



SCIENCE LIVE

VIRTUAL EDITION

# INTERNATIONAL ASTEROID DAY

1  
00:01:02,069 --> 00:00:19,370

[Music]

2  
00:01:05,750 --> 00:01:04,630

hello and welcome to another episode of

3  
00:01:08,070 --> 00:01:05,760

nasa science

4  
00:01:09,910 --> 00:01:08,080

live my name is brie hill and i'm a

5  
00:01:10,870 --> 00:01:09,920

public affairs specialist at nasa

6  
00:01:13,350 --> 00:01:10,880

headquarters

7  
00:01:14,149 --> 00:01:13,360

as well as your host for today's episode

8  
00:01:16,630 --> 00:01:14,159

today is

9  
00:01:18,230 --> 00:01:16,640

international asteroid day and here at

10  
00:01:21,350 --> 00:01:18,240

nasa we're watching the skies

11  
00:01:23,510 --> 00:01:21,360

24 7. and although today is dedicated to

12  
00:01:24,870 --> 00:01:23,520

raise awareness about asteroids

13  
00:01:27,510 --> 00:01:24,880

and what we're doing to protect the

14

00:01:29,429 --> 00:01:27,520

earth we also want to take a deeper look

15

00:01:31,190 --> 00:01:29,439

into how these rocky artifacts

16

00:01:32,550 --> 00:01:31,200

are the time capsules of our solar

17

00:01:34,789 --> 00:01:32,560

system

18

00:01:36,550 --> 00:01:34,799

asteroids are known as the geological

19

00:01:38,630 --> 00:01:36,560

remnants of the solar system

20

00:01:40,469 --> 00:01:38,640

and they can help us understand how life

21

00:01:43,109 --> 00:01:40,479

was formed here on earth

22

00:01:43,590 --> 00:01:43,119

today we are talking to nasa experts

23

00:01:46,389 --> 00:01:43,600

about

24

00:01:47,749 --> 00:01:46,399

everything asteroids like the upcoming

25

00:01:51,030 --> 00:01:47,759

sample return from

26

00:01:52,389 --> 00:01:51,040

a 4.5 billion year old asteroid named

27

00:01:54,389 --> 00:01:52,399

venue

28

00:01:55,590 --> 00:01:54,399

along with missions to the trojan

29

00:01:58,310 --> 00:01:55,600

asteroids

30

00:01:59,670 --> 00:01:58,320

a metal asteroid world and an upcoming

31

00:02:01,910 --> 00:01:59,680

test that will demonstrate

32

00:02:04,230 --> 00:02:01,920

a technique to change the orbit of an

33

00:02:08,229 --> 00:02:04,240

asteroid in space

34

00:02:10,550 --> 00:02:08,239

today i'm joined by danny dela justina

35

00:02:11,750 --> 00:02:10,560

a research scientist at the university

36

00:02:13,830 --> 00:02:11,760

of arizona

37

00:02:16,070 --> 00:02:13,840

and the acting deputy principal

38

00:02:19,510 --> 00:02:16,080

investigator for the osiris-rex

39

00:02:21,510 --> 00:02:19,520  
mission along with dr terrick daly

40

00:02:23,030 --> 00:02:21,520  
as senior scientist and deputy

41

00:02:25,030 --> 00:02:23,040  
instrument scientist

42

00:02:26,869 --> 00:02:25,040  
for the darp mission at the johns

43

00:02:29,510 --> 00:02:26,879  
hopkins university

44

00:02:32,229 --> 00:02:29,520  
applied physics laboratory thank you

45

00:02:35,030 --> 00:02:32,239  
both for joining today

46

00:02:36,710 --> 00:02:35,040  
thanks for having us bree happy to be

47

00:02:39,589 --> 00:02:36,720  
here

48

00:02:40,229 --> 00:02:39,599  
as you just heard nasa has a slew of

49

00:02:42,790 --> 00:02:40,239  
exciting

50

00:02:44,790 --> 00:02:42,800  
upcoming missions related to asteroids

51  
00:02:46,790 --> 00:02:44,800  
can you tell us danny why does

52  
00:02:48,150 --> 00:02:46,800  
nasa have so many spacecraft studying

53  
00:02:51,509 --> 00:02:48,160  
these objects

54  
00:02:54,309 --> 00:02:51,519  
aren't all asteroids the same

55  
00:02:56,070 --> 00:02:54,319  
that is a great question bree so no

56  
00:02:58,229 --> 00:02:56,080  
asteroids aren't all the same

57  
00:02:59,750 --> 00:02:58,239  
uh these objects are the leftovers of

58  
00:03:02,470 --> 00:02:59,760  
the formation of the planets

59  
00:03:02,949 --> 00:03:02,480  
and there are hundreds of thousands of

60  
00:03:06,949 --> 00:03:02,959  
these

61  
00:03:08,229 --> 00:03:06,959  
asteroids formed at varying distances

62  
00:03:10,470 --> 00:03:08,239  
from the sun

63  
00:03:12,470 --> 00:03:10,480

they bear the fingerprints of distinct

64

00:03:13,350 --> 00:03:12,480

processes that took place across the

65

00:03:16,309 --> 00:03:13,360

solar system

66

00:03:18,550 --> 00:03:16,319

from its formation until now and so by

67

00:03:20,710 --> 00:03:18,560

studying different examples of asteroids

68

00:03:22,550 --> 00:03:20,720

we can learn quite a bit about the

69

00:03:25,509 --> 00:03:22,560

variety of things that have happened in

70

00:03:28,789 --> 00:03:25,519

our solar system's history

71

00:03:30,710 --> 00:03:28,799

wow now terek do any of these asteroids

72

00:03:32,949 --> 00:03:30,720

we're studying have a potential hazard

73

00:03:34,910 --> 00:03:32,959

to earth

74

00:03:37,110 --> 00:03:34,920

well about a hundred tons of

75

00:03:37,670 --> 00:03:37,120

extraterrestrial material falls on the

76

00:03:40,710 --> 00:03:37,680

earth

77

00:03:43,830 --> 00:03:40,720

every day mostly as harmless dust and

78

00:03:45,750 --> 00:03:43,840

the occasional meteorite fragment more

79

00:03:46,550 --> 00:03:45,760

rarely earth does get hit by larger

80

00:03:49,910 --> 00:03:46,560

asteroids

81

00:03:54,070 --> 00:03:49,920

spacecraft

82

00:03:57,350 --> 00:03:56,550

wow well thank you so much danny and

83

00:03:59,509 --> 00:03:57,360

tarrick

84

00:04:01,589 --> 00:03:59,519

we'll be right back with our experts to

85

00:04:03,350 --> 00:04:01,599

answer a few more questions

86

00:04:05,589 --> 00:04:03,360

remember that you too can join the

87

00:04:08,229 --> 00:04:05,599

conversation and have your questions

88

00:04:09,190 --> 00:04:08,239

asked by answered by our guests using

89

00:04:11,910 --> 00:04:09,200

the hashtag

90

00:04:13,589 --> 00:04:11,920

ask nasa on social media or you can

91

00:04:15,110 --> 00:04:13,599

write in the comment box wherever you're

92

00:04:17,430 --> 00:04:15,120

watching the show today

93

00:04:19,189 --> 00:04:17,440

but first have you ever heard of the

94

00:04:21,349 --> 00:04:19,199

trojan asteroids

95

00:04:22,870 --> 00:04:21,359

nasa's lucy mission will launch later

96

00:04:25,110 --> 00:04:22,880

this year to visit

97

00:04:26,870 --> 00:04:25,120

several of these mysterious objects that

98

00:04:31,330 --> 00:04:26,880

share jupiter's orbit

99

00:06:08,870 --> 00:05:01,980

[Music]

100

00:06:10,550 --> 00:06:08,880

hi we're joined against by with danny

101  
00:06:11,909 --> 00:06:10,560  
and terek

102  
00:06:14,629 --> 00:06:11,919  
we've talked we've heard a little bit

103  
00:06:16,950 --> 00:06:14,639  
about the trojan asteroids that the nasa

104  
00:06:18,790 --> 00:06:16,960  
lucy mission will explore but i

105  
00:06:20,550 --> 00:06:18,800  
understand there's another asteroid

106  
00:06:23,510 --> 00:06:20,560  
focused mission named psyche

107  
00:06:23,909 --> 00:06:23,520  
can you tell us more about it of course

108  
00:06:26,150 --> 00:06:23,919  
so

109  
00:06:27,350 --> 00:06:26,160  
the psyche mission is a journey to a

110  
00:06:29,430 --> 00:06:27,360  
metal world

111  
00:06:32,070 --> 00:06:29,440  
that sits between the orbits of mars and

112  
00:06:35,189 --> 00:06:32,080  
jupiter so for the very first time

113  
00:06:38,870 --> 00:06:35,199

ever humanity will explore a world

114

00:06:40,710 --> 00:06:38,880

made not of rock or ice but of metal

115

00:06:43,110 --> 00:06:40,720

and this mission will give us a window

116

00:06:43,590 --> 00:06:43,120

into the metallic cores of planets which

117

00:06:45,350 --> 00:06:43,600

lie

118

00:06:47,749 --> 00:06:45,360

too deep beneath the surface to ever

119

00:06:49,270 --> 00:06:47,759

reach as well as tell us more about how

120

00:06:51,350 --> 00:06:49,280

the solar system formed

121

00:06:52,469 --> 00:06:51,360

and the psyche spacecraft is slated to

122

00:06:58,150 --> 00:06:52,479

launch in summer

123

00:07:03,270 --> 00:07:01,029

this is so cool now danny when we send

124

00:07:04,870 --> 00:07:03,280

these spacecraft out to study asteroids

125

00:07:05,510 --> 00:07:04,880

do they bring all the instruments with

126  
00:07:09,430 --> 00:07:05,520  
them

127  
00:07:11,350 --> 00:07:09,440  
can we ever bring samples back to earth

128  
00:07:12,469 --> 00:07:11,360  
that's a really good question bree and

129  
00:07:14,309 --> 00:07:12,479  
the answer is yes

130  
00:07:16,469 --> 00:07:14,319  
we can absolutely bring samples of

131  
00:07:18,870 --> 00:07:16,479  
asteroids back to earth for study

132  
00:07:20,950 --> 00:07:18,880  
so returning samples lets us study

133  
00:07:22,309 --> 00:07:20,960  
asteroid material in our laboratories

134  
00:07:24,390 --> 00:07:22,319  
with a lot more detail than we can

135  
00:07:26,950 --> 00:07:24,400  
gather from a spacecraft

136  
00:07:28,150 --> 00:07:26,960  
osiris-rex is nasa's first asteroid

137  
00:07:30,150 --> 00:07:28,160  
sample return mission

138  
00:07:31,830 --> 00:07:30,160

and last year it grabbed a sample from

139

00:07:33,589 --> 00:07:31,840

the surface of asteroid bennu

140

00:07:35,830 --> 00:07:33,599

you can see how wild gathering that

141

00:07:37,270 --> 00:07:35,840

sample was in this clip

142

00:07:39,749 --> 00:07:37,280

the sample of bennu is going to be

143

00:07:43,189 --> 00:07:39,759

delivered back to earth in september

144

00:07:45,589 --> 00:07:43,199

of 2023 so we can further study it

145

00:07:48,309 --> 00:07:45,599

and additionally our colleagues with the

146

00:07:50,550 --> 00:07:48,319

japanese space agency jaxa just returned

147

00:07:51,589 --> 00:07:50,560

samples from asteroid ryugu last

148

00:07:54,070 --> 00:07:51,599

december

149

00:07:54,869 --> 00:07:54,080

so jaxa is sharing part of the sample of

150

00:07:57,270 --> 00:07:54,879

ryugu

151  
00:07:59,189 --> 00:07:57,280  
with nasa and our laboratories are

152  
00:08:03,830 --> 00:07:59,199  
preparing for that really exciting

153  
00:08:08,309 --> 00:08:06,070  
oh my gosh it is so cool that we can

154  
00:08:10,230 --> 00:08:08,319  
learn so much about our solar system by

155  
00:08:12,550 --> 00:08:10,240  
studying these objects

156  
00:08:13,749 --> 00:08:12,560  
tarik in order to study them we have to

157  
00:08:15,909 --> 00:08:13,759  
find them first

158  
00:08:18,950 --> 00:08:15,919  
how does nasa find and characterize

159  
00:08:21,670 --> 00:08:18,960  
these near-earth objects

160  
00:08:22,710 --> 00:08:21,680  
nasa uses powerful telescopes both on

161  
00:08:25,510 --> 00:08:22,720  
the ground

162  
00:08:27,749 --> 00:08:25,520  
and in space to find asteroids and once

163  
00:08:28,469 --> 00:08:27,759

nasa finds an asteroid scientists

164

00:08:30,790 --> 00:08:28,479

calculate

165

00:08:31,830 --> 00:08:30,800

whether the orbit poses an impact hazard

166

00:08:33,430 --> 00:08:31,840

to earth

167

00:08:35,589 --> 00:08:33,440

scientists also make follow-up

168

00:08:36,469 --> 00:08:35,599

observations with other telescopes to

169

00:08:38,630 --> 00:08:36,479

figure out

170

00:08:40,870 --> 00:08:38,640

how big the asteroid is and what it's

171

00:08:41,509 --> 00:08:40,880

made of and all of this gets publicly

172

00:08:43,589 --> 00:08:41,519

posted

173

00:08:44,949 --> 00:08:43,599

on a website run by the center for near

174

00:08:47,190 --> 00:08:44,959

earth object studies

175

00:08:48,949 --> 00:08:47,200

at jpl jets propulsion laboratory so

176

00:08:51,110 --> 00:08:48,959

that people around the world can find

177

00:08:54,230 --> 00:08:51,120

out more

178

00:08:56,470 --> 00:08:54,240

now if we did find that hazardous

179

00:08:58,070 --> 00:08:56,480

hazardous asteroid what would we do

180

00:09:01,190 --> 00:08:58,080

about it

181

00:09:03,670 --> 00:09:01,200

well believe it or not as we speak nasa

182

00:09:04,550 --> 00:09:03,680

is developing technology to deflect an

183

00:09:07,110 --> 00:09:04,560

asteroid

184

00:09:09,509 --> 00:09:07,120

so that it would not hit the earth one

185

00:09:10,949 --> 00:09:09,519

option is to park a spacecraft next to

186

00:09:12,949 --> 00:09:10,959

the asteroid and use

187

00:09:13,990 --> 00:09:12,959

the gravitational pull of the spacecraft

188

00:09:15,590 --> 00:09:14,000

to slowly

189

00:09:17,829 --> 00:09:15,600

nudge the asteroid into a different

190

00:09:19,990 --> 00:09:17,839

orbit another option

191

00:09:21,670 --> 00:09:20,000

is to actually slam a spacecraft into

192

00:09:22,630 --> 00:09:21,680

the asteroid and change its orbit that

193

00:09:24,790 --> 00:09:22,640

way

194

00:09:26,070 --> 00:09:24,800

nasa will soon launch a mission called

195

00:09:28,790 --> 00:09:26,080

dart to test

196

00:09:30,150 --> 00:09:28,800

that particular technology by developing

197

00:09:32,070 --> 00:09:30,160

this technology now

198

00:09:35,350 --> 00:09:32,080

we'll be ready to deal with an asteroid

199

00:09:41,269 --> 00:09:38,710

okay so tarek just mentioned a mission

200

00:09:43,670 --> 00:09:41,279

to change an asteroid's orbit

201  
00:09:44,790 --> 00:09:43,680  
it sounds like science fiction that nasa

202  
00:09:47,430 --> 00:09:44,800  
is going to crash

203  
00:09:52,630 --> 00:09:47,440  
a spacecraft into an asteroid but let's

204  
00:10:00,949 --> 00:09:54,630  
is nasa really crashing a spacecraft

205  
00:10:04,949 --> 00:10:03,910  
yes nasa really is crashing a spacecraft

206  
00:10:06,949 --> 00:10:04,959  
into an asteroid

207  
00:10:08,949 --> 00:10:06,959  
that spacecraft is dart the double

208  
00:10:10,790 --> 00:10:08,959  
asteroid redirection test

209  
00:10:12,550 --> 00:10:10,800  
now asteroids hit the earth all of the

210  
00:10:14,230 --> 00:10:12,560  
time luckily the ones that are big

211  
00:10:15,030 --> 00:10:14,240  
enough to cause widespread damage are

212  
00:10:17,350 --> 00:10:15,040  
pretty rare

213  
00:10:19,430 --> 00:10:17,360

and none are expected in the near future

214

00:10:20,310 --> 00:10:19,440

nasa and others are actively tracking

215

00:10:23,190 --> 00:10:20,320

asteroids

216

00:10:23,910 --> 00:10:23,200

but also we haven't found all of them

217

00:10:26,389 --> 00:10:23,920

yet

218

00:10:28,389 --> 00:10:26,399

so it makes sense to do this first test

219

00:10:29,990 --> 00:10:28,399

to demonstrate if we needed to protect

220

00:10:31,590 --> 00:10:30,000

the earth what might we do

221

00:10:33,350 --> 00:10:31,600

and we should do this test before we

222

00:10:34,949 --> 00:10:33,360

need it that's where dart comes in

223

00:10:36,710 --> 00:10:34,959

dart is a spacecraft that's about the

224

00:10:38,710 --> 00:10:36,720

size of a vending machine and it has

225

00:10:40,470 --> 00:10:38,720

really long solar arrays that stick out

226  
00:10:42,949 --> 00:10:40,480  
and it's gonna be traveling really fast

227  
00:10:44,949 --> 00:10:42,959  
about 15 000 miles per hour

228  
00:10:46,710 --> 00:10:44,959  
and it's gonna slam into this target

229  
00:10:47,750 --> 00:10:46,720  
asteroid that's about the size of the

230  
00:10:50,550 --> 00:10:47,760  
great pyramid

231  
00:10:52,389 --> 00:10:50,560  
so slamming this smaller spacecraft into

232  
00:10:53,190 --> 00:10:52,399  
this larger asteroid isn't going to

233  
00:10:54,949 --> 00:10:53,200  
destroy it

234  
00:10:57,030 --> 00:10:54,959  
but it will deflect it it's going to

235  
00:10:58,870 --> 00:10:57,040  
give it a small little nudge

236  
00:11:00,069 --> 00:10:58,880  
and that will ever so slightly change

237  
00:11:01,990 --> 00:11:00,079  
that asteroid's future

238  
00:11:03,750 --> 00:11:02,000

path if you wanted to do this you would

239

00:11:05,509 --> 00:11:03,760

want to do it years in advance

240

00:11:07,110 --> 00:11:05,519

such that the asteroid and the earth

241

00:11:09,350 --> 00:11:07,120

weren't on a collision course

242

00:11:11,190 --> 00:11:09,360

in the future so is nasa crashing a

243

00:11:13,670 --> 00:11:11,200

spacecraft into an asteroid

244

00:11:14,949 --> 00:11:13,680

yes nasa really is in the name of

245

00:11:23,829 --> 00:11:14,959

planetary defense

246

00:11:27,750 --> 00:11:26,150

okay everyone i see we have so many

247

00:11:28,470 --> 00:11:27,760

questions coming in from our online

248

00:11:30,389 --> 00:11:28,480

viewers

249

00:11:32,470 --> 00:11:30,399

remember that it is not too late to ask

250

00:11:34,870 --> 00:11:32,480

your questions just use

251

00:11:36,870 --> 00:11:34,880

ask nasa or drop your question in the

252

00:11:40,150 --> 00:11:36,880

comment box wherever you're viewing

253

00:11:43,509 --> 00:11:40,160

our first question is from chandramani

254

00:11:46,310 --> 00:11:43,519

on twitter and they ask why do asteroids

255

00:11:49,269 --> 00:11:46,320

float in space

256

00:11:50,069 --> 00:11:49,279

tarek would you like to answer that one

257

00:11:53,269 --> 00:11:50,079

sure

258

00:11:55,750 --> 00:11:53,279

so asteroids are actually orbiting the

259

00:11:56,470 --> 00:11:55,760

sun so the gravitational pull of the sun

260

00:11:58,870 --> 00:11:56,480

is the

261

00:12:01,350 --> 00:11:58,880

gravitational giant in our solar system

262

00:12:02,790 --> 00:12:01,360

and the asteroids are orbiting the sun

263

00:12:04,389 --> 00:12:02,800

in the same way that the earth is

264

00:12:06,870 --> 00:12:04,399  
orbiting the sun but in a different

265

00:12:09,350 --> 00:12:06,880  
location

266

00:12:11,590 --> 00:12:09,360  
okay so i have a new question this one

267

00:12:14,790 --> 00:12:11,600  
is from rosebud on youtube

268

00:12:17,829 --> 00:12:14,800  
they ask will 2021 pdc

269

00:12:20,150 --> 00:12:17,839  
hit earth i'm scared tarik

270

00:12:21,110 --> 00:12:20,160  
i understand that this is not a real

271

00:12:23,190 --> 00:12:21,120  
asteroid

272

00:12:25,350 --> 00:12:23,200  
but was this name of the simulated

273

00:12:27,110 --> 00:12:25,360  
asteroid used at this year's

274

00:12:29,430 --> 00:12:27,120  
international planetary defense

275

00:12:31,590 --> 00:12:29,440  
conference can you tell us more about

276  
00:12:35,350 --> 00:12:31,600  
that exercise

277  
00:12:38,710 --> 00:12:35,360  
yes so as you just pointed out 2021 pdc

278  
00:12:39,269 --> 00:12:38,720  
is a fictional asteroid every couple of

279  
00:12:41,190 --> 00:12:39,279  
years

280  
00:12:42,629 --> 00:12:41,200  
the international community comes

281  
00:12:45,269 --> 00:12:42,639  
together to

282  
00:12:47,670 --> 00:12:45,279  
discuss how to respond if there were an

283  
00:12:50,150 --> 00:12:47,680  
asteroid that posed a hazard to earth

284  
00:12:50,710 --> 00:12:50,160  
and then this year there was a virtual

285  
00:12:53,110 --> 00:12:50,720  
meeting

286  
00:12:54,470 --> 00:12:53,120  
back in april where there was an

287  
00:12:57,750 --> 00:12:54,480  
exercise with this

288  
00:12:59,670 --> 00:12:57,760

fake asteroid 2021 pdc and

289

00:13:01,430 --> 00:12:59,680

decision makers and scientists from

290

00:13:04,310 --> 00:13:01,440

around the world worked together

291

00:13:04,710 --> 00:13:04,320

to practice and exercise what we would

292

00:13:07,110 --> 00:13:04,720

do

293

00:13:08,550 --> 00:13:07,120

in the event of such an asteroid threat

294

00:13:11,190 --> 00:13:08,560

and you can actually tell that's a fake

295

00:13:13,350 --> 00:13:11,200

asteroid because its name and number

296

00:13:15,509 --> 00:13:13,360

don't match the system that we use for

297

00:13:18,629 --> 00:13:15,519

real asteroids

298

00:13:21,190 --> 00:13:18,639

all right well chase on twitter asks

299

00:13:22,470 --> 00:13:21,200

what are our planetary defenses against

300

00:13:23,990 --> 00:13:22,480

asteroids

301  
00:13:26,069 --> 00:13:24,000  
danny would you like to talk about that

302  
00:13:28,150 --> 00:13:26,079  
one sure

303  
00:13:29,430 --> 00:13:28,160  
i'd be happy to build on what tarik said

304  
00:13:31,670 --> 00:13:29,440  
earlier so there

305  
00:13:33,509 --> 00:13:31,680  
is a couple of different ways that we

306  
00:13:36,150 --> 00:13:33,519  
are guarding our planet

307  
00:13:37,350 --> 00:13:36,160  
one of the biggest ways is just keeping

308  
00:13:40,069 --> 00:13:37,360  
our eyes out

309  
00:13:41,910 --> 00:13:40,079  
on the sky and searching for asteroids

310  
00:13:44,550 --> 00:13:41,920  
that we haven't yet discovered

311  
00:13:45,910 --> 00:13:44,560  
so there is a number of near-earth

312  
00:13:48,310 --> 00:13:45,920  
object surveys

313  
00:13:50,150 --> 00:13:48,320

and they are doing this full time around

314

00:13:51,829 --> 00:13:50,160  
the clock at different locations

315

00:13:53,990 --> 00:13:51,839  
on our planet so they get slightly

316

00:13:56,629 --> 00:13:54,000  
different looks at the sky

317

00:13:57,990 --> 00:13:56,639  
other potential ways that we would

318

00:14:01,110 --> 00:13:58,000  
mitigate against

319

00:14:01,430 --> 00:14:01,120  
any sort of asteroid hazard include you

320

00:14:04,389 --> 00:14:01,440  
know

321

00:14:05,990 --> 00:14:04,399  
testing some of the technologies that uh

322

00:14:07,990 --> 00:14:06,000  
tarek discussed earlier

323

00:14:09,350 --> 00:14:08,000  
using things like gravity tractors to

324

00:14:12,069 --> 00:14:09,360  
kind of slowly change

325

00:14:12,550 --> 00:14:12,079  
the um the path of these asteroids in

326  
00:14:14,949 --> 00:14:12,560  
space

327  
00:14:15,990 --> 00:14:14,959  
as well as impacting them and

328  
00:14:18,389 --> 00:14:16,000  
potentially nudging

329  
00:14:19,750 --> 00:14:18,399  
their paths in space like the dart

330  
00:14:22,949 --> 00:14:19,760  
mission will do

331  
00:14:25,990 --> 00:14:24,949  
okay well i hope that answers your

332  
00:14:29,509 --> 00:14:26,000  
question

333  
00:14:32,870 --> 00:14:29,519  
facebook

334  
00:14:36,230 --> 00:14:32,880  
and they ask how do you know that they

335  
00:14:40,069 --> 00:14:36,240  
are really that old danny can you share

336  
00:14:42,870 --> 00:14:40,079  
some insight on how old asteroids are

337  
00:14:43,990 --> 00:14:42,880  
yeah absolutely so we have a couple of

338  
00:14:46,710 --> 00:14:44,000

different pieces of

339

00:14:48,470 --> 00:14:46,720

information that allow us to draw that

340

00:14:50,949 --> 00:14:48,480

conclusion

341

00:14:51,829 --> 00:14:50,959

one of the biggest sources of

342

00:14:54,310 --> 00:14:51,839

information

343

00:14:55,670 --> 00:14:54,320

about asteroids are actually meteorites

344

00:14:58,949 --> 00:14:55,680

that we get

345

00:15:00,150 --> 00:14:58,959

delivered to earth through just natural

346

00:15:03,110 --> 00:15:00,160

impacts

347

00:15:04,150 --> 00:15:03,120

every year and so we have a large number

348

00:15:06,710 --> 00:15:04,160

of meteorites

349

00:15:09,910 --> 00:15:06,720

in our collections across the world and

350

00:15:12,629 --> 00:15:09,920

we can use those samples to do

351

00:15:13,269 --> 00:15:12,639

age dating and figure out exactly how

352

00:15:15,030 --> 00:15:13,279

old

353

00:15:17,110 --> 00:15:15,040

some of these samples are and and when

354

00:15:17,670 --> 00:15:17,120

they formed and that has given us

355

00:15:20,870 --> 00:15:17,680

insight

356

00:15:23,509 --> 00:15:20,880

into the fact that you know many uh

357

00:15:24,230 --> 00:15:23,519

many of our meteorites uh really were

358

00:15:26,389 --> 00:15:24,240

were born

359

00:15:29,350 --> 00:15:26,399

shortly after the formation of our solar

360

00:15:33,110 --> 00:15:31,189

i have another question for you this one

361

00:15:36,310 --> 00:15:33,120

is from nick georgiou

362

00:15:39,350 --> 00:15:36,320

on youtube and they ask will an asteroid

363

00:15:41,430 --> 00:15:39,360

ever hit earth and when and will it be

364

00:15:44,230 --> 00:15:41,440

in this lifetime

365

00:15:45,189 --> 00:15:44,240

who'd like to answer that one i can take

366

00:15:47,509 --> 00:15:45,199

that one

367

00:15:48,710 --> 00:15:47,519

so the first thing to say is there are

368

00:15:51,110 --> 00:15:48,720

no known

369

00:15:52,470 --> 00:15:51,120

asteroid impact threats for the next

370

00:15:55,350 --> 00:15:52,480

hundred years

371

00:15:56,550 --> 00:15:55,360

so that's the first thing um we do have

372

00:15:58,949 --> 00:15:56,560

asteroids that are

373

00:16:00,790 --> 00:15:58,959

smaller say like about a few meters

374

00:16:02,710 --> 00:16:00,800

maybe like 12 feet across

375

00:16:04,230 --> 00:16:02,720

and those hit maybe once a year but they

376

00:16:05,910 --> 00:16:04,240

break up in the atmosphere and don't

377

00:16:09,030 --> 00:16:05,920

cause a lot of damage

378

00:16:11,189 --> 00:16:09,040

um as danny mentioned our first defense

379

00:16:12,550 --> 00:16:11,199

is to find the asteroids and right now

380

00:16:14,949 --> 00:16:12,560

we have we know about

381

00:16:16,790 --> 00:16:14,959

40 or 50 of the asteroids that might

382

00:16:20,629 --> 00:16:16,800

cause like a regional

383

00:16:22,629 --> 00:16:20,639

um regional damage and so nasa is

384

00:16:23,910 --> 00:16:22,639

working really hard to find the rest of

385

00:16:25,430 --> 00:16:23,920

those asteroids

386

00:16:27,030 --> 00:16:25,440

because once we know where they are

387

00:16:32,550 --> 00:16:27,040

we'll be able to know

388

00:16:36,550 --> 00:16:35,189

okay so i have another question from

389

00:16:39,590 --> 00:16:36,560

youtube this is from

390

00:16:41,670 --> 00:16:39,600

radeon av they would like to know do

391

00:16:42,310 --> 00:16:41,680

asteroids have their own gravitational

392

00:16:45,110 --> 00:16:42,320

fields

393

00:16:47,110 --> 00:16:45,120

danny would you be able to answer that

394

00:16:49,990 --> 00:16:47,120

yes i'd be happy to answer that

395

00:16:52,230 --> 00:16:50,000

uh and and the answer is yes asteroids

396

00:16:52,710 --> 00:16:52,240

do have their own small gravitational

397

00:16:55,749 --> 00:16:52,720

fields

398

00:16:56,310 --> 00:16:55,759

they are much weaker than earth's um so

399

00:17:00,150 --> 00:16:56,320

we're

400

00:17:03,749 --> 00:17:00,160

often more like microgravity

401  
00:17:04,390 --> 00:17:03,759  
um when we look at asteroids like bennu

402  
00:17:07,510 --> 00:17:04,400  
and

403  
00:17:09,350 --> 00:17:07,520  
so they they have a very weak pull um

404  
00:17:10,789 --> 00:17:09,360  
compared to the larger planets in our

405  
00:17:13,350 --> 00:17:10,799  
solar system but

406  
00:17:13,909 --> 00:17:13,360  
even they might have really small moons

407  
00:17:15,669 --> 00:17:13,919  
um

408  
00:17:17,429 --> 00:17:15,679  
in the case of bennu we saw many

409  
00:17:18,870 --> 00:17:17,439  
particles just a couple centimeters

410  
00:17:20,630 --> 00:17:18,880  
across

411  
00:17:22,150 --> 00:17:20,640  
orbiting around it in its weak

412  
00:17:25,189 --> 00:17:22,160  
gravitational field

413  
00:17:27,350 --> 00:17:25,199

it's a great question steve

414

00:17:29,830 --> 00:17:27,360

johnson on youtube asked will we

415

00:17:32,630 --> 00:17:29,840

potentially be able to use the materials

416

00:17:37,830 --> 00:17:32,640

found on asteroids as refueling stations

417

00:17:44,070 --> 00:17:41,750

you want to take that one tarik sure so

418

00:17:45,029 --> 00:17:44,080

we will talk a lot about what we call

419

00:17:47,350 --> 00:17:45,039

isr uber

420

00:17:48,390 --> 00:17:47,360

in situ resource utilization which is

421

00:17:51,590 --> 00:17:48,400

using things on

422

00:17:54,470 --> 00:17:51,600

asteroids or on the moon for example

423

00:17:56,230 --> 00:17:54,480

to get resources like water or other

424

00:17:57,909 --> 00:17:56,240

things for astronauts or space

425

00:17:59,909 --> 00:17:57,919

exploration

426

00:18:01,510 --> 00:17:59,919

agencies to use so it's an area of

427

00:18:03,350 --> 00:18:01,520

active work where people

428

00:18:05,430 --> 00:18:03,360

are thinking about how to utilize

429

00:18:07,830 --> 00:18:05,440

resources out there in space

430

00:18:08,789 --> 00:18:07,840

but that i think is more of a long-term

431

00:18:10,150 --> 00:18:08,799

uh study

432

00:18:12,470 --> 00:18:10,160

rather than something that we can do

433

00:18:16,470 --> 00:18:12,480

right now

434

00:18:19,270 --> 00:18:16,480

coming in from

435

00:18:20,710 --> 00:18:19,280

space live on youtube and they ask if

436

00:18:23,990 --> 00:18:20,720

there is a difference between

437

00:18:27,350 --> 00:18:24,000

asteroids meteor meteorites and comets

438

00:18:30,390 --> 00:18:27,360

and if so what are they

439

00:18:31,669 --> 00:18:30,400

danny would you like to yes yeah i'd be

440

00:18:34,710 --> 00:18:31,679

happy to answer that

441

00:18:36,950 --> 00:18:34,720

so um there is a little bit of a a

442

00:18:38,710 --> 00:18:36,960

continuum between what we think of as

443

00:18:42,070 --> 00:18:38,720

asteroids and comets but

444

00:18:44,230 --> 00:18:42,080

typically asteroids are composed of more

445

00:18:45,350 --> 00:18:44,240

rocky materials and comets which

446

00:18:47,430 --> 00:18:45,360

originate

447

00:18:48,390 --> 00:18:47,440

further out in the solar system are

448

00:18:51,590 --> 00:18:48,400

composed of

449

00:18:53,590 --> 00:18:51,600

uh different ices um but there's some

450

00:18:55,110 --> 00:18:53,600

asteroids that have a little bit of icy

451

00:18:58,870 --> 00:18:55,120

material and and

452

00:19:00,230 --> 00:18:58,880

vice versa with comets and then as far

453

00:19:03,750 --> 00:19:00,240

as meteorites go

454

00:19:05,830 --> 00:19:03,760

meteorites are the material that have

455

00:19:07,750 --> 00:19:05,840

from other planetary objects that have

456

00:19:11,430 --> 00:19:07,760

collected on our planet

457

00:19:12,950 --> 00:19:11,440

and so we have a lot of meteorites from

458

00:19:15,430 --> 00:19:12,960

asteroids but we also have some

459

00:19:16,870 --> 00:19:15,440

meteorites from the moon and even mars

460

00:19:18,470 --> 00:19:16,880

and so meteorites again just kind of

461

00:19:20,549 --> 00:19:18,480

refer to material from

462

00:19:21,590 --> 00:19:20,559

other planetary objects that originated

463

00:19:24,150 --> 00:19:21,600

elsewhere that has

464

00:19:26,710 --> 00:19:24,160

landed on our planet through the course

465

00:19:29,350 --> 00:19:26,720

of earth's history

466

00:19:30,950 --> 00:19:29,360

wow um i have a question from youtube

467

00:19:35,350 --> 00:19:30,960

and it's from rafam

468

00:19:36,830 --> 00:19:35,360

567 and it asks what is the most strange

469

00:19:40,710 --> 00:19:36,840

asteroid that has been

470

00:19:43,909 --> 00:19:43,350

i think that is a subjective question

471

00:19:45,590 --> 00:19:43,919

and so

472

00:19:47,270 --> 00:19:45,600

tarek would probably give a different

473

00:19:50,950 --> 00:19:47,280

answer than

474

00:19:53,270 --> 00:19:50,960

uh than i would um i think some of the

475

00:19:56,070 --> 00:19:53,280

coolest asteroids that we have

476

00:19:57,990 --> 00:19:56,080

observed are asteroids in the outer

477

00:20:00,789 --> 00:19:58,000

asteroid belt that are part of

478

00:20:02,950 --> 00:20:00,799

the themis family and these are i

479

00:20:03,669 --> 00:20:02,960

alluded to earlier there's these objects

480

00:20:05,430 --> 00:20:03,679

uh

481

00:20:06,710 --> 00:20:05,440

asteroids and comets are a little bit of

482

00:20:09,669 --> 00:20:06,720

a continuum

483

00:20:12,230 --> 00:20:09,679

so there's some asteroids that display

484

00:20:15,270 --> 00:20:12,240

cometary activity every once in a while

485

00:20:17,510 --> 00:20:15,280

meaning they they show um tails and

486

00:20:18,549 --> 00:20:17,520

like they're um kind of off-gassing

487

00:20:21,270 --> 00:20:18,559

material

488

00:20:22,149 --> 00:20:21,280

and i think those are really strange and

489

00:20:25,590 --> 00:20:22,159

fascinating

490

00:20:28,950 --> 00:20:25,600

objects what we call active asteroids

491

00:20:31,430 --> 00:20:28,960

tarek what do you think honestly

492

00:20:33,190 --> 00:20:31,440

i think it's whatever asteroid we have

493

00:20:35,830 --> 00:20:33,200

most recently visited

494

00:20:38,310 --> 00:20:35,840

because every aspect right they're

495

00:20:40,710 --> 00:20:38,320

thinking about like osiris-rex right

496

00:20:42,950 --> 00:20:40,720

so we touched this asteroid and it

497

00:20:43,830 --> 00:20:42,960

behaved in a totally bizarre way right

498

00:20:45,909 --> 00:20:43,840

the whole surface

499

00:20:48,390 --> 00:20:45,919

moved away and the spacecraft kept going

500

00:20:50,310 --> 00:20:48,400

inward totally surprising people

501  
00:20:51,750 --> 00:20:50,320  
in terms of their expectations of how

502  
00:20:54,149 --> 00:20:51,760  
the asteroid would behave

503  
00:20:55,110 --> 00:20:54,159  
so every time we study a new asteroid we

504  
00:20:57,350 --> 00:20:55,120  
get surprised

505  
00:21:00,830 --> 00:20:57,360  
and i find the most recent surprise the

506  
00:21:06,390 --> 00:21:02,710  
interesting

507  
00:21:10,230 --> 00:21:06,400  
nice so i have a question from

508  
00:21:13,590 --> 00:21:10,240  
nick grugu on youtube and they asked

509  
00:21:16,870 --> 00:21:13,600  
nasa said that adoptis won't hit earth

510  
00:21:20,149 --> 00:21:16,880  
in 100 years does this mean

511  
00:21:24,470 --> 00:21:20,159  
in 100 years it will hit or does it mean

512  
00:21:26,710 --> 00:21:24,480  
something else so i can take that one so

513  
00:21:28,149 --> 00:21:26,720

the asteroid apophis which was what was

514

00:21:31,350 --> 00:21:28,159  
referenced

515

00:21:33,190 --> 00:21:31,360  
is an asteroid that in 2029

516

00:21:35,430 --> 00:21:33,200  
will make a close approach to earth it

517

00:21:37,190 --> 00:21:35,440  
will not hit the earth in 2029 or

518

00:21:39,430 --> 00:21:37,200  
anytime in the next hundred years

519

00:21:41,909 --> 00:21:39,440  
um in that really close approach to

520

00:21:43,190 --> 00:21:41,919  
earth the orbit of apophis and its spin

521

00:21:45,190 --> 00:21:43,200  
state and rotation

522

00:21:47,029 --> 00:21:45,200  
will change and so that makes it

523

00:21:48,470 --> 00:21:47,039  
challenging to predict what will happen

524

00:21:50,789 --> 00:21:48,480  
really far in the future

525

00:21:51,990 --> 00:21:50,799  
but um we know it's not going to hit for

526  
00:21:53,830 --> 00:21:52,000  
100 years

527  
00:21:56,310 --> 00:21:53,840  
there's we're not saying it will hit in

528  
00:21:57,029 --> 00:21:56,320  
100 years but we'll continue to study

529  
00:21:59,510 --> 00:21:57,039  
apophis

530  
00:22:01,110 --> 00:21:59,520  
and measure its orbit and monitor it so

531  
00:22:03,750 --> 00:22:01,120  
that we understand

532  
00:22:05,510 --> 00:22:03,760  
uh the hazard that it poses but to

533  
00:22:08,230 --> 00:22:05,520  
answer that question in short

534  
00:22:08,630 --> 00:22:08,240  
nasa is not saying it will impact in 100

535  
00:22:10,710 --> 00:22:08,640  
years

536  
00:22:12,470 --> 00:22:10,720  
it's just saying we know it a hundred

537  
00:22:14,789 --> 00:22:12,480  
years into the future and we'll continue

538  
00:22:16,149 --> 00:22:14,799

to monitor it

539

00:22:20,149 --> 00:22:16,159

there's some really good questions

540

00:22:22,710 --> 00:22:20,159

coming from youtube we have marcomai2010

541

00:22:24,830 --> 00:22:22,720

who asks why aren't the dark solar

542

00:22:27,110 --> 00:22:24,840

panels

543

00:22:29,909 --> 00:22:27,120

symmetrical

544

00:22:30,630 --> 00:22:29,919

okay so i can take the dart one um dart

545

00:22:32,789 --> 00:22:30,640

is

546

00:22:35,110 --> 00:22:32,799

actually a brand new technology called

547

00:22:37,190 --> 00:22:35,120

roll out solar arrays so think of like

548

00:22:39,270 --> 00:22:37,200

paper towels on a roll

549

00:22:41,029 --> 00:22:39,280

um and so the big solar panels you see

550

00:22:41,430 --> 00:22:41,039

extended out they're like school bus

551  
00:22:43,510 --> 00:22:41,440  
size

552  
00:22:45,110 --> 00:22:43,520  
actually on the spacecraft right now are

553  
00:22:46,870 --> 00:22:45,120  
wrapped up like around a paper towel

554  
00:22:48,230 --> 00:22:46,880  
tube well it's not a paper towel too but

555  
00:22:49,750 --> 00:22:48,240  
that kind of an idea

556  
00:22:51,510 --> 00:22:49,760  
and so when the spacecraft launches it

557  
00:22:53,350 --> 00:22:51,520  
deploys and that's just the way they

558  
00:22:55,270 --> 00:22:53,360  
were able to fit on the spacecraft

559  
00:22:56,549 --> 00:22:55,280  
they've referred to it to accommodation

560  
00:22:59,110 --> 00:22:56,559  
you've got to fit a lot of stuff on the

561  
00:23:00,789 --> 00:22:59,120  
spacecraft in a really small space

562  
00:23:02,470 --> 00:23:00,799  
and that's what benefited the design the

563  
00:23:04,710 --> 00:23:02,480

most but these solar arrays

564

00:23:05,590 --> 00:23:04,720

are brand new technology being tested

565

00:23:09,110 --> 00:23:05,600

for the first time

566

00:23:11,990 --> 00:23:09,120

on dart

567

00:23:14,870 --> 00:23:12,000

tala on facebook asked how many

568

00:23:16,789 --> 00:23:14,880

asteroids are there in our solar system

569

00:23:19,909 --> 00:23:16,799

and what are they doing are they helping

570

00:23:23,029 --> 00:23:21,510

i can take that one so there are

571

00:23:25,430 --> 00:23:23,039

hundreds of thousands

572

00:23:26,149 --> 00:23:25,440

of asteroids in the solar system that we

573

00:23:28,710 --> 00:23:26,159

know about

574

00:23:29,510 --> 00:23:28,720

and there are probably even more that we

575

00:23:33,029 --> 00:23:29,520

just haven't

576

00:23:37,029 --> 00:23:33,039

yet observed with uh our telescopes

577

00:23:39,029 --> 00:23:37,039

um and so they are

578

00:23:40,950 --> 00:23:39,039

as far as uh what they're doing most of

579

00:23:44,230 --> 00:23:40,960

them are just orbiting around the sun

580

00:23:47,990 --> 00:23:44,240

um and and sitting there waiting to be

581

00:23:51,029 --> 00:23:48,000

um observed and um examined by

582

00:23:52,470 --> 00:23:51,039

various telescopes usually with

583

00:23:55,269 --> 00:23:52,480

with instruments that give us some

584

00:23:57,190 --> 00:23:55,279

information about their composition

585

00:23:59,430 --> 00:23:57,200

and help us understand how they relate

586

00:24:01,750 --> 00:23:59,440

to other asteroids

587

00:24:02,950 --> 00:24:01,760

some asteroids like i mentioned earlier

588

00:24:05,029 --> 00:24:02,960

are what we call

589

00:24:06,390 --> 00:24:05,039

active so they do have some sort of

590

00:24:09,190 --> 00:24:06,400

activity um

591

00:24:09,590 --> 00:24:09,200

that's that's occurring on their surface

592

00:24:11,430 --> 00:24:09,600

but

593

00:24:13,029 --> 00:24:11,440

a lot of them like the other planets in

594

00:24:16,950 --> 00:24:13,039

our solar system are just

595

00:24:21,350 --> 00:24:19,909

i have one last question and it's for me

596

00:24:22,630 --> 00:24:21,360

maybe both of you could answer if we

597

00:24:24,549 --> 00:24:22,640

have a few moments

598

00:24:26,710 --> 00:24:24,559

what advice would you have for viewers

599

00:24:31,110 --> 00:24:26,720

who want to pursue a career similar to

600

00:24:35,029 --> 00:24:33,430

yeah so i i would be happy to answer at

601  
00:24:38,230 --> 00:24:35,039  
least from my perspective

602  
00:24:41,110 --> 00:24:38,240  
um so i would say you know you study

603  
00:24:42,070 --> 00:24:41,120  
in if if you go to college um i would

604  
00:24:44,230 --> 00:24:42,080  
recommend that

605  
00:24:45,990 --> 00:24:44,240  
uh study something that relates to

606  
00:24:49,110 --> 00:24:46,000  
understanding the physical world

607  
00:24:50,870 --> 00:24:49,120  
around us so you know people think of

608  
00:24:51,269 --> 00:24:50,880  
math and physics and engineering but

609  
00:24:55,269 --> 00:24:51,279  
also

610  
00:24:57,269 --> 00:24:55,279  
subjects like geology and even biology

611  
00:24:59,590 --> 00:24:57,279  
in especially because it has many

612  
00:25:00,710 --> 00:24:59,600  
applications to astrobiology are great

613  
00:25:02,310 --> 00:25:00,720

things to just begin

614

00:25:04,310 --> 00:25:02,320

understanding the world around you and

615

00:25:04,870 --> 00:25:04,320

questioning why are things the way they

616

00:25:07,110 --> 00:25:04,880

are

617

00:25:09,029 --> 00:25:07,120

and how did they get this way what do

618

00:25:11,830 --> 00:25:09,039

you think tarek

619

00:25:12,630 --> 00:25:11,840

i think yes to everything you said and

620

00:25:14,710 --> 00:25:12,640

then also

621

00:25:15,990 --> 00:25:14,720

applying looking for opportunities to

622

00:25:19,190 --> 00:25:16,000

get your hands dirty so

623

00:25:20,230 --> 00:25:19,200

internships are a really great way to

624

00:25:22,390 --> 00:25:20,240

build experience

625

00:25:24,070 --> 00:25:22,400

that looks good on a resume so while

626  
00:25:25,269 --> 00:25:24,080  
you're pursuing that important technical

627  
00:25:27,990 --> 00:25:25,279  
education

628  
00:25:30,230 --> 00:25:28,000  
be bold and ask people for opportunities

629  
00:25:31,269 --> 00:25:30,240  
to do work to do research so that you

630  
00:25:33,190 --> 00:25:31,279  
can get that

631  
00:25:35,269 --> 00:25:33,200  
work experience and internship

632  
00:25:37,350 --> 00:25:35,279  
experience along with that formal

633  
00:25:39,110 --> 00:25:37,360  
education

634  
00:25:41,029 --> 00:25:39,120  
thank you both for that answer to that

635  
00:25:42,390 --> 00:25:41,039  
question and unfortunately that's all

636  
00:25:44,230 --> 00:25:42,400  
the time we have

637  
00:25:46,789 --> 00:25:44,240  
thank you so much danny and tarik for

638  
00:25:49,909 --> 00:25:46,799

joining us today

639

00:25:52,549 --> 00:25:49,919

thank you bri thanks for having us yes

640

00:25:55,110 --> 00:25:52,559

it's been fun thank you

641

00:25:56,230 --> 00:25:55,120

thank you and thank you all for joining

642

00:25:58,230 --> 00:25:56,240

us from home

643

00:26:00,230 --> 00:25:58,240

to keep updated about any of the

644

00:26:00,870 --> 00:26:00,240

exciting missions mentioned on today's

645

00:26:03,990 --> 00:26:00,880

show

646

00:26:06,870 --> 00:26:04,000

be sure to follow nasa solar system

647

00:26:08,870 --> 00:26:06,880

on facebook twitter and instagram to

648

00:26:09,430 --> 00:26:08,880

learn more about nasa's planetary

649

00:26:13,110 --> 00:26:09,440

defense

650

00:26:15,190 --> 00:26:13,120

efforts follow asteroid watch on twitter

651  
00:26:16,789 --> 00:26:15,200  
and to learn more about how nasa is

652  
00:26:23,430 --> 00:26:16,799  
studying our solar system

653  
00:26:26,549 --> 00:26:24,390  
we solarsystem.nasa.gov so happy you

654  
00:26:27,190 --> 00:26:26,559  
could join us today but before we end

655  
00:26:29,430 --> 00:26:27,200  
our show

656  
00:26:30,230 --> 00:26:29,440  
we have a very special special message

657  
00:26:33,269 --> 00:26:30,240  
from nasa

658  
00:26:37,990 --> 00:26:33,279  
newest administrator bill nelson

659  
00:26:41,510 --> 00:26:38,000  
until next time happy asteroid day

660  
00:26:44,070 --> 00:26:41,520  
hi i'm bill nelson i have the privilege

661  
00:26:45,830 --> 00:26:44,080  
of heading up nasa and i want to thank

662  
00:26:49,350 --> 00:26:45,840  
you for joining us on

663  
00:26:52,230 --> 00:26:49,360

international asteroid day

664

00:26:53,669 --> 00:26:52,240

and every day for us at nasa is an

665

00:26:56,230 --> 00:26:53,679

asteroid day

666

00:26:57,029 --> 00:26:56,240

because we have these missions that are

667

00:27:00,870 --> 00:26:57,039

exploring

668

00:27:02,470 --> 00:27:00,880

for asteroids all the time

669

00:27:05,029 --> 00:27:02,480

as a matter of fact nasa and our

670

00:27:08,549 --> 00:27:05,039

partners are watching the skies

671

00:27:12,070 --> 00:27:08,559

24 7 365 and

672

00:27:16,070 --> 00:27:12,080

using ground-based telescopes

673

00:27:19,269 --> 00:27:16,080

we've already found 26 000

674

00:27:22,870 --> 00:27:19,279

near-earth asteroids

675

00:27:25,510 --> 00:27:22,880

but there's so many more to be found

676  
00:27:28,070 --> 00:27:25,520  
so today we announced the extension of

677  
00:27:31,990 --> 00:27:28,080  
nasa's neo-wise

678  
00:27:35,110 --> 00:27:32,000  
it's a space-based observatory

679  
00:27:39,269 --> 00:27:35,120  
that's going to help us find even more

680  
00:27:40,549 --> 00:27:39,279  
of these objects and work on nasa's

681  
00:27:43,350 --> 00:27:40,559  
first

682  
00:27:45,430 --> 00:27:43,360  
space based telescope that is

683  
00:27:49,110 --> 00:27:45,440  
specifically designed

684  
00:27:53,909 --> 00:27:49,120  
to find asteroids called neo

685  
00:27:55,830 --> 00:27:53,919  
surveyor it's currently underway

686  
00:27:57,269 --> 00:27:55,840  
we're also looking forward to the launch

687  
00:28:00,470 --> 00:27:57,279  
of dart

688  
00:28:03,110 --> 00:28:00,480

it's our first planetary defense

689

00:28:04,389 --> 00:28:03,120

test mission that's going to go later

690

00:28:07,190 --> 00:28:04,399

this year

691

00:28:08,389 --> 00:28:07,200

thank you for watching today's episode

692

00:28:11,430 --> 00:28:08,399

of nasa

693

00:28:12,310 --> 00:28:11,440

science live you can be assured that

694

00:28:16,910 --> 00:28:12,320

nasa

695

00:28:21,250 --> 00:28:16,920

is always looking up

696

00:28:42,830 --> 00:28:21,260

[Music]

697

00:28:42,840 --> 00:28:47,390

so