:21.085
FOR INSTANCE AT ROUCHE FENWAY WE
GET THE A LOT OF PARTS AND SUPPORT FROM THE MANUFACTURER.

DO THEY BUILD THE CARS?

THEY BUILD A LOT OF STAMPINGS,

STEEL BODY PARTS.

BUT THE REST OF IT HAS ALL MIGRATED TOWARD A RACING TYPE OF OPERATION RATHER THAN PRODUCTION.

>> Beth: OKAY.

WHO HAS MY FIRST AUDIENCE QUESTION?

COME ON UP.

>> I WAS WONDERING HOW THE BUILD
OF A REGULAR CAR IS DIFFERENT
FROM A RACE CAR.

>> WELL, THERE'S ACTUALLY QUITE A FEW THINGS.

IF YOU THINK ABOUT THE CAR THAT YOUR MOM AND DAD DRIVE, YOU GET IN AND THERE'S SEATS IN THE FRONT AND SEATS IN THE BACK.

IN A RACE CAR THERE'S ONE SEAT, JUST THE DRIVER.

WHEN YOU'RE DRIVING DOWN THE ROAD AND YOU'RE WARM, YOU CAN TURN THE AIR CONDITIONER ON, RIGHT?
NO AIR CONDITIONERS IN RACE CARS.
YOU CAN ROLL THE WINDOW DOWN BUT YOU CAN'T IN RACE CARS.
EVERYTHING ON THE INSIDE OF THE CAR IS TAKEN OUT.
IT'S VERY SPARTAN.
NOT VERY MUCH TO KEEP IT LIGHT.
WE WANT TO KEEP THE CARS VERY LIGHT BUT STRONG.
THE STRUCTURE OF A RACE CAR IS TUBE STEEL WELDED TOGETHER.
THE STRUCTURE OF YOUR MOM AND DAD'S CAR IS STAMPED STEEL
WELDED TOGETHER BUT THE STAMP

STEEL CAR HAS MORE ROOM INSIDE.

YOU CAN KEEP YOUR BROTHERS AND
SISTERS IN THE BACK.

THERE'S NO BACKSEAT IN THESE
CARS.

SO THAT'S A LITTLE BIT OF A
DIFFERENCE BETWEEN PRODUCTION
AND RACE CARS.

GREAT QUESTION.

>> Beth: LET'S TAKE A VIDEO

>> Hi, I'M SARAH.

>> Hi, I'M SARAH.

MY QUESTION IS CARS HAVE TIRES
THAT ARE FILLED WITH OXYGEN AND
NITROGEN, WHICH WORKS ABOUT

BETTER FOR NASCAR.

>> THE QUESTION IS DO WE RUN

NITROGEN AND OXYGEN INSIDE THE TIRES?

NO, WE USE PRIMELY NITROGEN.

NITROGEN IS INERT GAS WHICH MEANS AS IT HEATS UP, IT DOESN'T EXPAND VERY MUCH.

IT EXPANDS A LITTLE BUT NOT MUCH.

THE REASON WE LIKE THAT IS BECAUSE THE TIRE IS A MAJOR PORTION OF HOW THE CAR HANDLES.
AND THE TIRE BASED ON ITS CONSTRUCTION, HAS A SPRING RATE TO IT.

WE CHANGE -- ON A PIT STOP WE'LL CHANGE A QUARTER POUND OF AIR IN THE TIRES AS AN ADJUSTMENT.

A VERY, VERY MINUTE ADJUSTMENT BUT IT CHANGES HOW THE CAR HANDLES.

THE DRIVER SAYS IT DOES ONE THING, WE CORRECT IT ON A PIT STOP.

WE USE NITROGEN MAKE THEM GO FASTER.
WE HAVE TALKED ABOUT DOWN FORCE AND DRAG BUT THERE'S ONE MORE D, DRAFTING.

AND WE TALKED TO JACOB WALLACE ABOUT DRAFTING.

THE BEST WAY TO EXPLAIN DRAFTING IS TO THINK OF AIR AS MOLECULES.

YOU HAVE TO MOVE THEM OUT OF THE WAY.

THE WAY DRAFTING HELPS IS BY HAVING TWO CARS GET IN LINE.

THE FIRST CAR IS MOVING THE AIR
MOLECULES OUT OF THE WAY AND THE

SECOND CAR BEHIND, THOSE AIR

MOLECULES FLOAT OVER THE SECOND

CAR WITHOUT BOUNCING INTO THE

FRONT BUMPER.

DRAFTING IS LIKE DRAFTING BUT

BEING AS CLOSE AS POSSIBLE TO

THE DRIVER IN FRONT OF YOU.

RIGHT ON THE BUMPER.

THE FEELING OF BUMP DRAFTING, IF

YOU'RE THE BUMPER, ISN'T THAT

SCARY BECAUSE YOU FEEL LIKE YOU

HAVE MORE CONTROL BECAUSE YOU'RE

THE ONE DOING THE BUMPING.

IT'S MUCH SCARE YOUR IF YOU'RE
BEING BUMPED BECAUSE YOU CAN SEE

THE CAR COMING IN YOUR REARVIEW MIRROR BUT YOU'RE NOT 100% SURE

HOW MUCH FORCE THEY'RE GOING TO HIT YOU WITH AND YOU'RE NOT SURE IF IT'S GOING TO BE ENOUGH FORCE TO GET YOUR CAR UNSETTLED.

>> LAYTON IS PUTTING ON A RACE WORN SUIT WORN BY KYLE BUSCH AND IT'S IN CASE OF AN ACCIDENT.

WE CARRY 22 GALLONS OF FUEL AND IF THERE'S ACCIDENTS, THAT FUEL
CAN SPILL AND SLOSH ALL OVER.

THERE'S A SMALL CHANCE THAT IT A DRIVER COULD BE INSIDE A CAR WITH A FIRE INSIDE OF IT.

THese fire suits, they're not fire -- you can eventually get harmed but these are made of materials from SFI with a resistance rating, whether 30 seconds or a minute.

A driver can be inside a fire and because he's covered from head to toe between the helmet,
THE SUIT, GLOVES AND FOOTWEAR

HE'S SAFE UP TO A MINUTE INSIDE OF A BURNING CAR.

THAT GIVES HIM THE OPPORTUNITY TO GET THE WINDOW NET DOWN AND GET OUT.

HOW DOES THAT FEEL?

IT'S HOT AND HALF.

IT LOOKS HOT AND HEAVY.

IT IS HOT AND HEAVY.

THE DRIVERS ALSO HAVE A SET OF UNDERGARMENTS, SHIRTS AND PANTS,

THAT ARE UNDERNEATH THIS AND MAKES IT EVEN HOTTER.
INSIDE A RACE CAR IT CAN BE 130,

00:20:26,325 --> 00:20:27,625
140 DEGREES FOR UP TO FOUR HOURS

00:20:27,625 --> 00:20:31,128
SO IT'S HOT INSIDE.

00:20:31,128 --> 00:20:31,963
IT'S A TRADE OFF.

00:20:31,963 --> 00:20:35,333
YOU WANT TO KEEP THEM SAFE BUT

00:20:35,334 --> 00:20:35,734
COMFORTABLE.

00:20:35,733 --> 00:20:37,034
>> Marty: AND ENGINE BEHIND US

00:20:37,035 --> 00:20:37,603
GATES HOT.

00:20:37,603 --> 00:20:39,237
>> EVERYTHING ABOUT THE CAR IS

00:20:39,237 --> 00:20:39,504
HOT.

00:20:39,503 --> 00:20:41,072
>> Marty: A SUIT LIKE THIS HAS A

00:20:41,073 --> 00:20:42,507
STRONG CONNECTION TO NASA.

00:20:42,507 --> 00:20:46,577
>> IT DOES, THIS IS A FIRE

00:20:46,577 --> 00:20:48,512
RESISTANT SUIT.

00:20:48,512 --> 00:20:49,313
THE ASTRONAUTS WEAR SOMETHING
LIKE THIS.

THEY'RE ON TOP OF A ROMAN CANDLE

AND THERE'S A POSSIBILITY OF AN ACCIDENTAL.

YOU HAVE TO GIVE THEM TIME TO GET AWAY OF THE SPACECRAFT.

>> Marty: BETH GOT A CHANCE TO WEAR A SUIT LIKE THIS AND I'M A LITTLE BIT JEALOUS BECAUSE SHE GOT TO GO ON A NASCAR RIDE ALONG.

CHECK THIS OUT.

>> AT ATLANTA, I HAD TOO MUCH WEIGHT DOWN THE BACK STRETCH.
>> Beth: OH, GOSH.

SHUT UP.

TODAY I'M AT THE RICHMOND INTERNATIONAL RACEWAY WITH

WARREN LIPFORD, MY DRIVER ON

THANK YOU.

>> NO PROBLEM.

>> HOW FAST ARE WE GOING TO GO?

>> Probable is 135, 140.

>> You're hitting close to 160, 170.

WHEN YOU DRIVE, YOU JUST GO IN
THE CORNER, GIVE IT GAS, LET OFF.

YOU FEEL THE G'S AND TRY NOT TO WRECK.

SEE HOW SHE GOES.

I'M NERVOUS ABOUT THIS BUT LET'S JUST DO IT.

>> Beth: ALL RIGHT.

I'M NERVOUS ABOUT THIS BUT LET'S JUST DO IT.

>> READY?

>> Beth: READY AS I'M GOING TO BE.

THAT WAS A RIDE AROUND RICHMOND.

THAT WAS AWESOME.

COMPLETELY AWESOME!
OKAY.

00:23:14,425 --> 00:23:16,360
SO I'VE GOT TO SAY THIS RIDE

00:23:16,361 --> 00:23:17,896
ALONG WITH TOTALLY AWESOME.

00:23:17,895 --> 00:23:21,500
WARREN, THANK YOU SO MUCH.

00:23:21,500 --> 00:23:22,800
KURT, SHOULD WE TAKE MORE

00:23:22,800 --> 00:23:23,801
QUESTIONS?

00:23:23,801 --> 00:23:24,201
>> SURE.

00:23:24,201 --> 00:23:26,137
>> LET'S START WITH A VIDEO

00:23:26,137 --> 00:23:29,141
>> I'M ADAM, MY QUESTION IS WHY

00:23:29,141 --> 00:23:31,543
DON'T A ANY OF THE OTHER CARS

00:23:31,542 --> 00:23:32,877
HAVE ANY DOORS.

00:23:32,877 --> 00:23:33,811
>> GREAT QUESTION, ADAM.

00:23:33,811 --> 00:23:35,246
THE CARS DON'T HAVE DOORS.

00:23:35,247 --> 00:23:38,150
THEY STARTED HAVING DOORS BUT
NASCAR MADE THE GUYS WELD THOSE

UP AND SUBSEQUENTLY WE MOVED

AWAY FROM DOORS AS A SAFETY

THE CARS TEND TO WRECK A LOT AND

A LOT TIMES THE DOORS WOULD FLY

OPEN AND PRESENT A SAFE ISSUE SO

NASCAR IS MANDATED TO THE RACE

TEAMS THERE WILL NOT BE DOORS ON

THE RACE CARS.

YOU MIGHT WONDER HOW WE GET IN

AND OUT, JUST CLIMB THROUGH THE

WINDOW.

>> Beth: WE HAVE AN ONLINE
QUESTION.

>> IS CARBON FIBER USED IN NASCAR?

>> YES ACTUALLY.

CARBON FIRE IS USED A LOT.

THE CARBON SEATS THAT DRIVERS SIT IN OR CARBON.

THERE ARE A LOT OF LITTLE THINGS AROUND THE RACE CAR MADE OF CARBON.

IN TODAY'S WORLD, THE HOODS AND THE DECK LIDS OR TRUNK LIDS ARE MADE OF CARBON.

CARBON IS FINDING ITS WAY INTO
THE SPORT.

NASCAR HAS KEPT IT OUT OF THE SPORT FOR A LONG TIME BECAUSE CARBON IS VERY EXPENSIVE BUT THEY'RE FINDING OUT THE WEIGHT SAVINGS OFFSETS THE MONETARY INCREASE.

>> Beth: OKAY.

WHO HAS MY NEXT AUDIENCE QUESTION?

>> WOULD USING A LIGHTER CAR MAKE THE CASH GO FASTER BUT FLIP?

>> GREAT QUESTION.
CARBON FIBERS ARE -- IS A MUCH LIGHTER MATERIAL.

WE DO USE THEM, ONE, TO MAKE THE CAR LIGHTER SO IT GOES FASTER.

THEN YOU ASKED WOULD IT HELP IF IT FLIPS.

A CAR THAT FLIPS IS A FUNCTION OF HOW IT SPINS AND HOW THE AIR GOES OVER THE CAR WHEN IT SPINS.

CARBON WON'T NECESSARILY CHANGE THAT.

WHAT YOU CAN DO IS YOU CAN MAKE SOME OF THE PARTS OF THE CARING CARBON.

EXCHANGE ALUMINUM FOR CARBON AND
Some parts can be used to stop the car from flipping.

If you look at these cars over here, you'll see along the top, there are roof rails and those help the car that is spinning from flipping.

>> Beth: This pops off.

>> There are roof flaps that pop up.

The rails are stationary but the flaps pop up.

That's a major contributor to keeping cars on the ground.
GOOD QUESTION.

LET'S TAKE ANOTHER VIDEO QUESTION.

HI, I'M ADEN AND I WAS WONDERING ARE THEY LIMITED ON PIT STOPS?

WE'RE NOT LIMITED ON HOW MANY TIMES WE COME IN FOR A PIT STOP

BUT WE'RE LIMITED ON HOW MANY GUYS WE SEND OVER THE WALL,

SEVEN GUYS.

WE'RE ALSO LIMITED ON WHAT WE CAN DO ON A PIT STOP.

LAST YEAR IN THE YEARS PAST WE
COULD DO ALMOST ANYTHING.

NOT CHANGE A MOTOR BUT REPLACE PARTS DAMAGED ON THE CAR.

THIS YEAR NASCAR HAS NEW RULES THAT SAY WE DON'T WANT YOU FIXING YOUR CAR ON PIT ROW BECAUSE IT POSES A DANGER TO THE GUYS OUT THERE WORKING.

SO WE CAN NO LONGER TAKE PARTS OVER THE WALL AND PUT NEW PARTS ON.

WE CAN USE WHAT PARTS ARE LEFT AND REATTACH THEM BUT WE CAN'T ADD PARTS.
THE ANSWER IS THERE'S A LOT OF LIMITATIONS ON WHAT YOU CAN DO ON PIT ROAD.

>> Beth: DUCT TAPE IS A FRIEND. WE USE A LOT.

>> KURT, THANK YOU FOR BEING WITH US.

I WOULD LIKE TO THANK THE NASCAR HALL OF FAME, CRVA, OUR SPONSOR,

THE GERTRUDE E SKELLY FOUNDATION.

NEXT WEEK WE'LL LOOK AT WOMEN PAVING THE WAY TO MARS.

>> CHECK THIS OUT!

THIS IS SALLY RIDE'S P38 HELMET.
799
00:27:06,458 --> 00:27:08,059
AMERICA'S FIRST WOMAN IN SPACE.

800
00:27:08,058 --> 00:27:10,595
SHE USED TO WEAR THIS WHEN SHE

801
00:27:10,595 --> 00:27:15,432
FLEW ON THE NASA T38 JET.

802
00:27:15,432 --> 00:27:17,167
>> Beth: ONE THING ABOUT SALLY'S

803
00:27:17,167 --> 00:27:18,736
HELMET IS THE COLOR.

804
00:27:18,737 --> 00:27:22,540
SHE PICKED IT TO MATCH HER

805
00:27:22,539 --> 00:27:24,541
PERSONALITY AND WANTED A NICER

806
00:27:24,541 --> 00:27:24,875
SCRIPT.

807
00:27:24,875 --> 00:27:27,244
IN JUNE 1983 SHE FLEW ON

808
00:27:27,244 --> 00:27:29,613
CHALLENGER BRIDGING THE GENDER

809
00:27:29,614 --> 00:27:30,115
GAP.

810
00:27:30,115 --> 00:27:31,649
THE ACCOMPLISHED WOMEN HAVE

811
00:27:31,648 --> 00:27:32,883
FLOWN IN SPACE SINCE AND MORE

812
00:27:32,884 --> 00:27:34,818
ARE PREPARING TO FOLLOW IN THE
You think this is interesting?

Join us for "STEM in 30".

Today as we close out we will leave you with more sights and sounds of my ride along.

Stick out after the credits as we talk to Kurt more and take a few more questions.

Thanks for watching.

♪ MUSIC ♪♪