

1

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

I

2

00:00:25,120 --> 00:00:27,120

Yep

3

00:00:30,840 --> 00:00:32,840

All right, let's see it

4

00:00:34,160 --> 00:00:39,680

What tell me bears. Yep, it's a fan favorite. All right, let's do this thing

5

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

I

6

00:01:11,200 --> 00:01:15,240

Hope you're feeling pretty smart Jamie why because in this final season episode

7

00:01:15,240 --> 00:01:17,920

We're gonna have to behave like actual rocket scientists

8

00:01:18,480 --> 00:01:25,600

Excellent. What do you got? Well as you know throughout the history of mythbusters our relationship to rocketry has been a little bit like a Clint Eastwood movie

9

00:01:25,640 --> 00:01:27,640

There's been some good

10

00:01:28,440 --> 00:01:33,840

There's been some bad and a whole lot of the ugly

11

00:01:35,720 --> 00:01:41,760

This episode we hope to put it all together for an awesome fan favorite myth about non-standard rocket fuels

12

00:01:41,760 --> 00:01:48,080

I'm gonna go out on a limb here and guess that it's gummy bears. It is Sherlock. You're absolutely right

13

00:01:48,080 --> 00:01:51,120

Well, they do have a lot of calorific energy right and if it's true

14

00:01:51,120 --> 00:01:55,380

Just imagine we could fly to the moon on a rocket tail of pure sugary goodness

15

00:01:55,820 --> 00:01:58,060

That I like I thought you would

16

00:02:02,660 --> 00:02:06,860

Rockets a crowning majestic technological achievement

17

00:02:09,940 --> 00:02:15,380

Their harnessed explosive energy is capable of taking us out of this world

18

00:02:20,300 --> 00:02:25,020

This potential has led the mythbusters to fire a fearsome variety of rocketry

19

00:02:26,220 --> 00:02:27,720

Whoa

20

00:02:27,720 --> 00:02:29,720

And they've learned a thing or two

21

00:02:31,940 --> 00:02:33,940

Rockets are bombs with wings

22

00:02:35,020 --> 00:02:42,200

Total explosion upon ignition and a successful launch generally requires real rocket fuel

23

00:02:44,700 --> 00:02:49,780

So to test this fan requested tall tail of gummy bear powered propulsion

24

00:02:50,220 --> 00:02:53,380

Let's get things rolling with our resident rocket scientist

25

00:02:54,300 --> 00:02:58,860

Since we will be building rockets all episode long we thought it was important to start by defining our terms

26

00:02:58,900 --> 00:03:04,740

This is not an unreasonable depiction of the kind of rocket will use fiberglass body about seven feet long

27

00:03:04,740 --> 00:03:11,740

But it's the inside that really sets it apart now the business end where the exhaust comes out is called the fuel grain and the fuel

28

00:03:11,740 --> 00:03:15,140

Grain of this rocket like our Civil War one is made of paraffin

29

00:03:15,140 --> 00:03:20,580

But it's what sprays into the fuel grain that makes this a hybrid rocket and that is this a

30

00:03:21,020 --> 00:03:23,700

pressurized canister of liquid oxygen or locks

31

00:03:25,140 --> 00:03:33,300

Now when the locks is sprayed down through the paraffin and ignited it burns very fast and very hot and when it sprays out that nozzle

32

00:03:33,300 --> 00:03:36,380

It causes a reaction which sends this rocket into the sky

33

00:03:37,580 --> 00:03:44,780

The only difference between this hybrid rocket and the one we'll be making is that ours will be powered by delicious delicious candy

34

00:03:46,860 --> 00:03:48,860

No one tastes powerful

35

00:03:48,980 --> 00:03:52,820

That's the hybrid hardware, but the fable is fuel focused

36

00:03:53,300 --> 00:03:58,260

So it's out with the standard paraffin wax and in with the edible alternative

37

00:04:00,260 --> 00:04:05,780

Question is how do they make a fuel grain out of gummy bears? So this is how this whole thing works

38

00:04:06,100 --> 00:04:12,380

This is the rocket engine liner now. We're gonna fill this with gummy bears, but we're not gonna fill it solid

39

00:04:12,380 --> 00:04:18,060

We need to actually have a tube down the middle through which the liquid oxygen will flow so to create that

40

00:04:18,060 --> 00:04:23,580

I'm gonna insert this white plastic tube with a spacer disc so it's held in the middle

41

00:04:23,580 --> 00:04:26,820

We put the gummy bears in there and we're good to go

42

00:04:31,620 --> 00:04:33,620

Hello, oh hey

43

00:04:33,900 --> 00:04:35,900

Are we ready for this you got the mold?

44

00:04:36,500 --> 00:04:40,820

With the mold made the guys start by simply jamming the gummies in manually

45

00:04:41,020 --> 00:04:43,860

Although this won't be their only method of making the fuel grain

46

00:04:44,860 --> 00:04:50,500

Oh, okay close packing them in so tightly means there's more energy per cubic inch

47

00:04:51,100 --> 00:04:53,420

This episode sponsored by the American Dental Association

48

00:04:54,140 --> 00:04:58,380

But removing any air pockets is important too in our experience

49

00:04:58,900 --> 00:05:06,620

Airspaces in a rocket fuel grain are bad because there are places where the burning can propagate and create too much surface area

50

00:05:07,180 --> 00:05:09,060

Shove your candy in that hole

51

00:05:09,060 --> 00:05:14,980

Everything about a rocket burning is about controlling the burn and when you have too much surface area that burn can get out of control

52

00:05:14,980 --> 00:05:18,580

And really its failure mode is to blow up your rocket. That's bad

53

00:05:23,340 --> 00:05:24,980

All right

54

00:05:24,980 --> 00:05:29,820

That's one engine, but they've got two more in mind now Jamie and I are gonna cook two

55

00:05:30,100 --> 00:05:34,860

Different fuel grains and here's where things start to get interesting in the myth busters rocket kitchen

56

00:05:34,860 --> 00:05:41,180

See a hybrid fuel grain works better the more consistent it is therefore our second rocket is gonna be a contiguous

57

00:05:41,700 --> 00:05:44,780

Single-gummy rocket. We're gonna gently heat up the gummy bears. Ooh

58

00:05:46,500 --> 00:05:49,820

As soon as that mass is melted we're gonna pour it into the mold

59

00:05:51,540 --> 00:06:00,380

Ah nice and voila what we should get out is a fuel grain sized single gum nice control there
Heinemann

60

00:06:00,820 --> 00:06:05,900

When Jamie comes from seven generations of candy makers

61

00:06:07,780 --> 00:06:09,780

So there's an engine

62

00:06:11,780 --> 00:06:16,260

Potential engine for the third fuel grain we're sticking to the spirit of the myth

63

00:06:16,260 --> 00:06:21,100

Which is gummy bear rocket fuel, but we're gonna cheat a little bit because of some basic chemistry

64

00:06:21,580 --> 00:06:28,240

These guys are mostly gelatin which is mostly water the last time I checked water doesn't burn very well

65

00:06:28,440 --> 00:06:35,080

So we're gonna boil as much water off as we can pour the syrup into a mold and let it set into a hard rock candy

66

00:06:35,600 --> 00:06:37,600

Now we wait

67

00:06:38,520 --> 00:06:44,880

But gently boiling the mixture at 250 degrees overnight has not given the guys the result they require

68

00:06:44,920 --> 00:06:49,240

This could not be farther away from hard candy

69

00:06:50,040 --> 00:06:57,840

But we called a candy expert and the trick is to get the candy between 300 and 310 degrees Fahrenheit

70

00:06:58,960 --> 00:07:02,520

Adam begins by testing the new technique in small scale and

71

00:07:03,280 --> 00:07:08,800

Things are getting a little more serious make no mistake. This candy is super dangerous

72

00:07:08,800 --> 00:07:15,320

It's a super heated syrup if it got on you third degree burns a trip to the hospital and a permanent scar

73

00:07:16,480 --> 00:07:23,320

305 okay excellent if it got on Jamie wouldn't be any problem. We just peel off the skin off of his exo skeleton and they repair it

74

00:07:23,640 --> 00:07:25,640

I

75

00:07:27,320 --> 00:07:29,320

Good I'm good. I'm totally good

76

00:07:32,240 --> 00:07:34,080

Wow

77

00:07:34,080 --> 00:07:38,840

Okay, I'm just gonna cool this down because I've got a compressed gas cylinder over there

78

00:07:42,200 --> 00:07:45,840

Take two all right welcome back to how to ruin kitchen equipment

79

00:07:47,200 --> 00:07:50,540

Now I'm about to heat up a bunch more candy using this big

80

00:07:51,340 --> 00:07:54,660

Non-glass container I've learned from my mistakes

81

00:08:02,300 --> 00:08:04,140

Wow

82

00:08:04,140 --> 00:08:07,540

Boiling at the target temperature for an hour releases all of the water

83

00:08:08,900 --> 00:08:16,180

Just hold on to that while I pour and given the potential dangers the Heidemann steps in to help with the handling of the super heated syrup

84

00:08:17,300 --> 00:08:19,300

That's awesome

85

00:08:21,540 --> 00:08:24,940

Jamie I think this might be the worst mess I've ever made in your shop. I

86

00:08:26,300 --> 00:08:28,300

Don't know

87

00:08:28,380 --> 00:08:32,460

You'd have to think about it. I have to think about that you've made some pretty significant messes

88

00:08:41,500 --> 00:08:46,380

But with no further mishaps or mess their work here is done there we go

89

00:08:47,340 --> 00:08:52,820

Well, that was a lot more work than we anticipated but we finally have our three rocket grains

90

00:08:52,820 --> 00:08:57,940

We've got the hand-packed gummies. We got the contiguous single gummy and we've got the hard crack candy

91

00:08:57,940 --> 00:09:01,100

That's all we can do here in the shop now. It's time to head out to the desert

92

00:09:17,380 --> 00:09:24,660

Now as anyone who makes gummy bear rockets will tell you actually it might be the first but as will tell you once you've completed your gummy bear rocket

93

00:09:24,660 --> 00:09:29,500

You're going to need a place to fire it and in the Mojave desert at the edge of the Coen dry lake bed

94

00:09:29,500 --> 00:09:32,940

We are on the compound of the Friends of Amateur Rocketry

95

00:09:34,300 --> 00:09:39,560

This is it a little nowhere what makes this place so special is not only their

96

00:09:39,980 --> 00:09:45,780

Incredible expertise in rocketry, but it is on this exact location. We fired the Chinese rocket chair more than a decade ago

97

00:09:46,620 --> 00:09:48,620

and

98

00:09:50,860 --> 00:09:57,660

They hand-built the rockets for our third and final attempt to fire a car across the desert the J-03 episode

99

00:10:00,660 --> 00:10:08,860

Welcome to the Mythbusters Mojave HQ the launch pad location for some spectacular final season rocket science research

100

00:10:09,660 --> 00:10:13,660

Can gummy bears really fuel a liquid oxygen hybrid rocket?

101

00:10:16,620 --> 00:10:20,460

To coming up it gets real

102

00:10:28,140 --> 00:10:30,140

It's gotta go

103

00:10:40,700 --> 00:10:42,700

Majestic and magnificent

104

00:10:43,660 --> 00:10:49,980

Rockets are defined as a vehicle propelled by thrust rock one from burning on board fuel

105

00:10:51,500 --> 00:10:57,260

Any fuel and the most unlikely of all the mythical gummy bear

106

00:10:58,500 --> 00:11:04,900

So we've got three different versions of our gummy bear rockets those are gonna go into these four-inch rocket casings

107

00:11:05,700 --> 00:11:12,340

Inside this is a tank of liquid oxygen a valve and the rocket engine with the gummy bears

108

00:11:12,340 --> 00:11:17,420

And then the rocket nozzle those are all the major components that go into a hybrid rocket

109

00:11:18,940 --> 00:11:23,900

Now if you remember it's a hybrid rocket because we're feeding liquid oxygen through our fuel grain

110

00:11:23,900 --> 00:11:30,540

And that's what this giant tank is full of liquid oxygen literally some of the scariest stuff on earth

111

00:11:30,700 --> 00:11:36,540

To say this is flammable is really it's not accurate because this is what makes things flammable

112

00:11:36,540 --> 00:11:40,660

It is the enabler for burning which is exactly what it's doing in our rockets

113

00:11:42,340 --> 00:11:46,260

With the locks and rocket casing ready to roll cue the first fuel

114

00:11:46,820 --> 00:11:48,820

hand-packed gummies

115

00:11:48,900 --> 00:11:54,420

Isn't that pretty that is gorgeous. So the gummy bear fuel grain is going into its housing

116

00:11:55,220 --> 00:12:02,020

There are a lot of fiddly bits that all have to work perfectly in concert snap rings o rings

117

00:12:02,420 --> 00:12:06,180

Rocket grains housing and everything and it all has to be properly assembled

118

00:12:07,460 --> 00:12:09,460

With the engine loaded and locked

119

00:12:10,100 --> 00:12:12,100

It's go time for launch

120

00:12:12,660 --> 00:12:16,980

This is the pre-launch setup we mount the rocket

121

00:12:19,620 --> 00:12:24,460

Insert the altimeter and the descent parachute into the nose cone and then erect guide rail

122

00:12:30,060 --> 00:12:32,580

After that we de-ass the area

123

00:12:35,820 --> 00:12:37,820

Here we go

124

00:12:37,860 --> 00:12:41,420

Because just as our bomb squad so the only ones qualified due to the final

125

00:12:41,660 --> 00:12:47,940

Capping in of explosives our rocket techs here are the only ones qualified to work with the super

unstable liquid oxygen

126

00:12:48,020 --> 00:12:49,740

Once they have the locks in place

127

00:12:49,740 --> 00:12:55,180

They put in the ignition system and the countdown sequence begins it ends of course with me counting from five

128

00:12:55,620 --> 00:12:58,100

Two zero and I hit the launch button the moment

129

00:12:58,100 --> 00:13:04,020

I do an igniter starts a little fire in the base of the rocket at the same time a valve opens up and liquid oxygen begins

130

00:13:04,020 --> 00:13:09,620

To spray down the middle of the core of our fuel grain it is ignited by that flame and hopefully also in turn

131

00:13:09,860 --> 00:13:16,420

Ignites the fuel grain causing a chain reaction of explosive force that sends the rocket skyward
system is armed

132

00:13:17,380 --> 00:13:23,500

Theoretically this is it will hand-packed gummy bears be a viable rocket fuel

133

00:13:34,020 --> 00:13:36,020

Come on baby

134

00:13:41,380 --> 00:13:43,380

That's the sound of

135

00:13:44,100 --> 00:13:46,600

Not working. It's the sound of failure

136

00:13:50,260 --> 00:13:54,260

Well, we just fired our first gummy bear rocket and remember these were the gummy bears

137

00:13:54,260 --> 00:13:58,860

We're just jammed into a rocket grain shape with no other modification and

138

00:13:59,540 --> 00:14:04,580

We got a successful firing which is we heard it burn and shoot out some fire

139

00:14:04,580 --> 00:14:10,700

And then you started to hear the telltale sound of gummy bears individually peeling off from the rocket grain

140

00:14:11,180 --> 00:14:16,700

And getting pooped out of the bottom of our rocket, but not with enough force to actually lift this rocket

141

00:14:16,700 --> 00:14:19,300

We didn't get any else. We didn't get one inch. Yeah

142

00:14:22,940 --> 00:14:28,260

The ignition flame appeared to light the locks. Oh nice you're eating it

143

00:14:28,980 --> 00:14:35,020

We I'd still sweet Wow, but they'll lose packed flavorsome fuel simply fell apart

144

00:14:37,580 --> 00:14:43,380

Q gummy bear fuel number two this time we're using the melted gummy bears remember

145

00:14:43,380 --> 00:14:48,220

It's one solid contiguous gummy material molded into a tube shape

146

00:14:48,820 --> 00:14:51,860

I'm marginally more optimistic about this time. I

147

00:14:54,540 --> 00:14:57,460

Got a rocket in my pocket and I'm ready for some action

148

00:14:58,940 --> 00:15:04,340

I'm getting more and more excited the rocket grain is in there. I'm feeling very optimistic

149

00:15:06,540 --> 00:15:08,540

And sneeze

150

00:15:09,660 --> 00:15:11,660

There you go

151

00:15:12,300 --> 00:15:17,420

With the rocket ready for launch back at mission control it's countdown number two

152

00:15:17,820 --> 00:15:22,620

All right, here we go folks arming the system gummy bears are go

153

00:15:22,900 --> 00:15:24,900

I

154

00:15:26,340 --> 00:15:31,260

Watching in three two one

155

00:15:34,060 --> 00:15:38,340

See smoke. Oh that sounded good. Come on. Come on

156

00:15:40,180 --> 00:15:42,180

I hear it

157

00:15:42,180 --> 00:15:45,740

Sounds better than the last one. I am in no movement though

158

00:15:47,820 --> 00:15:49,820

No

159

00:15:49,860 --> 00:15:53,020

I'm sad

160

00:15:56,780 --> 00:16:03,820

From our bunker we push the ignition button and first we saw the igniter smoke and then as they released the liquid oxygen

161

00:16:04,180 --> 00:16:11,460

Into the chamber we heard this telltale sound that really typifies a hybrid rocket, which is kind of a

162

00:16:12,220 --> 00:16:14,220

And then there's this hum

163

00:16:14,780 --> 00:16:16,780

Oh

164

00:16:17,100 --> 00:16:21,980

That that right there tells you you're hearing a hybrid rocket fire

165

00:16:22,980 --> 00:16:28,140

Unfortunately, it did not have enough thrust to lift this rocket even an inch on its stand

166

00:16:29,180 --> 00:16:31,640

Yeah, well science, baby

167

00:16:33,420 --> 00:16:37,620

Now gummy bears may work like rocket fuel when you put them in little kids

168

00:16:37,900 --> 00:16:45,340

But for us not so much and that's why for the next round

169

00:16:45,340 --> 00:16:53,020

We're gonna be using gummy bears that we've boiled down to remove all of the water leaving only the

sugar and we're hoping that

170

00:16:53,020 --> 00:16:55,020

We'll get a better result out of that

171

00:16:55,980 --> 00:16:59,740

Optimism is high if gummy bears can possibly provide enough thrust

172

00:17:00,580 --> 00:17:06,980

This is the one right here then this concentrated candy. Oh, that's nice is their best chance

173

00:17:08,620 --> 00:17:10,620

All right

174

00:17:10,980 --> 00:17:12,980

If anything's gonna work

175

00:17:13,700 --> 00:17:18,060

This is gonna because we know sugar burns and there's a lot of energy in it actually

176

00:17:18,700 --> 00:17:21,020

Yep, one pound of sugar contains

177

00:17:21,940 --> 00:17:28,100

7,700 kilojoules meaning this fuel grain with 12 pounds of concentrated candy has the potential

178

00:17:28,620 --> 00:17:32,740

To lift a 50 pound rocket several thousand feet into the air

179

00:17:32,940 --> 00:17:38,160

All right, my hopes are all pinned on a large tube of hard candy

180

00:17:39,540 --> 00:17:44,220

But will it burn here we go and will it convert that energy to thrust?

181

00:17:45,100 --> 00:17:47,100

launching and

182

00:17:47,140 --> 00:17:48,980

three

183

00:17:48,980 --> 00:17:50,980

two

184

00:17:51,420 --> 00:17:53,420

One

185

00:17:53,740 --> 00:17:55,740

Ignition

186

00:18:02,740 --> 00:18:04,740

Oh

187

00:18:12,020 --> 00:18:16,580

A duck Houston we have all the problems

188

00:18:25,420 --> 00:18:28,580

Over the years the mythbusters have learned the hard way

189

00:18:28,980 --> 00:18:30,980

Oh

190

00:18:31,380 --> 00:18:33,860

That's here is a valid result

191

00:18:36,900 --> 00:18:40,260

One ignition and with a lack of thrust

192

00:18:42,840 --> 00:18:45,500

Gummy bear rocket fuel is looking like a bust

193

00:18:46,980 --> 00:18:48,480

A duck

194

00:18:48,480 --> 00:18:49,740

but

195

00:18:49,740 --> 00:18:55,840

Come on, you know us. We're not gonna give up just yet. We're gonna fire the hard candy rocket one more time

196

00:18:55,840 --> 00:19:03,840

I'm gonna add a sous-saint of, shall we say, encouragement to help it go a little more vigorously.

197

00:19:03,840 --> 00:19:08,840

What I'm doing is I put a spray adhesive down the throat of this and then pour gunpowder on it,

198

00:19:08,840 --> 00:19:10,840

and it coats the inside of the rocket engine.

199

00:19:10,840 --> 00:19:15,840

So when we stick the igniter in there, the whole surface is ignited nicely.

200

00:19:15,840 --> 00:19:17,840

This should be good to go.

201

00:19:17,840 --> 00:19:22,840

So with an even sprinkling of black powder in place to help initiate ignition,

202

00:19:22,840 --> 00:19:26,840

the guys are shooting for one last shot at gummy glory.

203

00:19:26,840 --> 00:19:31,840

So we've tried all our different versions of gummy bears and nothing has worked yet.

204

00:19:31,840 --> 00:19:35,840

This one right here has got to work. It's now or never.

205

00:19:35,840 --> 00:19:37,840

Alright, Mr. Heidemann, are you ready?

206

00:19:37,840 --> 00:19:38,840

I'm ready.

207

00:19:38,840 --> 00:19:39,840

Here we go.

208

00:19:39,840 --> 00:19:42,840

Here we are launching the hard candy rocket.

209

00:19:42,840 --> 00:19:47,840

Three, two, one, launch.

210

00:19:47,840 --> 00:19:49,840

Yep, come on, baby.

211

00:19:50,840 --> 00:19:54,840

Come on! It's got to go!

212

00:19:59,840 --> 00:20:04,840

It was the best-case candy scenario and there was no lift-off.

213

00:20:04,840 --> 00:20:09,840

But has the myth been busted or the mythbusters methodology?

214

00:20:09,840 --> 00:20:10,840

What is wrong?

215

00:20:10,840 --> 00:20:13,840

The Heidemann smells a hardware rat.

216

00:20:13,840 --> 00:20:18,840

At this point I'm becoming suspicious as to whether it's the fuel's fault

217

00:20:18,840 --> 00:20:23,840

or is it, say, the oxidizer or the general rocket system that is at fault here.

218

00:20:23,840 --> 00:20:27,840

So this next attempt, we're going to try and eliminate that as a concern

219

00:20:27,840 --> 00:20:30,840

and we're going to use paraffin as the fuel,

220

00:20:30,840 --> 00:20:34,840

which we know is capable of making a rocket like this fly really far.

221

00:20:34,840 --> 00:20:38,840

Yep, by replacing the gummy bears with standard rocket fuel,

222

00:20:38,840 --> 00:20:42,840

this control launch will test the hardware itself.

223

00:20:43,840 --> 00:20:49,840

Packed with paraffin, the rocket experts expect an altitude of 20,000 feet.

224

00:20:49,840 --> 00:20:53,840

Anything less than that, we're going to have some problems to solve.

225

00:20:54,840 --> 00:21:01,840

Okay, here we go. Launching in three, two, one.

226

00:21:02,840 --> 00:21:04,840

That's it, I see smoke.

227

00:21:04,840 --> 00:21:06,840

No!

228

00:21:11,840 --> 00:21:12,840

Ah!

229

00:21:12,840 --> 00:21:16,840

That's clearly not the high altitude expected.

230

00:21:16,840 --> 00:21:21,840

Here it comes. That doesn't look like it went higher than about 6 or 700 feet.

231

00:21:23,840 --> 00:21:26,840

It should have got at least 30 times higher.

232

00:21:26,840 --> 00:21:29,840

After the failure of all of our gummy bear rockets,

233

00:21:29,840 --> 00:21:33,840

we fired off this paraffin rocket as a test of our hardware and technology

234

00:21:33,840 --> 00:21:39,840

and it flew 675 feet. That is unremarkable.

235

00:21:40,840 --> 00:21:46,840

That is a pretty clear marker that we need to review our hardware and our technology before proceeding.

236

00:21:48,840 --> 00:21:50,840

Well, the rockets just aren't working.

237

00:21:50,840 --> 00:21:53,840

No, and the gummy bear results have to be thrown out completely.

238

00:21:53,840 --> 00:21:56,840

It's the tricky finicky business of these hybrid rockets

239

00:21:56,840 --> 00:21:58,840

that's getting in the way of us getting any actual results.

240

00:21:58,840 --> 00:22:00,840

I don't know what we're going to do.

241

00:22:00,840 --> 00:22:03,840

Well, let's head back to the shop and regroup.

242

00:22:03,840 --> 00:22:05,840

Alright, we'll have a total rethink about this.

243

00:22:05,840 --> 00:22:06,840

Yeah.

244

00:22:06,840 --> 00:22:10,840

With the hardware fail, all their results are redundant.

245

00:22:10,840 --> 00:22:16,840

All they've proved so far is they're facing one of the most challenging experiments in Mythbusters history.

246

00:22:17,840 --> 00:22:20,840

So it's back to the shop and square one.

247

00:22:21,840 --> 00:22:24,840

So these are the parts we were trying to use in the desert.

248

00:22:24,840 --> 00:22:29,840

We've got your gummy bears here, we've got your oxidizer, pressurized tank here with the valves

249

00:22:29,840 --> 00:22:31,840

and touch the ignition systems.

250

00:22:31,840 --> 00:22:33,840

Look, I think we just bit off more than we can chew.

251

00:22:33,840 --> 00:22:35,840

We are moving on.

252

00:22:35,840 --> 00:22:37,840

Instead, we're going to use a solid rocket motor like this.

253

00:22:37,840 --> 00:22:45,840

It may not look like that much, but it's actually a very carefully prepared mixture of fuel, oxidizer, and a binder to hold it all together.

254

00:22:45,840 --> 00:22:49,840

Now, it's nice and simple because in theory, all you do is light it and off it goes.

255

00:22:49,840 --> 00:22:55,840

We're going to make our own version of it using gummy bears as fuel along with the same oxidizer and binder.

256

00:22:56,840 --> 00:23:05,840

Solid rockets. They've ejected Buster's bond seed, powered Jato, and fired the Huacha. They're simple and effective.

257

00:23:05,840 --> 00:23:13,840

But producing fuel grains like this is not only time consuming and difficult, but you need a special license which neither Jamie nor I possess.

258

00:23:13,840 --> 00:23:18,840

So what we're going to do here is to turn these gummies into a powder.

259

00:23:18,840 --> 00:23:19,840

Here we go.

260

00:23:19,840 --> 00:23:24,840

And then send them off to a specialist who will produce for us fuel grains that look like this.

261

00:23:25,840 --> 00:23:29,840

This specialist require the fuel as a fine dry powder.

262

00:23:29,840 --> 00:23:33,840

Three, two, one.

263

00:23:33,840 --> 00:23:42,840

And to convert the gummies, Adam has hit upon a technique that doesn't involve large quantities of lethal lava-like serum.

264

00:23:42,840 --> 00:23:46,840

It seems like it's working strategically.

265

00:23:46,840 --> 00:23:52,840

Okay, I'm going to use a coffee grinder to make them even more powdery.

266

00:23:52,840 --> 00:23:54,840

Dude, look at that.

267

00:23:54,840 --> 00:23:58,840

That is a super fine powder that used to be gummy bears.

268

00:23:58,840 --> 00:24:02,840

That's exactly what our rocketeers want.

269

00:24:02,840 --> 00:24:05,840

Time to make a whole bunch more.

270

00:24:05,840 --> 00:24:12,840

While Adam ramps up production on his gummy bear crystal method, Jamie is well-being Jamie.

271

00:24:12,840 --> 00:24:16,840

Look, I'm loving the technical challenge of making a gummy bear-powered rocket.

272

00:24:16,840 --> 00:24:18,840

And if it works, cool.

273

00:24:18,840 --> 00:24:22,840

But let's face it, ultimately, there's no real practical application for it.

274

00:24:22,840 --> 00:24:28,840

So I'm going to make a second fuel powder, one that could conceivably be useful.

275

00:24:28,840 --> 00:24:31,840

Oh, God.

276

00:24:31,840 --> 00:24:34,840

That's awful.

277

00:24:34,840 --> 00:24:36,840

I'm going to use poop.

278

00:24:36,840 --> 00:24:42,840

It's a pretty disgusting sequence up next, so you might want to put down your snacks.

279

00:24:42,840 --> 00:24:46,840

Yep, Jamie's moving on from the myth and is thinking ahead.

280

00:24:46,840 --> 00:24:49,840

He's looking into the future of space travel.

281

00:24:49,840 --> 00:24:51,840

No, really?

282

00:24:51,840 --> 00:24:53,840

Oh, man, that's nasty.

283

00:24:53,840 --> 00:24:58,840

Add like Adam, his first step is to turn his potential fuel into a dry powder.

284

00:24:58,840 --> 00:25:04,840

First, I'm going to dry it out up here in the sun, which has the added benefit of keeping the stink out of the shop.

285

00:25:04,840 --> 00:25:07,840

They're already giving me night bears.

286

00:25:07,840 --> 00:25:11,840

And then I'm going to grind it down into a fine dry powder.

287

00:25:11,840 --> 00:25:15,840

Some sun-dried poop coming right up.

288

00:25:15,840 --> 00:25:17,840

I want them nice and dry and crispy.

289

00:25:17,840 --> 00:25:20,840

That's the way I like them.

290

00:25:21,840 --> 00:25:24,840

Ha ha ha ha ha ha.

291

00:25:24,840 --> 00:25:29,840

Processing dog waste into powder is one thing, but the big question is why.

292

00:25:29,840 --> 00:25:34,840

Look, I know it sounds kind of crazy, but crazy is kind of Jamie's MO.

293

00:25:34,840 --> 00:25:39,840

I have no idea if this is going to work or not, but we'll soon find out.

294

00:25:39,840 --> 00:25:43,840

Whenever he can design a system that has no waste whatsoever,

295

00:25:43,840 --> 00:25:49,840

where he's expended just enough energy to get the job done and no more, he is the happiest.

296

00:25:49,840 --> 00:25:52,840

Well, it's definitely breaking it up.

297

00:25:52,840 --> 00:25:56,840

And where does that philosophy reach? It's zenith in space.

298

00:25:56,840 --> 00:25:58,840

Astronauts are already drinking their own urine.

299

00:25:58,840 --> 00:26:00,840

I mean, after filtering.

300

00:26:00,840 --> 00:26:04,840

With Jamie's plan, they'd also be using their feces as rocket fuel.

301

00:26:04,840 --> 00:26:06,840

What could be more efficient?

302

00:26:06,840 --> 00:26:10,840

So while it sounds crazy, there might just be something to this.

303

00:26:10,840 --> 00:26:13,840

It may have seemed like a gag to make you gag,

304

00:26:13,840 --> 00:26:16,840

but typically by focusing on the details,

305

00:26:16,840 --> 00:26:18,840

I'll tell you one thing.

306

00:26:19,840 --> 00:26:21,840

This rocket better work.

307

00:26:21,840 --> 00:26:23,840

Jamie's actually thinking big.

308

00:26:23,840 --> 00:26:26,840

So with the gummies and poop powderized.

309

00:26:26,840 --> 00:26:28,840

Yep, that's pretty well ground up.

310

00:26:28,840 --> 00:26:31,840

It's packaged and sent off.

311

00:26:31,840 --> 00:26:35,840

After the dangerous process of combining it into a solid motor is complete,

312

00:26:35,840 --> 00:26:40,840

it'll be back to the desert for a date with detonation.

313

00:26:40,840 --> 00:26:47,840

Gummy bear rocket in three, two, one.

314

00:26:47,840 --> 00:26:49,840

There it goes.

315

00:27:04,840 --> 00:27:06,840

Welcome back to the Mojave Desert.

316

00:27:06,840 --> 00:27:09,840

Last time we were here, we were testing rockets made of gummy bears

317

00:27:09,840 --> 00:27:14,840

and the results were spectacularly unspectacular.

318

00:27:14,840 --> 00:27:16,840

Round two.

319

00:27:16,840 --> 00:27:19,840

We've got rockets that did this.

320

00:27:19,840 --> 00:27:21,840

Oh no.

321

00:27:21,840 --> 00:27:24,840

And rockets that did this.

322

00:27:24,840 --> 00:27:26,840

A duck.

323

00:27:26,840 --> 00:27:29,840

Yeah, so we've changed our methodology entirely.

324

00:27:29,840 --> 00:27:32,840

We've gone from hybrid rockets to solid rocket motors,

325

00:27:32,840 --> 00:27:36,840

and we've come back out to this site with a gummy bear rocket to test.

326

00:27:36,840 --> 00:27:40,840

We've also come out with something I might call Heinemanian.

327

00:27:40,840 --> 00:27:43,840

Horror within horror.

328

00:27:43,840 --> 00:27:46,840

Heinemanian has gotten a bee in his bonnet about making a rocket using poop,

329

00:27:46,840 --> 00:27:49,840

and we are also going to test that.

330

00:27:49,840 --> 00:27:51,840

Last time we saw the sweet and sour fuel,

331

00:27:51,840 --> 00:27:55,840

they were powderized and sent off to the rocket scientists.

332

00:27:55,840 --> 00:27:58,840

And here is what they did with them.

333

00:27:58,840 --> 00:28:01,840

They turned them into two official rocket motors.

334

00:28:01,840 --> 00:28:07,840

One made out of gummy bears, one made out of poop.

335

00:28:07,840 --> 00:28:10,840

Barely worse than the gummy bears.

336

00:28:10,840 --> 00:28:14,840

Yep, they've been converted into solid rocket propellant.

337

00:28:14,840 --> 00:28:16,840

It looks like this.

338

00:28:16,840 --> 00:28:19,840

Basically it's composed of an oxidizer and a fuel which is held in place

339

00:28:19,840 --> 00:28:22,840

by a binder made up of a variety of rubber resins.

340

00:28:22,840 --> 00:28:25,840

Now when that starts to burn, all those expanding gases

341

00:28:25,840 --> 00:28:27,840

are forced out through the rocket nozzle.

342

00:28:27,840 --> 00:28:30,840

That accelerates those gases, creating a lot of thrust,

343

00:28:30,840 --> 00:28:33,840

and up the rocket goes.

344

00:28:33,840 --> 00:28:37,840

In stark contrast to the hybrid system, it couldn't be simpler.

345

00:28:37,840 --> 00:28:40,840

An electronic match is lit, and in theory,

346

00:28:40,840 --> 00:28:45,840

the gummy and poop-based fuels begin an explosive chain reaction.

347

00:28:45,840 --> 00:28:50,840

The question is, how will the mythical fuels performance be measured?

348

00:28:50,840 --> 00:28:52,840

It's almost time for launch.

349

00:28:52,840 --> 00:28:55,840

Now our first launch is surprisingly not going to be either a gummy bear rocket

350

00:28:55,840 --> 00:28:57,840

or a poop rocket.

351

00:28:57,840 --> 00:29:01,840

It is in fact going to be a control launch of a best-case scenario rocket,

352

00:29:01,840 --> 00:29:03,840

otherwise known as a rocket.

353

00:29:03,840 --> 00:29:05,840

Big rocket coming through.

354

00:29:05,840 --> 00:29:08,840

It has the ideal mixture of fuel, binder, and oxidizer.

355

00:29:08,840 --> 00:29:12,840

Okay, in goes the engine with standard rocket propellant.

356

00:29:12,840 --> 00:29:17,840

And it will give us the best-case scenario of how high a rocket can go

357

00:29:17,840 --> 00:29:19,840

of this size and weight.

358

00:29:19,840 --> 00:29:22,840

Alright, well, that's it. Let's put it on the rail.

359

00:29:22,840 --> 00:29:24,840

Alright.

360

00:29:24,840 --> 00:29:37,840

Now I know we've already spent a bunch of time explaining the difference between this rocket

361

00:29:37,840 --> 00:29:40,840

and its predecessors, but you might not notice.

362

00:29:40,840 --> 00:29:43,840

We've got three cameras attached to this rocket

363

00:29:43,840 --> 00:29:47,840

so that we can see the rocket's eye view of its own launch.

364

00:29:47,840 --> 00:29:49,840

That's pretty cool.

365

00:29:50,840 --> 00:29:55,840

Oh, yeah. I remember.

366

00:29:55,840 --> 00:29:57,840

This part sucks.

367

00:30:00,840 --> 00:30:02,840

There we go. She's up.

368

00:30:02,840 --> 00:30:04,840

Alright, you ready?

369

00:30:04,840 --> 00:30:05,840

I'm ready.

370

00:30:05,840 --> 00:30:07,840

Okay, here we go.

371

00:30:07,840 --> 00:30:13,840

Bitbuster's solid rocket motor control in three, two, one.

372

00:30:20,840 --> 00:30:23,840

Yeah!

373

00:30:23,840 --> 00:30:27,840

I knew we'd see a rocket fire eventually if that was cool.

374

00:30:27,840 --> 00:30:29,840

Yeah.

375

00:30:32,840 --> 00:30:35,840

A little pop, that was the pop of parachute deploying.

376

00:30:35,840 --> 00:30:40,840

Unlike the hybrid system, the ignition and launch was successful.

377

00:30:40,840 --> 00:30:45,840

And the rocket's eye view of the Mojave Desert spectacular.

378

00:30:46,840 --> 00:30:52,840

However, oh, and it's tripping. It's tripping a lot.

379

00:30:52,840 --> 00:31:01,840

Proving once again that rocket science is, well, rocket science, wind conditions were less than ideal.

380

00:31:01,840 --> 00:31:06,840

Alright, let's go get our rocket.

381

00:31:06,840 --> 00:31:10,840

During ascent, the rocket was pushed significantly sideways.

382

00:31:10,840 --> 00:31:14,840

We might be wanting to drink here for a little while.

383

00:31:14,840 --> 00:31:23,840

But after a successful search and rescue, they head back to base, where they discover it reached 4,133 feet.

384

00:31:23,840 --> 00:31:27,840

But more detailed data reveals a potential problem.

385

00:31:27,840 --> 00:31:35,840

So we had a good launch, but the telemetry in GPS is telling us that we had a lot of lateral drift that may have compromised our data.

386

00:31:35,840 --> 00:31:41,840

Because if that curve was straightened out, it might have actually given us a higher altitude.

387

00:31:41,840 --> 00:31:44,840

So we've got another one of these rockets.

388

00:31:44,840 --> 00:31:46,840

Control test number two.

389

00:31:46,840 --> 00:31:48,840

And we're going to go again just to be sure.

390

00:31:48,840 --> 00:31:54,840

Yep, to ensure all the launches have equal conditions, they wait until the wind dies down.

391

00:31:54,840 --> 00:31:56,840

Alright, let's do this. You ready?

392

00:31:56,840 --> 00:31:57,840

Yeah.

393

00:31:57,840 --> 00:32:05,840

This is control number two, firing in three, two, one, launch.

394

00:32:11,840 --> 00:32:13,840

Wow.

395

00:32:13,840 --> 00:32:17,840

Beauty!

396

00:32:17,840 --> 00:32:19,840

That one went straight up.

397

00:32:19,840 --> 00:32:25,840

Straight up, almost straight down.

398

00:32:25,840 --> 00:32:28,840

Dude, I think that one's going to land like right here.

399

00:32:28,840 --> 00:32:34,840

It was coming right down, right on top of us.

400

00:32:34,840 --> 00:32:37,840

Nice walking distance from the bunker.

401

00:32:37,840 --> 00:32:42,840

And telemetry says the distance this went to was 4,491 feet.

402

00:32:42,840 --> 00:32:46,840

Well, that gives us our baseline. Time to fire up the gummy bear rocket.

403

00:32:46,840 --> 00:32:49,840

Let's do it.

404

00:32:49,840 --> 00:32:54,840

Unaffected by wind, control number two went almost 400 feet high.

405

00:32:54,840 --> 00:33:02,840

And the benchmark for gummy bears has been established.

406

00:33:02,840 --> 00:33:07,840

The rocket propellant we've been using is 77% ammonium perchlorate oxidizer

407

00:33:07,840 --> 00:33:11,840

and 23% fuel mixed with a rubber binder.

408

00:33:11,840 --> 00:33:17,840

Now we're replacing that fuel component with gummy bear powder.

409

00:33:17,840 --> 00:33:19,840

In goes the gummy bear motor.

410

00:33:19,840 --> 00:33:27,840

What we're looking to find out is how the gummy bear fuel component compares to the conventional fuel component.

411

00:33:27,840 --> 00:33:31,840

Good to go.

412

00:33:32,840 --> 00:33:37,840

It's been one of the most technically challenging experiments in Mythbusters history.

413

00:33:37,840 --> 00:33:41,840

But this is it. The gummy bears are good to go.

414

00:33:41,840 --> 00:33:46,840

You know, Jamie, not many people know this, but gummy bears are actually the poop of baby unicorns.

415

00:33:46,840 --> 00:33:47,840

Really?

416

00:33:47,840 --> 00:33:51,840

Yeah. No one's ever gotten close enough to figure out how their sphincter makes that bear shape.

417

00:33:51,840 --> 00:33:55,840

But a little known fact.

418

00:33:55,840 --> 00:34:02,840

The key point of comparison for the energy and efficiency of the propellant will be the maximum altitude attained.

419

00:34:02,840 --> 00:34:04,840

Alright, so this is it. You ready?

420

00:34:04,840 --> 00:34:05,840

Are you ready?

421

00:34:05,840 --> 00:34:08,840

I'm totally ready. Let's gummy the sky open.

422

00:34:08,840 --> 00:34:16,840

Conventional propellant launched this 8-foot rocket with 50-pound payload to 4,491 feet.

423

00:34:16,840 --> 00:34:19,840

How will the gummies go?

424

00:34:19,840 --> 00:34:26,840

Gummy bear rocket in 3, 2, 1.

425

00:34:26,840 --> 00:34:27,840

There it goes.

426

00:34:27,840 --> 00:34:29,840

We have ignition.

427

00:34:34,840 --> 00:34:36,840

Went way up there.

428

00:34:36,840 --> 00:34:38,840

It did.

429

00:34:38,840 --> 00:34:43,840

Gummy bears worked.

430

00:34:43,840 --> 00:34:44,840

Yep, they did.

431

00:34:44,840 --> 00:34:46,840

Give me something right there.

432

00:34:46,840 --> 00:34:47,840

Boom!

433

00:34:47,840 --> 00:34:54,840

A long and frustrating journey, but that one successful launch has made it all worthwhile.

434

00:34:54,840 --> 00:34:57,840

Sleeping is good.

435

00:34:57,840 --> 00:35:03,840

Coming up, the guys find out exactly how high the gummies flew.

436

00:35:04,840 --> 00:35:16,840

In this final season number crunching countdown, it's lift off for an all-time fan-favorite theme.

437

00:35:16,840 --> 00:35:23,840

In over 14 years of myth-busting, rockets sure have racked up the stats.

438

00:35:23,840 --> 00:35:25,840

Watch out!

439

00:35:25,840 --> 00:35:29,840

There have been 964 countdowns.

440

00:35:29,840 --> 00:35:30,840

Fire!

441

00:35:31,840 --> 00:35:34,840

Jato was attempted four times.

442

00:35:34,840 --> 00:35:38,840

The rocket sled successfully fired five times.

443

00:35:38,840 --> 00:35:40,840

Holy crap!

444

00:35:40,840 --> 00:35:41,840

Too cool!

445

00:35:43,840 --> 00:35:45,840

Then there were at least six.

446

00:35:46,840 --> 00:35:50,840

Of Adam's gloriously insane lift off vocal.

447

00:36:00,840 --> 00:36:03,840

Show permanent start.

448

00:36:03,840 --> 00:36:05,840

2, 1.

449

00:36:05,840 --> 00:36:09,840

Booster ignition and the final lift off of discovery.

450

00:36:09,840 --> 00:36:13,840

Rocket science is knife-edge sensitive technology,

451

00:36:13,840 --> 00:36:19,840

harnessing an explosive chain reaction for propulsion as its pitfalls.

452

00:36:19,840 --> 00:36:23,840

And not enough energy or poor design.

453

00:36:23,840 --> 00:36:24,840

A duck.

454

00:36:24,840 --> 00:36:26,840

Means you don't get off the launch pad.

455

00:36:26,840 --> 00:36:27,840

One!

456

00:36:28,840 --> 00:36:34,840

But how did the gummy bears and their sinister black vapor trail perform?

457

00:36:34,840 --> 00:36:35,840

Boom!

458

00:36:37,840 --> 00:36:39,840

After finding the landing site,

459

00:36:39,840 --> 00:36:41,840

beeping is good.

460

00:36:41,840 --> 00:36:43,840

That is beautiful.

461

00:36:43,840 --> 00:36:47,840

It's the mythical moment of truth.

462

00:36:47,840 --> 00:36:49,840

It flew, it's true.

463

00:36:51,840 --> 00:36:54,840

The first time I've seen a rocket,

464

00:36:54,840 --> 00:36:56,840

I knew it's true.

465

00:36:57,840 --> 00:37:01,840

But how did it perform compared to real rocket fuel?

466

00:37:03,840 --> 00:37:06,840

So when you decode the altimeter,

467

00:37:06,840 --> 00:37:12,840

it says that our gummy bear rocket got up to 3,691 feet.

468

00:37:12,840 --> 00:37:14,840

That's pretty respectable.

469

00:37:14,840 --> 00:37:15,840

Only respectable?

470

00:37:15,840 --> 00:37:17,840

So gummies flew, man!

471

00:37:17,840 --> 00:37:19,840

They ignited, they shot into the sky

472

00:37:19,840 --> 00:37:22,840

from almost 3,700 feet into the air.

473

00:37:22,840 --> 00:37:23,840

That was awesome.

474

00:37:23,840 --> 00:37:24,840

What does it mean?

475

00:37:24,840 --> 00:37:27,840

Is it time to break out the champagne and call NASA about our new rocket fuel?

476

00:37:27,840 --> 00:37:30,840

Let's slow down just a little bit and take a look.

477

00:37:30,840 --> 00:37:31,840

Here's the thing.

478

00:37:31,840 --> 00:37:34,840

The whole point of real rocketry is to maximize thrust and efficiency

479

00:37:34,840 --> 00:37:38,840

to get the largest possible payload as far from Earth as possible.

480

00:37:38,840 --> 00:37:42,840

So the discovery of a rocket fuel that is less efficient

481

00:37:42,840 --> 00:37:44,840

than the fuel we currently use

482

00:37:44,840 --> 00:37:46,840

is not really cause for celebration.

483

00:37:46,840 --> 00:37:50,840

It's more a reason to celebrate rocketry's flexibility, let's say.

484

00:37:50,840 --> 00:37:53,840

I'm going to say this one is plausible.

485

00:37:53,840 --> 00:37:56,840

Yep, the sweet mythical snacks carefully combined

486

00:37:56,840 --> 00:38:01,840

with a potent oxidizer and binder had enough energy for lift-off.

487

00:38:01,840 --> 00:38:04,840

But in such a high-performance technology,

488

00:38:04,840 --> 00:38:09,840

82% is merely viable and barely successful.

489

00:38:09,840 --> 00:38:10,840

Cue the Heinemann.

490

00:38:10,840 --> 00:38:13,840

Well, it was fun and it actually worked.

491

00:38:14,840 --> 00:38:18,840

But let's face it, there's not really any practical reason to use it.

492

00:38:19,840 --> 00:38:24,840

There is, however, another fuel that on the face of it might seem just as frivolous.

493

00:38:25,840 --> 00:38:31,840

But in reality, it might just have a practical use in future space travel.

494

00:38:35,840 --> 00:38:38,840

Alright, you might be forgiven for thinking Jamie has lost his marbles,

495

00:38:38,840 --> 00:38:40,840

but allow me to explain.

496

00:38:40,840 --> 00:38:43,840

What makes a rocket fly, what makes a good rocket fuel is a hydrocarbon

497

00:38:43,840 --> 00:38:45,840

because it burns well in the presence of oxygen.

498

00:38:45,840 --> 00:38:48,840

And poop is a hydrocarbon.

499

00:38:48,840 --> 00:38:52,840

Back in the shop, Jamie did some calorific testing of poop versus rocket fuel.

500

00:38:52,840 --> 00:38:55,840

2,916 calories per gram.

501

00:38:55,840 --> 00:38:58,840

Even though it was several orders less efficient than rocket fuel,

502

00:38:58,840 --> 00:39:00,840

it's a lot easier to find than gummy bears.

503

00:39:00,840 --> 00:39:03,840

Up on the rocket, it's being made all the time.

504

00:39:03,840 --> 00:39:07,840

And on a rocket where every gram counts in terms of the energy expenditure,

505

00:39:07,840 --> 00:39:09,840

he might just be on to something.

506

00:39:15,840 --> 00:39:18,840

The rocket is being made in the presence of oxygen.

507

00:39:21,840 --> 00:39:26,840

So after all that nasty, smelly, disgusting, doggie doo-doo,

508

00:39:26,840 --> 00:39:30,840

we end up with this sleek carbon fiber beauty right here.

509

00:39:30,840 --> 00:39:32,840

And there we go, alright.

510

00:39:33,840 --> 00:39:38,840

Ladies and gentlemen, the first poo rocket coming out of Midbusters.

511

00:39:38,840 --> 00:39:41,840

It's time to pronounce my poop rocket prediction.

512

00:39:41,840 --> 00:39:44,840

And I want to get this right because I don't want to poop the bed.

513

00:39:44,840 --> 00:39:47,840

I mean, rocketry is something that we do-do.

514

00:39:47,840 --> 00:39:52,840

So I'm here to say that I think that while the poop may launch,

515

00:39:52,840 --> 00:39:57,840

I don't think that our number two solution here will become our number one solution.

516

00:39:59,840 --> 00:40:01,840

Mind if I set this one off?

517

00:40:01,840 --> 00:40:03,840

Not at all. Be my guest.

518

00:40:03,840 --> 00:40:08,840

The standard rocket fuel control nearly hit 4,500 feet.

519

00:40:09,840 --> 00:40:13,840

How will Jamie's no-waste waste fuel compare?

520

00:40:13,840 --> 00:40:24,840

Alright, this is it. Poop rocket, the final launch in 5, 4, 3, 2, 1.

521

00:40:28,840 --> 00:40:29,840

Oh, there it goes.

522

00:40:29,840 --> 00:40:30,840

Oh!

523

00:40:30,840 --> 00:40:31,840

Yeah!

524

00:40:33,840 --> 00:40:34,840

Whoa!

525

00:40:34,840 --> 00:40:36,840

That's beautiful!

526

00:40:36,840 --> 00:40:38,840

Dude!

527

00:40:39,840 --> 00:40:43,840

It's got a very appropriately dark smoke trail, doesn't it?

528

00:40:46,840 --> 00:40:47,840

Jamie!

529

00:40:49,840 --> 00:40:51,840

That was really respectable!

530

00:40:51,840 --> 00:40:52,840

Yeah!

531

00:40:52,840 --> 00:40:54,840

That was fantastic!

532

00:40:54,840 --> 00:40:55,840

Fantastic!

533

00:41:05,840 --> 00:41:06,840

Oh!

534

00:41:08,840 --> 00:41:10,840

Well done, little poop rocket.

535

00:41:10,840 --> 00:41:16,840

Okay, so the telemetry is telling me that we got 2,900 feet.

536

00:41:16,840 --> 00:41:18,840

That's pretty respectable.

537

00:41:18,840 --> 00:41:21,840

Respectable? It's downright phenomenal.

538

00:41:21,840 --> 00:41:25,840

I mean, I know it didn't go as high as the gummy bears, but that was never the point.

539

00:41:25,840 --> 00:41:27,840

The fact is that it did launch.

540

00:41:27,840 --> 00:41:31,840

Here's the thing you need to know about why Pooh is amazing.

541

00:41:31,840 --> 00:41:35,840

It's always going to be there, and it's totally useless.

542

00:41:38,840 --> 00:41:42,840

If you're on a long space voyage, every gram counts as far as your payload.

543

00:41:42,840 --> 00:41:45,840

So you're going to want to recycle as much as possible.

544

00:41:45,840 --> 00:41:47,840

With something like urine, it's not so hard.

545

00:41:47,840 --> 00:41:50,840

You can filter it and treat it and then drink it again.

546

00:41:50,840 --> 00:41:55,840

But with Pooh, it's not like you're going to be able to process it and then re-consume it.

547

00:41:55,840 --> 00:42:00,840

We have, however, shown that it might just be a viable rocket fuel.

548

00:42:00,840 --> 00:42:01,840

Who knew?

549

00:42:05,840 --> 00:42:09,840

You heard it here first, NASA, or maybe you already thought of it.

550

00:42:09,840 --> 00:42:10,840

Probably did.

551

00:42:10,840 --> 00:42:12,840

A bunch of smart guys.

552

00:42:12,840 --> 00:42:14,840

Now, we got to call this before we go.

553

00:42:14,840 --> 00:42:17,840

Gummy bears and Pooh pass rocket fuel, how do we find it?

554

00:42:17,840 --> 00:42:19,840

I think it's pretty clear. They're both plausible.

555

00:42:19,840 --> 00:42:21,840

I think they are. Let's get out of here.