

1

00:00:00,000 --> 00:00:04,520

Hey, don't try what you're about to see at home.

2

00:00:04,520 --> 00:00:06,320

We're what you call experts.

3

00:00:06,320 --> 00:00:07,320

That's right.

4

00:00:07,320 --> 00:00:10,520

We do this for a living.

5

00:00:10,520 --> 00:00:14,560

On this episode of Mythbusters, we're taking you out to the ball game.

6

00:00:14,560 --> 00:00:18,120

I wanna see you take a full swing and that beanie still stay on your head.

7

00:00:18,120 --> 00:00:23,600

Legendary pitcher Roger Clemens joins the Mythbusters All-Stars for a baseball special.

8

00:00:23,600 --> 00:00:25,440

Fastball's like watching a dart go, man.

9

00:00:25,440 --> 00:00:26,440

It's beautiful.

10

00:00:26,440 --> 00:00:29,280

And we reveal the physics of a ball in flight.

11

00:00:29,280 --> 00:00:31,640

That is sweet.

12

00:00:31,640 --> 00:00:38,800

We're going to touch base with four big myths and answer once and for all some of baseball's

13

00:00:38,800 --> 00:00:40,120

burning questions.

14

00:00:40,120 --> 00:00:44,640

Step up to the plate with Adam and Jamie.

15

00:00:44,640 --> 00:00:45,640

That is a bat.

16

00:00:45,640 --> 00:00:46,640

That's not a broomstick.

17

00:00:46,640 --> 00:00:50,640

And find out, does parking your bat give you more clout?

18

00:00:50,640 --> 00:00:52,680

That's the head.

19

00:00:52,680 --> 00:00:57,360

And can you hit a ball so hard that the hide comes clean off?

20

00:00:57,360 --> 00:00:58,360

Wow.

21

00:00:58,480 --> 00:01:04,080

Meanwhile, Carrie, Tori and Grant discover if a humid ball is harder to hit.

22

00:01:04,080 --> 00:01:05,080

Nice.

23

00:01:05,080 --> 00:01:06,080

Woo!

24

00:01:06,080 --> 00:01:09,080

And does sliding into base actually slow you down?

25

00:01:09,080 --> 00:01:13,960

Wow, that looks like a herd.

26

00:01:13,960 --> 00:01:16,640

Who are the Mythbusters?

27

00:01:16,640 --> 00:01:17,640

Adam Savage.

28

00:01:17,640 --> 00:01:19,440

Is everybody ready for time?

29

00:01:19,440 --> 00:01:20,440

And Jamie Heidemann.

30

00:01:20,440 --> 00:01:22,840

Yes, me all worked up just looking at it.

31

00:01:22,840 --> 00:01:24,120

That was beautiful.

32

00:01:24,120 --> 00:01:27,480

Joining them more than 30 years of special effects experience.

33

00:01:27,480 --> 00:01:29,800

That was heavy.

34

00:01:29,800 --> 00:01:30,800

Joining them, Grant Imahara.

35

00:01:30,800 --> 00:01:33,640

Jamie makes it look so easy when he does it.

36

00:01:33,640 --> 00:01:34,640

Tori Bellachy.

37

00:01:34,640 --> 00:01:36,600

Somebody ordered some exploding pants.

38

00:01:36,600 --> 00:01:37,600

And Carrie Byron.

39

00:01:37,600 --> 00:01:38,600

High explosives and electricity.

40

00:01:38,600 --> 00:01:39,600

Woo!

41

00:01:39,600 --> 00:01:41,600

They don't just tell the myths.

42

00:01:41,600 --> 00:01:51,960

They put them to the test.

43

00:01:51,960 --> 00:01:55,880

Everything says America quite like baseball.

44

00:01:55,880 --> 00:01:59,880

Baseball is one of the great common denominators of American life.

45

00:01:59,880 --> 00:02:04,400

When game time rolls round, there are no social barriers.

46

00:02:04,400 --> 00:02:06,160

Hot dogs and home runs.

47

00:02:06,160 --> 00:02:08,320

Base sliding and big hits.

48

00:02:08,320 --> 00:02:13,200

For decades, it's been the country's national pastime.

49

00:02:13,200 --> 00:02:18,160

And so you guys figured it would be the perfect arena for the Mythbusters to take a swing

50

00:02:18,160 --> 00:02:24,640

and a myth.

51

00:02:24,640 --> 00:02:25,640

You guys like baseball?

52

00:02:25,640 --> 00:02:26,640

Are you kidding?

53

00:02:26,640 --> 00:02:28,160

I love going to the ball game.

54

00:02:28,160 --> 00:02:29,400

Well so do our fans.

55

00:02:29,400 --> 00:02:33,520

And they have inundated us with baseball myths to bust.

56

00:02:33,520 --> 00:02:34,720

So what do we got?

57

00:02:34,720 --> 00:02:36,560

Can a cork bat hit a ball further?

58

00:02:36,560 --> 00:02:39,320

What about whether sliding into base is quicker than running?

59

00:02:39,320 --> 00:02:42,480

How about the one does a dry ball go farther than a humid ball?

60

00:02:42,480 --> 00:02:43,480

Exactly.

61

00:02:43,480 --> 00:02:47,640

And can you hit a baseball so hard, you knock the hide right off.

62

00:02:47,640 --> 00:02:48,800

Me.

63

00:02:48,800 --> 00:02:52,480

And we have got a real baseball legend to help us out.

64

00:02:52,480 --> 00:02:53,480

Who?

65

00:02:53,480 --> 00:02:55,960

None other than the Roger Clemens.

66

00:02:55,960 --> 00:02:57,160

Roger Clemens?

67

00:02:57,160 --> 00:02:58,600

How did we get him?

68

00:02:58,600 --> 00:03:01,120

Turns out the Rockets fan of the show.

69

00:03:01,120 --> 00:03:05,120

Let's play ball.

70

00:03:05,120 --> 00:03:06,120

That's right.

71

00:03:06,120 --> 00:03:12,960

It's the Mythbusters and the Mythbusters.

72

00:03:12,960 --> 00:03:15,880

He's one of the all time baseball greats.

73

00:03:15,880 --> 00:03:19,040

Richard Roger Clemens.

74

00:03:19,040 --> 00:03:25,280

In a career spanning more than 20 years, the man they call the Rocket has won a World Series

75

00:03:25,280 --> 00:03:30,840

and taken out the prestigious Cy Young Award an amazing seven times.

76

00:03:30,840 --> 00:03:40,040

He also happens to be a big fan of Mythbusters and Jamie's stammering with excitement.

77

00:03:40,040 --> 00:03:45,800

I'm speechless to have the Roger Clemens here helping us deal with these baseball issues

78

00:03:45,800 --> 00:03:51,920

Later in the show we'll study the mojo of the throw and answer once and for all the age

79

00:03:51,920 --> 00:03:57,920

old question can a baseball really slide and curve or is it just an optical illusion?

80

00:03:57,920 --> 00:04:01,920

I'm going to try and give it my best out here so you can tell what this baseball actually

81

00:04:01,920 --> 00:04:08,080

does with these high speed cameras.

82

00:04:08,080 --> 00:04:09,840

We'll return to Roger later.

83

00:04:09,840 --> 00:04:17,040

In the meantime, our first baseball myths are real Corker.

84

00:04:17,040 --> 00:04:21,280

Man how great is it to have Roger Clemens helping us do baseball myths?

85

00:04:21,280 --> 00:04:23,280

Yep, can't wait to see him do his stuff.

86

00:04:23,280 --> 00:04:28,800

Well our first myth is a total classic, the Corked Bat.

87

00:04:28,800 --> 00:04:30,040

What's a Corked Bat about?

88

00:04:30,040 --> 00:04:31,040

Here's the idea.

89

00:04:31,040 --> 00:04:34,040

You drill a hole in the end of a normal regulation Major League Baseball bat, you put some Cork

90

00:04:34,040 --> 00:04:38,400

in there, you plug it back in with wood and that bat is all of a sudden able to hit balls

91

00:04:38,400 --> 00:04:39,400

a lot farther.

92

00:04:39,440 --> 00:04:41,040

Is that legal in baseball?

93

00:04:41,040 --> 00:04:45,360

It's ever so slightly totally illegal.

94

00:04:45,360 --> 00:04:46,360

You bet it's illegal.

95

00:04:46,360 --> 00:04:52,840

In 2003 the baseball world was wrought when star slugger Sammy Sosa's bat split during

96

00:04:52,840 --> 00:04:57,080

a game exposing a Cork core.

97

00:04:57,080 --> 00:05:02,360

He claimed it was a practice bat he picked up by mistake but Sosa was immediately ejected

98

00:05:02,360 --> 00:05:07,040

from the game and suspended for seven matches.

99

00:05:07,040 --> 00:05:10,000

What do you think our general plan is?

100

00:05:10,000 --> 00:05:13,680

Well we get a bunch of bats, figure out how to Cork some of them and see which one will

101

00:05:13,680 --> 00:05:15,200

hit a ball further.

102

00:05:15,200 --> 00:05:18,320

I think we should remove the human element from this as much as we can.

103

00:05:18,320 --> 00:05:23,400

Let's make a machine that swings the bat the exact same speed every time.

104

00:05:23,400 --> 00:05:27,080

Yeah and while we're at it we need to do the same sort of thing with a ball only we can

105

00:05:27,080 --> 00:05:29,800

use a cannon instead of the swinging machine.

106

00:05:29,800 --> 00:05:31,560

You know what?

107

00:05:31,560 --> 00:05:37,000

I'm thinking that we've already built everything we need to test this myth for previous episodes.

108

00:05:37,000 --> 00:05:38,440

We don't need to go out anywhere.

109

00:05:38,440 --> 00:05:39,960

It's all right here in the shop.

110

00:05:39,960 --> 00:05:43,960

Yeah a few modifications maybe but they'll work.

111

00:05:43,960 --> 00:05:44,960

Excellent.

112

00:05:44,960 --> 00:05:48,080

Ladies and gentlemen it's a myth busters first.

113

00:05:48,080 --> 00:05:52,240

No blueprint diagrams, no time consuming bills.

114

00:05:52,240 --> 00:05:56,040

This baseball myth will be totally off the shelf.

115

00:05:56,040 --> 00:05:58,800

Kerry Gretton Torrey built a sword swinging rig when they were doing sword cutting a sword

116

00:05:58,800 --> 00:06:05,240

that's perfect for swimming in a baseball bat.

117

00:06:05,240 --> 00:06:08,960

In 2002 Jamie and I already built an air powered cannon.

118

00:06:08,960 --> 00:06:12,080

That is so wrong.

119

00:06:12,080 --> 00:06:17,360

Which is perfect for throwing baseballs at speeds well up to the supersonic range I think.

120

00:06:17,360 --> 00:06:23,080

Now a Roger Clemens fastball fizzles towards the batter at between 90 and 100 miles per

121

00:06:23,080 --> 00:06:24,080

hour.

122

00:06:24,080 --> 00:06:25,640

There we go.

123

00:06:25,640 --> 00:06:31,760

But Adam and Jamie will go for a more average fastball speed about 80 miles an hour.

124

00:06:31,760 --> 00:06:33,880

Let's just quickly try 7 psi.

125

00:06:33,880 --> 00:06:38,800

The air pressure required to do that is around 7.5 pounds per square inch.

126

00:06:38,800 --> 00:06:40,960

At 7.5 psi.

127

00:06:40,960 --> 00:06:44,480

Here we go.

128

00:06:44,480 --> 00:06:46,360

79 miles per hour.

129

00:06:46,360 --> 00:06:48,360

Close enough.

130

00:06:48,360 --> 00:06:52,400

Next gotta get the batting rig into the swing of things.

131

00:06:52,400 --> 00:06:56,520

I'm going to swing this bat on high speed camera and we're going to measure how fast

132

00:06:56,520 --> 00:07:02,840

it is and calibrate this machine so it swings about just as fast.

133

00:07:02,840 --> 00:07:06,200

Adam's clean swing clocks 62 miles per hour.

134

00:07:06,200 --> 00:07:11,560

That equates to air pressure of 70 psi.

135

00:07:11,560 --> 00:07:14,560

All they have to do now is cork some bats.

136

00:07:14,560 --> 00:07:19,080

But baseball authorities don't want us to show exactly how that's done.

137

00:07:19,080 --> 00:07:24,800

And as Adam tampers with the timber he's wondering if this whole quirky cork caper isn't a case

138

00:07:24,800 --> 00:07:30,000

of mind over matter.

139

00:07:30,000 --> 00:07:33,920

Since 1970, 6 major league hitters have been caught using a cork bat.

140

00:07:33,920 --> 00:07:36,240

It kind of makes you wonder if there's something to it.

141

00:07:36,240 --> 00:07:40,080

Well the act of corking a bat does remove some weight.

142

00:07:40,080 --> 00:07:44,320

But if you want to swing with a lighter bat there's nothing in the regulations that prevent

143

00:07:44,320 --> 00:07:46,920

you from just going and getting a lighter bat.

144

00:07:46,920 --> 00:07:48,080

Then why do it?

145

00:07:48,080 --> 00:07:52,840

Well to a major league hitter the psychological advantage may be huge.

146

00:07:52,840 --> 00:07:58,400

If you believe your bat has special power you may be more likely to get that hit.

147

00:07:58,400 --> 00:08:02,080

That could be the difference between being struck out or making a home run.

148

00:08:02,080 --> 00:08:03,080

Exactly.

149

00:08:03,080 --> 00:08:06,040

Testing baseball myths with cannons and robots.

150

00:08:06,040 --> 00:08:09,320

Isn't that so myth busters?

151

00:08:09,320 --> 00:08:12,160

Something's going to go someplace where it shouldn't.

152

00:08:12,160 --> 00:08:19,400

We're going to have mayhem and destruction one way or another.

153

00:08:19,400 --> 00:08:26,760

What the heck it's all in the name of science.

154

00:08:26,760 --> 00:08:31,560

The next hitter in this baseball special, the rocket launches.

155

00:08:31,560 --> 00:08:34,400

You know it's good when the catcher doesn't catch you.

156

00:08:34,400 --> 00:08:39,840

And next, when robots rebel.

157

00:08:39,840 --> 00:08:44,120

Tori, Kari and Grant get the drop on a controversial baseball myth.

158

00:08:44,120 --> 00:08:46,120

Wow, good bouncing.

159

00:08:46,120 --> 00:08:54,960

It's the myth busters baseball special and the next myth's hot off the fan site.

160

00:08:54,960 --> 00:08:56,640

I've got a really cool baseball myth.

161

00:08:56,640 --> 00:08:58,160

This one is all over the internet.

162

00:08:58,160 --> 00:08:59,160

Alright, let's hear it.

163

00:08:59,160 --> 00:09:02,800

Well the idea is if you keep your baseballs in a humidor like the thing that you keep

164

00:09:02,800 --> 00:09:07,720

your cigars fresh with that it makes it really hard to hit a home run with.

165

00:09:07,720 --> 00:09:13,360

Yeah, I saw this one on our website and according to the fans at one stadium in particular once

166

00:09:13,360 --> 00:09:19,040

they started keeping their balls in a humidor the number of home runs went down dramatically.

167

00:09:19,040 --> 00:09:24,080

For years the Colorado Rockies home ground in Denver had the highest home run rate in

168

00:09:24,080 --> 00:09:30,080

the majors but since they started storing baseballs in a humidor the run rate has dried

169

00:09:30,080 --> 00:09:31,080

up.

170

00:09:31,080 --> 00:09:32,080

Is there a link?

171

00:09:32,080 --> 00:09:35,280

Well to test this myth I think first off we're going to need to build a humidifier and stick

172

00:09:35,280 --> 00:09:36,280

some baseballs in it.

173

00:09:36,280 --> 00:09:39,840

You know what we should also do is dry out a set of baseballs so that we have something

174

00:09:39,840 --> 00:09:41,040

to compare to.

175

00:09:41,040 --> 00:09:45,040

So before we go to the park and start hitting balls around I think what we should do is

176

00:09:45,040 --> 00:09:47,720

set up a small scale experiment in our shop.

177

00:09:47,720 --> 00:09:52,000

We'll drop both the dry balls and the humidor balls from the same height and see which bounces

178

00:09:52,000 --> 00:09:53,000

higher.

179

00:09:53,920 --> 00:09:57,960

Out in the car park the guys set up to get the drop on this baseball myth.

180

00:09:57,960 --> 00:10:04,560

You're going to be dropping from a height of 125 inches so it's like 10 and a half feet.

181

00:10:04,560 --> 00:10:06,240

They'll drop 10 balls.

182

00:10:06,240 --> 00:10:11,040

The first five have spent two weeks locked in an old fridge with a dehumidifier which

183

00:10:11,040 --> 00:10:13,560

cut humidity to just 10 percent.

184

00:10:19,560 --> 00:10:21,160

That's some good bouncing.

185

00:10:21,160 --> 00:10:23,520

These are all about 110 centimeters.

186

00:10:23,520 --> 00:10:25,520

Ball five.

187

00:10:25,520 --> 00:10:26,520

Thank you.

188

00:10:26,520 --> 00:10:27,520

Ball five.

189

00:10:27,520 --> 00:10:29,520

Not in baseball there's no ball five.

190

00:10:29,520 --> 00:10:32,520

But on myth busters.

191

00:10:32,520 --> 00:10:34,520

Wow.

192

00:10:34,520 --> 00:10:42,080

The high speed camera shows the dry balls bounced an average height of 106 centimeters.

193

00:10:42,080 --> 00:10:43,080

That's pretty consistent.

194

00:10:43,080 --> 00:10:44,080

Great.

195

00:10:44,080 --> 00:10:46,160

Let's move on to the humid balls.

196

00:10:46,160 --> 00:10:50,440

The other five balls spent the same time in a makeshift humidior.

197

00:10:50,440 --> 00:10:56,040

Carrie put a block of waterlog foam in a perforated plastic container and then put that and the

198

00:10:56,040 --> 00:10:57,800

balls in a cooler.

199

00:10:57,800 --> 00:11:01,920

As the water evaporated vapor escaped through the holes.

200

00:11:01,920 --> 00:11:03,420

Seal this up.

201

00:11:03,420 --> 00:11:08,320

Raising the humidity inside the cooler to a damp 90 percent.

202

00:11:08,320 --> 00:11:09,320

Humid ball number one.

203

00:11:09,320 --> 00:11:10,320

Feel that.

204

00:11:10,320 --> 00:11:12,120

Just from touching it you can tell that it's softer.

205

00:11:12,120 --> 00:11:16,480

Can this match scale the same dizzy heights as the dry balls?

206

00:11:16,480 --> 00:11:18,480

Wow.

207

00:11:18,520 --> 00:11:23,640

All right.

208

00:11:23,640 --> 00:11:28,440

After soaking up the atmosphere in Carrie's cooler it seems the humid balls just can't

209

00:11:28,440 --> 00:11:30,120

bounce back.

210

00:11:30,120 --> 00:11:36,120

The average height of a humid ball bounce is 91 centimeters as opposed to 106 centimeters

211

00:11:36,120 --> 00:11:37,800

for the dry balls.

212

00:11:37,800 --> 00:11:39,960

That's a difference of 14 percent.

213

00:11:39,960 --> 00:11:47,880

Now in your typical baseball scenario with an outfield of say 425 feet 14 percent is

214

00:11:47,880 --> 00:11:52,760

almost 60 feet which is a difference between an out or a home run.

215

00:11:52,760 --> 00:11:54,260

That is really amazing.

216

00:11:54,260 --> 00:11:56,560

I think it definitely warrants for their investigation.

217

00:11:56,560 --> 00:11:59,860

Yeah I say we get out to the baseball field and start hitting these balls and see which

218

00:11:59,860 --> 00:12:00,860

ones go farther.

219

00:12:00,860 --> 00:12:05,080

Well I just don't think we'll be able to both pitch and hit consistently every time.

220

00:12:05,080 --> 00:12:08,280

And what we really need to do is isolate the variable of humidity.

221

00:12:08,280 --> 00:12:10,000

You know what I'd also like to do?

222

00:12:10,000 --> 00:12:12,720

I'd like to introduce a control into this experiment.

223

00:12:12,720 --> 00:12:15,680

You know a mid-range humidity that we can test against the two extremes.

224

00:12:15,680 --> 00:12:16,680

All right.

225

00:12:16,680 --> 00:12:17,680

Sounds good.

226

00:12:17,680 --> 00:12:23,680

Now Adam and Jamie have already got the batting machine and the pitching cannon tied up trying

227

00:12:23,680 --> 00:12:29,120

to crack the case of the court bat.

228

00:12:29,120 --> 00:12:34,600

So Grant's gone the one better and designed a robot that bats and pitches.

229

00:12:34,600 --> 00:12:35,600

Here's the deal.

230

00:12:35,600 --> 00:12:39,920

The robot will have two arms one holding a bat one holding a ball.

231

00:12:39,920 --> 00:12:45,440

A motor turns the arms, bat connects with ball, ball goes flying to the fence.

232

00:12:45,440 --> 00:12:51,080

It's going to be geared for raw power.

233

00:12:51,080 --> 00:12:52,080

Is this our gear?

234

00:12:52,080 --> 00:12:53,080

Yeah that's it.

235

00:12:53,080 --> 00:13:01,760

It looks like a saw blade.

236

00:13:01,760 --> 00:13:03,720

The robot batters wired up.

237

00:13:03,720 --> 00:13:06,160

Grant gives it the juice.

238

00:13:06,160 --> 00:13:16,560

Three, two, one.

239

00:13:16,560 --> 00:13:19,200

The ball jolted free before contact.

240

00:13:19,200 --> 00:13:23,680

The bat smashed into the springs really hitting a groove.

241

00:13:23,680 --> 00:13:27,120

So we're going to ditch the springs and go with some foam.

242

00:13:27,120 --> 00:13:29,440

Some kind of rigid blue foam.

243

00:13:29,440 --> 00:13:33,680

When the bat comes through it'll hit the ball and break the foam not breaking the bat.

244

00:13:33,680 --> 00:13:35,800

Hopefully this will work.

245

00:13:35,800 --> 00:13:40,440

And three, two, one.

246

00:13:40,440 --> 00:13:42,440

Hey!

247

00:13:42,440 --> 00:13:43,800

Good job!

248

00:13:43,800 --> 00:13:47,080

The bat is still intact.

249

00:13:47,080 --> 00:13:55,360

Looks like the mad batter is ready to be taken out to the ballpark.

250

00:13:55,360 --> 00:13:56,360

Stay tuned.

251

00:13:56,360 --> 00:13:59,120

Soon Roger Clemens will be letting fly.

252

00:13:59,120 --> 00:14:02,280

I might reach 90 miles an hour today for y'all.

253

00:14:02,280 --> 00:14:10,720

And after the break, more manic mechanized mayhem as the court bat myth hits home.

254

00:14:10,720 --> 00:14:12,720

That's the hit!

255

00:14:12,720 --> 00:14:19,600

On the Mythwesterz baseball special, Carrie, Tori and Grant have been bouncing around the

256

00:14:19,600 --> 00:14:24,920

myth that a humid baseball is harder to hit out of the park.

257

00:14:24,920 --> 00:14:28,920

Tori, Carrie and Grant are off to get some ballpark figures.

258

00:14:29,920 --> 00:14:37,920

Here we are in beautiful San Jose and look at the crowd!

259

00:14:37,920 --> 00:14:43,160

Ladies and gentlemen, get ready because you are about to witness dry balls versus humid

260

00:14:43,160 --> 00:14:44,160

balls.

261

00:14:44,160 --> 00:14:45,160

This is how we're going to do it.

262

00:14:45,160 --> 00:14:50,760

We're going to use our robot batting machine and we are going to hit 30 dry balls and 30

263

00:14:50,760 --> 00:14:51,760

humid balls.

264

00:14:51,760 --> 00:14:57,760

And whichever goes farther, takes it all home.

265

00:14:57,760 --> 00:15:02,520

This would all the way in the big league, but in this case, an aluminum bat might better

266

00:15:02,520 --> 00:15:04,920

cope with the riggers of the rig.

267

00:15:04,920 --> 00:15:07,800

We've got three sets of balls.

268

00:15:07,800 --> 00:15:13,880

Humid balls at 90%, dry balls at 10%, finally a control group at about 50%.

269

00:15:13,880 --> 00:15:16,720

Our baseball hitting robot is situated right on home plate.

270

00:15:16,720 --> 00:15:19,120

It's going to hit balls into the outfield.

271

00:15:19,120 --> 00:15:23,400

Tori and Carrie will be out there with different colored flags, one for each type of ball.

272

00:15:23,400 --> 00:15:28,400

They'll mark the point where the ball first hits the ground.

273

00:15:28,400 --> 00:15:33,520

Now the robot worked okay in the show, but you guys know only too well how things go

274

00:15:33,520 --> 00:15:35,240

on this show.

275

00:15:35,240 --> 00:15:39,840

It's a brand new, intricate rig with high speed moving parts.

276

00:15:39,840 --> 00:15:43,800

Seriously, what are the chances of it working first time?

277

00:15:43,800 --> 00:15:49,040

Okay, first we have the control at 50% humidity with the aluminum bat.

278

00:15:49,040 --> 00:15:51,040

Three, two, one.

279

00:15:51,040 --> 00:15:53,040

Nice!

280

00:15:53,040 --> 00:16:01,320

Well, I'll be.

281

00:16:01,320 --> 00:16:08,120

Far from striking out, the mad batters striking those balls as clean as Babe Ruth himself.

282

00:16:08,120 --> 00:16:10,720

One small step for man.

283

00:16:10,720 --> 00:16:15,200

One giant leap for mankind.

284

00:16:15,200 --> 00:16:21,400

I'm really happy with the rig.

285

00:16:21,400 --> 00:16:22,400

So shoot.

286

00:16:22,400 --> 00:16:32,320

The guys mix it up, sending a barrage of dry, normal and humid balls soaring into the sky.

287

00:16:32,320 --> 00:16:33,320

Nice!

288

00:16:33,320 --> 00:16:35,640

This is where all the magic happens.

289

00:16:35,640 --> 00:16:36,640

This is the data.

290

00:16:36,640 --> 00:16:44,640

This is what the experiment is all about.

291

00:16:44,760 --> 00:16:49,120

No wind to affect the flight of the ball, test conditions are perfect.

292

00:16:49,120 --> 00:16:52,640

And already, Grant can see a pattern developing.

293

00:16:52,640 --> 00:16:59,680

Yellow flags, which are the most humid balls, are closer to home plate.

294

00:16:59,680 --> 00:17:03,280

The control balls, which are pink, are a little bit further out.

295

00:17:03,280 --> 00:17:08,400

And out here in the outfield, the dry balls, which are the red flags, are the furthest

296

00:17:08,400 --> 00:17:09,400

out.

297

00:17:09,400 --> 00:17:18,600

They're still too early to call, but this might be a trend.

298

00:17:18,600 --> 00:17:19,600

That's good.

299

00:17:19,600 --> 00:17:21,520

They're starting to group together.

300

00:17:21,520 --> 00:17:27,160

Like some medieval war machine, the rig keeps kissing leather till the ammo runs out.

301

00:17:27,160 --> 00:17:31,360

And there's definitely a pool of yellow, pink and red flags.

302

00:17:31,360 --> 00:17:33,800

That means that the human balls didn't go as far.

303

00:17:33,800 --> 00:17:35,960

Then comes the control at 50% humidity.

304

00:17:35,960 --> 00:17:40,000

And the furthest with a 10% humidity, dry balls all the way at the outer edge.

305

00:17:40,000 --> 00:17:42,320

And that totally agrees with our small scale tests.

306

00:17:42,320 --> 00:17:45,400

Yeah, it's a spread of plus or minus 15 feet.

307

00:17:45,400 --> 00:17:52,800

You know, I think there's some truth to this myth, because there's definitely a pattern

308

00:17:52,800 --> 00:17:55,720

where the dry balls were going farther than the humid balls.

309

00:17:55,720 --> 00:17:59,680

It's funny how such a small thing can make such a huge difference all in the game.

310

00:17:59,680 --> 00:18:03,760

Yep, there's so many variables in baseball, I think it would be hard to attribute a decrease

311

00:18:03,760 --> 00:18:05,720

in home runs to just humidity.

312

00:18:05,720 --> 00:18:09,000

You know, it's weird though, starting this season, Major League Baseball teams are keeping

313

00:18:09,000 --> 00:18:10,000

their balls in humid ores.

314

00:18:10,000 --> 00:18:11,440

Well, that settles it for me.

315

00:18:11,440 --> 00:18:13,440

This is definitely plausible.

316

00:18:13,440 --> 00:18:14,440

Plausible.

317

00:18:14,440 --> 00:18:15,440

Plausible.

318

00:18:15,440 --> 00:18:29,720

Meanwhile, Adam and Jamie have been put in a cork in it.

319

00:18:29,720 --> 00:18:34,120

Now the rules of baseball state that a bat must be a single piece of wood.

320

00:18:34,120 --> 00:18:36,240

That's how they leave the factory.

321

00:18:36,240 --> 00:18:42,880

But in the search for more spring, some players hollow out bats replacing wood with cork.

322

00:18:42,880 --> 00:18:45,240

But does cork equal cloud?

323

00:18:45,240 --> 00:18:46,640

I'll just let Adam explain.

324

00:18:46,640 --> 00:18:49,240

The heart of this experiment is a timer.

325

00:18:49,240 --> 00:18:51,840

One that fires a ball, one that swings a bat.

326

00:18:51,840 --> 00:18:52,840

Here's how it started.

327

00:18:52,840 --> 00:18:54,160

I release the safety, I click this.

328

00:18:54,160 --> 00:18:56,280

This sends electrical signals all the way down here.

329

00:18:56,280 --> 00:18:58,600

Follow me.

330

00:18:58,600 --> 00:19:03,080

To our bank of air tanks, which we built for the Pirate Special Cannon, these two solenoids

331

00:19:03,080 --> 00:19:04,880

are activated by that timer.

332

00:19:04,880 --> 00:19:07,800

They activate these valves, releasing all the air from these tanks into the bottom of

333

00:19:07,800 --> 00:19:09,600

this barrel, in which is one of these balls in a sabre.

334

00:19:09,600 --> 00:19:11,920

The ball starts traveling down the barrel.

335

00:19:11,920 --> 00:19:15,960

As the ball travels down the barrel, a second electrical impulse activates this quick release

336

00:19:15,960 --> 00:19:20,360

on a valve, which releases this bat, which is on the spring on this cylinder here, swinging

337

00:19:20,360 --> 00:19:21,360

all the way around.

338

00:19:21,360 --> 00:19:24,840

Hopefully, at the very moment the ball is leaving the barrel, hitting the bat right

339

00:19:24,840 --> 00:19:29,240

at the point of impact we want, capturing it on high speed camera, knocking it out of

340

00:19:29,240 --> 00:19:31,960

the park and answering our question once and for all.

341

00:19:31,960 --> 00:19:35,480

The reason we're doing it this way is we need to isolate the effect of the cork.

342

00:19:35,480 --> 00:19:39,640

Now, if the bat is swinging at the same speed each time and the cannon is firing the ball

343

00:19:39,640 --> 00:19:44,400

at the same speed each time, the only variable here is the corked bat, and that should make

344

00:19:44,400 --> 00:19:47,880

it really obvious if the corked bat is providing extra spring.

345

00:19:47,880 --> 00:19:51,440

First, a regulation uncorked bat.

346

00:19:51,440 --> 00:19:54,720

I'm going to fire both of these things at precisely the same second.

347

00:19:54,720 --> 00:19:55,960

Okay.

348

00:19:55,960 --> 00:19:58,960

The tricky part of this experiment is the timing.

349

00:19:58,960 --> 00:20:04,160

The ball will be flying at 80 miles per hour and the bat swinging at 60 miles per hour

350

00:20:04,160 --> 00:20:08,680

for a combined collision speed of 140 miles per hour.

351

00:20:08,680 --> 00:20:14,280

If Adam's timing is out, even by a couple of milliseconds, the two won't connect.

352

00:20:14,280 --> 00:20:20,200

In, three, two.

353

00:20:20,200 --> 00:20:21,200

Strike one.

354

00:20:21,200 --> 00:20:27,200

Cannon and robot weren't in sync, but never fear the game's not over yet.

355

00:20:27,200 --> 00:20:30,600

High speed says that we've dialed into our correct batting speed.

356

00:20:30,600 --> 00:20:37,200

The mechanical bat is swinging just as fast as I was able to, 62 miles an hour.

357

00:20:37,200 --> 00:20:43,280

However, the ball is showing up to the party 141 milliseconds early.

358

00:20:43,280 --> 00:20:45,320

Adam tweaks the timer.

359

00:20:45,320 --> 00:20:48,360

I've delayed the ball by 141 milliseconds.

360

00:20:48,360 --> 00:20:49,360

Everybody ready?

361

00:20:49,360 --> 00:20:53,360

In, five, four, three.

362

00:20:53,360 --> 00:21:02,480

Hey, hey, hey, hey, we hit it.

363

00:21:02,480 --> 00:21:03,840

Woo!

364

00:21:03,840 --> 00:21:09,040

This time, Adam's timing was spot on, but the ball rocketed off the bat and smashed

365

00:21:09,040 --> 00:21:11,200

a chunk out of the scale.

366

00:21:11,200 --> 00:21:13,200

The guys reset.

367

00:21:13,200 --> 00:21:14,200

Yo.

368

00:21:14,200 --> 00:21:17,200

That's the hit.

369

00:21:17,200 --> 00:21:21,600

This batting robot's really got its eye in.

370

00:21:22,040 --> 00:21:25,040

That was another good hit.

371

00:21:25,040 --> 00:21:26,040

Oh.

372

00:21:26,040 --> 00:21:29,920

It hit one side of your shot, but then the other.

373

00:21:29,920 --> 00:21:30,920

Oh, there it is.

374

00:21:30,920 --> 00:21:32,240

It's in the armature wire.

375

00:21:32,240 --> 00:21:34,920

That's great.

376

00:21:34,920 --> 00:21:38,560

Now that we've seen a number of hits with a regulation bat, what the high speed camera

377

00:21:38,560 --> 00:21:42,680

is telling us is that the ball is consistently leaving the cannon at 80 miles an hour, which

378

00:21:42,680 --> 00:21:45,480

happens to be about the speed of the Roger Clinton's pitch.

379

00:21:45,480 --> 00:21:49,400

It's also leaving the bat once it gets hit at 80 miles an hour.

380

00:21:49,400 --> 00:21:54,560

The next thing we need to do is test how fast it leaves the bat when the bat is caught.

381

00:21:54,560 --> 00:21:58,000

If it leaves faster, that'll answer our question.

382

00:21:58,000 --> 00:21:59,000

Three.

383

00:21:59,000 --> 00:22:04,160

That was a hit.

384

00:22:04,160 --> 00:22:05,160

That was a hit.

385

00:22:05,160 --> 00:22:06,240

The ball is over here.

386

00:22:06,240 --> 00:22:07,880

And the bat is still there.

387

00:22:07,880 --> 00:22:11,520

So with any luck, that's data.

388

00:22:11,520 --> 00:22:15,640

The ball is coming into the bat at about 80 miles an hour, but it is leaving that bat

389

00:22:15,640 --> 00:22:18,640

at half that speed at about 40 miles an hour.

390

00:22:18,640 --> 00:22:23,360

Remember, when they tested the regulation bat, the ball was arriving at 80 miles per

391

00:22:23,360 --> 00:22:27,360

hour and leaving at almost the same speed.

392

00:22:27,360 --> 00:22:28,840

Try again.

393

00:22:28,840 --> 00:22:33,480

That looked like a beautiful hit.

394

00:22:33,480 --> 00:22:39,120

That looked like a perfect line drive back towards your welder.

395

00:22:39,120 --> 00:22:40,120

That's perfect.

396

00:22:40,120 --> 00:22:44,480

That's as good as our best one with the non-cork bat.

397

00:22:44,480 --> 00:22:49,840

Our earlier data points with the normal uncork bat had the ball leaving the bat pretty much

398

00:22:49,840 --> 00:22:54,120

at exactly the speed it was going towards the bat at.

399

00:22:54,120 --> 00:22:58,760

And these and both of our good data sets on the cork bat is leaving it half the speed.

400

00:22:58,760 --> 00:23:03,800

Loading your lumber with lightweight cork poses two problems.

401

00:23:03,800 --> 00:23:09,200

The bat might be lighter and easier to swing, but reduced weight means less energy delivered

402

00:23:09,200 --> 00:23:10,200

to the ball.

403

00:23:10,400 --> 00:23:15,760

Also, instead of adding extra spring, the cork actually absorbs some of the impact.

404

00:23:15,760 --> 00:23:20,480

Those two factors add up to blunted batting ability.

405

00:23:20,480 --> 00:23:25,240

A ball hitting a cork bat is going to leave that bat at a slower speed than a ball hitting

406

00:23:25,240 --> 00:23:27,720

a regulation unmodified bat.

407

00:23:27,720 --> 00:23:32,360

I mean, they made this thing to hit a ball really efficiently.

408

00:23:32,360 --> 00:23:36,040

I don't think it warrants any modification.

409

00:23:36,040 --> 00:23:41,480

Looks like this baseball mitt's been knocked out of the park.

410

00:23:41,480 --> 00:23:42,480

Guess what?

411

00:23:42,480 --> 00:23:43,480

What?

412

00:23:43,480 --> 00:23:45,800

I made a commemorative plaque for this mitt.

413

00:23:45,800 --> 00:23:48,800

A corked bat, okay.

414

00:23:48,800 --> 00:23:52,520

Well, you know, one way or another it looks like the guys that got caught using a cork

415

00:23:52,520 --> 00:23:54,680

bat got themselves suspended for nothing.

416

00:23:54,680 --> 00:23:58,120

Yeah, you know, while our sample size might have been small, our results were totally

417

00:23:58,120 --> 00:23:59,120

unambiguous.

418

00:23:59,120 --> 00:24:03,080

Every time a ball came up the cork bat, it was coming off at half the speed that it was

419

00:24:03,080 --> 00:24:04,680

off of a normal bat.

420

00:24:05,040 --> 00:24:07,840

Yeah, far from acting like a spring, it was a lot more like a sponge.

421

00:24:07,840 --> 00:24:10,240

I gotta say, this one is totally busted.

422

00:24:10,240 --> 00:24:11,240

Total.

423

00:24:11,240 --> 00:24:12,240

It's busted.

424

00:24:18,960 --> 00:24:20,960

Ahead on this baseball special.

425

00:24:20,960 --> 00:24:22,880

Well, there could be some blood.

426

00:24:22,880 --> 00:24:25,440

The mythbusters really let things slide.

427

00:24:25,440 --> 00:24:27,600

You can leave it all on the field.

428

00:24:27,600 --> 00:24:29,320

My blood, my teeth.

429

00:24:29,320 --> 00:24:35,920

Up next, Roger Clemens unleashes his arsenal so we can take a close look at the physics

430

00:24:35,920 --> 00:24:37,440

of a ball in flight.

431

00:24:37,440 --> 00:24:38,440

Sweet.

432

00:24:38,440 --> 00:24:46,400

We do a lot of crazy stunts in this show, but none of it is stuff you should try at

433

00:24:46,400 --> 00:24:47,400

home.

434

00:24:47,400 --> 00:24:54,960

On this mythbusters baseball special, it's time for our rock and Roger Clemens to step

435

00:24:54,960 --> 00:24:55,960

up to the plate.

436

00:24:56,240 --> 00:24:59,680

I might reach 90 miles an hour today for y'all.

437

00:24:59,680 --> 00:25:03,920

Roger's agreed to throw his whole taxonomy of pitches for us while we shoot it with the

438

00:25:03,920 --> 00:25:07,920

high-speed camera from several angles, and that really ought to allow us to break down

439

00:25:07,920 --> 00:25:12,240

what's going on from a physics perspective with each of these pitches.

440

00:25:12,240 --> 00:25:18,040

The team is hoping to use the high-speed camera to unravel the mojo of the throw.

441

00:25:18,040 --> 00:25:22,960

But to warm up that famous arm, the rocket first puts some pitches in front of Adam and

442

00:25:22,960 --> 00:25:23,960

Jamie.

443

00:25:23,960 --> 00:25:24,960

Room service is right there.

444

00:25:24,960 --> 00:25:27,960

Somebody bring in your breakfast in the morning.

445

00:25:27,960 --> 00:25:28,960

I'm going to put it right there.

446

00:25:28,960 --> 00:25:29,960

You can't miss it.

447

00:25:29,960 --> 00:25:30,960

You can close your eyes and hit it.

448

00:25:34,960 --> 00:25:35,960

That is a bat.

449

00:25:35,960 --> 00:25:36,960

That's not a broomstick.

450

00:25:36,960 --> 00:25:38,960

Now swing like you're f***ed off.

451

00:25:41,960 --> 00:25:42,960

Hey!

452

00:25:42,960 --> 00:25:43,960

All right!

453

00:25:43,960 --> 00:25:49,960

The mythbusters may be struck out, but with the rocket firing on all cylinders, it's time

454

00:25:49,960 --> 00:25:53,440

to unravel the parameters of the pitch.

455

00:25:53,440 --> 00:25:56,760

Next up, a basic four-seam fastball.

456

00:25:56,760 --> 00:26:02,040

We hold the fastball in this manner, and from my understanding, this ball rotates when I

457

00:26:02,040 --> 00:26:03,880

let it go in this manner.

458

00:26:03,880 --> 00:26:06,400

Four seams, these seams will catch that wind.

459

00:26:06,400 --> 00:26:07,400

That ball will track.

460

00:26:07,400 --> 00:26:12,440

The fastball is like watching a dark go, man.

461

00:26:12,440 --> 00:26:13,440

It's beautiful.

462

00:26:13,440 --> 00:26:18,720

Looking at the high-speed, the fastball pitch does exactly what Roger said it to do.

463

00:26:18,720 --> 00:26:23,360

The backspin keeps the ball on the straight and narrow as it rifles over the plate at

464

00:26:23,360 --> 00:26:25,240

more than 80 miles an hour.

465

00:26:25,240 --> 00:26:28,000

But what happens when Roger changes his grip?

466

00:26:28,000 --> 00:26:34,040

Basically, if you're a fastball here, you're in this area for the slider, and you're offset

467

00:26:34,040 --> 00:26:37,400

and you're basically cutting the side of the ball.

468

00:26:37,400 --> 00:26:42,160

It should go maybe down four inches and away from a right-handed hitter four inches.

469

00:26:42,160 --> 00:26:43,160

That's a true slider.

470

00:26:43,160 --> 00:26:45,720

There we go.

471

00:26:45,720 --> 00:26:48,400

You know it's good when the catcher doesn't catch you.

472

00:26:48,600 --> 00:26:51,440

Roger's found perfect pitch again.

473

00:26:51,440 --> 00:26:54,840

The slider veers away to the right of the plate.

474

00:26:54,840 --> 00:26:57,520

Curveball.

475

00:26:57,520 --> 00:27:01,400

While a classic curveball suddenly dips in midair.

476

00:27:01,400 --> 00:27:05,000

The curveball, again, you're using a seam, and it's based on your middle finger.

477

00:27:05,000 --> 00:27:09,840

You're grabbing a seam and locking down with pretty firm pressure on this finger here.

478

00:27:09,840 --> 00:27:11,480

This one just guides it.

479

00:27:11,480 --> 00:27:15,680

And it is a motion where you're throwing it like a fastball, but as you get to the reach

480

00:27:15,680 --> 00:27:18,080

point, you turn your wrist.

481

00:27:18,080 --> 00:27:23,120

Even out of Roger's right paw, it's almost as if the ball has a life of its own.

482

00:27:23,120 --> 00:27:24,120

I can see that curving.

483

00:27:24,120 --> 00:27:26,280

Yeah, in this speed you'll definitely see it curving.

484

00:27:26,280 --> 00:27:30,840

But while the high-speed shots show as the ball swerving and dipping, they can't tell

485

00:27:30,840 --> 00:27:33,160

as much about how it happens.

486

00:27:33,160 --> 00:27:39,080

And that's why Cary, Tori and Grant are at NASA's Ames Research Center in San Francisco.

487

00:27:39,080 --> 00:27:43,720

Luckily for us, scientist Rabindra Mehta is a big baseball fan.

488

00:27:43,720 --> 00:27:50,600

The beauty of our lab is that we study aerodynamics, fluid mechanics as applied to airplanes or

489

00:27:50,600 --> 00:27:52,400

space shuttles.

490

00:27:52,400 --> 00:27:57,640

But it's the same fluid mechanics, aerodynamics, that's applied to baseballs or soccer balls

491

00:27:57,640 --> 00:27:59,040

or what have you.

492

00:27:59,040 --> 00:28:03,360

So basically you have married your two passions for science and sports.

493

00:28:03,360 --> 00:28:04,360

Isn't that wonderful?

494

00:28:04,360 --> 00:28:08,720

Okay, so we heard that you actually have a tank where you can show us all these things

495

00:28:08,720 --> 00:28:09,720

visually?

496

00:28:09,720 --> 00:28:11,600

Yes, absolutely.

497

00:28:11,600 --> 00:28:16,240

What we'll do now is go over to this water channel where we have a baseball.

498

00:28:16,240 --> 00:28:19,840

As you see, it's mounted on a motor, so we're able to rotate it to show you the effects

499

00:28:19,840 --> 00:28:20,840

of rotation.

500

00:28:20,840 --> 00:28:26,240

But when you see what's going on here, I think it's going to be really cool.

501

00:28:26,240 --> 00:28:35,600

To simulate airflow around a baseball, they introduce streams of fluorescent dye.

502

00:28:35,600 --> 00:28:41,160

While it's still, the dye flows in a symmetrical pattern around the ball.

503

00:28:41,160 --> 00:28:45,600

Now imagine that ball has just been fired from Roger Clemens' fist.

504

00:28:45,600 --> 00:28:49,480

Oh wow, look how the aerodynamics change.

505

00:28:49,480 --> 00:28:52,520

As it spins, the airflow is disrupted.

506

00:28:52,520 --> 00:28:55,920

The air pressure on the ball's underside suddenly drops.

507

00:28:55,920 --> 00:29:01,600

And this ball now will have a force downwards as it's flying through the air.

508

00:29:01,600 --> 00:29:05,120

So this would be your classic current ball.

509

00:29:05,120 --> 00:29:09,800

Lower air pressure on the bottom of the ball makes it dip during flight.

510

00:29:09,800 --> 00:29:13,520

The principle's exactly the same for each different pitch.

511

00:29:13,520 --> 00:29:17,480

It is the axis of spin that determines what type of pitch it is.

512

00:29:17,480 --> 00:29:22,840

With a standard fast ball, which is released with backspin, you get an upward lift force.

513

00:29:22,840 --> 00:29:27,840

With a slider, the axis of spin would be more or less vertical.

514

00:29:27,840 --> 00:29:33,760

And in which case, the ball would tend to go towards the left because of that.

515

00:29:33,760 --> 00:29:41,680

And the curve ball tumbling, spinning about the horizontal axis, makes it go down.

516

00:29:41,680 --> 00:29:48,400

So our high-speed shots and NASA show that bendy baseball behavior is no myth.

517

00:29:48,400 --> 00:29:51,720

So what about the infamous rising fast ball?

518

00:29:51,720 --> 00:29:57,200

Many hitters swear that some fast balls suddenly lift in mid-air as they hurdle towards the

519

00:29:57,200 --> 00:29:58,360

plate.

520

00:29:58,360 --> 00:29:59,360

Is that a myth?

521

00:29:59,360 --> 00:30:04,560

Now for it to rise, the lift force due to the spin would have to exceed the weight of

522

00:30:04,560 --> 00:30:05,560

the ball, right?

523

00:30:05,560 --> 00:30:06,560

That's pretty simple.

524

00:30:06,560 --> 00:30:12,840

Now it turns out that for the type of conditions which we find in baseball, the maximum lift

525

00:30:12,840 --> 00:30:18,600

force is only equivalent to about half the weight of the ball.

526

00:30:18,600 --> 00:30:23,400

Not even a pitcher as prodigious as Roger Clemens can make a baseball fly in the face

527

00:30:23,400 --> 00:30:24,900

of physics.

528

00:30:24,900 --> 00:30:30,700

Showing a fast ball that rises is about as likely as Adam and Jamie hitting home runs

529

00:30:30,700 --> 00:30:33,660

in the World Series.

530

00:30:33,660 --> 00:30:37,700

You know, hanging out with Roger Clemens, it becomes really clear that pitching is just

531

00:30:37,700 --> 00:30:40,020

as much of an art as it is a science.

532

00:30:40,020 --> 00:30:41,020

Totally agree.

533

00:30:41,020 --> 00:30:43,980

And while we were there, we had the added bonus of another myth busted.

534

00:30:43,980 --> 00:30:46,300

Yep, the myth of the rising fast ball.

535

00:30:46,300 --> 00:30:51,140

It turns out that for the backspin to exert enough force to lift the ball, it'd have to

536

00:30:51,140 --> 00:30:53,700

exert more force than the weight of the ball.

537

00:30:53,700 --> 00:30:54,700

Which it can't.

538

00:30:54,700 --> 00:30:59,220

Yeah, it might be possible with a beach ball, but not a baseball.

539

00:30:59,220 --> 00:31:00,220

Busted.

540

00:31:00,220 --> 00:31:01,220

Totally busted.

541

00:31:01,220 --> 00:31:14,220

You know, the editors made it look like Jamie and Adam's cork bat rig worked the first

542

00:31:14,220 --> 00:31:15,220

time.

543

00:31:15,220 --> 00:31:20,340

If you want to find out what really happened, log on to [discovery.com slash mythbusters](http://discovery.com/slash/mythbusters),

544

00:31:20,340 --> 00:31:21,220

the magic of editing.

545

00:31:25,220 --> 00:31:31,020

On this baseball special, it's time to get down and dirty as the mythbusters All Stars

546

00:31:31,020 --> 00:31:33,700

take a long run up at the slide.

547

00:31:33,700 --> 00:31:36,860

Alright, this baseball myth is all about the slide.

548

00:31:36,860 --> 00:31:37,860

The what?

549

00:31:37,860 --> 00:31:39,300

Do you watch any sporting events?

550

00:31:39,300 --> 00:31:42,700

Yeah, robot combat.

551

00:31:42,700 --> 00:31:43,700

It's a sport.

552

00:31:43,700 --> 00:31:44,700

Right.

553

00:31:44,700 --> 00:31:47,940

Well, you know in baseball when you see a guy run to the base and he slides into it?

554

00:31:47,940 --> 00:31:50,300

Oh yes, I have seen that.

555

00:31:50,300 --> 00:31:52,540

But wouldn't it be faster just to run?

556

00:31:52,540 --> 00:31:53,540

Well that's the myth.

557

00:31:53,540 --> 00:31:57,380

A lot of people think that on bases that you can't overrun that it's faster to slide into

558

00:31:57,380 --> 00:31:58,380

them.

559

00:31:58,380 --> 00:32:00,420

Alright, sounds like that's worth testing.

560

00:32:00,420 --> 00:32:01,420

Yeah.

561

00:32:01,420 --> 00:32:05,060

The slide is part and parcel of baseball.

562

00:32:05,060 --> 00:32:10,780

In trying to beat the tag and hit the bag, a runner sends the kitty litter flying.

563

00:32:10,780 --> 00:32:15,340

But when a player hits the dirt, is the friction costing him precious time?

564

00:32:15,340 --> 00:32:18,020

Would it be faster to stay on two feet?

565

00:32:18,020 --> 00:32:19,980

Okay, so how are we going to test this?

566

00:32:19,980 --> 00:32:20,980

This one's simple.

567

00:32:20,980 --> 00:32:24,380

We just run at the base and then we slide into the base and see which one's faster.

568

00:32:24,380 --> 00:32:26,220

I got the perfect thing to time that.

569

00:32:26,220 --> 00:32:27,980

It's accurate down to the millisecond.

570

00:32:27,980 --> 00:32:31,820

I can start it when we leave one base and stop it when we tag the next.

571

00:32:31,820 --> 00:32:32,820

Cool.

572

00:32:32,820 --> 00:32:36,180

Alright, let's ask Jamie and see if he wants to play.

573

00:32:36,180 --> 00:32:40,940

Our sporting gurus head on out to the University of Pacific Stockton campus.

574

00:32:40,940 --> 00:32:43,660

Gee, they really look the part, don't they?

575

00:32:43,660 --> 00:32:46,620

There's just one teensy problem.

576

00:32:46,620 --> 00:32:49,700

None of our all stars can slide.

577

00:32:49,700 --> 00:32:55,260

But never fear, uni head coach Ed Sprague has agreed to take on these raw recruits.

578

00:32:55,260 --> 00:32:59,260

I'm going to teach you on the grass so we can minimize the injuries we might have today

579

00:32:59,260 --> 00:33:00,260

by the end of the day.

580

00:33:00,260 --> 00:33:01,260

Alright.

581

00:33:01,260 --> 00:33:02,260

So you're planning on some injuries?

582

00:33:02,260 --> 00:33:03,260

There could be some blood.

583

00:33:03,260 --> 00:33:08,260

Ed spent 11 years in the major leagues, playing for six different teams and is famous for

584

00:33:08,260 --> 00:33:13,380

hitting the winning home run in game two of the 1992 World Series.

585

00:33:13,380 --> 00:33:16,060

But now he's really got his work cut out for it.

586

00:33:16,060 --> 00:33:21,660

You want to try to take the brunt of the slide on the outside of your shin here, alright?

587

00:33:21,660 --> 00:33:23,160

And then on our butt.

588

00:33:23,160 --> 00:33:26,420

We don't want to jam our knee into the ground and we don't want to get our feet way into

589

00:33:26,420 --> 00:33:27,420

the air.

590

00:33:27,420 --> 00:33:31,540

Now, as we know, mythbusters often fly by the seat of their pants.

591

00:33:31,540 --> 00:33:34,060

So you might think they'd be naturals at this.

592

00:33:34,060 --> 00:33:38,740

Get the hands up.

593

00:33:38,740 --> 00:33:43,860

But you'd be wrong.

594

00:33:43,860 --> 00:33:45,540

I can make a robot to do it.

595

00:33:45,540 --> 00:33:48,580

And in order to test this myth, we're going to have to be able to slide correctly.

596

00:33:48,580 --> 00:33:54,460

So I say we give it a few more minutes, maybe a few more hours, until we get it down right.

597

00:33:54,460 --> 00:33:57,820

Once we get the slide down right, then we can start testing this myth.

598

00:33:57,820 --> 00:34:02,660

Eventually, the guy's slide starts to look more technique and less train wreck.

599

00:34:02,660 --> 00:34:06,260

Alright, I think you guys have shown enough improvement that we're going to move on to

600

00:34:06,260 --> 00:34:09,460

the blood alley, I mean the dirt over here.

601

00:34:09,460 --> 00:34:11,940

Blood alley, huh?

602

00:34:11,940 --> 00:34:15,260

It's time to get Grant's timing rig up to speed.

603

00:34:15,260 --> 00:34:18,020

So the timer's going to have millisecond resolution.

604

00:34:18,020 --> 00:34:20,740

There's one switch to start the sequence.

605

00:34:20,740 --> 00:34:27,620

And what you'll do is have your foot on this and the second you leave, it'll start the

606

00:34:27,620 --> 00:34:28,620

timer.

607

00:34:28,620 --> 00:34:35,380

It'll be a second switch here that goes to a latching relay and this is going to be

608

00:34:35,380 --> 00:34:36,780

on the bag.

609

00:34:36,780 --> 00:34:43,100

So when you come up and hit the bag, it'll freeze the timer wherever it is.

610

00:34:43,100 --> 00:34:48,300

On the first attempt, Tori will run and try and stop dead on the bag.

611

00:34:48,300 --> 00:34:49,460

Ready when you are.

612

00:34:49,460 --> 00:34:54,180

The instant Tori's foot leaves the switch, the timer starts.

613

00:34:54,180 --> 00:34:58,260

In his head, he's trying to beat a ball that's flying in from the outfield.

614

00:34:58,260 --> 00:34:59,260

I'm still on!

615

00:34:59,260 --> 00:35:00,260

I'm still touching!

616

00:35:00,260 --> 00:35:02,260

What was my time?

617

00:35:02,260 --> 00:35:03,260

3.624.

618

00:35:03,260 --> 00:35:05,780

Pretty sure I was safe.

619

00:35:05,780 --> 00:35:07,900

Tori struggled to stop his momentum.

620

00:35:07,900 --> 00:35:10,540

You get going that fast, it's hard to stop.

621

00:35:10,540 --> 00:35:15,820

I mean, you want a mass to go, you're stopped dead on that target.

622

00:35:15,820 --> 00:35:18,620

This time he's going to slide into base.

623

00:35:18,620 --> 00:35:21,100

Can he beat 3.6 seconds?

624

00:35:21,100 --> 00:35:24,260

Will he snap his leg off at the knee?

625

00:35:24,260 --> 00:35:25,260

Nice!

626

00:35:25,260 --> 00:35:27,260

Did I stop it?

627

00:35:27,260 --> 00:35:28,820

Nice, you sure did.

628

00:35:28,820 --> 00:35:29,820

Okay, good.

629

00:35:29,820 --> 00:35:31,820

Hey, what was my time?

630

00:35:31,820 --> 00:35:33,620

3.572.

631

00:35:33,620 --> 00:35:38,220

By sliding Tori shaved .05 of a second off his previous time.

632

00:35:38,500 --> 00:35:44,180

It's not much, but it could be the difference between safe and out.

633

00:35:44,180 --> 00:35:48,620

Time for the other two all-stars to do their dashes.

634

00:35:48,620 --> 00:35:50,620

Nice!

635

00:35:50,620 --> 00:35:53,620

4.076.

636

00:35:53,620 --> 00:35:55,420

And let their hip bone slip.

637

00:35:55,420 --> 00:35:58,900

It's 100 milliseconds, a tenth of a second faster.

638

00:35:58,900 --> 00:36:01,420

I actually thought that was probably your best slide of the day.

639

00:36:01,420 --> 00:36:05,020

That's a good hard slide right there.

640

00:36:05,220 --> 00:36:07,220

4.13 seconds.

641

00:36:11,220 --> 00:36:13,780

Wow, that looked like it hurt.

642

00:36:13,780 --> 00:36:15,780

You beat your time.

643

00:36:15,780 --> 00:36:17,900

3.93 seconds.

644

00:36:17,900 --> 00:36:21,500

When the dust settles, the results seem to match Tori's.

645

00:36:21,500 --> 00:36:26,180

On test one, the guys each had to slow their speed at the last second in order to stay

646

00:36:26,180 --> 00:36:28,540

upright and not overrun the base.

647

00:36:28,540 --> 00:36:34,540

But on the second run, they actually accelerated into the slide and that last second speeding

648

00:36:34,540 --> 00:36:37,220

up shaved milliseconds off the time.

649

00:36:37,220 --> 00:36:38,980

You know, this myth is looking confirmed.

650

00:36:38,980 --> 00:36:43,100

It looks like it is faster to slide into a bag than it is to slow down and stop on it.

651

00:36:43,100 --> 00:36:44,980

That's what all the data says.

652

00:36:44,980 --> 00:36:46,900

Yep, the numbers don't lie.

653

00:36:46,900 --> 00:36:48,900

So myth confirmed, huh?

654

00:36:48,900 --> 00:36:49,900

Confirmed.

655

00:36:49,900 --> 00:36:50,900

Confirmed.

656

00:36:58,900 --> 00:36:59,900

Still to come.

657

00:36:59,900 --> 00:37:00,980

Everybody in the bag.

658

00:37:00,980 --> 00:37:04,020

Our baseball special goes out with a bag.

659

00:37:04,540 --> 00:37:07,540

Ha, ha, ha.

660

00:37:09,540 --> 00:37:12,780

We're at the bottom of the ninth on this baseball special.

661

00:37:12,780 --> 00:37:19,900

There's one final myth and again, it was the subject of fan site frenzy.

662

00:37:19,900 --> 00:37:20,900

What do we have?

663

00:37:20,900 --> 00:37:25,100

Well, we started this episode out with a myth about the inside of a bat.

664

00:37:25,100 --> 00:37:26,100

Cork bat.

665

00:37:26,100 --> 00:37:27,100

Exactly.

666

00:37:27,100 --> 00:37:29,020

We're going to finish it off with a myth about the inside of a ball.

667

00:37:29,020 --> 00:37:34,100

Specifically, that you can hit a baseball hard enough to knock the hide off the ball

668

00:37:34,140 --> 00:37:37,340

while the inside itself goes out of the park.

669

00:37:37,340 --> 00:37:41,540

Sounds like another classic cartoon caper.

670

00:37:41,540 --> 00:37:48,300

A ball is pitched at such speed and hit with such force that the stitches split and hide

671

00:37:48,300 --> 00:37:51,860

is left behind.

672

00:37:51,860 --> 00:37:54,660

It's not a scenario pitchers enjoy contemplating.

673

00:37:54,660 --> 00:37:58,580

Have you ever seen somebody hit the hide off the ball?

674

00:37:58,580 --> 00:37:59,580

Is it possible?

675

00:37:59,580 --> 00:38:01,300

Are you saying I give up a lot of home runs?

676

00:38:01,340 --> 00:38:04,820

I've ever seen the hide come off a baseball that I throw in one in there.

677

00:38:04,820 --> 00:38:07,980

Roger thinks Jamie's got a hide even asking.

678

00:38:07,980 --> 00:38:10,740

I have thrown some balls in there at 94-95.

679

00:38:10,740 --> 00:38:14,580

The hitters, they say the scouts that sit in the stands that block the pitches say that

680

00:38:14,580 --> 00:38:19,380

the ball has come back over 130, 140 miles an hour.

681

00:38:19,380 --> 00:38:21,980

Thank God the ball has not come unraveled.

682

00:38:21,980 --> 00:38:25,180

You can definitely put a flat spot in the ball when a guy hits it real hard or squares

683

00:38:25,180 --> 00:38:26,180

it up as we say.

684

00:38:26,180 --> 00:38:30,900

But to bring the hide completely off, that would be a chore for you two men.

685

00:38:30,900 --> 00:38:34,300

I'm sure you could find something with bringing the hide off of it.

686

00:38:34,300 --> 00:38:37,740

We're going to have to investigate.

687

00:38:37,740 --> 00:38:42,980

Back at home base, Adam and Jamie plan to test this myth by firing up the air cannon once

688

00:38:42,980 --> 00:38:43,980

again.

689

00:38:43,980 --> 00:38:50,260

We've already seen that a mere 7.5 psi was enough to send a ball rocketing at 80 miles

690

00:38:50,260 --> 00:38:51,260

an hour.

691

00:38:51,260 --> 00:38:54,260

Oh, that's the hit!

692

00:38:54,260 --> 00:38:57,900

Obviously, that's not fast enough to knock the hide off.

693

00:38:57,900 --> 00:39:01,620

So they load a fresh ball and double the air pressure.

694

00:39:01,620 --> 00:39:05,540

Adam, I'm actually at 15 psi.

695

00:39:05,540 --> 00:39:09,420

Three, two.

696

00:39:09,420 --> 00:39:15,660

At 15 psi, the cannon spits that ball out at 170 miles an hour.

697

00:39:15,660 --> 00:39:16,660

Wow.

698

00:39:16,660 --> 00:39:18,860

That's really powerful.

699

00:39:18,860 --> 00:39:22,380

More than double the speed of a Clemens aspirin tablet.

700

00:39:22,380 --> 00:39:23,380

Oh.

701

00:39:23,380 --> 00:39:25,580

It went through the blanket.

702

00:39:25,580 --> 00:39:29,060

But the hide still hasn't hightailed it.

703

00:39:29,060 --> 00:39:30,860

How about 40 psi?

704

00:39:30,860 --> 00:39:32,020

Oh, yeah.

705

00:39:32,020 --> 00:39:41,260

Three, two, one.

706

00:39:41,260 --> 00:39:47,020

The ball cannon into the static bat at 200 miles per hour, almost twice as fast as the

707

00:39:47,020 --> 00:39:50,460

quickest major league pitch ever recorded.

708

00:39:50,460 --> 00:39:55,580

It might be bye-bye bat, but the ball still not disemboweled.

709

00:39:55,580 --> 00:39:58,940

So the fastest pitch ever recorded is 103 miles an hour.

710

00:39:58,940 --> 00:40:01,860

We've got this puppy up to 200 miles an hour.

711

00:40:01,860 --> 00:40:05,860

At that speed, it was snapping our bats like twigs, and it still is totally intact.

712

00:40:05,860 --> 00:40:10,940

Well, it's obvious to me that knocking the hide off a ball is way beyond the capability

713

00:40:10,940 --> 00:40:12,700

of a human pitcher or batter.

714

00:40:12,700 --> 00:40:14,340

We're just going to leave it there?

715

00:40:14,340 --> 00:40:15,340

What do we do now?

716

00:40:15,340 --> 00:40:16,340

Of course not.

717

00:40:16,340 --> 00:40:17,420

We've got the rig.

718

00:40:17,420 --> 00:40:20,620

Let's open it wide up and see what we can get out of it.

719

00:40:20,620 --> 00:40:23,100

That's just what you were going to do after we all left anyway, weren't you?

720

00:40:23,100 --> 00:40:24,100

Of course.

721

00:40:24,100 --> 00:40:26,100

All right, let's do that.

722

00:40:26,100 --> 00:40:30,820

They're going full power, 150 psi.

723

00:40:30,820 --> 00:40:33,060

Can that unveil a ball's innards?

724

00:40:33,060 --> 00:40:35,500

We're locked and loaded.

725

00:40:35,500 --> 00:40:37,060

It's time to take cover.

726

00:40:37,060 --> 00:40:38,500

You can man the switch.

727

00:40:38,500 --> 00:40:39,700

Everybody back here.

728

00:40:39,700 --> 00:40:41,140

Everybody in the back.

729

00:40:41,140 --> 00:40:46,620

With the scaredy cat crew safe behind the ballistics panel, Adam triggers the timer.

730

00:40:46,820 --> 00:40:49,180

Four, three, two.

731

00:40:51,260 --> 00:40:53,740

That's no longer a ball.

732

00:40:53,740 --> 00:40:55,740

It's a bullet.

733

00:41:00,220 --> 00:41:02,780

Yeah, that is beautiful.

734

00:41:02,780 --> 00:41:05,020

You knocked the skin off the ball.

735

00:41:05,020 --> 00:41:09,380

This is actually what it would take to do that myth.

736

00:41:09,380 --> 00:41:10,220

Right, right, right.

737

00:41:10,220 --> 00:41:11,460

Absolutely.

738

00:41:11,460 --> 00:41:12,700

I want to find the hide.

739

00:41:12,700 --> 00:41:13,700

OK.

740

00:41:17,380 --> 00:41:20,860

That ball's been peeled like an orange.

741

00:41:20,860 --> 00:41:27,380

I don't know about you, but I don't think that a batter could do that.

742

00:41:27,380 --> 00:41:31,780

This thing was traveling at 437 miles per hour by my math.

743

00:41:31,780 --> 00:41:33,380

I don't think there's anyone that can pitch that fast.

744

00:41:33,380 --> 00:41:37,420

That's four times as fast as a really good picture or more than that.

745

00:41:37,420 --> 00:41:40,700

So that means myth busted.

746

00:41:47,620 --> 00:41:50,300

So winged batter.

747

00:41:50,300 --> 00:41:52,180

Dude, that was so much fun.

748

00:41:52,180 --> 00:41:54,260

Yeah, how was it working with Roger Clemens?

749

00:41:54,260 --> 00:41:55,260

It was unbelievable.

750

00:41:55,260 --> 00:41:57,860

All right, well, let's tally up the final score.

751

00:41:57,860 --> 00:41:58,860

Cork bat.

752

00:41:58,860 --> 00:41:59,860

Busted.

753

00:41:59,860 --> 00:42:00,860

How about human balls?

754

00:42:00,860 --> 00:42:01,860

Definitely plausible.

755

00:42:01,860 --> 00:42:03,700

Knockin' the hide off a ball?

756

00:42:03,700 --> 00:42:04,700

Totally busted.

757

00:42:04,700 --> 00:42:07,820

We had to turn this thing into a bullet before we got anything.

758

00:42:07,820 --> 00:42:08,820

How'd slide go?

759

00:42:08,820 --> 00:42:09,820

It's confirmed.

760

00:42:09,820 --> 00:42:12,340

It's definitely faster to slide into a base than to run.

761

00:42:12,340 --> 00:42:13,340

Yeah, who knew?

762

00:42:13,340 --> 00:42:15,740

There's actually a lot more to baseball than you might think.

763

00:42:15,740 --> 00:42:19,380

Yeah, you know, I think sports is going to continue to provide a fertile myth-busting

764

00:42:19,380 --> 00:42:20,620

ground in the future.

765

00:42:20,620 --> 00:42:23,940

Great, because there's nothing that we're better at than organized sports, right?

766

00:42:23,940 --> 00:42:25,420

Ba-da-ba-ba-ba-ba-ba-ba-ba-da-da-da-da.

767

00:42:25,420 --> 00:42:26,420

Oh, so we...

768

00:42:26,420 --> 00:42:27,420

Winged out.

769

00:42:27,420 --> 00:42:28,420

We are.

770

00:42:34,420 --> 00:42:35,780

Baseball myths was fun.

771

00:42:35,780 --> 00:42:40,260

Yeah, getting Roger the Rocket Clemens on board, that's great.

772

00:42:40,260 --> 00:42:44,100

You know, the only reason we did baseball myths is because we got flooded with emails

773

00:42:44,100 --> 00:42:45,900

from the fans that wanted to see him.

774

00:42:45,900 --> 00:42:47,460

It was definitely a hit with the fans.

775

00:42:47,460 --> 00:42:52,900

And in fact, if you have a home run of an idea, log on to [discovery.com slash mythbusters](http://discovery.com/mythbusters)

776

00:42:52,900 --> 00:42:53,900

and follow the links.

777

00:42:53,900 --> 00:42:56,900

Who knows, maybe one of your myths will make it to first base.