Mars Base Camp – Red Planet *Odyssey*

1
00:00:08.370 --> 00:00:19.290
Torey Earle: Hi everybody, my name is Torey Earle, and I am an Extension Specialist for 4-H Youth Development with the University of Kentucky College of Agriculture, Food and Environment Cooperative Extension Service.

2
00:00:19.890 --> 00:00:26.880
Torey Earle: We're here today to introduce you to this year's national 4-H STEM Challenge which is called Mars Base Camp.

3
00:00:27.510 --> 00:00:38.340
Torey Earle: If you hadn't noticed this year, we're doing the 4-H STEM Challenge training, just a little differently. This second activity is called Red Planet *Odyssey* from the 4-H STEM Challenge.

4
00:00:43.590 --> 00:00:54.000
Torey Earle: In our second activity in the Mars Base Camp Challenge we're going to try to see how we can move over around on Mars. And this is called Red Planet Odyssey.

5
00:00:54.570 --> 00:01:08.610
Torey Earle: During this activity participants will build a smaller over and there are instructions given with rover as to how I suggest a way to put it together, but this will also be a chance for them to experiment a little bit and try some different things.

6
00:01:10.200 --> 00:01:22.380
Torey Earle: In building the rover. I'm going to try to give you some tips and some things that I've learned and putting one together that might make it a little easier for you and get you maneuvering around more successfully.

7
00:01:23.910 --> 00:01:33.390
Torey Earle: In addition, the information that they determine from landing zone surveyor and the landing zone cards that they got in the previous activity.

8
00:01:33.750 --> 00:01:53.190
Torey Earle: They are going to be challenged with building an obstacle course based on those features that might be in existence in the area that they landed on Mars in doing this just use

every day, ordinary things from around the house or around the classroom and you can use books, you can use

9
00:01:55.440 --> 00:02:05.670
Torey Earle: Just, just about anything to create an obstacle for your rover to get over what we're going to do now is move into looking at the parts that are in the kit for the rover.

10
00:02:06.240 --> 00:02:13.920
Torey Earle: And again, like I said, I'm gonna try to give you some tips of ways to make it a little easier to assemble. So, let's get started.

11
00:02:15.150 --> 00:02:28.620
Torey Earle: As we get started. This is what the rover kit looks like as it would come out of the experiment kit either the educator, or the family, kit. And it's box them all nicely together like that.

12
00:02:29.490 --> 00:02:43.170
Torey Earle: And I've got the parks laid out right here. This is your, your base or your chassis for the rover. It's got four wheels two axles three gears several small screws and electric motor.

13
00:02:45.000 --> 00:02:55.320
Torey Earle: Motor anchor point or holder and a battery holder. You will need to double A batteries to go with this in order to make it run

14
00:02:57.060 --> 00:03:09.870
Torey Earle: Several of the things that I discovered about this kit are that you, you're going to have to apply some force in a couple of places to get some of the gears on or to actually do get the screws to start in

15
00:03:11.340 --> 00:03:13.800
Torey Earle: The kit itself does come with a small screwdriver

16
00:03:15.300 --> 00:03:25.800
Torey Earle: My recommendation would be to probably get you something that's a little more substantial that will hold on to the screws, a little bit better because

17
00:03:26.940 --> 00:03:39.750
Torey Earle: The screws are tiny. And they, if you're not very careful with them. They do have a tendency to strip out but the instructions for the rover are included right here it goes. Step one.

18
00:03:41.340 --> 00:03:48.600
Torey Earle: Through. Step five. To get your rover put together. So we're going to look through those and

19
00:03:50.280 --> 00:04:09.840
Torey Earle: Get this rover put together and order for it to move around. Now one of the ideas behind doing this red planet Odyssey activity is for participants to think about the engineering design process and that process is listed on page 20 of your Facilitator Guide

20
00:04:11.550 --> 00:04:19.230
Torey Earle: Where do you start by asking and identifying the problem. Imagine or brainstorm solutions to what you're wanting to do

21
00:04:20.220 --> 00:04:29.190
Torey Earle: Plan by putting together a couple of three sketches or ideas as to what what the good ideas that came from the group during brainstorming would be

22
00:04:29.820 --> 00:04:37.200
Torey Earle: Create you build a working model or a prototype that follows those design characteristics that you wanted to have

23
00:04:37.830 --> 00:04:46.170
Torey Earle: You test which you would evaluate through the testing and collect data collect and analyze data based on what the test for re reveals

24
00:04:46.740 --> 00:04:58.290
Torey Earle: And then you would improve on the design that you've made. So keeping those in mind this is the engineering design process. And we're going to get started putting this rover together.

25
00:05:00.540 --> 00:05:07.380

Torey Earle: According to our instructions that came with the rover. Step one is going to be to install

26
00:05:08.430 --> 00:05:09.480
Torey Earle: This long screw.

27
00:05:10.890 --> 00:05:21.660
Torey Earle: The longest one in the kit into the medium gear, you'll see there's three different size gears here the medium gear actually has two different teeth gears on it.

28
00:05:23.490 --> 00:05:28.890
Torey Earle: You put the screw started into the side with the smallest gear.

29
00:05:29.910 --> 00:05:31.500
Torey Earle: And then take your screwdriver

30
00:05:35.370 --> 00:05:35.880
Torey Earle: And

31
00:05:37.140 --> 00:05:38.550
Torey Earle: start screaming it in like that.

32
00:05:40.560 --> 00:05:41.910
Torey Earle: Once you get it all the way through.

33
00:05:43.110 --> 00:05:45.480
Torey Earle: A Southern chef dollar on it will allow the gear to turn

34
00:05:47.640 --> 00:05:49.380
Torey Earle: Them looking at your chastity.

35
00:05:51.060 --> 00:05:54.600
Torey Earle: The medium gear cozy it in the second hole.

36
00:05:55.680 --> 00:05:57.210
Torey Earle: On the side of the board.

37
00:05:58.950 --> 00:06:07.530
Torey Earle: One of the things it does tell you is to make sure to leave space for rotation. If you look at the chassis itself. There's a small hole that will be

38
00:06:08.520 --> 00:06:27.990
Torey Earle: On the end where the motor will be attached and there is not one on the end or you will attach the battery holder. If you're going to follow the design that is listed in the instructions. So looking at this side with the, the small hole.

39
00:06:29.100 --> 00:06:30.300
Torey Earle: facing towards you.

40
00:06:32.460 --> 00:06:33.510
Torey Earle: Turn the rover.

41
00:06:34.560 --> 00:06:41.940
Torey Earle: To the right, with a side up and you're going to install the gear and the first second hole.

42
00:06:43.050 --> 00:06:45.150
Torey Earle: Right there. So you put the gear on top.

43
00:06:47.250 --> 00:06:47.730
Torey Earle: With

44
00:06:52.020 --> 00:06:55.890
Torey Earle: Your screwdriver. You're just going to screw it into that second hole.

45
00:06:57.960 --> 00:07:04.140
Torey Earle: And make sure that it will still turn frame that you may have to back it out to us a little bit. Make sure it turns freely.

46
00:07:08.850 --> 00:07:13.170
Torey Earle: The next step. It gives in the instructions is to install the actual

47
00:07:14.430 --> 00:07:30.090
Torey Earle: My suggestion is going to be that you would install this large gear on to the actual first which it gives you in step two, because as you would install it, you're going to have to put the axle in

48
00:07:31.140 --> 00:07:38.820
Torey Earle: And then you're going to have to put some pressure on it. So I would recommend setting the actual on the table, taking both hands.

49
00:07:40.350 --> 00:07:46.110
Torey Earle: One on either side of gear and pressing it down on to the actual itself. This allows you to

50
00:07:47.250 --> 00:07:54.180
Torey Earle: Have a little smoother and a little easier transition of the actual on there, then you would install the actual

51
00:07:55.500 --> 00:07:57.720
Torey Earle: Through the holes.

52
00:07:59.670 --> 00:08:03.720
Torey Earle: On the bottom of the chassis lying it up so it goes all the way through.

53
00:08:05.340 --> 00:08:12.450
Torey Earle: And this also allows you to make sure that you got your medium gear installed.

54
00:08:13.800 --> 00:08:15.750
Torey Earle: In the correct co on the side.

55
00:08:17.160 --> 00:08:31.320

Torey Earle: Because that way it will turn large here which the motor itself is going to turn the bigger part of the medium gear and the smaller part of the medium gear is going going to turn the gear that's on the actual

56
00:08:33.870 --> 00:08:35.550
Torey Earle: We got a little bit of

57
00:08:37.260 --> 00:08:44.550
Torey Earle: Maybe got the gear, a little too far on there. So we're going to take it and bring it back out just a little bit.

58
00:08:45.990 --> 00:09:00.600
Torey Earle: But you want to leave space on either side for your wheels to attach. Make sure to get it in there. Make sure the gear meshes and turns freely and it's going to look kind of like that when you get done.

59
00:09:02.070 --> 00:09:02.340
Torey Earle: Now,

60
00:09:03.750 --> 00:09:15.900
Torey Earle: Step three are again in step two, it gives you an indication to install the small gear on the motor this small gear your motor right here, my suggestion.

61
00:09:16.470 --> 00:09:32.040
Torey Earle: Put the motor flat on the table. Start the small gear onto the motor shaft. It's gonna take a little pressure to do it. But then, just like you did with the gear on the actual press it down.

62
00:09:33.090 --> 00:09:36.840
Torey Earle: And my suggestion is make make the

63
00:09:38.220 --> 00:09:42.210
Torey Earle: motor shaft coming out flush or even with

64
00:09:44.010 --> 00:09:47.940

Torey Earle: The outside of the gear and you could put it on the table and push it down just a little bit more like that.

65
00:09:49.200 --> 00:09:57.540
Torey Earle: Now before you would install your motor. This is one of the tips that I have figured out that makes things work. Just a little easier.

66
00:09:58.680 --> 00:10:06.990
Torey Earle: The two tabs that are on your motor right here. They're, they're flat out the side there they're parallel to the top of the motor

67
00:10:08.040 --> 00:10:10.800
Torey Earle: I would suggest very carefully.

68
00:10:12.060 --> 00:10:15.570
Torey Earle: banding each of those tabs up just a little bit.

69
00:10:17.070 --> 00:10:18.540
Torey Earle: That looks kind of like this.

70
00:10:20.490 --> 00:10:30.810
Torey Earle: Or like that to tab spin up. This will allow you to put the wires through. And to wrap them a little tighter. So they will stay in place.

71
00:10:34.080 --> 00:10:40.260
Torey Earle: Step three of our process indicates that you should put the motor

72
00:10:41.550 --> 00:10:47.550
Torey Earle: On to the chassis of the rover itself and

73
00:10:49.860 --> 00:10:52.440
Torey Earle: The suggestion is to use

74
00:10:54.900 --> 00:10:58.650

Torey Earle: These to hold the very back of the chassis.

75
00:11:00.300 --> 00:11:06.540
Torey Earle: To start the motor. Hold on. Mounting in. And then as you would put it on.

76
00:11:10.680 --> 00:11:19.290
Torey Earle: Going to use the corresponding holes that would light up on the rover chassis itself to be right here and here.

77
00:11:23.520 --> 00:11:25.080
Torey Earle: I would suggest

78
00:11:26.430 --> 00:11:28.230
Torey Earle: First, putting

79
00:11:30.000 --> 00:11:31.260
Torey Earle: The smaller screws.

80
00:11:33.330 --> 00:11:34.170
Torey Earle: Into

81
00:11:37.890 --> 00:11:38.940
Torey Earle: If you can hang on to them.

82
00:11:40.260 --> 00:11:41.160
Torey Earle: They are a little tricky.

83
00:11:42.600 --> 00:11:46.650
Torey Earle: But one of the smaller screws into one of the holes on the motor mounting

84
00:11:50.010 --> 00:11:50.640
Torey Earle: Band.

85

00:11:52.050 --> 00:11:52.620
Torey Earle: And then

86
00:11:53.910 --> 00:11:54.960
Torey Earle: String it in

87
00:11:56.430 --> 00:12:02.460
Torey Earle: The hole on the back first hole on the back of a rover chancy

88
00:12:06.240 --> 00:12:07.170
Torey Earle: Take a second one.

89
00:12:08.400 --> 00:12:10.380
Torey Earle: And put it in right beside it.

90
00:12:15.900 --> 00:12:19.710
Torey Earle: If you're using the screwdriver that came with the kit.

91
00:12:21.000 --> 00:12:27.450
Torey Earle: I will do that on these next two just to show you that it is possible to do it. But before you would put any more screws and

92
00:12:28.650 --> 00:12:30.780
Torey Earle: I'm gonna suggest sliding the motor through

93
00:12:32.070 --> 00:12:36.420
Torey Earle: Making sure that it matches up and you can turn the large gear and say,

94
00:12:37.860 --> 00:12:40.770
Torey Earle: It's if all of your gears are turning together.

95
00:12:47.550 --> 00:12:49.350
Torey Earle: line everything up.

96
00:12:50.760 --> 00:12:51.420
Torey Earle: To where it

97
00:12:52.500 --> 00:12:53.310
Torey Earle: fits nicely.

98
00:12:55.290 --> 00:12:56.310
Torey Earle: And then take

99
00:13:00.540 --> 00:13:01.290
Torey Earle: That came with the kit.

100
00:13:03.000 --> 00:13:05.220
Torey Earle: Chris, an island.

101
00:13:08.070 --> 00:13:10.560
Torey Earle: The mounting hole that will work.

102
00:13:11.700 --> 00:13:16.170
Torey Earle: There are several in the chassis of the rover itself.

103
00:13:18.360 --> 00:13:25.770
Torey Earle: So you can see the little small screwdriver will work, but it's it's a little bit

104
00:13:28.800 --> 00:13:31.380
Torey Earle: A bit tricky to use it sometimes a little precarious.

105
00:13:33.270 --> 00:13:36.570
Torey Earle: So I'm going to turn it around this way so you can see

106
00:13:39.930 --> 00:13:41.220
Torey Earle: The process on their side.

107
00:13:42.720 --> 00:13:44.100
Torey Earle: And you choose the screwdriver

108
00:13:46.920 --> 00:13:51.780
Torey Earle: And then tighten all the screws down make sure that motors held in their family.

109
00:14:00.780 --> 00:14:03.450
Torey Earle: And that should hold in their fairly tightly

110
00:14:04.830 --> 00:14:06.570
Torey Earle: You see, you've got four screws left

111
00:14:07.890 --> 00:14:09.450
Torey Earle: Those four screws left

112
00:14:11.730 --> 00:14:15.180
Torey Earle: Two of them are going to be used for mounting the battery holder.

113
00:14:16.440 --> 00:14:18.210
Torey Earle: The suggestion in

114
00:14:19.410 --> 00:14:21.060
Torey Earle: The instructions itself.

115
00:14:22.470 --> 00:14:28.170
Torey Earle: Suggest that you might mount a screw right behind the motor to keep it from sliding backwards.

116
00:14:30.150 --> 00:14:36.660
Torey Earle: I found if you get these on the motor mounting bracket screwed down tight enough the motors not going to move

117
00:14:39.210 --> 00:14:43.410

Torey Earle: So now let's look at mounting battery compartment.

118
00:14:45.180 --> 00:15:01.140
Torey Earle: battery compartment will set on what you could consider a the front or the back of your over depending on if you want it all wheel drive or not, or if you want it front wheel drive and rear wheel drive will take to have your screws and I'm going to go back to order screwdriver here.

119
00:15:04.290 --> 00:15:05.280
Torey Earle: Lineup

120
00:15:07.920 --> 00:15:09.090
Torey Earle: The mounting holes.

121
00:15:10.890 --> 00:15:13.140
Torey Earle: In your battery holder.

122
00:15:16.380 --> 00:15:21.690
Torey Earle: And you can choose which ones you want to use. I'm going to use

123
00:15:23.700 --> 00:15:24.600
Torey Earle: One right there.

124
00:15:25.770 --> 00:15:27.300
Torey Earle: And then I'm going to use

125
00:15:30.570 --> 00:15:33.240
Torey Earle: One that is to hold down from it.

126
00:15:39.360 --> 00:15:44.040
Torey Earle: Screw them into the battery holder, the Oscars. We'll still rotate

127
00:15:47.340 --> 00:15:50.460
Torey Earle: And then we're going to land this up.

128
00:15:53.700 --> 00:15:56.430
Torey Earle: And screw it down to the chassis itself.

129
00:16:00.090 --> 00:16:08.760
Torey Earle: If you notice I did change the position of where I first was intending to put that screw from the outermost whole to

130
00:16:09.600 --> 00:16:22.050
Torey Earle: What would be considered 1234 and five, the two of the four whole instead of the one in the four you could choose to use three squares, if you wanted to, to will hold it sufficiently

131
00:16:25.530 --> 00:16:27.330
Torey Earle: From there, we're going to wire up our motor

132
00:16:31.380 --> 00:16:35.490
Torey Earle: This is another trick or a tip that I'm going to give you

133
00:16:37.080 --> 00:16:41.490
Torey Earle: Is you would push wires down underneath the chassis.

134
00:16:44.040 --> 00:16:44.880
Torey Earle: Of your over

135
00:16:46.590 --> 00:16:49.800
Torey Earle: And then bring them back up through

136
00:16:52.230 --> 00:16:55.470
Torey Earle: The hole that is closest to the motor of the round hole on the chassis.

137
00:16:57.930 --> 00:17:19.590

Torey Earle: You notice that each one of the wires is already the installation is already stripped off of it, but it's not completely removed. This is handy because the wires themselves are stranded wires. They they'll pray, if you're not careful. So my suggestion, carefully remove

138
00:17:20.610 --> 00:17:40.260
Torey Earle: The insulation off the wire and then immediately twist the wire so it makes it more of a solid wire and you don't have strands coming out all over the place. Same thing with the black wire and you can do it in either order black first then read or read first and black.

139
00:17:41.820 --> 00:17:42.540
Torey Earle: The

140
00:17:44.610 --> 00:17:46.920
Torey Earle: Operation of this is

141
00:17:48.000 --> 00:18:07.560
Torey Earle: He using to double A batteries. So this is a direct current motor or DC motor which means that it doesn't matter which lead goes on which pole are

142
00:18:08.760 --> 00:18:09.810
Torey Earle: tab on the motor

143
00:18:12.750 --> 00:18:21.630
Torey Earle: It will make a difference as to which direction the rover moves, but it doesn't make a difference which direction or which one you hook them up to on either one.

144
00:18:25.110 --> 00:18:31.740
Torey Earle: My suggestion would be just decide which one you want to do and just do it consistently with all of your participants, so

145
00:18:33.090 --> 00:18:35.310
Torey Earle: I'm going to put the red

146
00:18:37.260 --> 00:18:37.890
Torey Earle: Lead

147
00:18:40.260 --> 00:18:41.190
Torey Earle: On the tab.

148
00:18:43.680 --> 00:18:47.610
Torey Earle: Facing what I would consider the back of my rover.

149
00:18:49.050 --> 00:18:57.510
Torey Earle: And if you notice, I'm having a twist face a little bit more because they are very, very small wires and you want to get them through there.

150
00:18:59.340 --> 00:19:05.610
Torey Earle: And it's still not twisted quite enough. So, this is this is a tricky part.

151
00:19:07.350 --> 00:19:11.100
Torey Earle: So I think I got it twisted enough. This time I'll put it through here.

152
00:19:15.270 --> 00:19:15.900
Torey Earle: And then

153
00:19:17.130 --> 00:19:24.870
Torey Earle: I'm going to do is I'm going to wrap my copper wire around the insulation.

154
00:19:25.890 --> 00:19:27.180
Torey Earle: Around the raid installation.

155
00:19:29.580 --> 00:19:30.510
Torey Earle: Going into my motor

156
00:19:33.120 --> 00:19:35.640
Torey Earle: Re twist the black wire.

157
00:19:36.720 --> 00:19:37.890

Torey Earle: And carefully.

158
00:19:39.330 --> 00:19:40.920
Torey Earle: Run it through.

159
00:19:42.390 --> 00:19:44.310
Torey Earle: The other tab on the other side.

160
00:19:45.990 --> 00:19:48.060
Torey Earle: And do the same thing. Just wrap it

161
00:19:49.230 --> 00:19:50.010
Torey Earle: Around

162
00:19:52.590 --> 00:19:54.990
Torey Earle: The installation on the wire sale.

163
00:19:59.250 --> 00:20:00.870
Torey Earle: And it looks on things that mark.

164
00:20:05.130 --> 00:20:12.990
Torey Earle: Before securing the wheels on the actual again this is a tip that I recommend for securing the wheels on the actual

165
00:20:14.040 --> 00:20:22.830
Torey Earle: After you get the leads for the motor hooked up, I would suggest that you make sure the switch.

166
00:20:24.060 --> 00:20:29.970
Torey Earle: Or your battery box is in the off position then install your batteries.

167
00:20:31.920 --> 00:20:34.470
Torey Earle: And just to make sure that everything is working correctly.

168
00:20:36.900 --> 00:20:40.110
Torey Earle: Test it and see if your motor patterns, your actual

169
00:20:42.150 --> 00:20:44.280
Torey Earle: As you can see, and here

170
00:20:45.510 --> 00:20:49.920
Torey Earle: It is working. So we turned it off. They were removed batteries.

171
00:20:56.040 --> 00:20:57.870
Torey Earle: installer for yours or axles.

172
00:21:00.690 --> 00:21:04.980
Torey Earle: Simply press the wheel are press the axle down into the wheel.

173
00:21:06.930 --> 00:21:08.580
Torey Earle: And they did the same thing on the other side.

174
00:21:10.590 --> 00:21:16.980
Torey Earle: Making sure that your wheels and axles spin freely and don't have

175
00:21:18.570 --> 00:21:19.620
Torey Earle: A lot of friction on them.

176
00:21:23.670 --> 00:21:30.750
Torey Earle: Okay, get some freedom there. They want to move and just a little bit away are spinning freely.

177
00:21:33.000 --> 00:21:35.400
Torey Earle: Then take your front axle.

178
00:21:37.110 --> 00:21:37.950
Torey Earle: Install it

179
00:21:41.160 --> 00:21:42.390
Torey Earle: Through

180
00:21:43.440 --> 00:21:44.250
Torey Earle: Both hold

181
00:21:47.070 --> 00:21:49.230
Torey Earle: And then you can press

182
00:21:50.670 --> 00:22:01.620
Torey Earle: The X all into the whale itself on both that I can sure to leave again enough freedom of movement for the, the actual is when the wheels turning freely.

183
00:22:02.850 --> 00:22:04.680
Torey Earle: And we have it there is your rover.

184
00:22:05.880 --> 00:22:17.820
Torey Earle: You may ask about the the bear wires here, there's not gonna be enough current to provide a shock for anybody but a suggestion that I might offer

185
00:22:18.360 --> 00:22:29.640
Torey Earle: Is especially if you're going to reuse these for various purposes. Those are very, very fragile wires, but take you a small piece of masking tape.

186
00:22:30.930 --> 00:22:31.530
Torey Earle: And

187
00:22:32.610 --> 00:22:35.670
Torey Earle: Secure over the top of those wires.

188
00:22:36.840 --> 00:22:53.460

Torey Earle: And cover up your tabs. That way you've got don't have not insulated wires that are exposed to something like that. And the reason I say to masking tape is because it's easy to remove and will necessarily damage the wires, as you take them off.

189
00:22:55.860 --> 00:22:58.440
Torey Earle: Now we reinstall our batteries.

190
00:23:04.410 --> 00:23:06.780
Torey Earle: According to the diagram that's in the battery holder.

191
00:23:07.920 --> 00:23:11.280
Torey Earle: And we'll see if our over most

192
00:23:13.800 --> 00:23:21.540
Torey Earle: At this point, it does not. So I've kind of see if I've got the batteries incorrectly. I do. So let's troubleshoot

193
00:23:22.860 --> 00:23:24.300
Torey Earle: Why is our overnight movie.

194
00:23:25.980 --> 00:23:26.400
Torey Earle: Take

195
00:23:28.080 --> 00:23:29.340
Torey Earle: The masking tape off.

196
00:23:30.840 --> 00:23:32.790
Torey Earle: And we'll see if we still have a good connection.

197
00:23:35.370 --> 00:23:46.710
Torey Earle: There we go. And it may have been that we and putting the masking tape on we might want to look at a little, little different configuration. So we'll put it over the top of one wire.

198

00:23:48.360 --> 00:23:50.040
Torey Earle: Then we'll put it over the top.

199
00:23:51.270 --> 00:23:55.890
Torey Earle: Of another wire that way. They're not together will say this. There we go.

200
00:23:57.330 --> 00:23:58.800
Torey Earle: And there goes our over

201
00:24:00.510 --> 00:24:01.950
Torey Earle: Now you'll notice

202
00:24:04.020 --> 00:24:04.920
Torey Earle: It pretty quick.

203
00:24:07.980 --> 00:24:19.110
Torey Earle: You might want to try to think of some ways to slow it down. I have experimented with a few ways and not found one that is truly successful yet.

204
00:24:21.330 --> 00:24:33.210
Torey Earle: I was able to do a configuration where I switched this large gear and this small gear and left out the medium gear. It did slow it down some

205
00:24:33.930 --> 00:24:54.060
Torey Earle: But ended up having to push it to get it started because there was not enough torque in the motor itself to cause it to start moving. So as you would have your participants design their obstacle courses, you might think about the speed that the rover actually rods.

206
00:24:55.290 --> 00:25:04.710
Torey Earle: Now another thing that one of our science, engineering and technology leadership board party our members came up with.

207
00:25:06.480 --> 00:25:17.610
Torey Earle: They discovered that as the rover ran it would it would pull to the side closest the motor kind of make it go around in circles, so they thought of the idea

208
00:25:19.020 --> 00:25:23.700
Torey Earle: Of using to rubber are actually one rubber bands, what they had. I'm going to use to on this one.

209
00:25:25.200 --> 00:25:26.220
Torey Earle: We're going to flip it over.

210
00:25:27.810 --> 00:25:28.440
Torey Earle: I'll take

211
00:25:29.970 --> 00:25:31.470
Torey Earle: One side of an axle out

212
00:25:33.390 --> 00:25:37.770
Torey Earle: Put our two rubber bands on it. Oh, actually read through this way.

213
00:25:44.160 --> 00:25:45.690
Torey Earle: Right, whether to rubber bands.

214
00:25:50.340 --> 00:25:52.950
Torey Earle: And then through the outside but the wheel back all

215
00:25:56.010 --> 00:26:00.780
Torey Earle: Then do the same thing with the back. I want to take one point I love

216
00:26:02.250 --> 00:26:03.120
Torey Earle: Come back here.

217
00:26:04.770 --> 00:26:05.850
Torey Earle: My actual food.

218
00:26:07.770 --> 00:26:09.120

Torey Earle: What the rubber band like so.

219
00:26:16.500 --> 00:26:19.530
Torey Earle: Make sure our gear line up again and put our way back home.

220
00:26:25.170 --> 00:26:31.410
Torey Earle: Or moving freely. We're going to try and make sure that our rubber band is not twisted

221
00:26:37.140 --> 00:26:38.970
Torey Earle: And basically what we're going to have here.

222
00:26:42.450 --> 00:26:43.590
Torey Earle: Is a belt drive

223
00:26:45.000 --> 00:26:46.110
Torey Earle: All wheel drive over

224
00:26:49.290 --> 00:26:49.920
Torey Earle: There we go.

225
00:26:51.660 --> 00:26:54.540
Torey Earle: To rubber band and let's see what happened.

226
00:26:56.670 --> 00:26:58.440
Torey Earle: We now have an all wheel drive over over

227
00:26:59.490 --> 00:27:00.960
Torey Earle: That slows down, want to

228
00:27:05.340 --> 00:27:14.610
Torey Earle: So that might be one suggestion that you would use the rubber band or something that you would have to source outside of the kit. But in doing that.

229
00:27:15.720 --> 00:27:23.370
Torey Earle: It's calling to put a little more friction on the motor itself. So it will slow the rover day off.

230
00:27:24.600 --> 00:27:36.450
Torey Earle: Another suggestion I would have for that is taking a piece of masking tape and taping the wires down on the bottom to keep the rubber bands from rubbing against the wires and possibly

231
00:27:37.980 --> 00:27:43.050
Torey Earle: Breaking the installation Allah. So something like this. And there you go.

232
00:27:44.100 --> 00:27:44.970
Torey Earle: You know, I have

233
00:27:46.050 --> 00:27:50.520
Torey Earle: An all wheel drive over that is a little slower but if

234
00:27:52.530 --> 00:27:54.990
Torey Earle: It'll climb over some things so

235
00:27:58.560 --> 00:27:59.640
Torey Earle: There is building

236
00:28:01.170 --> 00:28:05.490
Torey Earle: Your Red Planet Odyssey rover for

237
00:28:06.720 --> 00:28:11.310
Torey Earle: Step our activity to in the Mars Base Camp Challenge.

238
00:28:12.900 --> 00:28:21.420
Torey Earle: As your participant window is behind their obstacle course for their red planet Odyssey rover to maneuver through

239
00:28:22.230 --> 00:28:38.640
Torey Earle: The idea is for the rover to be able to direct itself as much as possible. That may mean it would bounce off obstacles and turn itself in a certain direction, but the the least amount of human interaction with it as possible.

240
00:28:40.830 --> 00:28:48.360
Torey Earle: Now, as I said earlier, you can use many things for developing these obstacle courses you can use blocks, you can use

241
00:28:50.460 --> 00:28:55.320
Torey Earle: Books, you can use empty toilet paper rolls. You can use

242
00:28:57.210 --> 00:29:04.950
Torey Earle: Balls, anything like that that you think you can make your over either maneuver around over or through

243
00:29:07.320 --> 00:29:22.170
Torey Earle: One suggestion I would have is that you utilize their landing area from the previous activity to help them determine what their obstacle course is going to look like. Is it going to have craters isn't going to have

244
00:29:23.730 --> 00:29:38.190
Torey Earle: Just strictly flat terrain is it going to have mountains of any type, is it going to have a very rocky uneven bumpy turay and you can get that from the landing cards based on where their

245
00:29:39.930 --> 00:29:43.140
Torey Earle: landing zone surveyor landed in the previous activity.

246
00:29:44.580 --> 00:30:03.270
Torey Earle: Now if they landed on a grid that they were in orbit around Mars, they won't have any terrain to develop so they could just come up with their own come up with ideas or maybe take a combination of Ideas From Other landing cards that the other participants have

247
00:30:04.350 --> 00:30:07.050

Torey Earle: So hope you've enjoyed the

248
00:30:08.070 --> 00:30:13.770
Torey Earle: Red Planet Odyssey rover part of this Mars Base Camp Challenge.

249
00:30:15.510 --> 00:30:16.050
Torey Earle: And

250
00:30:17.070 --> 00:30:20.190
Torey Earle: Next we're going to move on to the

251
00:30:21.960 --> 00:30:27.570
Torey Earle: Crop curiosity, where we learn a little bit more about growing food on Mars.