4.5 Gibson and Will Engaging with the Three Animals Race Task Transcript

[Gibson and Will Engaging with Three Animals Race Task]

Transcript:

[Students are on the GeoGebra webpage for the Three Animals Page 1.]
Teacher: Alright...
Teacher: Will, what do you think?
Will: So um the rabbit and the turtle are increasing by a constant rate but the alligator is being multiplied each time
Will: So, it would calm down faster or it would...
Will: I wouldn't know actually until I did the math like...
Will: If it would but eventually maybe after 100 meters he would end up being the fastest.
Teacher: Gibson, why do you think turtle?
Gibson: I said the turtle because I immediately knew that since he was 50 meters ahead...
Gibson: It would take a little over 15 seconds to get there but...
Gibson: having a little bit of second thoughts,
Gibson: because of the exponential function that...
[Footage cuts to students on the same webpage. They begin moving the time slider to the right. The three animals move toward the finish line as the slider moves right.]
Teacher: And you can watch the animals move
Teacher: And so we're taking the feet of the animal you know because it's an image so that's how you can tell where they are...
Will: Yeah... so, both the rabbit and alligator get it finished between 13 and 14 seconds
[Footage cuts to students using the GeoGebra Three Animals Page 2. This page has a spread sheet with a column for time in seconds, the distance for the turtle, the distance for the rabbit, and the distance for the alligator. They have entered 50 into the first cell for the turtle column.]
Teacher: So, that's after one second
Will: Okay... so, it'd
Will: be 47 the first because that he starts at zero seconds
Will: after one second is completed he would be 47
Gibson: The distance from the start so, it's the distance increasing
Will: Oh yeah, it's increasing
Gibson: So would this not be 50, 53?
[Student erases.]
Gibson: Because one second...
Will: One second after he starts, he's three meters ahead of the start.
Gibson: So, he's 53 meters
Will: 53...

[Student enters 53 into the first cell in the turtle's column.]
Will: And then 56.
[Student enters 56 into the next cell in the turtle's column.]
Gibson: 59... 62...
[Student enters 59, 62 and into the next cells in the turtle's column.]
Will: Yeah
[Student enters 65, 68, and 71 and into the next cells in the turtle's column.]
Gibson: 65... 68... 71...
[Footage cuts to students working on the GeoGebra page 2 under the rabbit column. Their cursor is hovering in the first cell in the column.]
Will: Rabbit? I don't think that's the right equation!
Gibson: Starting at a rate of one meter per second and going one meter per second faster each second
Will: Yeah. So, I think that's also going to be exponential.
Gibson: That's what I thought
Will: But that's not exponential. So...
Gibson: No, it's linear
Will: So, it would be one... Going one second faster
Will: So, it starts at one plus...
Gibson: Wouldn't it be? Yeah, it would be one
Gibson: plus one to the...
Will: Actually, it might be because if you do one to like the fifth power it's still one.
Will: It might be easier if we like start this spreadsheet and see what the pattern is.
Will: So, like...
Gibson: one second
Will: one second he'll be 99...
Gibson: and then one?
Will: yeah one... I am sorry!
[Student enters 1 in the first cell of the rabbit column.]
Will: and then after that
Will: it would be... He's gonna go to three
[Student enters 3 in the next cell of the rabbit column.]
Gibson: yeah
Will: and then six...
Teacher: Why is he gonna be at six?
Will: Because between one and three...
Will: Okay, so, at the start he went one second and then...
Will: then the next time he went two seconds which added to three
Will: and then now he's gonna go three, three meters in one second which gets you to six
Will: and then you'll add four which will get you to ten.
Will: So, I think it is some kind of exponential something...
Will: You know what I mean?
Gibson: yeah I'll let you fill this up
[Student fills in the next cells in the spreadsheet with 6 and 10.]
Will: Um... But I just don't know like what the function would be

Teacher: It's okay you don't have to write the function
Will: Okay!
Will: So, we can just kind of...?
Teacher: Uhum, fill in the table if you want.
[Student fills in successive cells with 15, 21, and 28]
Will: So, that's three, plus four, plus five, plus six, plus seven,
Will: plus eight...
[Student types 36 into next cell.]
Will: plus nine, plus ten
[Student types 45 into the next cell and 55 into the cell after that.]
[Footage cuts to students continuing to work on the Three Animals page 2 under the alligator column.]
Will: It doesn't work...
Gibson: Okay. So, 1.5 meters per second...
Will: So...
Will: So, then he's going 1.5 times
[Student enters 1.5 into the 7th row of the alligator column in the spreadsheet. The five rows before are filled with zeros. Then they click into the next cell in the column.]
Gibson: Would it be 1.5 to go...? one point...?
Gibson: Wait hold on...
Will: It might be to the 1.5 'x' power.
Will: Let's see if that works
Will: But then what goes right here...?
Will: So, if we're changing that to 1.5
Gibson: I'm saying that it would just be 1.5 to the 1.5 'x'...
Gibson: Because it's starting out at that...
Gibson: that's the base rate and then it's increasing by 1.5 times 'x' which is the time
Will: Ok, I don't think it's like exact. So...
Will: Unless there are decimals which is possible
Gibson: That's true
Will: Okay. So, if he... he went 1.5
Will: and he's going to go 1.5 again
Will: and then we have to add it to the previous...
Will: Don't we?
Will: So...
Will: It would be 3.75? is that right?
[Student enters 3.75 into the next cell in the alligator column.]
Gibson: What do you mean?
Will: I did 1.5 times 1.5
Will: to get how much he went between 6 and 7 and then I added back the 1.5
Gibson: 1.5 plus 1.5
Will: 1.5 times 1.5
Gibson: Right...
Will: And then I added that back
Will: because it's from the start

Gibson: but if we kept it I think just 1.5
Gibson: to the 1.5 'x'
Gibson: Well I'm confusing myself...
Will: Okay. So, basically what I did is he went 1.5 between six and seven
Will: and then between seven and eight, he's going to go
Will: 1.5 times 1.5 which is 2.25
Will: So, that's how much more he went...
Gibson: Yes...
Will: But you have to add this back because it's from the start...
Teacher: So, what would the next one be then, Will?
Will: I got... 9.375 so I multiplied 3.75 times...
Will: times two point... oh wait never mind. Hold on...
Will: Okay, So, then it would be...
Will: He increased 2.25 that time so now it'd be 2.25
Will: times 1.5
Will: plus 3.75
Will: So, I got 7.125
Will: Like I said...
Gibson: What are you adding back, again? You're adding back the original?
Will: Right...
Gibson: Oh yeah oh I get what you're saying now
[Student enters 7.125 into the next cell in the column.]
Will: And then 3.375
Will: times 1.5 plus the 7.125
Will: gives you 12.1875
[Student enters 12.1875 into the next cell in the column.]
Will: 5.0625 times 1.5 plus 12 point...
Gibson: It rounded up to 12:19
Will: 19.78
[Footage cuts to students working on the same page with more of the alligator column filled out.]
Teacher: Don't worry about this... if you were to graph each of these
Teacher: with a time versus distance from the start line graph...
Teacher: What would you expect each
Teacher: um, graph to look like for each animal?
Teacher: So for turtle what would you expect the graph to look like?
Will: Just linear?
Gibson: Starting with the...
Gibson: You said it was time and distance?
Teacher: Correct!
Gibson: Okay, So, with the y-intercept of 50.
Will: Okay...
Will: draw it on here?
Teacher: No, just write the word it's linear. You guys are going to graph again down here
Gibson: oh okay...

Will: I wonder if now that we have all these... we could do like the regression line and
Will: get the actual function
Gibson: we might be able to...
Will: I'll try it real fast
Will: which one do we need it for we have the rabbit one correct right?
Teacher: yes! okay so what would rabbit's graph look like?
Gibson: it would be expon-... yeah it would be exponential...
Teacher: okay!
Teacher: and alligator?
Gibson: that would be exponential too
Teacher: okay!
Gibson: because that's what we treated it as...
[An image of the graph of the rabbit's distance over time from a graphing calculator appears on the left side of the screen.]
Will: yeah
Will: this might not actually work I'm just trying it
[Footage cuts to students continuing to work on the Three Animals Page 2.]
Gibson: that's the rabbit I'm going to label it...
Teacher: Will, what'd you just have that look for?
[An image of the graph of rabbit's distance over time from a graphing calculator appears to the left side of the screen along with an image of the formula for a quadratic regression.]
Will: I got a quadratic equation...
Teacher: you've got a quadratic equation? okay!
Will: but exponential gave me an error but it has a R of one, like a correlation thing so