

Introduction and background:

I received the following feedback from an accomplished robotics teacher. I emailed him my instructional materials, and he graciously took the time to go through all of them (except my assignments... I didn't have them done yet) and provide me with an array of valuable comments and suggestions.

While I did not have time to implement his suggestions, I still greatly appreciate his taking the time to provide them to me. If anything, I will always be able to read these suggestions and go back and look at what they are referring to. This will in its own way serve as a "what not to do" lesson to myself and any others who find this material.

If you want to learn more about LEGO MINDSTORMS NXT robotics, you should definitely try out his tutorial at:

http://www.ortop.org/NXT_Tutorial/

With that said, immediately the following is a copy and paste of the email he sent me:

I know this assignment was to create a more conventional "Stage on the stage" lesson plan so in that regard it seems well thought out. I think your materials are a good start for teachers who want to go that route.

Lecturing about Lego Robotics is kind of like lecturing about swimming. You don't really learn it until you do it and everyone is starting at a different skill level. I've found that students do much better learning this material when you provide them with the "magnetic field" with which to align themselves, give them the tools needed to learn, and turn them loose. I haven't lectured about Lego robotics for more than an hour in my ten years of teaching it.

That global comment aside, the rest are just little nits:

Lesson 1

On page 2 of lesson 1 you say that RIS used Technic pieces. While some were provided, the main difference between RIS and NXT is that RIS wasn't Technic centric. There are lots of places on a RCX that use LEGO studs to connect things. Those are gone now for NXT.

I don't know if LEGO calls their motors Servo Motors. If so I guess you can go with it. In reality, the Lego motors aren't servo motors. A servo motor will rotate to the number of degrees you tell it to and stay there. The Lego motors are just motors with a built in rotation sensor. The Servo motor reference occurs many places.

As far as output devices on page 4, Lego also supplies lamps in the education set if you care.

Lesson 2

Page 3. My kids have found the RoboCenter to be pretty useless. That may be because they use my tutorial, though.

Somewhere the importance of comments should be discussed. I've even had some instructors who don't accept any program that isn't well commented.

Lesson 3

Page 2: Many kids don't understand how to route wires in a way that make the program more readable. The standard routing NXT-G does often makes the wire pass through portions of blocks, on top of other wires, etc. The user simply clicks the mouse at corners while drawing the wire.

Page 2. You might tell people again where the complete palette is.

Lesson 4

Everything seems great

TESTS

Lesson 1 Test

I'd come up with more relevant questions for 1-5 or just drop them.

Question 9: Spins, while not a Lego term, could be considered rotations in some kids minds. Direction could be included. You might include "Power" and "Speed". This is often confused by students. What they are really controlling is the motor POWER, not the speed. If you are going to test on it, though, you'd need to include that in a lesson. Other incorrect answers might be "Position" or "Angle".

Lesson 2 Test

This test needs a lot of work. Testing on graphical elements without pictures is a dubious process. People's brains don't work that way.

#1 I wouldn't test on the RoboCenter because I just have everyone turn it off immediately.

#2 That's just testing on Lego vocabulary which seems a little picky. Some students won't know the name of the Complete Palette, they just know it visually as where you go for all the goodies.

#3 I wouldn't know the answer with certainty

#4 Seems too nerdy. People don't think this way. They look visually at the selections they are given and choose from those.

#5 You'd need to give people a picture of the buttons if you were going to do this question.

#6 I don't know the answer

#8 You'd need a picture if you were going to ask this question

#9 Students don't know or care. They just know the software they are given.

Lesson 3 Test

#6: Do we really care that students have memorized this? When they look at the screen they will see which are selected.

#7 That's a pretty tough question for someone who just learned it. Multiple choice might be better.

#9 I think you meant to say "This programming block makes your program stop what it is doing until a specific condition has been met."

#10 Technically it does because of the friction inside the motor. It may or may not be immediately visible and it's not linear.

Lesson 4 Test

#1 I don't know what you're getting at.

#8 I don't teach Logical operations to middle schoolers. They seldom need it. I'm not sure if it's worth testing on Logic blocks.

I wish you all the best on this.

Cheers,

Dale