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00:00:00,000 --> 00:00:06,000

On this unique episode of Mythbusters, it's the Young Scientist special.

2

00:00:06,000 --> 00:00:07,000

That equals fire.

3

00:00:07,000 --> 00:00:15,000

When four of the brightest brains in the country join the team to put a trio of tall environmental tales to the test.

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00:00:15,000 --> 00:00:18,000

I think it's outrageous. I'm preposterous.

5

00:00:18,000 --> 00:00:23,000

Carrie and Grant get Young Scientist's Alyssa and Catherine in deep doo doo.

6

00:00:23,000 --> 00:00:25,000

Who's having a good time here?

7

00:00:25,000 --> 00:00:26,000

No comment.

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00:00:26,000 --> 00:00:30,000

Can this awesome foursome fire up a mower on methane?

9

00:00:30,000 --> 00:00:32,000

I told you we needed an electric start on this thing.

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00:00:32,000 --> 00:00:34,000

That full start was cheaper.

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00:00:34,000 --> 00:00:36,000

Then Adam has a brain explosion.

12

00:00:36,000 --> 00:00:38,000

Hit me in the head. That's it.

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00:00:38,000 --> 00:00:42,000

When he, Jamie and Brandon put a new spin on electric vehicles.

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00:00:42,000 --> 00:00:44,000

That was awesome.

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00:00:44,000 --> 00:00:47,000

Finally, can Scotty take the heat?

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00:00:47,000 --> 00:00:49,000

There's no way you can make it louder.

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00:00:49,000 --> 00:00:50,000

Shut up.

18

00:00:50,000 --> 00:00:57,000

The Sheep, Tori and Wiz kid Eric blow the lid on global warming.

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00:01:00,000 --> 00:01:02,000

Who are the Mythbusters?

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00:01:04,000 --> 00:01:05,000

Adam Savage.

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00:01:05,000 --> 00:01:07,000

It's time to destroy it.

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00:01:07,000 --> 00:01:09,000

And Jamie Heidemann.

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00:01:09,000 --> 00:01:10,000

I like it.

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00:01:10,000 --> 00:01:14,000

Between them more than 30 years of special effects experience.

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00:01:15,000 --> 00:01:17,000

Huge dramatic music.

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00:01:17,000 --> 00:01:19,000

Joining them, Carrie Byron.

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00:01:19,000 --> 00:01:21,000

This should be interesting.

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00:01:21,000 --> 00:01:23,000

Grant Imahara.

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00:01:23,000 --> 00:01:24,000

Yes, yes.

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00:01:24,000 --> 00:01:25,000

And Tori Bellachy.

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00:01:25,000 --> 00:01:27,000

I want to make a withdrawal.

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00:01:27,000 --> 00:01:29,000

They don't just tell the Myths.

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00:01:29,000 --> 00:01:31,000

Isn't that awesome?

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00:01:31,000 --> 00:01:33,000

They put them to the test.

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00:01:41,000 --> 00:01:42,000

Young Scientist's Challenge.

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00:01:42,000 --> 00:01:46,000

Absolutely 40 of the brightest science wizards in the country.

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00:01:46,000 --> 00:01:51,000

All competing for the prize of being named Discovery's Young Scientist of the Year.

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00:01:51,000 --> 00:01:52,000

40 finalists, huh?

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00:01:52,000 --> 00:01:53,000

How did they pick a winner?

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00:01:53,000 --> 00:01:56,000

They run them through some fairly serious scientific hoops.

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00:01:56,000 --> 00:02:02,000

A set of challenges designed to find out who is the smartest science kid on the block.

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00:02:02,000 --> 00:02:04,000

Well, what did they get?

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00:02:04,000 --> 00:02:09,000

For starters, they get a fistful of cash man, 20,000 bucks.

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00:02:09,000 --> 00:02:10,000

That's not bad.

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00:02:10,000 --> 00:02:11,000

Not bad at all.

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00:02:11,000 --> 00:02:15,000

The winner of the 2007 Discovery Channel Young Scientist Challenge.

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00:02:15,000 --> 00:02:17,000

Eric Gustafson.

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00:02:19,000 --> 00:02:21,000

So that kid, Eric, he's the winner.

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00:02:21,000 --> 00:02:25,000

Yep, and don't forget, he doesn't just get that dough, he actually gets our prize as well,

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00:02:25,000 --> 00:02:29,000

where he and three of his co-finalists get to come right here.

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00:02:29,000 --> 00:02:30,000

And work with us.

52

00:02:30,000 --> 00:02:31,000

Yep.

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00:02:31,000 --> 00:02:33,000

Hello, Young Scientist!

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00:02:33,000 --> 00:02:36,000

Congratulations on all your hard work this week and becoming finalists.

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00:02:36,000 --> 00:02:43,000

The Science Channel Prize will be a trip for several young scientists to the set of Mythbusters in San Francisco.

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00:02:45,000 --> 00:02:47,000

You know, I think they should do something green with these kids.

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00:02:47,000 --> 00:02:49,000

There's a ton of environmental myths out there.

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00:02:49,000 --> 00:02:51,000

It's exactly what they're interested in.

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00:02:51,000 --> 00:02:53,000

That's what we should tackle.

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00:02:53,000 --> 00:02:55,000

Right. Well, let's see who we got to work with.

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00:02:55,000 --> 00:02:58,000

Will Alyssa Chan come up here, please? Alyssa?

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00:02:58,000 --> 00:03:00,000

How about Catherine Haber?

63

00:03:00,000 --> 00:03:02,000

Where are you, Catherine?

64

00:03:02,000 --> 00:03:05,000

Brandon Shee, where are you?

65

00:03:05,000 --> 00:03:06,000

Eric Gustafson.

66

00:03:06,000 --> 00:03:08,000

Where are you, Eric?

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00:03:11,000 --> 00:03:12,000

They look like a great bunch.

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00:03:12,000 --> 00:03:13,000

I can't wait to meet them.

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00:03:13,000 --> 00:03:15,000

You don't have to wait long. They'll be here soon.

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00:03:15,000 --> 00:03:16,000

Excellent. Let's get to work.

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00:03:16,000 --> 00:03:17,000

Okay.

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00:03:24,000 --> 00:03:25,000

Where are they?

73

00:03:25,000 --> 00:03:26,000

I don't know.

74

00:03:26,000 --> 00:03:28,000

What did that note say again?

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00:03:30,000 --> 00:03:31,000

Welcome to Mythbusters.

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00:03:31,000 --> 00:03:35,000

Meet us in the blueprint room, signed Jamie.

77

00:03:35,000 --> 00:03:38,000

Dude, where are the kids?

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00:03:38,000 --> 00:03:39,000

I don't know.

79

00:03:39,000 --> 00:03:42,000

Well, where did you tell them to meet us?

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00:03:42,000 --> 00:03:43,000

Oh.

81

00:03:43,000 --> 00:03:46,000

Hey, guys. I'm so sorry we're late.

82

00:03:46,000 --> 00:03:48,000

It's really all Jamie's fault.

83

00:03:48,000 --> 00:03:50,000

You guys are looking a little green.

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00:03:50,000 --> 00:03:52,000

We have a bunch of green myths to test.

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00:03:52,000 --> 00:03:54,000

Can you guys help us test them?

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00:03:54,000 --> 00:03:55,000

Yeah.

87

00:03:55,000 --> 00:03:56,000

Fantastic.

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00:03:56,000 --> 00:03:58,000

We've got one to do with the greenhouse effect.

89

00:03:58,000 --> 00:04:00,000

We've got one to do with electricity.

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00:04:00,000 --> 00:04:03,000

And we have another one which I don't think I'm going to tell you about just yet.

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00:04:03,000 --> 00:04:04,000

So let's go. Come on. Let's roll.

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00:04:04,000 --> 00:04:05,000

Go, go, go, go, go.

93

00:04:05,000 --> 00:04:07,000

Move, move, move, move.

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00:04:07,000 --> 00:04:14,000

It's green for go because our four young scientists are going to turn the heat up on three environmental myths.

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00:04:14,000 --> 00:04:21,000

First, Brandon meets Adam and Jamie to find out if electric cars are just good for nothing's slow pokes.

96

00:04:21,000 --> 00:04:29,000

Then Eric, the young scientist of the year, joins Tori and Scotty to see if greenhouse gases really make our planet warmer.

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00:04:29,000 --> 00:04:31,000

And Alyssa and Catherine.

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00:04:31,000 --> 00:04:39,000

Well, they've got a myth with some real beef as they find out if cows really spell calamity for the climate.

99

00:04:39,000 --> 00:04:40,000

No.

100

00:04:40,000 --> 00:04:41,000

Okay.

101

00:04:41,000 --> 00:04:42,000

What do we got?

102

00:04:42,000 --> 00:04:47,000

We got a myth about the general perception of electric cars.

103

00:04:47,000 --> 00:04:50,000

You mean that they're sluggish, you know, not very peppy?

104

00:04:50,000 --> 00:04:51,000

Exactly.

105

00:04:51,000 --> 00:04:53,000

We're going to tackle it and find out if it's true.

106

00:04:53,000 --> 00:04:54,000

Could be fun.

107

00:04:54,000 --> 00:04:56,000

Could be electric.

108

00:04:58,000 --> 00:05:00,000

Ah, the humble electric car.

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00:05:00,000 --> 00:05:04,000

Small, slow, and really a bit silly, right?

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00:05:04,000 --> 00:05:06,000

Well, maybe not.

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00:05:06,000 --> 00:05:09,000

Adam and Jamie are going to bust a fuse to find out.

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00:05:09,000 --> 00:05:11,000

What do you think the plan is?

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00:05:11,000 --> 00:05:15,000

First, we need to get a basic electric car and see what it does.

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00:05:15,000 --> 00:05:20,000

Okay, I agree, but we are eventually going to go to the full-on state of the art, right?

115

00:05:20,000 --> 00:05:21,000

Absolutely.

116

00:05:21,000 --> 00:05:29,000

So, before state of the art comes run of the mill, a regular car that's been converted to run on

battery power.

117

00:05:29,000 --> 00:05:33,000

And right spark, Brandon Shee is in the hot seat.

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00:05:36,000 --> 00:05:37,000

We're going to blindfold you.

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00:05:37,000 --> 00:05:40,000

We've got two cars, one electric, one knob.

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00:05:40,000 --> 00:05:44,000

We're going to put you in the back seat of those cars, blindfolded, while we run them to some paces,

121

00:05:44,000 --> 00:05:46,000

and you're going to give us your impressions.

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00:05:46,000 --> 00:05:51,000

The cars are identical, but one runs on gas and the other on batteries.

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00:05:51,000 --> 00:05:53,000

I don't want you to know which one is which while you're driving it.

124

00:05:53,000 --> 00:05:57,000

So, Jamie, you're going to put on these headphones, and you're going to play some music while you're driving,

125

00:05:57,000 --> 00:06:00,000

and Brandon, well, obviously, you're going to be blindfolded.

126

00:06:00,000 --> 00:06:06,000

While Brandon can't see which car is which, Jamie can't hear which one is which.

127

00:06:06,000 --> 00:06:09,000

The gas car leads first up.

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00:06:09,000 --> 00:06:11,000

In the middle with you.

129

00:06:11,000 --> 00:06:15,000

Then the team pits stop and swap to the electric car.

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00:06:17,000 --> 00:06:20,000

So, Brandon, blindfolded in the back seat of both cars.

131

00:06:20,000 --> 00:06:21,000

What was your impression?

132

00:06:21,000 --> 00:06:22,000

Could you tell the difference?

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00:06:22,000 --> 00:06:23,000

It was actually hard to tell.

134

00:06:23,000 --> 00:06:27,000

The second one seemed a lot smoother, but the time of speed, I don't know,

135

00:06:27,000 --> 00:06:29,000

because they both felt like they were going fast.

136

00:06:29,000 --> 00:06:35,000

Jamie's lead foot, oh, and experience, meant he had no trouble picking the electric car.

137

00:06:35,000 --> 00:06:39,000

This car, the second car, it's real sluggish on the start-up.

138

00:06:39,000 --> 00:06:42,000

Once you got going, it was pretty much the same, but for some reason,

139

00:06:42,000 --> 00:06:45,000

their acceleration on the bottom end was really low.

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00:06:45,000 --> 00:06:49,000

And what that means is that there may be some mileage to this myth.

141

00:06:49,000 --> 00:06:52,000

Maybe electric cars really are slugs.

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00:06:52,000 --> 00:06:55,000

For test two, the guys hit upon a bright idea.

143

00:06:55,000 --> 00:07:01,000

Maybe they can build their own electric vehicle and see if they can put a bit of pep in its step.

144

00:07:01,000 --> 00:07:05,000

But Brandon's days as a passenger on the show are over.

145

00:07:05,000 --> 00:07:11,000

We got rules, and you'll address me as Mr. Heineman and Adam as Mr. Savage, okay?

146

00:07:11,000 --> 00:07:15,000

And you'll say, sir before and sir after whenever we talk to you.

147

00:07:15,000 --> 00:07:16,000

Sir, yes, sir.

148

00:07:16,000 --> 00:07:18,000

Then it's down to business.

149

00:07:18,000 --> 00:07:22,000

They'll fit a large electric motor to a go-cart, add a bunch of batteries,

150

00:07:22,000 --> 00:07:25,000

and then see if they can make the cart smoke.

151

00:07:25,000 --> 00:07:27,000

That's what I'm talking about.

152

00:07:27,000 --> 00:07:29,000

What is that?

153

00:07:29,000 --> 00:07:32,000

Lithium iron phosphate, state-of-the-art.

154

00:07:32,000 --> 00:07:35,000

We're going to bring this up to about 90 volts.

155

00:07:35,000 --> 00:07:37,000

That is beautiful.

156

00:07:37,000 --> 00:07:42,000

These are big daddy versions of the type of batteries that power laptops and hand tools.

157

00:07:42,000 --> 00:07:45,000

They're light, but they deliver plenty of pizzazz.

158

00:07:45,000 --> 00:07:52,000

So an electric motor powered by 26 of these bad boys should really get the sparks flying.

159

00:07:52,000 --> 00:07:57,000

And Brandon's job is to help make sure it's the tires that smoke, not the wiring.

160

00:07:57,000 --> 00:08:00,000

Do that full side, but you'll go down one.

161

00:08:00,000 --> 00:08:05,000

If you do this, that equals fire, and lots and lots of push-ups.

162

00:08:05,000 --> 00:08:06,000

Yes, sir.

163

00:08:06,000 --> 00:08:09,000

So two, two, two, two, all right?

164

00:08:11,000 --> 00:08:13,000

Then it's all power to the cart.

165

00:08:15,000 --> 00:08:17,000

Brandon's got it wired right.

166

00:08:17,000 --> 00:08:19,000

Wow.

167

00:08:19,000 --> 00:08:22,000

I just got like a really warm feeling for my whole body.

168

00:08:22,000 --> 00:08:23,000

It works.

169

00:08:23,000 --> 00:08:24,000

Fantastic.

170

00:08:24,000 --> 00:08:26,000

Let's get this thing out to the track.

171

00:08:26,000 --> 00:08:31,000

And out on the track is Go Time in the Young Scientist's time trial.

172

00:08:31,000 --> 00:08:36,000

A showdown between the Mythbusters green machine and a gas-powered rival.

173

00:08:36,000 --> 00:08:38,000

Are you ready for this? You ready today?

174

00:08:38,000 --> 00:08:39,000

I'm ready today.

175

00:08:39,000 --> 00:08:40,000

Today is go-carts.

176

00:08:40,000 --> 00:08:44,000

We're racing a gas go-cart and time-trialing it against an electric go-cart.

177

00:08:44,000 --> 00:08:45,000

You feel good?

178

00:08:45,000 --> 00:08:46,000

I feel good.

179

00:08:46,000 --> 00:08:47,000

Okay, hit me in the head.

180

00:08:47,000 --> 00:08:48,000

That's it.

181

00:08:48,000 --> 00:08:49,000

All right.

182

00:08:49,000 --> 00:08:52,000

Adam's first weapon of choice is the gas guzzler.

183

00:08:53,000 --> 00:08:56,000

Gasoline power go-cart time trial.

184

00:08:56,000 --> 00:08:59,000

Three, two, one, go.

185

00:09:02,000 --> 00:09:05,000

Adam will get four laps, and the fastest one will count.

186

00:09:08,000 --> 00:09:11,000

He's quick, but it's soon got him all in a spin.

187

00:09:15,000 --> 00:09:18,000

Finally, he gets in his fastest lap.

188

00:09:21,000 --> 00:09:22,000

How did I do?

189

00:09:22,000 --> 00:09:23,000

58 seconds.

190

00:09:23,000 --> 00:09:26,000

Ha! Let's break out the electric one.

191

00:09:26,000 --> 00:09:30,000

Later, our bovine back ends threatening our planet.

192

00:09:30,000 --> 00:09:33,000

The girl's ready to see how dirty science can get.

193

00:09:33,000 --> 00:09:39,000

But next, Eric, Tori, and Scotty put melting ice caps under the Mythbusters microscope.

194

00:09:39,000 --> 00:09:41,000

Let's start melting some Jamie.

195

00:09:42,000 --> 00:09:46,000

It's the Mythbusters Young Scientist Special.

196

00:09:46,000 --> 00:09:51,000

And next, it's a myth that's got a lot of people hot under the collar.

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00:09:53,000 --> 00:09:55,000

Okay, Tori, so you've heard of global warming, right?

198

00:09:55,000 --> 00:09:56,000

Yeah.

199

00:09:56,000 --> 00:10:01,000

Well, some people think that carbon emissions are increasing the amount of CO<sub>2</sub> in the atmosphere

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00:10:01,000 --> 00:10:05,000

and raising the Earth's temperature, therefore causing the polar ice caps to melt,

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00:10:05,000 --> 00:10:06,000

and that's not good.

202

00:10:06,000 --> 00:10:11,000

What you're saying is maybe we should test to see if CO<sub>2</sub> does increase the temperature in our environment.

203

00:10:11,000 --> 00:10:15,000

And while we're at it, I think we should test some other gases to see if they're also contributing.

204

00:10:18,000 --> 00:10:24,000

Many people remain unconvinced that CO<sub>2</sub> and other greenhouse gases are causing the Earth to warm up.

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00:10:24,000 --> 00:10:27,000

It's a hotbed of controversy.

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00:10:27,000 --> 00:10:31,000

A controversy that the young scientists want to resolve.

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00:10:31,000 --> 00:10:34,000

Right here, the Earth is warming up.

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00:10:34,000 --> 00:10:37,000

What to resolve right here, right now?

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00:10:37,000 --> 00:10:39,000

What's the plan? How are we going to test this?

210

00:10:39,000 --> 00:10:42,000

Well, I think we should build a series of greenhouses.

211

00:10:42,000 --> 00:10:48,000

We'll fill them with our different greenhouse gases, put some ice inside, and see if it has an effect on the ice melting.

212

00:10:48,000 --> 00:10:49,000

That sounds great.

213

00:10:49,000 --> 00:10:52,000

But you know what might be kind of cool is instead of just ice, we do ice sculptures.

214

00:10:52,000 --> 00:10:55,000

But I don't think I'm going to be able to do four exact sculptures.

215

00:10:55,000 --> 00:10:59,000

So what I'll do is I'll make a little maquette, we'll have it scanned into the computer,

216

00:10:59,000 --> 00:11:02,000

and we'll use a CNC machine to make duplicate ice sculptures.

217

00:11:02,000 --> 00:11:05,000

After doing that, I'll get to work on the greenhouses.

218

00:11:05,000 --> 00:11:10,000

The plan, build identical greenhouse boxes, put identical ice sculptures in each,

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00:11:10,000 --> 00:11:15,000

add measured quantities of CO<sub>2</sub> and methane, and see what happens.

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00:11:15,000 --> 00:11:19,000

To help them out, Discovery channels young scientists of the year.

221

00:11:19,000 --> 00:11:24,000

At just 11, Eric Gustafson's the ultimate pocket rocket scientist.

222

00:11:24,000 --> 00:11:27,000

Now, are you familiar with global warming?

223

00:11:27,000 --> 00:11:31,000

The fossil fuels are made up of strings of hydrocarbons.

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00:11:31,000 --> 00:11:34,000

And when you burn them, they release many different greenhouse gases,

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00:11:34,000 --> 00:11:37,000

mainly carbon dioxide and methane.

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00:11:37,000 --> 00:11:41,000

Eric's got it down, but for the rest of us, well, here's a graphic.

227

00:11:41,000 --> 00:11:46,000

Light waves from the sun travel through the atmosphere and are absorbed by the Earth's surface,

228

00:11:46,000 --> 00:11:48,000

warming it up in the process.

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00:11:48,000 --> 00:11:52,000

That heat is then radiated from the surface back to the atmosphere,

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00:11:52,000 --> 00:11:59,000

where gases like CO<sub>2</sub> absorb it and in turn, heat up, increasing the warmth of our environment.

231

00:11:59,000 --> 00:12:01,000

At least, that's the theory.

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00:12:01,000 --> 00:12:05,000

But back to business, measuring up for the greenhouses.

233

00:12:05,000 --> 00:12:08,000

Scotty, I think I have all the marks now.

234

00:12:08,000 --> 00:12:11,000

And organized in the little piles.

235

00:12:11,000 --> 00:12:14,000

I have number ones, number twos, number threes.

236

00:12:14,000 --> 00:12:17,000

Perfect. I better keep you around.

237

00:12:17,000 --> 00:12:19,000

Next, they frame it all up.

238

00:12:20,000 --> 00:12:23,000

And turn the back into a heat trap.

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00:12:23,000 --> 00:12:28,000

The reason we're painting it black is because it'll absorb more heat and more light.

240

00:12:28,000 --> 00:12:31,000

And re-emit it as a longer wavelength.

241

00:12:31,000 --> 00:12:35,000

And that's the whole reason the greenhouse effect works.

242

00:12:35,000 --> 00:12:36,000

Hey Eric.

243

00:12:36,000 --> 00:12:37,000

Yeah?

244

00:12:37,000 --> 00:12:40,000

Here's 20 bucks. I want you to go paint Adam's car now.

245

00:12:40,000 --> 00:12:41,000

Really?

246

00:12:41,000 --> 00:12:43,000

Be a good boy.

247

00:12:43,000 --> 00:12:49,000

The greenhouses are covered in mylar, so the light gets in, but the gases don't get out.

248

00:12:49,000 --> 00:12:52,000

Then they seal the scene with silicone.

249

00:12:52,000 --> 00:12:55,000

Alright Eric, so our first box is complete.

250

00:12:55,000 --> 00:12:56,000

Yep.

251

00:12:56,000 --> 00:12:59,000

Thanks for your help. I'm going to knock out the next three.

252

00:12:59,000 --> 00:13:01,000

Why don't you go help Tori with the ice sculpture?

253

00:13:01,000 --> 00:13:02,000

Okay.

254

00:13:02,000 --> 00:13:06,000

Well, that's a move that takes Eric from the greenhouse to the madhouse.

255

00:13:06,000 --> 00:13:08,000

So Eric, you've seen the show, right?

256

00:13:08,000 --> 00:13:09,000

Yep.

257

00:13:09,000 --> 00:13:11,000

You know what's in this box, right?

258

00:13:11,000 --> 00:13:12,000

No.

259

00:13:12,000 --> 00:13:15,000

This is a block of C4.

260

00:13:15,000 --> 00:13:20,000

You're going to sculpt Adam at a C4, and at the end of the episode, we're going to blow it up.

261

00:13:20,000 --> 00:13:23,000

You've got to be careful because it's very volatile.

262

00:13:23,000 --> 00:13:25,000

I mean, if you drop it, it could go off.

263

00:13:25,000 --> 00:13:26,000

Okay.

264

00:13:26,000 --> 00:13:27,000

So be careful.

265

00:13:27,000 --> 00:13:28,000

Take it slow.

266

00:13:28,000 --> 00:13:30,000

Shoo, shoo, shoo.

267

00:13:30,000 --> 00:13:34,000

You don't want to peel off the wrapping too fast because it might set it off.

268

00:13:34,000 --> 00:13:42,000

I'm not sure if he's crazy or not right now, but I'd much rather have him sculpt Adam at a C4, explosive.

269

00:13:42,000 --> 00:13:44,000

And here's the mission.

270

00:13:44,000 --> 00:13:50,000

Tori will mold a Jamie doll, Eric, and Adam doll, and the best looking one will be the model for their ice sculptures.

271

00:13:50,000 --> 00:13:53,000

Is that working on Mythbusters fun?

272

00:13:54,000 --> 00:13:55,000

Sometimes.

273

00:13:55,000 --> 00:14:01,000

But then there are the times when you could potentially be exploded.

274

00:14:01,000 --> 00:14:02,000

I know.

275

00:14:02,000 --> 00:14:05,000

It's like you got to take the good with the bad.

276

00:14:05,000 --> 00:14:06,000

That's what I always say.

277

00:14:08,000 --> 00:14:13,000

Tori's going great guns, while Eric's handling his with kid gloves.

278

00:14:13,000 --> 00:14:15,000

All right, Eric, you done?

279

00:14:15,000 --> 00:14:16,000

Yep.

280

00:14:16,000 --> 00:14:17,000

Okay.

281

00:14:17,000 --> 00:14:18,000

What do you think?

282

00:14:18,000 --> 00:14:20,000

Wow, that looks just like Jamie.

283

00:14:20,000 --> 00:14:21,000

That looks just like Adam.

284

00:14:21,000 --> 00:14:22,000

Sweet.

285

00:14:22,000 --> 00:14:24,000

Now that they're done, why don't we scan this one?

286

00:14:24,000 --> 00:14:26,000

We'll use this for the ice sculptures.

287

00:14:26,000 --> 00:14:27,000

Okay.

288

00:14:27,000 --> 00:14:28,000

And then we can blow that one up.

289

00:14:28,000 --> 00:14:29,000

Awesome.

290

00:14:29,000 --> 00:14:30,000

Yeah.

291

00:14:30,000 --> 00:14:34,000

For our global warming experiment, we need four identical ice sculptures.

292

00:14:34,000 --> 00:14:39,000

So we're here at Artistic Ice Design where they're going to use their CNC machine to make us four ice jammies.

293

00:14:39,000 --> 00:14:40,000

See the drill?

294

00:14:40,000 --> 00:14:41,000

Yeah.

295

00:14:41,000 --> 00:14:43,000

Carm it up, bro!

296

00:14:44,000 --> 00:14:51,000

The CNC or Computer Numerical Control Machines are programmed to produce identical sculptures.

297

00:14:51,000 --> 00:14:54,000

But as for that grating din they create...

298

00:14:54,000 --> 00:14:56,000

Don't you just love that sound?

299

00:14:57,000 --> 00:14:59,000

That's what I was going for.

300

00:14:59,000 --> 00:15:02,000

Each sculptor takes around 40 minutes to carve.

301

00:15:07,000 --> 00:15:10,000

And then four identical ice jammies emerge.

302

00:15:10,000 --> 00:15:11,000

Get it, America.

303

00:15:12,000 --> 00:15:13,000

You got it?

304

00:15:13,000 --> 00:15:14,000

I had a point.

305

00:15:15,000 --> 00:15:16,000

No, let him, he got it.

306

00:15:16,000 --> 00:15:17,000

Whoa!

307

00:15:17,000 --> 00:15:18,000

Come on, man.

308

00:15:18,000 --> 00:15:19,000

What are you doing?

309

00:15:19,000 --> 00:15:20,000

Don't drop them.

310

00:15:20,000 --> 00:15:23,000

Now that I have my army of ice jammies, I'm going to take over the world.

311

00:15:23,000 --> 00:15:28,000

But first, I want to see which greenhouse gases cause these ice sculptures to melt faster.

312

00:15:31,000 --> 00:15:32,000

Let's go, buddy.

313

00:15:34,000 --> 00:15:36,000

Can you guys make me one more?

314

00:15:41,000 --> 00:15:49,000

Our young scientists Brandon and Adam and Jamie are testing the tail that electric cars have no get up and go.

315

00:15:49,000 --> 00:15:52,000

Adam's already taken the gas card for a spin.

316

00:15:52,000 --> 00:15:53,000

His fastest lap?

317

00:15:53,000 --> 00:15:54,000

58 seconds.

318

00:15:54,000 --> 00:15:57,000

But will it run rings around the electric one?

319

00:15:57,000 --> 00:16:03,000

This falls into the category on the mid-busters of another thing I get to do that is so crazy cool.

320

00:16:03,000 --> 00:16:10,000

Like sitting in a doorway of a helicopter at 3,000 feet having an octopus eat out of my head.

321

00:16:11,000 --> 00:16:13,000

Sky diving.

322

00:16:13,000 --> 00:16:17,000

Racing these go-karts is such a rush.

323

00:16:17,000 --> 00:16:22,000

Adam's hoping to put in an electrifying lap on the battery card.

324

00:16:22,000 --> 00:16:29,000

But 26 high output batteries have beefed up the card in a way the guys weren't quite expecting.

325

00:16:29,000 --> 00:16:31,000

This one is 302 pounds.

326

00:16:31,000 --> 00:16:32,000

302 pounds?

327

00:16:32,000 --> 00:16:36,000

120 some odd pounds heavier than the gas.

328

00:16:36,000 --> 00:16:38,000

That's what the batteries and all the rig weights.

329

00:16:38,000 --> 00:16:39,000

What are you going to do?

330

00:16:39,000 --> 00:16:41,000

We'll take it out on the track for starters.

331

00:16:41,000 --> 00:16:47,000

Adam's revved up to see if his electric charge can give the gas burner a bit of a jolt.

332

00:16:47,000 --> 00:16:55,000

Both cars develop an identical 25 horsepower so will the extra weight of the batteries slow down the electric car?

333

00:16:55,000 --> 00:17:00,000

Battery doesn't have the growl of gas but Adam's hoping it's got the bite.

334

00:17:00,000 --> 00:17:02,000

He has four laps to find out.

335

00:17:02,000 --> 00:17:03,000

It's absolutely silent.

336

00:17:03,000 --> 00:17:05,000

All I can hear are the tires.

337

00:17:05,000 --> 00:17:07,000

Almost like he's not there.

338

00:17:10,000 --> 00:17:13,000

And a montage later and the results are in.

339

00:17:13,000 --> 00:17:14,000

One minute.

340

00:17:14,000 --> 00:17:17,000

Woo dude this thing smokes.

341

00:17:17,000 --> 00:17:21,000

So the slug tag starting to look a little tarnished.

342

00:17:21,000 --> 00:17:23,000

Electric versus gas go-karts what do you think?

343

00:17:23,000 --> 00:17:26,000

Well time-wise there was no difference between the two.

344

00:17:26,000 --> 00:17:29,000

Yeah the electric held its own it was no slug.

345

00:17:29,000 --> 00:17:35,000

After the break Alyssa, Catherine, Carrie and Grant end up in a sticky situation.

346

00:17:35,000 --> 00:17:37,000

It's got to be easier ways to save the environment.

347

00:17:37,000 --> 00:17:43,000

And later Brandon, Adam and Janie see if an electric bike can burn rubber.

348

00:17:50,000 --> 00:17:55,000

It's the Mythbusters Young Scientist special and now it's time for a real blast.

349

00:17:55,000 --> 00:17:57,000

Oh excuse me.

350

00:17:57,000 --> 00:18:01,000

Okay Carrie guess what the biggest polluter in the world is?

351

00:18:01,000 --> 00:18:02,000

Cars.

352

00:18:02,000 --> 00:18:03,000

No.

353

00:18:03,000 --> 00:18:04,000

Factories.

354

00:18:04,000 --> 00:18:05,000

No.

355

00:18:05,000 --> 00:18:06,000

Tori.

356

00:18:06,000 --> 00:18:07,000

It's the humble cow.

357

00:18:07,000 --> 00:18:08,000

Cows?

358

00:18:08,000 --> 00:18:09,000

Seriously?

359

00:18:09,000 --> 00:18:14,000

Yes and according to this myth cow flatulence is the biggest single contributor to global warming.

360

00:18:14,000 --> 00:18:19,000

Well as crazy as it sounds I mean that makes sense cows produce the greenhouse gas methane

361

00:18:19,000 --> 00:18:23,000

and methane has 20 times the effect of carbon dioxide and global warming.

362

00:18:23,000 --> 00:18:27,000

Also consider that there are over one billion cows in the world.

363

00:18:27,000 --> 00:18:30,000

Boy guess we have a beefy mythibust.

364

00:18:30,000 --> 00:18:33,000

Forget cars, forget factories.

365

00:18:33,000 --> 00:18:39,000

The inconvenient truth of this myth is that it's cows that are the world's worst polluter.

366

00:18:39,000 --> 00:18:44,000

But can the humble heifer really be bringing the planet to its knees?

367

00:18:44,000 --> 00:18:48,000

Okay so do you have any ideas on how we can test this?

368

00:18:48,000 --> 00:18:49,000

Why don't we just start with the basics.

369

00:18:49,000 --> 00:18:54,000

We'll get some cows, check out the engine room, see how much methane they produce

370

00:18:54,000 --> 00:18:57,000

and then do a little math being that there's a billion cows in the world.

371

00:18:57,000 --> 00:18:59,000

We can see how bad for the environment they really are.

372

00:18:59,000 --> 00:19:04,000

That sounds like a good plan but I'm a little fuzzy on the see how much methane they produce part.

373

00:19:04,000 --> 00:19:07,000

I have a rough idea for a gas catcher.

374

00:19:07,000 --> 00:19:08,000

Yeah I'm not touching that.

375

00:19:08,000 --> 00:19:11,000

Well that's precisely what the young scientists are for.

376

00:19:11,000 --> 00:19:20,000

And here are the young scientists Catherine and Alyssa unfortunately for them they've got no wind of what their methane mission is all about.

377

00:19:20,000 --> 00:19:21,000

Hello?

378

00:19:21,000 --> 00:19:22,000

Come in.

379

00:19:22,000 --> 00:19:24,000

So Catherine and Alyssa right?

380

00:19:24,000 --> 00:19:25,000

Yep.

381

00:19:25,000 --> 00:19:28,000

So do you guys have any idea what myth we're gonna do?

382

00:19:28,000 --> 00:19:29,000

Not really.

383

00:19:29,000 --> 00:19:30,000

It's gonna be a dirty one.

384

00:19:30,000 --> 00:19:32,000

I might want to change the shoes.

385

00:19:32,000 --> 00:19:33,000

Uh oh.

386

00:19:33,000 --> 00:19:39,000

With just enough time to say boot scoot, they're off to a dairy farm to gather gas.

387

00:19:39,000 --> 00:19:40,000

Welcome.

388

00:19:40,000 --> 00:19:41,000

Are you Albert?

389

00:19:41,000 --> 00:19:42,000

I'm Albert.

390

00:19:42,000 --> 00:19:43,000

I'm Grant.

391

00:19:43,000 --> 00:19:46,000

Dairy farmer Albert Strauss is an expert on methane gas.

392

00:19:46,000 --> 00:19:50,000

His famous creamery organic farm's been going since 1941.

393

00:19:50,000 --> 00:19:56,000

We are on the hunt for some methane and we followed our noses here.

394

00:19:56,000 --> 00:19:57,000

We came to the right place.

395

00:19:57,000 --> 00:20:05,000

What we're trying to find out here today is how much methane a single cow toot would contain.

396

00:20:05,000 --> 00:20:11,000

And then from there we can figure out the impact the one of these little cows has on the environment.

397

00:20:11,000 --> 00:20:16,000

Luckily the myth musters have plenty of experience with bovine behavior.

398

00:20:16,000 --> 00:20:20,000

This is starting to feel like a bad idea.

399

00:20:20,000 --> 00:20:24,000

So the young scientists are in good hands.

400

00:20:24,000 --> 00:20:25,000

Give him back.

401

00:20:25,000 --> 00:20:27,000

I'm in slime.

402

00:20:27,000 --> 00:20:33,000

The plan is to bag a bovine bottom burps using a yet to be patented gas grabber.

403

00:20:33,000 --> 00:20:36,000

It's a plastic bag at the end of a pole with a string.

404

00:20:36,000 --> 00:20:45,000

And so when the cow lets off some gas she pulls a string and hopefully in that bag will be something that constitutes methane.

405

00:20:45,000 --> 00:20:46,000

Slowly.

406

00:20:46,000 --> 00:20:50,000

Carrie waits for the exact moment to pounce.

407

00:20:50,000 --> 00:20:53,000

Grant, this is utterly disgusting.

408

00:20:53,000 --> 00:20:56,000

You're doing great. Try and blend in.

409

00:20:56,000 --> 00:21:00,000

Oh, there's one. There's one up there. Up to your right.

410

00:21:00,000 --> 00:21:01,000

Oh no, it's just poo.

411

00:21:01,000 --> 00:21:02,000

That's a number two.

412

00:21:02,000 --> 00:21:04,000

Lucky she's got lots of backup.

413

00:21:04,000 --> 00:21:06,000

I don't think they like you.

414

00:21:06,000 --> 00:21:11,000

Maybe if you rub some poo on you you'll smell more like them.

415

00:21:11,000 --> 00:21:13,000

And as with all great plans.

416

00:21:13,000 --> 00:21:14,000

Careful.

417

00:21:14,000 --> 00:21:15,000

Easy.

418

00:21:15,000 --> 00:21:16,000

Slowly.

419

00:21:16,000 --> 00:21:18,000

That's good. That's good.

420

00:21:18,000 --> 00:21:20,000

I think you got it.

421

00:21:20,000 --> 00:21:22,000

I don't think they like that.

422

00:21:22,000 --> 00:21:23,000

One down.

423

00:21:23,000 --> 00:21:24,000

Good job.

424

00:21:24,000 --> 00:21:27,000

This is not as easy as you might think it would be.

425

00:21:27,000 --> 00:21:32,000

But has Carrie nabbed a bag of wind or just a bag of hot air?

426

00:21:32,000 --> 00:21:37,000

Only UC Davis air quality guru, Dr. Frank Midler, can tell.

427

00:21:37,000 --> 00:21:38,000

You've measured the wrong end.

428

00:21:38,000 --> 00:21:42,000

The majority of methane comes from the front end of the cow, not the back end.

429

00:21:42,000 --> 00:21:43,000

Yep, you heard right.

430

00:21:43,000 --> 00:21:46,000

After all their effort they've got the wrong hole.

431

00:21:46,000 --> 00:21:48,000

So how is the methane produced?

432

00:21:48,000 --> 00:21:51,000

The methane is produced in the room of the cow, the first stomach.

433

00:21:51,000 --> 00:21:53,000

It's very large, about 50 gallons.

434

00:21:53,000 --> 00:21:54,000

50 gallons?

435

00:21:54,000 --> 00:21:55,000

Yes.

436

00:21:55,000 --> 00:21:57,000

The microbes inside the room keep producing methane gas.

437

00:21:57,000 --> 00:22:00,000

And of course one way or another this methane has to come out.

438

00:22:00,000 --> 00:22:02,000

But the main end is the front.

439

00:22:02,000 --> 00:22:04,000

He's belching it out.

440

00:22:04,000 --> 00:22:13,000

Inside these bovine bio bubbles they can monitor methane levels from every burp and every cow pat to levels of one part per billion.

441

00:22:13,000 --> 00:22:16,000

So generally how much methane does one cow produce?

442

00:22:16,000 --> 00:22:21,000

Just as a rule of thumb, between 250 and 400 pounds per cow per year.

443

00:22:21,000 --> 00:22:27,000

So that's one billion cows making 400 pounds of methane each a year.

444

00:22:27,000 --> 00:22:30,000

Ouch, and that's not the only bad news.

445

00:22:30,000 --> 00:22:35,000

Once the manure gets old and older and starts some place, it produces methane as well.

446

00:22:35,000 --> 00:22:39,000

Its methane may have all right, but what's that mean for the myth?

447

00:22:39,000 --> 00:22:40,000

Okay, what have we learned so far?

448

00:22:40,000 --> 00:22:45,000

Your average cow burps over 300 pounds of methane per year, which doesn't sound like a lot,

449

00:22:45,000 --> 00:22:52,000

but considering there are over a billion cows in the world, that's almost 16,000 tons of methane per hour.

450

00:22:52,000 --> 00:22:56,000

And to make matters worse, as a manure rots, it creates more methane.

451

00:22:56,000 --> 00:22:58,000

So all in all, it's looking like cows are pretty bad for the environment.

452

00:22:58,000 --> 00:23:00,000

Not so fast.

453

00:23:00,000 --> 00:23:05,000

I mean, while there's nothing you can do about the burps, apparently you can harvest methane from manure,

454

00:23:05,000 --> 00:23:07,000

which you can then use to power things.

455

00:23:07,000 --> 00:23:10,000

You realize that means we have to collect poo.

456

00:23:10,000 --> 00:23:13,000

Which is precisely what the young scientists are for.

457

00:23:13,000 --> 00:23:17,000

And what better place to harvest this cow dung than back at the creamery?

458

00:23:17,000 --> 00:23:20,000

The girl's ready to see how dirty science can get?

459

00:23:20,000 --> 00:23:22,000

Oh, yeah.

460

00:23:22,000 --> 00:23:28,000

Because of their relentless burping, the cow's character reference is taking a nose dump.

461

00:23:28,000 --> 00:23:33,000

But if the mythbusters can use the methane from their dung, then their reputation may be saved.

462

00:23:33,000 --> 00:23:38,000

All right, you guys, now comes the glamorous part of TV work.

463

00:23:38,000 --> 00:23:45,000

And what self-respecting, up-and-coming scientists wouldn't love to get their hands on a project like this.

464

00:23:45,000 --> 00:23:47,000

Who's having a good time here?

465

00:23:47,000 --> 00:23:50,000

No comments.

466

00:23:50,000 --> 00:23:54,000

We've got three containers full of fresh cow dung.

467

00:23:54,000 --> 00:24:00,000

We're going to take them back to the shop and try and build our own methane digester and see if we can get it to work.

468

00:24:00,000 --> 00:24:09,000

Jamie and Adam are testing the myth electric vehicles are slowpokes.

469

00:24:09,000 --> 00:24:11,000

The electric go-kart kick butt.

470

00:24:11,000 --> 00:24:14,000

But before they call the myth, Adam wants more proof.

471

00:24:14,000 --> 00:24:18,000

And at Infineon Raceway, it's time to up the ante.

472

00:24:18,000 --> 00:24:19,000

So, what's up next?

473

00:24:19,000 --> 00:24:22,000

Next we've got motorcycles.

474

00:24:22,000 --> 00:24:23,000

Nice.

475

00:24:25,000 --> 00:24:28,000

This is the kill-a-cycle, the world's fastest electric drag bike.

476

00:24:28,000 --> 00:24:34,000

It's 490 horsepower, 374 volts, and it has a dry weight of 645 pounds.

477

00:24:34,000 --> 00:24:37,000

Bill Dubais built this bike from scratch.

478

00:24:37,000 --> 00:24:40,000

What do you have to say to people that think electric vehicles are slugs?

479

00:24:40,000 --> 00:24:45,000

You see it out in the track, and you tell me if you think an electric vehicle is a slug.

480

00:24:45,000 --> 00:24:50,000

And the kill-a-cycle will be slugging it out against this, Q. Racecaller, Brandon.

481

00:24:50,000 --> 00:24:54,000

This is a gas-powered pro stock drag motorcycle.

482

00:24:55,000 --> 00:25:01,000

It has a horsepower of 270, 2680 cc, and a dry weight of 420.

483

00:25:09,000 --> 00:25:13,000

And the contender, pure electric grunt.

484

00:25:14,000 --> 00:25:16,000

And that's just the warm-up run.

485

00:25:16,000 --> 00:25:19,000

They're all ready. I think we need to get down to the finish line to watch this.

486

00:25:19,000 --> 00:25:20,000

Let's go. I can't wait.

487

00:25:20,000 --> 00:25:23,000

Which one's faster? You know, I really don't know.

488

00:25:25,000 --> 00:25:27,000

Each bike will do one time run.

489

00:25:29,000 --> 00:25:30,000

The kill-a-cycle.

490

00:25:34,000 --> 00:25:37,000

163 for the quarter. Now, that's quick.

491

00:25:41,000 --> 00:25:46,000

But at 166 miles an hour, the pro stock just wins the game.

492

00:25:46,000 --> 00:25:48,000

Man, they both were going fast.

493

00:25:49,000 --> 00:25:53,000

That bike is smoking. I've never seen anything like it.

494

00:25:53,000 --> 00:25:55,000

500 horsepower up from batteries?

495

00:25:55,000 --> 00:25:59,000

Okay, so maybe I got beat by the gas-powered stock bike, but only just.

496

00:26:00,000 --> 00:26:03,000

Next up is we are finishing with the Flash.

497

00:26:03,000 --> 00:26:05,000

Really, really, really fast cars.

498

00:26:06,000 --> 00:26:11,000

After the break, the guys lift the lid on the secret of cow power.

499

00:26:11,000 --> 00:26:17,000

And later, Brandon, Adam, and Jamie feel the need, the need for speed.

500

00:26:24,000 --> 00:26:28,000

Is cow power real or just a load of old bull?

501

00:26:29,000 --> 00:26:33,000

Can these drums of doo-doo do the trick and make methane?

502

00:26:33,000 --> 00:26:35,000

There's only one way to find out.

503

00:26:35,000 --> 00:26:39,000

Back at M7, the methane digester tanks arrived.

504

00:26:39,000 --> 00:26:41,000

125 gallons.

505

00:26:41,000 --> 00:26:45,000

Now, a methane digester is a barrel you fill with organic material.

506

00:26:45,000 --> 00:26:49,000

As the organic material breaks down, it gives off methane gas.

507

00:26:49,000 --> 00:26:53,000

It kind of looks like a car. You've got this big belly, you've got the little legs down here.

508

00:26:53,000 --> 00:26:56,000

All these is a head and a little tail.

509

00:26:56,000 --> 00:26:59,000

You certainly have the artist's vision.

510

00:27:00,000 --> 00:27:04,000

So to make the digester work, you have to get this into that.

511

00:27:05,000 --> 00:27:08,000

It's time to slip the slop into the digester.

512

00:27:08,000 --> 00:27:15,000

The worst-case scenario, a virtual tidal wave of bulls will engulf Carrie and I,

513

00:27:15,000 --> 00:27:18,000

soaking us to the bone with cow dung.

514

00:27:19,000 --> 00:27:21,000

Everybody ready for this?

515

00:27:21,000 --> 00:27:22,000

Yeah.

516

00:27:22,000 --> 00:27:24,000

Ready.

517

00:27:24,000 --> 00:27:27,000

Maybe we should have opened this on the ground.

518

00:27:27,000 --> 00:27:28,000

Ready?

519

00:27:28,000 --> 00:27:30,000

No!

520

00:27:30,000 --> 00:27:31,000

Okay.

521

00:27:31,000 --> 00:27:32,000

Okay, okay.

522

00:27:32,000 --> 00:27:33,000

Get the lid.

523

00:27:33,000 --> 00:27:35,000

Pull the lid up.

524

00:27:35,000 --> 00:27:36,000

There we go.

525

00:27:36,000 --> 00:27:38,000

That's perfect.

526

00:27:38,000 --> 00:27:40,000

Just like clockwork.

527

00:27:40,000 --> 00:27:41,000

Carrie?

528

00:27:41,000 --> 00:27:42,000

Yeah?

529

00:27:42,000 --> 00:27:43,000

Take the lid.

530

00:27:43,000 --> 00:27:44,000

Look at me.

531

00:27:44,000 --> 00:27:45,000

Look at me.

532

00:27:45,000 --> 00:27:46,000

Stay with me.

533

00:27:46,000 --> 00:27:50,000

Get the lid and tilt it forward as you pull it back.

534

00:27:52,000 --> 00:27:53,000

Perfect.

535

00:27:53,000 --> 00:27:54,000

Okay.

536

00:27:54,000 --> 00:27:58,000

It's got to be easier ways to save the environment.

537

00:27:58,000 --> 00:27:59,000

See?

538

00:27:59,000 --> 00:28:01,000

I told you it was foolproof.

539

00:28:01,000 --> 00:28:03,000

Hey, piece of cake.

540

00:28:04,000 --> 00:28:08,000

And of course always leave a bit of time for potty humor.

541

00:28:08,000 --> 00:28:10,000

No! No!

542

00:28:11,000 --> 00:28:16,000

So now they filled the tank with 100 gallons of goo,

543

00:28:16,000 --> 00:28:19,000

leaving room on top for the gas.

544

00:28:19,000 --> 00:28:24,000

When I came to Mythbusters, I was expecting to do some drilling

545

00:28:24,000 --> 00:28:27,000

and cut some steel and, you know, build stuff,

546

00:28:27,000 --> 00:28:31,000

but this is more of like a smelly job.

547

00:28:31,000 --> 00:28:36,000

Once the temperature starts to climb towards the optimum 90 degrees,

548

00:28:37,000 --> 00:28:40,000

they cap the top and add some plumbing.

549

00:28:41,000 --> 00:28:43,000

This is our methane digester.

550

00:28:43,000 --> 00:28:45,000

In this tank we have 100 gallons of cow manure.

551

00:28:45,000 --> 00:28:48,000

The gas comes out at the top, comes down this tube,

552

00:28:48,000 --> 00:28:50,000

this valve bleeds off any condensation.

553

00:28:50,000 --> 00:28:52,000

The gas continues along, splits off,

554

00:28:52,000 --> 00:28:55,000

goes through these cutoff valves, into the coupler,

555

00:28:55,000 --> 00:28:57,000

into the tire inflation valve.

556

00:28:57,000 --> 00:29:01,000

And if nature takes its course, hopefully these will inflate with methane.

557

00:29:02,000 --> 00:29:04,000

After much thought, Catherine Christens,

558

00:29:04,000 --> 00:29:07,000

the methane maker, um, Moo Moo.

559

00:29:07,000 --> 00:29:08,000

Beautiful!

560

00:29:08,000 --> 00:29:09,000

We even made a tail.

561

00:29:09,000 --> 00:29:13,000

Then Cisco Imahara gives Moo Moo a bit of a giddy up.

562

00:29:13,000 --> 00:29:14,000

Woo!

563

00:29:14,000 --> 00:29:16,000

Come on, Moo Moo.

564

00:29:16,000 --> 00:29:18,000

Let's make some methane.

565

00:29:18,000 --> 00:29:21,000

Call him crazy, but it's worth it.

566

00:29:21,000 --> 00:29:24,000

The hippy heifers been very busy overnight.

567

00:29:24,000 --> 00:29:25,000

I'm so excited.

568

00:29:25,000 --> 00:29:27,000

We just started with some cow dung,

569

00:29:27,000 --> 00:29:29,000

and we already have two inner tubes full of methane.

570

00:29:29,000 --> 00:29:32,000

I think it's really useful because cow dung is something that is free,

571

00:29:32,000 --> 00:29:37,000

and we have a wonderful supply of it, and people can use it as power.

572

00:29:37,000 --> 00:29:39,000

Next question is, for what?

573

00:29:39,000 --> 00:29:42,000

So the challenge here is to take a regular, off-the-shelf,

574

00:29:42,000 --> 00:29:44,000

gasoline-powered lawn mower,

575

00:29:44,000 --> 00:29:48,000

and convert it to a Moo Moo methane-powered lawn mower.

576

00:29:48,000 --> 00:29:51,000

If we get the valves all set up right,

577

00:29:51,000 --> 00:29:53,000

hopefully we'll get some sort of ignition.

578

00:29:53,000 --> 00:29:57,000

And that brings us to the blowing up bit.

579

00:29:57,000 --> 00:30:01,000

Normally the gasoline engines rely on a correct mix of fuel vapor

580

00:30:01,000 --> 00:30:02,000

and air.

581

00:30:02,000 --> 00:30:06,000

So we need to see what happens to methane when you add air to it,

582

00:30:06,000 --> 00:30:12,000

and see if you actually get enough of a reaction that could possibly power an engine.

583

00:30:12,000 --> 00:30:15,000

This'll be 10-inch pure methane!

584

00:30:16,000 --> 00:30:20,000

Pure methane has enough poke to power a mower,

585

00:30:20,000 --> 00:30:23,000

but add 5% oxygen to the mix.

586

00:30:23,000 --> 00:30:24,000

Woo!

587

00:30:24,000 --> 00:30:25,000

Yeah!

588

00:30:25,000 --> 00:30:26,000

Yeah!

589

00:30:29,000 --> 00:30:31,000

Methane packs a punch when you add a little fire,

590

00:30:31,000 --> 00:30:34,000

but when you add a little oxygen and then a little fire,

591

00:30:34,000 --> 00:30:36,000

it goes from, bam!

592

00:30:36,000 --> 00:30:40,000

Which is exactly what internal combustion engines need to operate.

593

00:30:41,000 --> 00:30:44,000

But will it woff the lawn mower into action?

594

00:30:45,000 --> 00:30:48,000

We'll stick an electric motor on just about anything we can get our hands on.

595

00:30:48,000 --> 00:30:52,000

So if you want to see an electric ATV go up against it at gas one,

596

00:30:52,000 --> 00:30:55,000

log on to [Discovery.com](http://Discovery.com) slash MythBusters.

597

00:30:58,000 --> 00:31:00,000

The heat's on back at Ice Station Central.

598

00:31:00,000 --> 00:31:04,000

The greenhouses are ready, and the Jamie Ice Dolls are chilling out.

599

00:31:04,000 --> 00:31:10,000

But can their small-scale greenhouses back at M7 really produce a plausible greenhouse effect?

600

00:31:10,000 --> 00:31:14,000

The guys head off to consult an expert at UC Berkeley.

601

00:31:14,000 --> 00:31:18,000

And after a little demonstration showing the power of ice...

602

00:31:18,000 --> 00:31:19,000

Ah!

603

00:31:20,000 --> 00:31:22,000

Oh my God!

604

00:31:22,000 --> 00:31:24,000

...its down to business.

605

00:31:24,000 --> 00:31:29,000

So I've heard a lot about people making models to protect the future of global warming,

606

00:31:29,000 --> 00:31:33,000

and with all the complicated systems on Earth, wouldn't that be a little difficult?

607

00:31:33,000 --> 00:31:36,000

We can do experiments on small scales in the lab.

608

00:31:36,000 --> 00:31:39,000

We can make observations on a global scale.

609

00:31:39,000 --> 00:31:43,000

But you're right, it is hard to replicate in a 3-foot by 3-foot chamber.

610

00:31:43,000 --> 00:31:47,000

It's a challenge. I think it can be done, but it's a challenge to replicate that.

611

00:31:47,000 --> 00:31:50,000

Challenge? That's MythBusters' second name.

612

00:31:50,000 --> 00:31:54,000

And back at M7, it's time to commit the Jamie's to a watery grave.

613

00:31:54,000 --> 00:31:57,000

What Jamie's looking at, you like that?

614

00:31:57,000 --> 00:31:59,000

That ice-cold stair.

615

00:31:59,000 --> 00:32:01,000

Try working with them all the time.

616

00:32:01,000 --> 00:32:04,000

Everything has to be kept identical in this experiment.

617

00:32:04,000 --> 00:32:06,000

That looks good right there.

618

00:32:06,000 --> 00:32:09,000

So that's 1,570-foot candles.

619

00:32:09,000 --> 00:32:14,000

So let's try to get all the lights so that that amount of light is going into each greenhouse.

620

00:32:14,000 --> 00:32:15,000

Okay.

621

00:32:15,000 --> 00:32:17,000

Accurate thermometers are essential.

622

00:32:17,000 --> 00:32:21,000

These thermometers measure a tenth of a centigrade.

623

00:32:21,000 --> 00:32:25,000

To make sure it all runs to plan, the guys have called in Manish Gupta,

624

00:32:25,000 --> 00:32:28,000

a gas monitoring expert from Los Gatos Research.

625

00:32:28,000 --> 00:32:33,000

The Earth's CO<sub>2</sub> levels stand at around 350 parts per million,

626

00:32:33,000 --> 00:32:37,000

and methane, a tiny 1,800 parts per billion.

627

00:32:37,000 --> 00:32:40,000

But amounts that small are no problem for this gear.

628

00:32:40,000 --> 00:32:42,000

For methane, it's in the part per billion level.

629

00:32:42,000 --> 00:32:44,000

And for CO<sub>2</sub>, in the part per million level.

630

00:32:44,000 --> 00:32:49,000

So now they can up the greenhouse gas levels in minutely accurate increments.

631

00:32:49,000 --> 00:32:55,000

And once the gases are in, everyone can chill out and watch ice melt.

632

00:32:55,000 --> 00:32:57,000

Let's start melting some Jamie's.

633

00:32:57,000 --> 00:33:02,000

When we return, the guys put the pedal to the electric metal.

634

00:33:02,000 --> 00:33:04,000

I want to see what it does against a real race car.

635

00:33:04,000 --> 00:33:06,000

Can you arrange that for me?

636

00:33:06,000 --> 00:33:07,000

I'll make some calls.

637

00:33:15,000 --> 00:33:20,000

An infinity on raceway that kilocycles proved one thing.

638

00:33:20,000 --> 00:33:25,000

Battery power is hot, but it's still got beat by its gas-powered rival.

639

00:33:25,000 --> 00:33:27,000

So what's next?

640

00:33:27,000 --> 00:33:29,000

This is the X1, an electric sports car.

641

00:33:29,000 --> 00:33:33,000

It's 400 volts, 600 amp system, gives it 250 horsepower,

642

00:33:33,000 --> 00:33:35,000

and its dry weight is just over 1,500 pounds.

643

00:33:35,000 --> 00:33:38,000

But is this a pretender or a contender?

644

00:33:38,000 --> 00:33:42,000

Inventor Ian Wright says the power is in the polymer.

645

00:33:42,000 --> 00:33:44,000

These ones are lithium polymer.

646

00:33:44,000 --> 00:33:47,000

It's actually the same technology used in model airplanes.

647

00:33:47,000 --> 00:33:49,000

They're a high power to weight ratio battery.

648

00:33:49,000 --> 00:33:53,000

So for a 500 pound battery system, you can get as much as 700 horsepower.

649

00:33:53,000 --> 00:33:54,000

Wow.

650

00:33:56,000 --> 00:33:57,000

In the other corner...

651

00:33:57,000 --> 00:33:59,000

This is an F430 Ferrari.

652

00:33:59,000 --> 00:34:03,000

It's 4.3 liter gas engine, gives it 495 horsepower,

653

00:34:03,000 --> 00:34:05,000

and its dry weight is 3,400 pounds.

654

00:34:05,000 --> 00:34:09,000

The gas car is a pedigree proven performer.

655

00:34:10,000 --> 00:34:13,000

With top notch just under 200 miles an hour,

656

00:34:13,000 --> 00:34:16,000

this flying pony's definitely no slouch.

657

00:34:16,000 --> 00:34:18,000

My money's not electric on this one.

658

00:34:18,000 --> 00:34:20,000

I don't know. I think it's going to be a close call.

659

00:34:21,000 --> 00:34:25,000

They're straining at the leash, and in 3, 2, 1...

660

00:34:34,000 --> 00:34:37,000

Electric ran the quarter in 11.96.

661

00:34:37,000 --> 00:34:40,000

The Ferrari slower in 12.7.

662

00:34:40,000 --> 00:34:42,000

Electric kicked the gas's butt.

663

00:34:42,000 --> 00:34:44,000

It really did.

664

00:34:44,000 --> 00:34:46,000

Well, it's clear as could be.

665

00:34:46,000 --> 00:34:48,000

The electric car smoked the gas car.

666

00:34:48,000 --> 00:34:52,000

So if you think electric cars are sluggish, you're wrong.

667

00:34:52,000 --> 00:34:55,000

The electric car won by plenty.

668

00:34:55,000 --> 00:35:00,000

But crazy as it seems, its top speed was slower than the Ferrari.

669

00:35:00,000 --> 00:35:03,000

103 versus 119 miles an hour.

670

00:35:03,000 --> 00:35:04,000

So what's up with this?

671

00:35:04,000 --> 00:35:07,000

Everyone's top speed was lower than the Ferrari's and yet it won.

672

00:35:07,000 --> 00:35:10,000

It's because the electric motor has a lot more bottom end torque.

673

00:35:10,000 --> 00:35:12,000

It got off the line quicker.

674

00:35:12,000 --> 00:35:14,000

So it didn't need to go that fast to win.

675

00:35:14,000 --> 00:35:15,000

Wow!

676

00:35:15,000 --> 00:35:17,000

So the secret to the action is in the traction.

677

00:35:17,000 --> 00:35:20,000

The power's fed progressively to the wheels.

678

00:35:20,000 --> 00:35:22,000

And with no gearbox or gears,

679

00:35:22,000 --> 00:35:24,000

the electric car's linear acceleration

680

00:35:24,000 --> 00:35:27,000

means it doesn't lose its grip off the line.

681

00:35:27,000 --> 00:35:31,000

Whereas the gas car wastes time spinning its wheels.

682

00:35:31,000 --> 00:35:34,000

And that's enough to give the X1 the winning edge.

683

00:35:34,000 --> 00:35:37,000

It's quicker but not faster.

684

00:35:37,000 --> 00:35:39,000

That's cool!

685

00:35:39,000 --> 00:35:42,000

So far the guys have gunned the go-karts,

686

00:35:42,000 --> 00:35:46,000

dragged the bikes and given the sports cars a spin.

687

00:35:46,000 --> 00:35:49,000

But next it's time for the ultimate test.

688

00:35:49,000 --> 00:35:52,000

I want to know though what it does against a real race car.

689

00:35:52,000 --> 00:35:53,000

Can you arrange that for me?

690

00:35:53,000 --> 00:35:54,000

I'll make some calls.

691

00:35:54,000 --> 00:35:56,000

Okay, good. Let's do it.

692

00:35:56,000 --> 00:36:01,000

Music

693

00:36:01,000 --> 00:36:03,000

At Rancho El Stinko,

694

00:36:03,000 --> 00:36:05,000

Moomoo's got gas.

695

00:36:05,000 --> 00:36:06,000

Two bags full.

696

00:36:06,000 --> 00:36:09,000

But is that enough to light up a lawn mower?

697

00:36:09,000 --> 00:36:12,000

This is where we see if cow power can actually turn into real power.

698

00:36:12,000 --> 00:36:16,000

So the mower gets hitched up to pure Moomoo power.

699

00:36:16,000 --> 00:36:17,000

And...

700

00:36:17,000 --> 00:36:22,000

Pressure on it guys.

701

00:36:22,000 --> 00:36:24,000

How can we do an electric start on this thing?

702

00:36:24,000 --> 00:36:26,000

I told you we needed an electric start on this thing.

703

00:36:26,000 --> 00:36:29,000

The full start was cheaper. Sorry.

704

00:36:29,000 --> 00:36:33,000

It takes years of experience to come up with this solution.

705

00:36:33,000 --> 00:36:37,000

Our strong recommendation, don't try this at home.

706

00:36:37,000 --> 00:36:38,000

Almost.

707

00:36:38,000 --> 00:36:40,000

You like my electric start?

708

00:36:40,000 --> 00:36:42,000

The pressure's on.

709

00:36:42,000 --> 00:36:46,000

The girls have added an extra 200 pounds to the inner tubes.

710

00:36:46,000 --> 00:36:49,000

Music

711

00:36:49,000 --> 00:36:52,000

And the sockets finally socked it.

712

00:36:52,000 --> 00:36:54,000

Ha ha ha ha!

713

00:36:54,000 --> 00:36:56,000

Methane powered lawn mower.

714

00:36:56,000 --> 00:36:58,000

That's powered by manure.

715

00:36:58,000 --> 00:37:00,000

I'm so proud of Moomoo.

716

00:37:00,000 --> 00:37:02,000

She filled up two full inner tubes

717

00:37:02,000 --> 00:37:05,000

and we actually powered the lawn mower using her methane.

718

00:37:05,000 --> 00:37:08,000

Methane filled inner tubes in the shop is one thing.

719

00:37:08,000 --> 00:37:12,000

But letting these two ring circus lures in the big wide world

720

00:37:12,000 --> 00:37:13,000

is something else entirely.

721

00:37:13,000 --> 00:37:15,000

We've come out to an organic lawn

722

00:37:15,000 --> 00:37:17,000

because the idea is we want to get some clippings

723

00:37:17,000 --> 00:37:20,000

to feed to our organic cows back at the creamery.

724

00:37:20,000 --> 00:37:25,000

Music

725

00:37:25,000 --> 00:37:29,000

Just when it looked like Moomoo was going to be a party pooper.

726

00:37:29,000 --> 00:37:30,000

That's it?

727

00:37:30,000 --> 00:37:31,000

Ha ha ha!

728

00:37:31,000 --> 00:37:32,000

Okay, we have ignition.

729

00:37:32,000 --> 00:37:33,000

It works.

730

00:37:33,000 --> 00:37:36,000

And it cuts grass too.

731

00:37:36,000 --> 00:37:38,000

Now if I were going to, you know,

732

00:37:38,000 --> 00:37:41,000

design a methane powered lawn mower from scratch

733

00:37:41,000 --> 00:37:43,000

I'd probably start with something similar to this.

734

00:37:43,000 --> 00:37:46,000

But I'd have a pressurized tank on board

735

00:37:46,000 --> 00:37:49,000

so that you don't have to have people standing on inner tubes.

736

00:37:49,000 --> 00:37:52,000

And most importantly, an electric start.

737

00:37:52,000 --> 00:37:55,000

So it's time to take the clippings back to the creamer.

738

00:37:55,000 --> 00:37:57,000

And Albert's let them in on a family secret.

739

00:37:57,000 --> 00:38:00,000

His whole farm runs on Moomoo.

740

00:38:00,000 --> 00:38:02,000

The surprising thing about this dairy

741

00:38:02,000 --> 00:38:06,000

is that it works in real life on a gigantic scale.

742

00:38:06,000 --> 00:38:09,000

Oh, it's a river of poo!

743

00:38:09,000 --> 00:38:11,000

Ha ha ha ha!

744

00:38:11,000 --> 00:38:12,000

Can you smell that?

745

00:38:12,000 --> 00:38:14,000

That is the sweet smell of power.

746

00:38:14,000 --> 00:38:16,000

Oh!

747

00:38:16,000 --> 00:38:19,000

And it all goes into this.

748

00:38:19,000 --> 00:38:23,000

So that's the size of the digester you need to power the farm.

749

00:38:23,000 --> 00:38:24,000

Yes it is.

750

00:38:24,000 --> 00:38:26,000

It does about 90% of our electricity.

751

00:38:26,000 --> 00:38:29,000

How much gas is produced by this pond?

752

00:38:29,000 --> 00:38:32,000

We produce about 2,000 cubic feet per day.

753

00:38:32,000 --> 00:38:35,000

And how much liquid does it take to produce all this gas?

754

00:38:35,000 --> 00:38:38,000

Oh, this is a 650,000 gallon pond.

755

00:38:38,000 --> 00:38:40,000

Wait, so you don't have any electricity bills?

756

00:38:40,000 --> 00:38:42,000

You don't have any gas bills?

757

00:38:42,000 --> 00:38:44,000

You don't have any bills to heat your water up?

758

00:38:44,000 --> 00:38:45,000

Very little.

759

00:38:45,000 --> 00:38:47,000

I'm getting me a cow.

760

00:38:47,000 --> 00:38:51,000

Albert, you really know how to show your guests a good time.

761

00:38:51,000 --> 00:38:54,000

I'm standing in one gassy cloud right here.

762

00:38:54,000 --> 00:38:55,000

You are.

763

00:38:55,000 --> 00:38:57,000

Oh, did I fall in?

764

00:38:57,000 --> 00:38:59,000

Carrie, remember...

765

00:38:59,000 --> 00:39:01,000

Oh, it's a river of poo!

766

00:39:01,000 --> 00:39:07,000

The Mythbusters' Methade Mayhem has finally come the full circle.

767

00:39:07,000 --> 00:39:12,000

So is cow gas ruining the environment?

768

00:39:12,000 --> 00:39:14,000

I'm afraid the myth is confirmed.

769

00:39:14,000 --> 00:39:15,000

What news?

770

00:39:15,000 --> 00:39:18,000

We can harvest the gas produced by the cows and use it as power.

771

00:39:18,000 --> 00:39:22,000

And also eliminate a lot of greenhouse gas at the same time.

772

00:39:22,000 --> 00:39:23,000

So it's confirmed?

773

00:39:23,000 --> 00:39:24,000

It's confirmed.

774

00:39:24,000 --> 00:39:28,000

But the news isn't all bad because there's a way to minimize the effects.

775

00:39:28,000 --> 00:39:29,000

More good news.

776

00:39:29,000 --> 00:39:32,000

You two can go home and take a bath.

777

00:39:32,000 --> 00:39:35,000

Seriously, take a bath?

778

00:39:35,000 --> 00:39:37,000

Thank God.

779

00:39:37,000 --> 00:39:41,000

Have you smelled yourself lately?

780

00:39:41,000 --> 00:39:43,000

I've been here with you.

781

00:40:11,000 --> 00:40:17,000

The Methane and the CO2 have been a degree higher consistently.

782

00:40:17,000 --> 00:40:22,000

But after three and a half hours withstanding the heat, the Jamie's finally cracked.

783

00:40:22,000 --> 00:40:24,000

So we've let the experiment run for four hours.

784

00:40:24,000 --> 00:40:27,000

And I think from the results that we're getting, we can come to a conclusion.

785

00:40:27,000 --> 00:40:32,000

Both the Methane and the CO<sub>2</sub> greenhouses were made hotter than the control.

786

00:40:32,000 --> 00:40:37,000

Throughout the whole experiment, it looks like the gases do increase the temperature inside the greenhouses.

787

00:40:37,000 --> 00:40:41,000

The CO<sub>2</sub> greenhouse stayed steady on 24.8 degrees Celsius.

788

00:40:41,000 --> 00:40:44,000

The Methane on 24.9.

789

00:40:44,000 --> 00:40:48,000

And both the controls were consistently a degree cooler.

790

00:40:48,000 --> 00:40:55,000

I think that this is showing that CO<sub>2</sub> and Methane are major culprits for global warming.

791

00:40:55,000 --> 00:40:59,000

All right, so the results from the global warming experiment were pretty conclusive.

792

00:40:59,000 --> 00:41:04,000

Yeah, the greenhouses with carbon dioxide and Methane stayed consistently warmer than the control.

793

00:41:04,000 --> 00:41:08,000

Yeah, it was almost one degree Celsius warmer the entire time.

794

00:41:08,000 --> 00:41:10,000

All right, so this one's confirmed?

795

00:41:10,000 --> 00:41:11,000

Confirmed.

796

00:41:18,000 --> 00:41:23,000

On the racetrack, the myth that electric cars are slow pokes is hitting the skids.

797

00:41:23,000 --> 00:41:30,000

There's one more test for the X1 sports car if Jamie can find a worthy challenger.

798

00:41:30,000 --> 00:41:36,000

Then, as if by magic, he finds a pedigree race car just spinning wheels in the pits.

799

00:41:36,000 --> 00:41:39,000

The FJR 50 is a Formula 3 race car.

800

00:41:39,000 --> 00:41:45,000

It's 2-liter turbocharged gas engine gives it 300 horsepower and its dry weight is about 1200 pounds.

801

00:41:47,000 --> 00:41:50,000

And it's got a serious nutcase to drive it.

802

00:41:50,000 --> 00:41:53,000

I don't know about this one. I don't know whether it's a fair race or not.

803

00:41:53,000 --> 00:41:56,000

That's a honest and goodness race car against a street car.

804

00:41:56,000 --> 00:41:58,000

Yeah, that's not about fair.

805

00:41:58,000 --> 00:42:00,000

This is now about pure fun.

806

00:42:00,000 --> 00:42:03,000

It's showtime. The ultimate test.

807

00:42:03,000 --> 00:42:10,000

The X1 street car's got a real job on its hands against the fully fledged Formula 3 race car.

808

00:42:10,000 --> 00:42:11,000

Dude!

809

00:42:15,000 --> 00:42:20,000

That did so much better than I thought it would. That was amazing.

810

00:42:20,000 --> 00:42:23,000

I think our work here is done. Results speak for themselves.

811

00:42:23,000 --> 00:42:29,000

They totally do. The electric vehicles were anything but sluggish and slow.

812

00:42:29,000 --> 00:42:30,000

With busted.

813

00:42:30,000 --> 00:42:31,000

Totally. Let's go.

814

00:42:36,000 --> 00:42:40,000

But there's still one little item of unfinished business.

815

00:42:40,000 --> 00:42:42,000

There's something I want to let you in on.

816

00:42:42,000 --> 00:42:43,000

Okay.

817

00:42:43,000 --> 00:42:46,000

Remember when I had you sculpt, Adam?

818

00:42:46,000 --> 00:42:47,000

Yeah.

819

00:42:47,000 --> 00:42:48,000

And I told you it was C4.

820

00:42:48,000 --> 00:42:49,000

Uh-huh.

821

00:42:49,000 --> 00:42:50,000

It's not really C4.

822

00:42:50,000 --> 00:42:56,000

Because I mean, would I do something crazy like this if this was C4?

823

00:42:56,000 --> 00:42:59,000

I mean, I'm nuts. But I'm not that crazy.

824

00:42:59,000 --> 00:43:03,000

This isn't going to really explode. You're just trying to trick me.

825

00:43:03,000 --> 00:43:06,000

I don't know. Here we go. Plug your ears.

826

00:43:07,000 --> 00:43:08,000

I knew it.

827

00:43:11,000 --> 00:43:14,000

Hey, are you in the fifth to the eighth grade?

828

00:43:14,000 --> 00:43:19,000

Do you think that you have what it takes to be America's next top young scientist?

829

00:43:19,000 --> 00:43:26,000

Go to [discoveryeducation.com slash youngscientist](http://discoveryeducation.com/youngscientist) and enter Discovery Education's Young Scientist Challenge.

830

00:43:26,000 --> 00:43:30,000

But enter soon. The deadline is June 15th.