

1

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

On this episode of MythBusters, Adam and Jamie are taking silver screen sounds to task.

2

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

We want to see whether these things make the same sounds in real life that they do in the movies.

3

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

Bye bye!

4

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

Yep, are those audio cliches, fact or fake?

5

00:00:21,000 --> 00:00:26,000

Meanwhile, Carrie Grant and Tori cast off for science.

6

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

This is blow your own sail with a full-size boat.

7

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

They're testing the physics thought experiment.

8

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

Is it possible to blow your own sail?

9

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

Come on!

10

00:00:36,000 --> 00:00:40,000

Chaos mayhem, I see hijinks, ahoy!

11

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

I feel like there might be just a little element of danger here.

12

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

Who are the MythBusters?

13

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

Adam Savage.

14

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

I'm done with science for today.

15

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

And Jamie Heidemann.

16

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

Way to go there, buddy.

17

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

Between them more than 30 years of special effects experience.

18

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

Joining them, Grant Imahara.

19

00:01:03,000 --> 00:01:05,000

That's why we can never have anything nice.

20

00:01:05,000 --> 00:01:06,000

Tori Bellachy.

21

00:01:06,000 --> 00:01:08,000

I'll try to let you guys down.

22

00:01:08,000 --> 00:01:09,000

And Carrie Byron.

23

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

Oh!

24

00:01:10,000 --> 00:01:11,000

I went to college for this.

25

00:01:11,000 --> 00:01:16,000

They don't just tell the Myths, they put them to the test.

26

00:01:17,000 --> 00:01:24,000

First off, an audio myth that Adam's having nightmares over.

27

00:01:26,000 --> 00:01:27,000

Look at that.

28

00:01:27,000 --> 00:01:30,000

Somebody's left me a present.

29

00:01:30,000 --> 00:01:31,000

Beautiful.

30

00:01:36,000 --> 00:01:39,000

Looks like I'm gonna have to take care of this myself.

31

00:01:46,000 --> 00:01:47,000

Ah!

32

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

Bye-bye.

33

00:02:16,000 --> 00:02:25,000

What was that?

34

00:02:25,000 --> 00:02:27,000

That was our next story.

35

00:02:27,000 --> 00:02:28,000

Really?

36

00:02:28,000 --> 00:02:30,000

Because it looked to me like you were trying to kill me.

37

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

No, no, no.

38

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

It sounds like I'm trying to kill you.

39

00:02:33,000 --> 00:02:34,000

I don't get it.

40

00:02:34,000 --> 00:02:39,000

Well, our next story is about whether the sounds you hear in the movies are accurate to the real world.

41

00:02:39,000 --> 00:02:41,000

Sounds cool!

42

00:02:42,000 --> 00:02:47,000

Yup, the sounds of Hollywood are being put under the Mythbusters microscope.

43

00:02:47,000 --> 00:02:55,000

To give a story suspense, add dramatic punch, or even a real one.

44

00:02:55,000 --> 00:03:02,000

Movie makers manipulate, massage, and enrich every single sound effect we hear.

45

00:03:02,000 --> 00:03:07,000

But do these audio cliches care any resemblance to the real thing?

46

00:03:07,000 --> 00:03:13,000

To find out, Adam and Jamie have got their ears to the sound.

47

00:03:13,000 --> 00:03:20,000

Alright, so if memory serves, the classic movie sound effects we'll be working with are things like the punch, the silent serves, and explosions.

48

00:03:20,000 --> 00:03:23,000

In any others we run into along the way.

49

00:03:23,000 --> 00:03:25,000

Alright, and the testing seems to be pretty straightforward.

50

00:03:25,000 --> 00:03:34,000

We punch something, we use the sounds here, we blow something up, and we record those sounds and compare them to what the movies generally represent as those sounds.

51

00:03:34,000 --> 00:03:36,000

Let's start with the punch.

52

00:03:36,000 --> 00:03:38,000

Okay.

53

00:03:38,000 --> 00:03:42,000

Fear not, Adam, there'll be no sobering sequel.

54

00:03:45,000 --> 00:03:49,000

Instead, Jamie's reprising the violence of the hams.

55

00:03:49,000 --> 00:03:53,000

I always like to wear rain gear when I carry around my pigs.

56

00:03:53,000 --> 00:03:58,000

Yup, Porky here is stepping up to take one for the team. Again.

57

00:03:58,000 --> 00:04:05,000

Clearly, Jamie and I are about to start punching this pig, but in order to compare the sound of our punches to your classic movie punch,

58

00:04:05,000 --> 00:04:10,000

we're going to record it. With this, a directional microphone pointed exactly at the point of impact.

59

00:04:10,000 --> 00:04:21,000

We will hit the pig, put it on this mic, and we will store it on this computer where we will compare it to this, the sound of a classic movie punch.

60

00:04:23,000 --> 00:04:25,000

Go at him.

61

00:04:30,000 --> 00:04:32,000

Nice, did that hurt?

62

00:04:32,000 --> 00:04:34,000

A little bit, I hit my fingers a little wrong.

63

00:04:34,000 --> 00:04:44,000

Considering his hand was unprotected, Jamie gave it all he could, but the sound wasn't exactly Silver Screen Superhero.

64

00:04:45,000 --> 00:04:47,000

You want to piece of me?

65

00:04:49,000 --> 00:04:52,000

We're going to get hurt if we keep doing it like this.

66

00:04:52,000 --> 00:04:58,000

To avoid hurting themselves, they have to pull their punches, limiting the power they can put into them.

67

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

And the audio recording reflects their less than action hero efforts.

68

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

Alright, and for comparison, here's the movie punch.

69

00:05:14,000 --> 00:05:17,000

There's no equivalency at all.

70

00:05:18,000 --> 00:05:21,000

Which leaves the myth reeling, but not yet knocked out.

71

00:05:21,000 --> 00:05:23,000

Yet another use for duct tape.

72

00:05:23,000 --> 00:05:29,000

Next, they're going to add a little action movie oomph to try and get a more Hollywood style sound.

73

00:05:32,000 --> 00:05:38,000

And with his makeshift boxing glove, Jamie will be able to throw a full-blooded right hook.

74

00:05:40,000 --> 00:05:47,000

But despite pounding the pork appreciably harder, it's clear the audio still doesn't match up.

75

00:05:48,000 --> 00:05:50,000

It's still nowhere near.

76

00:05:54,000 --> 00:06:00,000

Next up, Carrie Grant and Tori set sail for a physics thought experiment.

77

00:06:01,000 --> 00:06:04,000

Okay, now this is what I'm talking about.

78

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

So can you tell us what we're doing out here?

79

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

Yeah, what are we testing the myth that if we take Grant's sailing, he's going to throw up?

80

00:06:09,000 --> 00:06:15,000

No, but we're actually doing a sailing myth, so I figured why wouldn't we be in the blueprint room when we could be out here?

81

00:06:17,000 --> 00:06:21,000

Alright, well can we get on with it? Because this is a ticking time bomb.

82

00:06:21,000 --> 00:06:26,000

Okay, well our next myth is actually this year's plane on a conveyor belt. It's called blow your own sail.

83

00:06:26,000 --> 00:06:33,000

That's the one that if you have a windless day, if you take a giant fan and blow it into your sail, you can actually start sailing.

84

00:06:33,000 --> 00:06:36,000

Exactly, but fans say it might not work.

85

00:06:36,000 --> 00:06:38,000

Right, because of Newtonian physics.

86

00:06:38,000 --> 00:06:40,000

Alright, well I think we need to get to the bottom of this one.

87

00:06:40,000 --> 00:06:42,000

Or get sick trying.

88

00:06:42,000 --> 00:06:44,000

Speak for yourself, landlubber.

89

00:06:44,000 --> 00:06:54,000

It's a classic physics fable. Be calmed in the doldrums, our hero pulls out a fan, whips up a wind, and hey presto, she's blowing her own sail.

90

00:06:54,000 --> 00:06:58,000

But do Newton's laws really mean this myth is dead in the water?

91

00:06:58,000 --> 00:07:03,000

What happens if you take this physics thought experiment into the real world?

92

00:07:05,000 --> 00:07:10,000

Okay, it's not because I'm prone to getting seasick, but shouldn't we go back to the shop and do some small scale experiment?

93

00:07:10,000 --> 00:07:12,000

What? Why?

94

00:07:12,000 --> 00:07:15,000

I mean, we're here now. Let's just put a fan on here and go for it.

95

00:07:15,000 --> 00:07:21,000

Well the problem is it's not a windless day. We won't know if we're sailing because of our fan or because of changing the wind.

96

00:07:21,000 --> 00:07:23,000

Alright, he's got a good point.

97

00:07:23,000 --> 00:07:31,000

Alright, why don't we go back to the shop, do some small scale tests, get some miniature sailboats and some miniature fans and find out exactly what's happening before we go full scale.

98

00:07:31,000 --> 00:07:33,000

Yeah, it's probably a good idea.

99

00:07:33,000 --> 00:07:35,000

Grant is looking a little green, isn't he?

100

00:07:36,000 --> 00:07:46,000

So to avoid Grant's nautical nausea, it's back to terra firma, where the goal is getting to grips with the underlying science of the story.

101

00:07:46,000 --> 00:07:57,000

So this myth is essentially about Newton's laws, and specifically his first law, which states that an object will remain in its current state of motion unless acted upon by an external force.

102

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

Now in our case, the object is the boat. Current state of motion at rest. The external force, the wind, acts upon the boat and causes it to move along.

103

00:08:07,000 --> 00:08:15,000

Now, in the case of our sailor, if this person were able to generate the wind while sitting on the boat, it's no longer an external force.

104

00:08:15,000 --> 00:08:22,000

They're internal in the same frame of reference. When they blow on it, theoretically, the boat won't move.

105

00:08:22,000 --> 00:08:28,000

And worryingly for the myth, it's not just Newton's first law making movement unlikely.

106

00:08:28,000 --> 00:08:37,000

So there is another Newtonian principle, that is the third law of motion, which says that for every action there is an equal and opposite reaction.

107

00:08:37,000 --> 00:08:43,000

So therefore, if the fan is blowing wind into the sail, it's also pushing the fan backwards.

108

00:08:43,000 --> 00:08:49,000

If this is true, these two forces are going to cancel each other out, and this boat's not going to go anywhere. It's just going to stall.

109

00:08:49,000 --> 00:08:57,000

So with two of Newton's laws lining up to sink this sea-going saga, the team prepares for a proof-of-concept test.

110

00:08:57,000 --> 00:09:07,000

One that will put the scientific theory into practice. And while Carrie makes a raft on wheels, Tori stays high and dry on a fake blue sea.

111

00:09:07,000 --> 00:09:12,000

Because although this myth is all about boats, there's no need to get wet yet.

112

00:09:13,000 --> 00:09:17,000

Now obviously we could test it on water, but water poses a couple of problems.

113

00:09:17,000 --> 00:09:22,000

One, it takes a lot of force to get the boat to move through the water.

114

00:09:22,000 --> 00:09:29,000

0.44 pounds to be exact. Plus, getting the boat to move straight in the water is going to be another problem we have to overcome.

115

00:09:29,000 --> 00:09:31,000

But I have a solution for both of those.

116

00:09:31,000 --> 00:09:36,000

Instead of using the boat and water, we're going to use this cart with wheels on this flat piece of acrylic.

117

00:09:36,000 --> 00:09:40,000

That way the cart will go straight and we're going to reduce the amount of friction.

118

00:09:40,000 --> 00:09:45,000

It only takes 0.24 pounds of force to move this car. This is going to be perfect.

119

00:09:46,000 --> 00:09:52,000

Still to come on MythBusters. The audio action heats up. There's a sting in the tail.

120

00:09:52,000 --> 00:09:54,000

This is Big Mom.

121

00:09:54,000 --> 00:09:57,000

And Tori rides back to the future.

122

00:09:57,000 --> 00:10:00,000

This is a very bad idea.

123

00:10:01,000 --> 00:10:07,000

Over the years, the MythBusters have tackled a heap of Hollywood tall tales.

124

00:10:07,000 --> 00:10:20,000

Until now, the myths have been based upon the tendency of movie makers to suspend reality with physics-defying visual effects.

125

00:10:20,000 --> 00:10:24,000

But this time, Adam and Jamie are hot on the Oral Trail.

126

00:10:25,000 --> 00:10:32,000

And to find out if a big screen punch sounds anything like the real thing, Adam's upping the addy.

127

00:10:32,000 --> 00:10:40,000

As I really don't want to hurt this anymore by punching this poor pig, I'm going to make a fist-punching analog.

128

00:10:40,000 --> 00:10:45,000

Not a machine. It's going to be pretty simple. It's going to be a combination of this and a combination of that.

129

00:10:45,000 --> 00:10:47,000

Here we go.

130

00:10:47,000 --> 00:10:51,000

The Ballistics Gel Fist will provide an accurate-sounding skin-on-skin contact.

131

00:10:51,000 --> 00:10:56,000

And the leverage of the bat will ensure Adam gets a good solid hit.

132

00:10:59,000 --> 00:11:01,000

That gets ready.

133

00:11:02,000 --> 00:11:04,000

That was nice.

134

00:11:06,000 --> 00:11:07,000

Let's listen.

135

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

To the naked ear, it was a marked improvement. But let's get an objective comparison.

136

00:11:14,000 --> 00:11:17,000

That was pretty good. Alright, let's listen to the movie sound.

137

00:11:17,000 --> 00:11:22,000

There's no comparison.

138

00:11:22,000 --> 00:11:26,000

If the myth was on the ropes before, it's down for the count now.

139

00:11:26,000 --> 00:11:32,000

But if the movie effect isn't a recording of a real punch, what exactly is it?

140

00:11:32,000 --> 00:11:33,000

We need to talk to an expert.

141

00:11:33,000 --> 00:11:35,000

I think we do.

142

00:11:36,000 --> 00:11:38,000

Where are we going to find one?

143

00:11:38,000 --> 00:11:45,000

With a resume that includes a heap of Tim Burton blockbusters, Steve knows exactly how to pack a Hollywood punch.

144

00:11:46,000 --> 00:11:49,000

Why does an R best punch sound like this?

145

00:11:49,000 --> 00:11:52,000

You have a punch that sounds like punching a face.

146

00:11:52,000 --> 00:11:57,000

The Hollywood one is not about that. It's about drama. It's about selling the story.

147

00:11:57,000 --> 00:12:00,000

You might add a whoosh of something like this, a pipe or a dowel.

148

00:12:01,000 --> 00:12:06,000

Alright, just a little bit of that leading into the punch is going to give you that sense of the fist really moving fast.

149

00:12:06,000 --> 00:12:13,000

I noticed that you had the really good slap sound, but you might want to have a little bit of chest kind of like low end to it.

150

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

You might want to either just...

151

00:12:16,000 --> 00:12:21,000

Just a little bit of that can give you that sense of kind of a skull underneath that face slap that you got.

152

00:12:21,000 --> 00:12:22,000

Yeah.

153

00:12:22,000 --> 00:12:23,000

What else?

154

00:12:24,000 --> 00:12:28,000

You might want to hear the sound of a skull cracking.

155

00:12:30,000 --> 00:12:31,000

Wow.

156

00:12:31,000 --> 00:12:33,000

Well, that's... I love it.

157

00:12:34,000 --> 00:12:37,000

So those are the individual elements that go to make up a Hollywood punch.

158

00:12:37,000 --> 00:12:42,000

And by layering them, you get a result that's rich in texture and depth.

159

00:12:43,000 --> 00:12:45,000

Let's take our best punch at the pig.

160

00:12:46,000 --> 00:12:50,000

Alright, now Steve said it needed some low end. Let's take one of Steve's chest hits.

161

00:12:51,000 --> 00:12:56,000

Now he said it needed a whoosh. Let's take the one of the swings he made of that little pipe.

162

00:12:57,000 --> 00:13:01,000

And then finally, let's add in some bone cracking walnut sounds.

163

00:13:02,000 --> 00:13:04,000

And play them all together and see what we get.

164

00:13:05,000 --> 00:13:06,000

It's pretty good, huh?

165

00:13:07,000 --> 00:13:09,000

Yep, but it doesn't change the result.

166

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

Punch sound effects are Hollywood fiction and the myth is busted.

167

00:13:18,000 --> 00:13:23,000

Carrie Grant and Tori are tackling a maritime myth that contradicts the father of physics.

168

00:13:23,000 --> 00:13:27,000

Can you move your boat by blowing your own sail?

169

00:13:28,000 --> 00:13:31,000

To find out, they're setting up a small scale proof of concept.

170

00:13:32,000 --> 00:13:34,000

Okay, the next step is the fans.

171

00:13:34,000 --> 00:13:36,000

So I got a whole bunch of little desk fans.

172

00:13:36,000 --> 00:13:38,000

I'm going to see if any of them are going to work for this experiment.

173

00:13:38,000 --> 00:13:42,000

When I turn them on and put them on here, it should push the little car backwards.

174

00:13:43,000 --> 00:13:44,000

Carrie needs to find a fan.

175

00:13:45,000 --> 00:13:47,000

Okay, you're not going to work?

176

00:13:47,000 --> 00:13:49,000

With a power to weight ratio.

177

00:13:50,000 --> 00:13:51,000

Nope.

178

00:13:51,000 --> 00:13:52,000

That will make the raft move.

179

00:13:53,000 --> 00:13:54,000

I think it's too heavy.

180

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

The desk fans are just too feeble, so Carrie goes for broke with a model airplane propeller.

181

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

Okay, ready?

182

00:14:03,000 --> 00:14:04,000

That ought to work.

183

00:14:08,000 --> 00:14:11,000

Meanwhile, Grant has a small scale sail up his sleeve.

184

00:14:11,000 --> 00:14:17,000

And after he rigs it to the raft, the guys are all set to clear up the fanside controversy.

185

00:14:20,000 --> 00:14:27,000

When you blow your own sail, will you stall as the Newtonian advocates predict or sail off into the sunset?

186

00:14:27,000 --> 00:14:30,000

All right, now it's time to replicate the myth in small scale.

187

00:14:30,000 --> 00:14:35,000

We have our fan attached to our raft, which is going to be blowing into the sail that's attached to the raft.

188

00:14:35,000 --> 00:14:40,000

Now, according to Newton's third law of motion, these two forces should cancel each other out.

189

00:14:40,000 --> 00:14:42,000

In this boat, you're going to stall.

190

00:14:42,000 --> 00:14:46,000

So just like in the wind source, the wind source is on the boat.

191

00:14:46,000 --> 00:14:47,000

Blow your own sail.

192

00:14:47,000 --> 00:14:48,000

Here we go.

193

00:14:51,000 --> 00:14:52,000

All right.

194

00:14:52,000 --> 00:14:53,000

That's great.

195

00:14:53,000 --> 00:14:54,000

All right, let's go.

196

00:14:55,000 --> 00:14:56,000

All right.

197

00:14:56,000 --> 00:14:57,000

That's great.

198

00:14:57,000 --> 00:15:00,000

All right, it looks like Newton's laws are cancelling out cartoon laws.

199

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

Yep, and here's how.

200

00:15:01,000 --> 00:15:08,000

If you do a test without the sail, using just the fan, you can see there's enough thrust to move the boat backwards.

201

00:15:09,000 --> 00:15:17,000

But put a sail in the way and that backwards thrust is cancelled out by the equal at opposite force pushing the boat forward.

202

00:15:18,000 --> 00:15:21,000

The boat stalls and the myth is busted.

203

00:15:21,000 --> 00:15:22,000

Or is it?

204

00:15:22,000 --> 00:15:26,000

Because our intrepid trio aren't giving up so easily.

205

00:15:27,000 --> 00:15:33,000

Coming up next on Mythbusters, can we use this fan to blow our own sail?

206

00:15:39,000 --> 00:15:40,000

What do we have next?

207

00:15:40,000 --> 00:15:42,000

Well, as you know, the rattlesnake.

208

00:15:42,000 --> 00:15:49,000

Phenomus rattlesnake and its iconic warning rattle are completely endemic to the American Western.

209

00:15:49,000 --> 00:15:56,000

And what I want to know is, is the sound we're accustomed to hearing from the rattlesnake actually

a real rattlesnake sound.

210

00:15:56,000 --> 00:16:00,000

Well, this isn't a rattler. This is a Madagascar Tree boa.

211

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

You are such a buzzkill.

212

00:16:03,000 --> 00:16:04,000

She likes you.

213

00:16:04,000 --> 00:16:06,000

Yeah, I like her.

214

00:16:07,000 --> 00:16:11,000

Anybody that's seen a western knows the sound that a rattlesnake makes.

215

00:16:11,000 --> 00:16:14,000

But is that actually the sound?

216

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

Or is that a movie construct?

217

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

So we're going to have to get ourselves a real rattlesnake and see what the sound like.

218

00:16:23,000 --> 00:16:27,000

So Owen, are we going to be able to get him to rattle without freaking him out?

219

00:16:27,000 --> 00:16:30,000

Well, this is a big bob and just try stopping him.

220

00:16:30,000 --> 00:16:31,000

Really?

221

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

Yeah.

222

00:16:32,000 --> 00:16:33,000

He likes to rattle.

223

00:16:33,000 --> 00:16:34,000

He likes to talk.

224

00:16:34,000 --> 00:16:40,000

This is Big Bob and this is the classic movie sound effect of the rattlesnake.

225

00:16:40,000 --> 00:16:49,000

What we want to know is how much like that does Big Bob sound?

226

00:16:49,000 --> 00:16:51,000

Shall we record this guy?

227

00:16:51,000 --> 00:16:52,000

I think so.

228

00:16:52,000 --> 00:16:55,000

Here we go. Let's go for it.

229

00:16:59,000 --> 00:17:00,000

Awesome.

230

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

There we go.

231

00:17:01,000 --> 00:17:05,000

That sounded pretty good, but let's get an objective assessment.

232

00:17:06,000 --> 00:17:11,000

All right, let's start with the movie rattlesnake.

233

00:17:11,000 --> 00:17:12,000

Go.

234

00:17:18,000 --> 00:17:21,000

And now here's Big Bob.

235

00:17:28,000 --> 00:17:29,000

That is dead on.

236

00:17:29,000 --> 00:17:30,000

That's the same sound.

237

00:17:30,000 --> 00:17:35,000

Absolutely clear that they used real rattlesnakes to make rattlesnake sounds in films.

238

00:17:35,000 --> 00:17:36,000

I think so.

239

00:17:36,000 --> 00:17:37,000

Confirmed.

240

00:17:45,000 --> 00:17:50,000

So far in Blow Your Own Sail, there are no flaws in Newton's Laws.

241

00:17:50,000 --> 00:17:56,000

The forward thrust captured by the sail has an equal and opposite force pushing backwards,

242

00:17:56,000 --> 00:17:58,000

leaving the boat grounded.

243

00:17:58,000 --> 00:18:00,000

But it's not over yet.

244

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

The team thinks that tweaking the variables might get things moving.

245

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

So we're going to do all sorts of experiments.

246

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

We're going to try different sails.

247

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

We're going to try different winds.

248

00:18:07,000 --> 00:18:10,000

And we're going to see if we can actually blow your own sail.

249

00:18:10,000 --> 00:18:11,000

Yep.

250

00:18:11,000 --> 00:18:16,000

With the fan, sail and boat all in proportion, everything is canceled out.

251

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

So they're starting by making their small scale sail smaller.

252

00:18:21,000 --> 00:18:25,000

Now you're probably asking yourself, why are you guys testing a small sail?

253

00:18:25,000 --> 00:18:29,000

But if you look to the graphic, you'll see what I think is going to happen.

254

00:18:29,000 --> 00:18:34,000

I think that the wind is going to actually get around the small sail and push the sailboat backwards.

255

00:18:34,000 --> 00:18:40,000

Now given what we've seen so far, it may seem surprising to you that we think the boat is going to travel backwards.

256

00:18:40,000 --> 00:18:43,000

Now there's a lot of thrust coming off of this prop.

257

00:18:43,000 --> 00:18:50,000

If the size of the sail is small compared to the source of the wind, you may get some of that thrust escaping around the edges of the sail,

258

00:18:50,000 --> 00:18:53,000

giving us a net thrust pushing the boat backwards.

259

00:18:53,000 --> 00:18:57,000

All right, here we go. Three, two, one.

260

00:18:57,000 --> 00:19:01,000

Hey, look at that. It cancels itself out.

261

00:19:01,000 --> 00:19:04,000

All right, you know what? Should we turn up the speed?

262

00:19:04,000 --> 00:19:05,000

Sure.

263

00:19:05,000 --> 00:19:07,000

Yeah, let's try it and see what happens.

264

00:19:10,000 --> 00:19:11,000

Whoa!

265

00:19:12,000 --> 00:19:14,000

That was weird.

266

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

It seems if the sail contains all of the fan's thrust, the boat is marooned.

267

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

But tweak the sail size and fan speed and you start moving.

268

00:19:24,000 --> 00:19:27,000

However, they're heading in the wrong direction.

269

00:19:27,000 --> 00:19:30,000

To reverse that, maybe they need to go bigger.

270

00:19:30,000 --> 00:19:33,000

For the next test, we've stepped up the size of the sail.

271

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

But to do that, we also had to raise the fan so that the airstream hits right into the center of our sail.

272

00:19:39,000 --> 00:19:41,000

Hopefully this will propel the boat.

273

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

Ready when you are.

274

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

Okay, here we go.

275

00:19:43,000 --> 00:19:47,000

Wow, that's not going forward at all. The forces are still canceling each other out.

276

00:19:47,000 --> 00:19:48,000

Can you dial it up?

277

00:19:50,000 --> 00:19:53,000

100%! Whoa! That's looking scary!

278

00:19:53,000 --> 00:19:55,000

It's starting to go! It's starting to go!

279

00:19:55,000 --> 00:19:58,000

Faster! Moving forward!

280

00:19:58,000 --> 00:19:59,000

Woo!

281

00:19:59,000 --> 00:20:00,000

Hey!

282

00:20:03,000 --> 00:20:07,000

With faster wind speed, you can blow your own sail!

283

00:20:07,000 --> 00:20:10,000

All right, look. I'm not a sailor and I'm not an aeronautical engineer.

284

00:20:10,000 --> 00:20:12,000

But this is what I think is happening.

285

00:20:12,000 --> 00:20:17,000

So, the fan provides a certain amount of thrust that blows into the sail.

286

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

The sail in turn can only absorb so much of that thrust.

287

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

The rest of it gets reflected back, leaving us with a net thrust vector causing the boat to go forward.

288

00:20:28,000 --> 00:20:33,000

Yep, the reflection means the sum of the total thrust is in a forward direction.

289

00:20:34,000 --> 00:20:36,000

We just made a lot more wins!

290

00:20:36,000 --> 00:20:38,000

A lot more wins!

291

00:20:38,000 --> 00:20:42,000

What is the most wind we can produce with the biggest fan we can use?

292

00:20:42,000 --> 00:20:43,000

Jet engine.

293

00:20:43,000 --> 00:20:46,000

Yeah, that would be awesome!

294

00:20:46,000 --> 00:20:48,000

What a great proof of concept, though.

295

00:20:50,000 --> 00:20:52,000

Next on Mythbusters.

296

00:20:52,000 --> 00:20:53,000

Come on!

297

00:20:53,000 --> 00:20:55,000

We'll blow your own sail, take off.

298

00:20:59,000 --> 00:21:04,000

Carrie Grant and Tori have found that with enough puff and a big enough sail,

299

00:21:04,000 --> 00:21:07,000

it is possible to blow your own sail.

300

00:21:07,000 --> 00:21:08,000

More power!

301

00:21:08,000 --> 00:21:11,000

But their little toy raft didn't move very fast.

302

00:21:12,000 --> 00:21:18,000

To nail this sea-going saga in the small scale, the team feel the need for more speed.

303

00:21:18,000 --> 00:21:23,000

So, we are moving on to a jet-cap model turbine engine.

304

00:21:23,000 --> 00:21:27,000

This thing can make a model plane fly at 250 miles an hour.

305

00:21:27,000 --> 00:21:31,000

It puts out 17.5 pounds of thrust.

306

00:21:31,000 --> 00:21:33,000

This is going to give us the wind speeds that we need.

307

00:21:33,000 --> 00:21:37,000

But first, what I need to do is mount this engine to our longboard skateboard.

308

00:21:37,000 --> 00:21:41,000

The reason why we are using a longboard skateboard is because this thing puts out so much heat,

309

00:21:41,000 --> 00:21:44,000

we got to keep our sail away from the source.

310

00:21:44,000 --> 00:21:46,000

And speaking of heat.

311

00:21:46,000 --> 00:21:50,000

So, one of the problems with upgrading our source of thrust to a jet engine

312

00:21:50,000 --> 00:21:54,000

is that the exhaust gases can be in excess of 600 degrees Celsius.

313

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

Now, this is silk.

314

00:21:55,000 --> 00:21:59,000

This is the ideal material we found for our small scale experiment.

315

00:21:59,000 --> 00:22:06,000

The only problem with silk is that when you expose it to flame, this happens.

316

00:22:06,000 --> 00:22:12,000

So, while Grant looks into flame-resistant sail materials, Tari gets busy with the sailboard bill.

317

00:22:12,000 --> 00:22:18,000

Just like before, they'll be on land using wheels rather than on water in a boat.

318

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

It's kind of fitting that we're using this jet engine because a long time ago,

319

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

I actually built a jet engine out of a vacuum cleaner motor.

320

00:22:25,000 --> 00:22:27,000

It didn't have much thrust.

321

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

I mean, practically it had no thrust at all.

322

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

But it's kind of cool to actually use a real jet engine for an experiment.

323

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

With the baby engine on board, it's over to Grant.

324

00:22:39,000 --> 00:22:43,000

Okay, so this is flame-resistant material.

325

00:22:43,000 --> 00:22:49,000

This is a 6061 aluminum frame, which has a melting temperature above that of the jet exhaust.

326

00:22:49,000 --> 00:22:52,000

This is the kind of sail you're going to need if you're going to use a jet engine

327

00:22:52,000 --> 00:22:54,000

to blow yourself along.

328

00:22:54,000 --> 00:22:57,000

The jet-powered sailboard is done.

329

00:22:57,000 --> 00:22:59,000

Now to give it a run.

330

00:22:59,000 --> 00:23:03,000

There are not many places you can fire off a mini jet engine,

331

00:23:03,000 --> 00:23:07,000

but a creepy, abandoned naval base is won.

332

00:23:07,000 --> 00:23:09,000

This thing looks dangerous.

333

00:23:09,000 --> 00:23:11,000

Yeah, I think we need to ride it before we test. What do you think?

334

00:23:11,000 --> 00:23:13,000

Ride a jet-powered skateboard.

335

00:23:13,000 --> 00:23:15,000

Yeah, are you guys dying to do it?

336

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

Not really, but I would enjoy another decade of watching you fall off this thing in slow motion

337

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

and work for the bicycle.

338

00:23:22,000 --> 00:23:27,000

I think this is a very bad idea.

339

00:23:27,000 --> 00:23:30,000

So before we start doing the experiment, I want to test this engine.

340

00:23:30,000 --> 00:23:34,000

So I've turned the engine around, that way I can ride it, and I won't burn my butt.

341

00:23:34,000 --> 00:23:39,000

Unfortunately for Tori, our health insurance actually covers a full body cast.

342

00:23:39,000 --> 00:23:41,000

I'm kind of getting nervous. I don't know why.

343

00:23:41,000 --> 00:23:46,000

So if anything untoward should happen, he'll be covered.

344

00:23:47,000 --> 00:23:49,000

What could possibly go wrong?

345

00:23:49,000 --> 00:23:52,000

I got a jet engine strapped to the skateboard.

346

00:23:52,000 --> 00:23:55,000

All right, fire it up.

347

00:23:55,000 --> 00:23:59,000

Medic standing by. Somebody dial 911.

348

00:24:04,000 --> 00:24:09,000

On his jet-powered skateboard is Tori about to take a trip to the future

349

00:24:09,000 --> 00:24:12,000

or a trip back to the ER.

350

00:24:17,000 --> 00:24:23,000

Oh my God, it works.

351

00:24:23,000 --> 00:24:26,000

Every kid's going to want one of these for Christmas.

352

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

That was a good test.

353

00:24:28,000 --> 00:24:33,000

What that tells me is that the jet engine, which mind you, is only this big,

354

00:24:33,000 --> 00:24:39,000

provides enough thrust to carry Tori who weighs 175 pounds on top of the skateboard.

355

00:24:39,000 --> 00:24:42,000

Now if we replace Tori with the sail,

356

00:24:42,000 --> 00:24:46,000

I think we're going to have plenty of thrust for our experiment.

357

00:24:48,000 --> 00:24:51,000

All right, this is extreme blow your own sail.

358

00:24:51,000 --> 00:24:53,000

Do it.

359

00:24:54,000 --> 00:24:56,000

Oh, I love this sail.

360

00:24:58,000 --> 00:25:00,000

Come on, baby.

361

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

Come on.

362

00:25:02,000 --> 00:25:03,000

Gotta look at that.

363

00:25:03,000 --> 00:25:05,000

Go, go, go, go.

364

00:25:08,000 --> 00:25:10,000

That worked perfectly.

365

00:25:10,000 --> 00:25:14,000

The jet engine was powerful enough to overcome the counseling forces

366

00:25:14,000 --> 00:25:17,000

and we got our sailboat to move forward.

367

00:25:20,000 --> 00:25:22,000

We did it!

368

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

Oh, the sail!

369

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

So initially when we started out testing this myth,

370

00:25:27,000 --> 00:25:31,000

it was with a very small boat on top of a table.

371

00:25:31,000 --> 00:25:33,000

And this, this is what we do.

372

00:25:33,000 --> 00:25:38,000

We step things up each time and we've gone to a jet-powered skateboard

373

00:25:38,000 --> 00:25:40,000

with a fireproof sail.

374

00:25:40,000 --> 00:25:45,000

And I've got to say, this is great because what this says is that each time

375

00:25:45,000 --> 00:25:48,000

it's been possible to blow your own sail.

376

00:25:48,000 --> 00:25:52,000

Now we've just got to go up to the big thing, the real thing, boat.

377

00:25:52,000 --> 00:25:54,000

Next step's going to be fun.

378

00:25:54,000 --> 00:25:56,000

Full scale, baby.

379

00:25:56,000 --> 00:25:59,000

And back at the shop they've taken delivery of just the thing.

380

00:25:59,000 --> 00:26:02,000

A boat with a built-in fan.

381

00:26:02,000 --> 00:26:06,000

So we are going to take this myth full scale and this is the boat we are going to use.

382

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

It is a shower water spider swap boat and this thing comes with a fan

383

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

which is attached to a 40 horsepower engine that's capable of putting out 200 pounds of thrust.

384

00:26:18,000 --> 00:26:20,000

Woo!

385

00:26:20,000 --> 00:26:25,000

We're going to take this fan, flip it around, put up a mask, put up a sail

386

00:26:25,000 --> 00:26:28,000

and see if we can blow our own sail.

387

00:26:28,000 --> 00:26:31,000

It was dragging me, it was actually pulling me off my feet.

388

00:26:31,000 --> 00:26:33,000

I think this is going to do it.

389

00:26:33,000 --> 00:26:36,000

With Grant measuring wind speeds of 63 miles per hour,

390

00:26:36,000 --> 00:26:39,000

this puppy is clearly powerful enough.

391

00:26:39,000 --> 00:26:44,000

Which means it's time to take delivery of the sail and get busy with the rigging.

392

00:26:45,000 --> 00:26:48,000

Okay, now that we have the sail, it's time to erect the mast.

393

00:26:48,000 --> 00:26:53,000

Now we're making it out of aluminum because it's lightweight and has a really high tensile strength.

394

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

But we're making a removable base completely out of steel.

395

00:26:56,000 --> 00:27:02,000

We want to clamp onto the boat instead of drilling or welding because it's a borrowed boat, it's gorgeous.

396

00:27:02,000 --> 00:27:09,000

Against all odds, our team of landlubbers has built and rigged its own square sail from scratch.

397

00:27:09,000 --> 00:27:12,000

Faster, go faster.

398

00:27:12,000 --> 00:27:14,000

Woo!

399

00:27:15,000 --> 00:27:17,000

Ready to blow your sail?

400

00:27:18,000 --> 00:27:20,000

Yeah, I don't have enough wind.

401

00:27:20,000 --> 00:27:26,000

To find out if it'll go when the fan blows, it's time to take this test down to the waterline.

402

00:27:26,000 --> 00:27:30,000

We found ourselves a lake that's completely isolated so we have no current and no wind.

403

00:27:30,000 --> 00:27:33,000

This should be the perfect place to experiment.

404

00:27:33,000 --> 00:27:36,000

And the perfect place for a pre-test joyride.

405

00:27:36,000 --> 00:27:41,000

With the throttle full on, the team thrashes around getting their bearings

406

00:27:41,000 --> 00:27:45,000

and getting a feel for the Swamp Boat's fan-powered thrust.

407

00:27:46,000 --> 00:27:48,000

It handles beautifully.

408

00:27:48,000 --> 00:27:49,000

Love it.

409

00:27:49,000 --> 00:27:51,000

But will it sail?

410

00:27:57,000 --> 00:28:03,000

The next classic Hollywood sound effect to get the Mythbusters treatment is the gun silencer.

411

00:28:04,000 --> 00:28:10,000

And down at the South San Francisco Police Department shooting range, the boys mean business.

412

00:28:10,000 --> 00:28:15,000

Cue Meyer Sound's senior audio scientist, Dr. Roger Schwenke.

413

00:28:16,000 --> 00:28:24,000

With several previous appearances on the show, he gets the much sought after title of Honorary Mythbuster.

414

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

Strokebot, baby.

415

00:28:26,000 --> 00:28:32,000

And today he's brought along his laboratory grade recording and analysis equipment.

416

00:28:33,000 --> 00:28:38,000

We want to see whether these things actually make the same sounds in real life that they do in the movies.

417

00:28:38,000 --> 00:28:40,000

Or do they make any sound at all?

418

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

How do these silencers work?

419

00:28:43,000 --> 00:28:46,000

Well, they're kind of like mufflers on cars.

420

00:28:46,000 --> 00:28:53,000

They've got a series of baffles in them that sort of slow down and redirect the gases that are passing through

421

00:28:53,000 --> 00:28:56,000

and absorb a lot of the energy and the sound.

422

00:28:56,000 --> 00:29:02,000

That's how silencers silence, but outside a movie theater, but exactly are they used for?

423

00:29:02,000 --> 00:29:06,000

Look, we would be remiss if we didn't explain that this is not an assassin's tool.

424

00:29:06,000 --> 00:29:10,000

Actually, military and law enforcement love suppressors for four main reasons.

425

00:29:10,000 --> 00:29:15,000

The extra weight out at the front of the gun actually reduces both muzzle lift and the recoil of the gun,

426

00:29:15,000 --> 00:29:17,000

making it easier to aim and stay on target.

427

00:29:17,000 --> 00:29:22,000

It does actually reduce the sound and the concussion, the blast of the bullet,

428

00:29:22,000 --> 00:29:28,000

and it also reduces the muzzle flash to zero, all of which makes this a safer and easier weapon to use.

429

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

Right, let's get down to testing.

430

00:29:31,000 --> 00:29:34,000

First up, Adam and Jamie take aim at a baseline.

431

00:29:34,000 --> 00:29:38,000

First, we are going to fire an unmodified pistol at the target.

432

00:29:38,000 --> 00:29:41,000

And three, two, one.

433

00:29:45,000 --> 00:29:49,000

Then we're going to put a silencer on that gun and shoot again at the target

434

00:29:49,000 --> 00:29:57,000

and compare the silenced round sound to the original gun sound and to the movie sound effect of the silencer.

435

00:30:02,000 --> 00:30:06,000

A bold silenced pistol. It's just as cool as you think it is.

436

00:30:06,000 --> 00:30:10,000

Now for the suppressor. Is the movie version anything like reality?

437

00:30:10,000 --> 00:30:11,000

Thank you.

438

00:30:11,000 --> 00:30:16,000

Do silences work as well in real life as they do on film?

439

00:30:19,000 --> 00:30:20,000

That's nice.

440

00:30:20,000 --> 00:30:24,000

That was pretty cool. That seemed a lot quieter than I thought it would.

441

00:30:24,000 --> 00:30:28,000

And Jamie's 9mm pistol is equally surprising.

442

00:30:31,000 --> 00:30:37,000

It's an impressive improvement, but for analysis, let's hear from our expert acoustician.

443

00:30:37,000 --> 00:30:41,000

First, decibels, a measure of the intensity of the sound pressure.

444

00:30:41,000 --> 00:30:48,000

So we go from 161 and then suppress, we get down to 128. That's a big change.

445

00:30:48,000 --> 00:30:52,000

That goes from dangerous to hearing to safe.

446

00:30:52,000 --> 00:30:58,000

But it's not just the power. The texture and time signature of the sound is also altered.

447

00:30:58,000 --> 00:30:59,000

Can we hear?

448

00:30:59,000 --> 00:31:01,000

Here's the one suppressed.

449

00:31:01,000 --> 00:31:04,000

Okay, now let's hear suppressed.

450

00:31:07,000 --> 00:31:08,000

Yeah, that tells the story.

451

00:31:08,000 --> 00:31:11,000

And it's a story worth hearing again.

452

00:31:13,000 --> 00:31:16,000

A story with a surprise ending.

453

00:31:16,000 --> 00:31:22,000

I swear, I went into this one thinking this would be completely busted. I'm kind of blown away.

454

00:31:22,000 --> 00:31:26,000

But what about the all-important movie version? How does that stack up?

455

00:31:26,000 --> 00:31:27,000

Can we hear the Hollywood sound?

456

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

Yeah, sure.

457

00:31:30,000 --> 00:31:32,000

Dude, that is far out.

458

00:31:32,000 --> 00:31:35,000

Far out indeed. But although it's not quite identical,

459

00:31:38,000 --> 00:31:43,000

the real-life suppressor does reduce the volume of the gunshot to Hollywood levels.

460

00:31:46,000 --> 00:31:49,000

And that's enough to impress Adam a lot.

461

00:31:49,000 --> 00:31:56,000

One of the most common questions we get is, are we surprised by the results that we come up with on the show?

462

00:31:56,000 --> 00:31:59,000

Today, monstrously surprised.

463

00:31:59,000 --> 00:32:08,000

I arrived at work this morning expecting that we would completely bust the myth that you could possibly suppress the sound of a bullet anywhere close to what the movies would lead you to believe.

464

00:32:08,000 --> 00:32:15,000

And I leave today being a convert to the idea this thing is totally plausible.

465

00:32:16,000 --> 00:32:23,000

The only reason I'm not calling it confirmed is because instead of a QQ sound like they do in the movies, I'm shooting my cameraman's knees out here,

466

00:32:23,000 --> 00:32:26,000

it's more like a pfft sound.

467

00:32:26,000 --> 00:32:31,000

But that is picking nits as far as I'm concerned. This is astonishing.

468

00:32:36,000 --> 00:32:40,000

Okay, so here's the plan. We've got our full-size fan boat and our full-size sail.

469

00:32:40,000 --> 00:32:46,000

We get out on the water and try it first in its regular configuration with the fan facing backwards.

470

00:32:46,000 --> 00:32:48,000

And we'll turn it on and hopefully go forward.

471

00:32:48,000 --> 00:32:56,000

Then we're going to flip the fan around, raise the sail, and see if you can actually blow your own sail.

472

00:32:56,000 --> 00:32:58,000

There she blows!

473

00:32:58,000 --> 00:33:04,000

So first up, with the fan pointing backwards, Carrie and Grant will do a straight line speed test.

474

00:33:04,000 --> 00:33:11,000

That way, when they get the sail up and face the fan forwards, they'll have a reference for their performance.

475

00:33:11,000 --> 00:33:14,000

How do you feel about calling this the Queen Airy?

476

00:33:15,000 --> 00:33:21,000

She may have a name, but the Queen Airy is not off to the best of starts.

477

00:33:21,000 --> 00:33:24,000

I think we're in a bit of a predicament here.

478

00:33:24,000 --> 00:33:28,000

The weight of the sail is making it very tricky to maneuver.

479

00:33:28,000 --> 00:33:31,000

You guys are going zero miles an hour!

480

00:33:32,000 --> 00:33:35,000

But despite Tori's encouragement,

481

00:33:35,000 --> 00:33:38,000

Looks like these islands are boat magnets.

482

00:33:38,000 --> 00:33:41,000

Grant and Carrie do finally get into position.

483

00:33:42,000 --> 00:33:45,000

First test up is the fan in the right configuration.

484

00:33:45,000 --> 00:33:49,000

The sail down, I'm going to get in the chase boat, have them drive towards me,

485

00:33:49,000 --> 00:33:52,000

and I'm going to check their speed with the radar gun.

486

00:33:52,000 --> 00:33:58,000

Alright, this is the first test, fan facing backwards, sail down, speed test.

487

00:33:58,000 --> 00:33:59,000

Here we go!

488

00:34:02,000 --> 00:34:06,000

Now, if you asked me when we were in the shop and we first turned on the swamp boat,

489

00:34:06,000 --> 00:34:10,000

and Grant took out the anemometer and got 60 miles an hour standing me on the fan,

490

00:34:10,000 --> 00:34:15,000

I would have said that blow your own sailboat was going to boom, blast across the water.

491

00:34:15,000 --> 00:34:20,000

But now that we've done a test with the mast on, even with the sail down,

492

00:34:20,000 --> 00:34:22,000

it really slowed down the boat.

493

00:34:22,000 --> 00:34:26,000

I think we're going to get some movement, but it's going to be slight.

494

00:34:26,000 --> 00:34:28,000

How fast were we?

495

00:34:28,000 --> 00:34:30,000

20 miles an hour!

496

00:34:30,000 --> 00:34:32,000

That was a good test.

497

00:34:32,000 --> 00:34:36,000

Let's flip the fan around and put the sail up and see how fast we go when we blow our own sail.

498

00:34:41,000 --> 00:34:46,000

Music

499

00:34:46,000 --> 00:34:54,000

Carrie Grant and Tori are preparing to flip the fan and raise the sail for a physics-defined finale.

500

00:34:54,000 --> 00:34:59,000

They're about to find out, with a real boat on real water,

501

00:34:59,000 --> 00:35:02,000

if it's possible to really blow your own sail.

502

00:35:02,000 --> 00:35:04,000

But plain sailing, it's not.

503

00:35:04,000 --> 00:35:08,000

I feel like there might be just a little element of danger here.

504

00:35:08,000 --> 00:35:10,000

I hope that holds.

505

00:35:10,000 --> 00:35:14,000

I mean, the swamp boat is not meant to have the fan backwards,

506

00:35:14,000 --> 00:35:18,000

and it's definitely not meant to have this giant lumbering sail on it.

507

00:35:18,000 --> 00:35:19,000

How's your line of sight?

508

00:35:19,000 --> 00:35:23,000

I think we might actually have a little danger of tipping.

509

00:35:23,000 --> 00:35:26,000

I just really don't want to get wet today.

510

00:35:26,000 --> 00:35:28,000

Raise the main sail!

511

00:35:28,000 --> 00:35:30,000

Flip the jib-jab!

512

00:35:30,000 --> 00:35:33,000

I'm trimming as fast as I can!

513

00:35:33,000 --> 00:35:37,000

Now, in order for this myth to be confirmed, what we're looking for is forward movement.

514

00:35:37,000 --> 00:35:40,000

Due to the fan blowing into the sail.

515

00:35:40,000 --> 00:35:43,000

Not drifting, not just poking along.

516

00:35:43,000 --> 00:35:47,000

We're actually talking about directed forward movement.

517

00:35:47,000 --> 00:35:48,000

Forget that?

518

00:35:48,000 --> 00:35:50,000

I'm looking at confirmed.

519

00:35:50,000 --> 00:35:52,000

Okay, I think that looks parallel.

520

00:35:52,000 --> 00:35:57,000

So what we're also interested in is the comparison of the speed of the fan blowing into the sail

521

00:35:57,000 --> 00:36:01,000

versus the fan pointed backwards.

522

00:36:01,000 --> 00:36:02,000

Alright, you guys ready?

523

00:36:02,000 --> 00:36:04,000

Will we get improvement?

524

00:36:04,000 --> 00:36:06,000

Probably not.

525

00:36:06,000 --> 00:36:09,000

The target that we're looking at is 20 miles an hour.

526

00:36:09,000 --> 00:36:16,000

If we get even a quarter of that five miles an hour, I would be very, very impressed.

527

00:36:16,000 --> 00:36:23,000

Or, at its very real possibility, the shallow bottom boat with its top heavy sail goes bottom up.

528

00:36:23,000 --> 00:36:25,000

Okay, we're in!

529

00:36:25,000 --> 00:36:28,000

We have no idea what can go wrong.

530

00:36:28,000 --> 00:36:32,000

I mean, the mask could blow off, the boat could flip over.

531

00:36:32,000 --> 00:36:35,000

They might get sucked into the fan and chopped up into little pieces.

532

00:36:35,000 --> 00:36:38,000

Hey, good sailing. Good luck.

533

00:36:38,000 --> 00:36:40,000

What was that about being sucked into the fan?

534

00:36:40,000 --> 00:36:43,000

Chopped into little pieces.

535

00:36:43,000 --> 00:36:49,000

There off, Tori and the support vehicle tows them out to open water.

536

00:36:49,000 --> 00:36:57,000

With plenty of space, no major winds or currents, it's the perfect location for a spot of scientific sailing.

537

00:36:57,000 --> 00:36:58,000

Alright, you ready to do this?

538

00:36:58,000 --> 00:36:59,000

Ready.

539

00:36:59,000 --> 00:37:01,000

Okay, here we go.

540

00:37:01,000 --> 00:37:05,000

This is blow your own sail with the full-size boat.

541

00:37:05,000 --> 00:37:07,000

Go, Rolo!

542

00:37:12,000 --> 00:37:17,000

I gotta tell you, the funniest part about this whole experiment is when we first turned on that fan,

543

00:37:17,000 --> 00:37:22,000

and the boat just started to spin and dip down in one direction.

544

00:37:22,000 --> 00:37:24,000

Grant and I both were super wide-eyed.

545

00:37:24,000 --> 00:37:26,000

Just me thought we were going over.

546

00:37:26,000 --> 00:37:29,000

They're wildly out of control.

547

00:37:29,000 --> 00:37:34,000

There's no forward movement, just a whole lot of spinning and crashing.

548

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

Very crazy, just there.

549

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

So when we first started, and I gunned it, we started turning in a circle, and I was like, this is it.

550

00:37:43,000 --> 00:37:46,000

That's it. We're going in the water.

551

00:37:46,000 --> 00:37:51,000

But, I turned it down and we tried it again, and actually what I found was...

552

00:37:51,000 --> 00:37:53,000

Yeah! It's going in the water!

553

00:37:53,000 --> 00:38:00,000

You keep vectoring the fan. If you keep that thrust at sail, you can actually get it to go forward.

554

00:38:04,000 --> 00:38:07,000

Ha-ha! There she goes!

555

00:38:07,000 --> 00:38:10,000

Look at it! They're going forward!

556

00:38:10,000 --> 00:38:13,000

We blew our own sail! It's working!

557

00:38:13,000 --> 00:38:20,000

By ramping it up myth-buster style, the team has seemingly contradicted Newtonian physics.

558

00:38:20,000 --> 00:38:24,000

It's working. They're blowing their own sail.

559

00:38:24,000 --> 00:38:27,000

Now, this was nuts.

560

00:38:27,000 --> 00:38:30,000

We only got three miles an hour, but we actually got movement.

561

00:38:30,000 --> 00:38:36,000

We got forward movement, and we were able to steer by pointing the wind into different parts of the sail.

562

00:38:36,000 --> 00:38:39,000

I have to say, this is a successful day.

563

00:38:41,000 --> 00:38:44,000

Three miles an hour!

564

00:38:45,000 --> 00:38:53,000

No doubt they'd go a lot faster with the fan facing backwards and no sail, but that's not the point.

565

00:38:53,000 --> 00:38:59,000

The myth asks, can you power a sailboat with your own fan? And you can.

566

00:38:59,000 --> 00:39:06,000

I don't know exactly what's going on, because apparently we're flying in the face of Newton's loss, but here's what I think is happening.

567

00:39:06,000 --> 00:39:09,000

We have a significant amount of thrust coming out of this fan.

568

00:39:09,000 --> 00:39:13,000

It's hitting the sail. The sail can only push so much.

569

00:39:13,000 --> 00:39:19,000

The rest of that thrust gets reflected back, giving us a net thrust pushing us in the forward direction.

570

00:39:19,000 --> 00:39:27,000

And forward in both directions, because to prove that real wind wasn't a factor, Grant and Carrie sail both ways.

571

00:39:27,000 --> 00:39:31,000

Dude, that was awesome!

572

00:39:31,000 --> 00:39:33,000

I cannot believe it. We blew our own sail.

573

00:39:33,000 --> 00:39:35,000

This one is totally confirmed.

574

00:39:35,000 --> 00:39:41,000

Totally confirmed. I mean, this thing went forward with the wind from our own fan.

575

00:39:41,000 --> 00:39:43,000

Confirmed!

576

00:39:48,000 --> 00:39:54,000

You may remember in the opening sequence, Adam and Jamie set off a Hollywood-style explosive fireball.

577

00:39:54,000 --> 00:39:56,000

Bye-bye!

578

00:39:57,000 --> 00:40:02,000

But despite having plenty, the guys didn't blow up the car just for fun.

579

00:40:06,000 --> 00:40:15,000

It was part of the test to find out whether the ubiquitous explosive sound effect you hear in the movies is anything like the real thing.

580

00:40:15,000 --> 00:40:21,000

So first up, let's show you the ingredients of a typical silver screen big bang.

581

00:40:21,000 --> 00:40:25,000

Two gallons of gasoline, ringed in some debt cord and stuck in the front seat.

582

00:40:25,000 --> 00:40:30,000

That's how Hollywood makes its spectacular fireball explosions.

583

00:40:30,000 --> 00:40:32,000

But what do they really sound like?

584

00:40:32,000 --> 00:40:34,000

Bye-bye!

585

00:40:36,000 --> 00:40:38,000

It's quite a difference, huh?

586

00:40:41,000 --> 00:40:46,000

Much like the punch, the movie version has a lot more texture and depth.

587

00:40:47,000 --> 00:40:51,000

Quite simply, it's more dramatic than the real thing.

588

00:40:53,000 --> 00:40:55,000

How did the waveforms compare?

589

00:40:55,000 --> 00:41:00,000

They're clearly very different. The gas explosion we just did had a very sudden onset,

590

00:41:00,000 --> 00:41:05,000

and the energy is concentrated in a very narrow range of low frequencies.

591

00:41:07,000 --> 00:41:13,000

Whereas the classic movie explosion has a much slower onset,

592

00:41:13,000 --> 00:41:17,000

and the energy is over a much wider range of frequencies,

593

00:41:17,000 --> 00:41:21,000

and it lasts for a much, much longer time. It's a very different sound.

594

00:41:22,000 --> 00:41:24,000

Which sounds like a busted myth.

595

00:41:24,000 --> 00:41:29,000

But the guys aren't done yet. They're not getting bogged down with just one big boom.

596

00:41:30,000 --> 00:41:34,000

If the sound of a gasoline-fueled fireball doesn't match the movies,

597

00:41:34,000 --> 00:41:37,000

maybe a real high-explosive will.

598

00:41:38,000 --> 00:41:41,000

Queer old friend, C4.

599

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

Now we're going to blow this car up for realsies and check out how that sounds.

600

00:41:46,000 --> 00:41:48,000

Alright, here we go.

601

00:41:48,000 --> 00:41:53,000

2.2 pounds of C4 in 3, 2, 1.

602

00:41:53,000 --> 00:41:58,000

Ah! Oh! Oh! Oh!

603

00:41:58,000 --> 00:42:01,000

Kaboom!

604

00:42:03,000 --> 00:42:06,000

That was a good solid thud.

605

00:42:06,000 --> 00:42:09,000

Kind of makes you feel all warm and fuzzy inside, don't it?

606

00:42:09,000 --> 00:42:11,000

It does.

607

00:42:12,000 --> 00:42:14,000

A good solid thud.

608

00:42:14,000 --> 00:42:19,000

But once again, it's clearly a completely different sound to the sound effect.

609

00:42:20,000 --> 00:42:25,000

I'm looking at the top, the movie explosion, and I'm seeing this big, wide bandwidth of sound.

610

00:42:25,000 --> 00:42:28,000

And I see the C4, and I see nothing like that.

611

00:42:28,000 --> 00:42:31,000

I see one sharp impulse, a little bit of surrounding noise,

612

00:42:31,000 --> 00:42:35,000

but nowhere near the depth and the range of the movie explosion.

613

00:42:35,000 --> 00:42:38,000

I'm going to go out of the limp and say, I think that one's busted.

614

00:42:38,000 --> 00:42:44,000

Yep, the contrast between the real explosions and the film sound effect is as clear as a bell.

615

00:42:44,000 --> 00:42:49,000

And that leaves this final movie myth about as busted as the car.

616

00:42:49,000 --> 00:42:52,000

Let's get out of here before our shoes get all dirty.