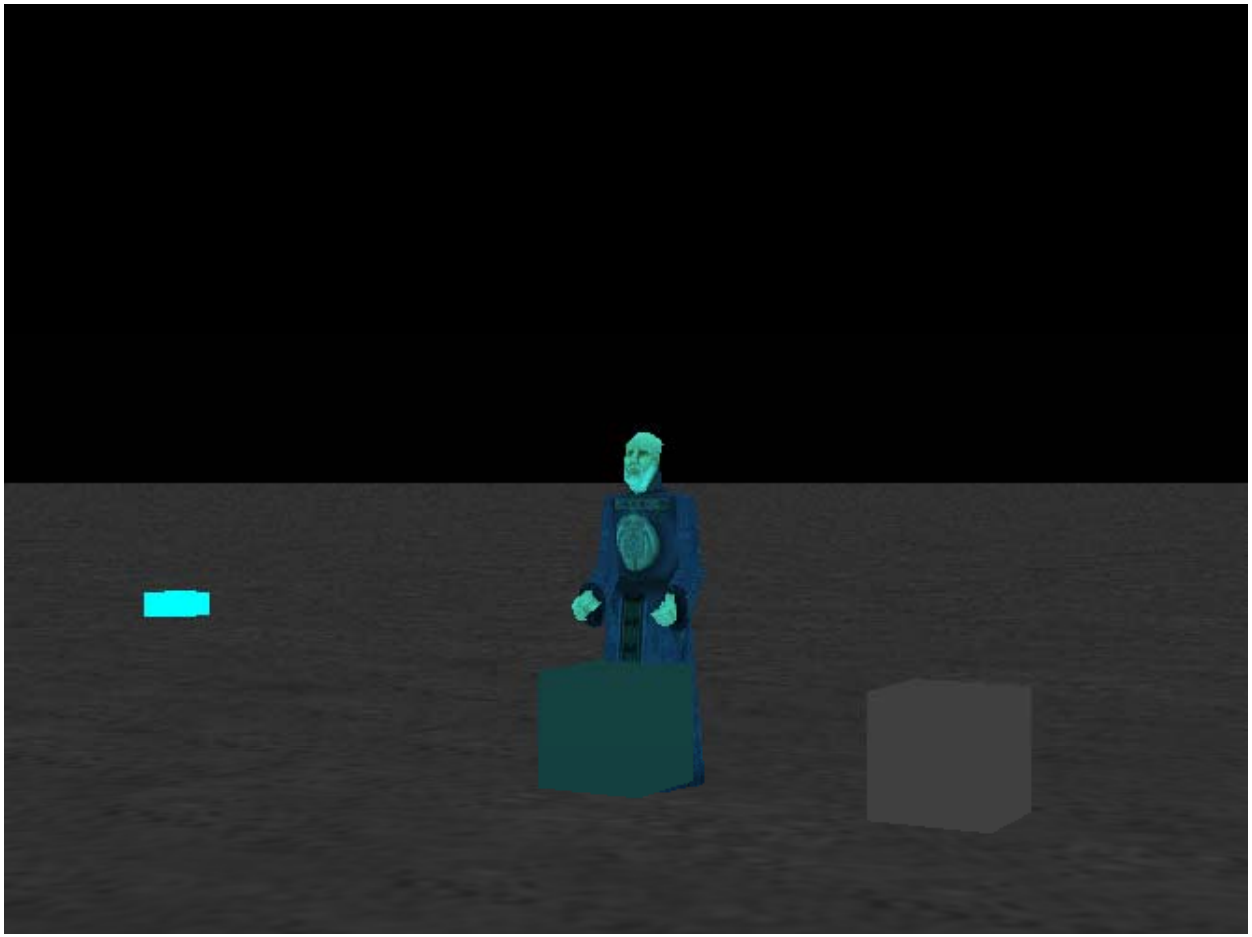
Class-Level Variables in Alice



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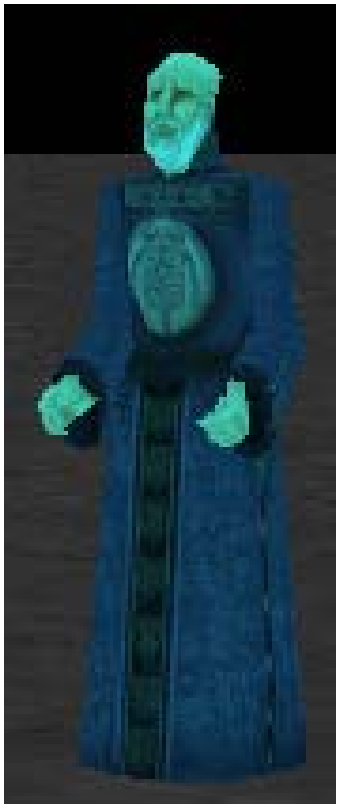
Under the direction of Professor Rodger
Duke University, July 2008

Instructions for the Game

Download the starting world for this tutorial. It includes a game. These are the instructions:



-The point of the game is to collect the 6 lighted cubes that will hide themselves at the beginning of the game.

-You can press F to make your character face towards the nearest cube.

-You can press T to teleport to a different location.

-Your task is to limit the wizard's power so you can't just press F 5 times to win. You also need to make it so that when the wizard collects all 6 cubes, the game winning animation shows up.

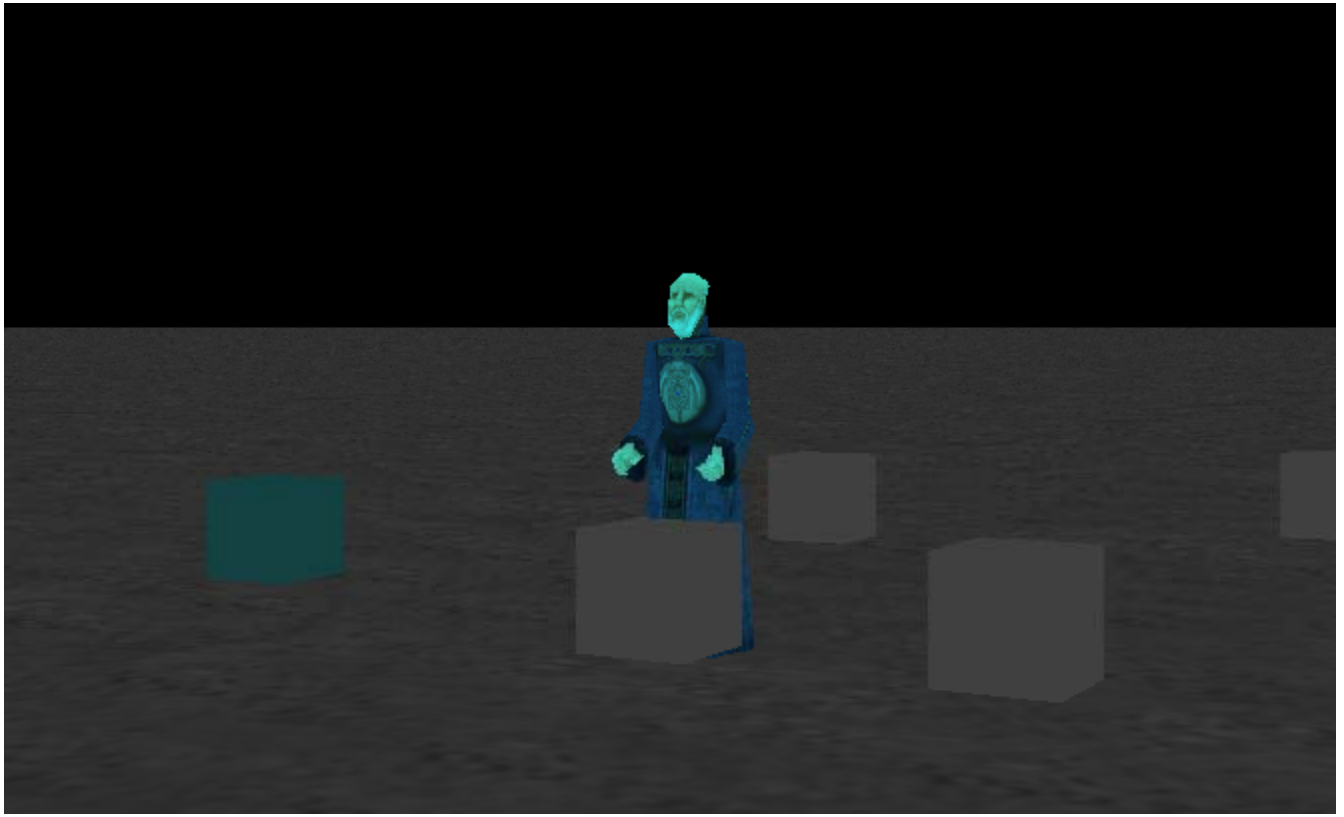
Using Variables

-A variable is a space where information that changes can be stored, such as a number that needs to be added to or subtracted from as a game is played.

-A class-level variable is information that changes and is tied to a specific object, as opposed to just general information.

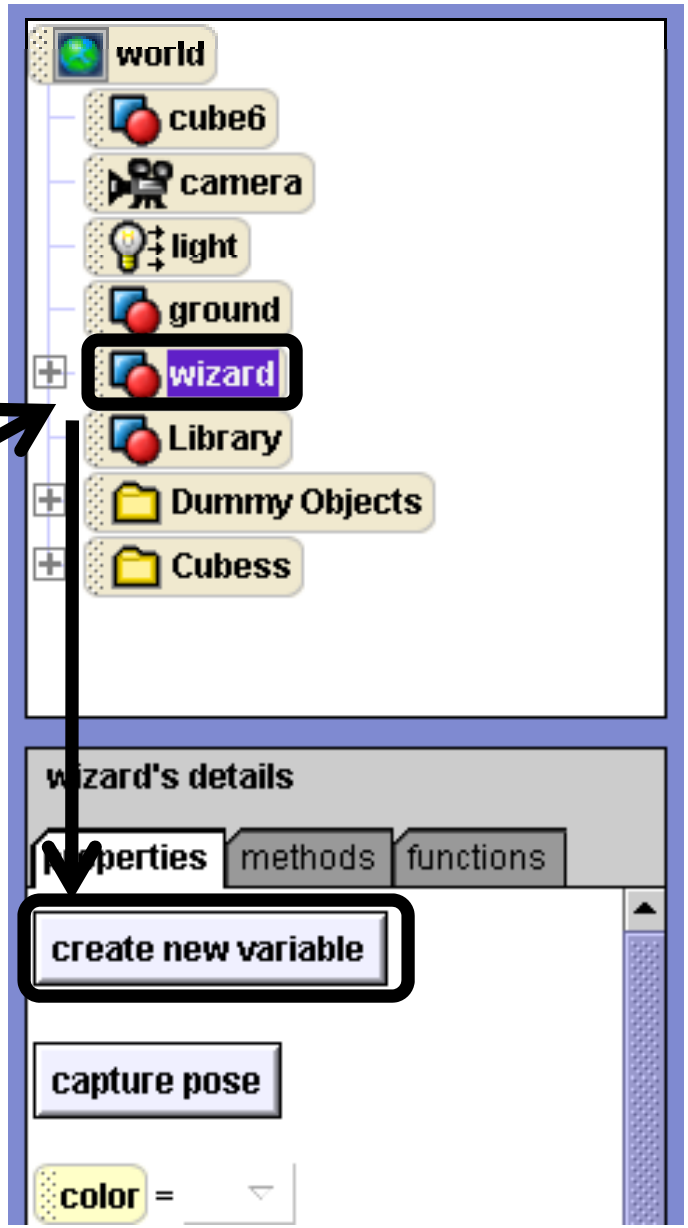
Testing Out the World

Try playing the world to see what happens and familiarize yourself with how the game looks. The opening animation should play in which the lighted cubes fly off to different places in the world.



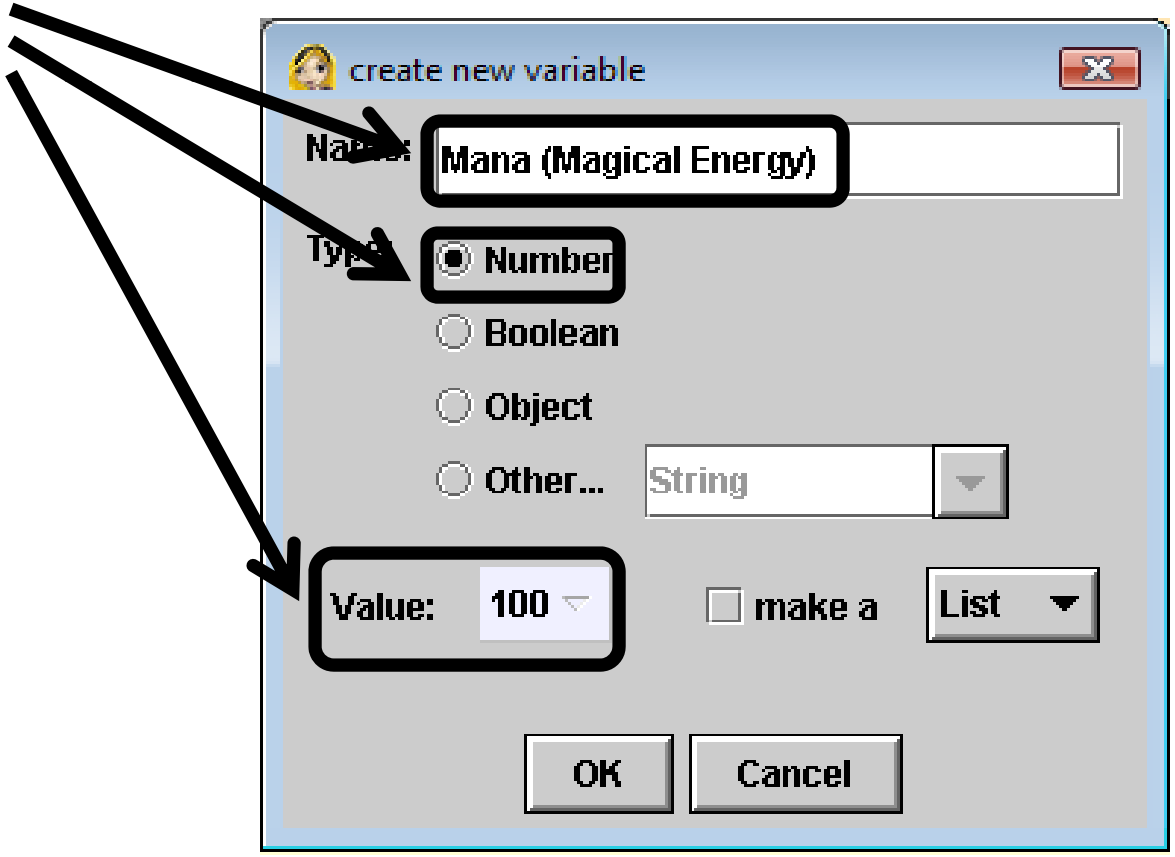
Creating the Variables

-We are going to give the wizard mana, which in typical role-playing video games are points that a character can use to perform magic.
-Click on the wizard in the object tree, and then on the properties pane click create new variable.



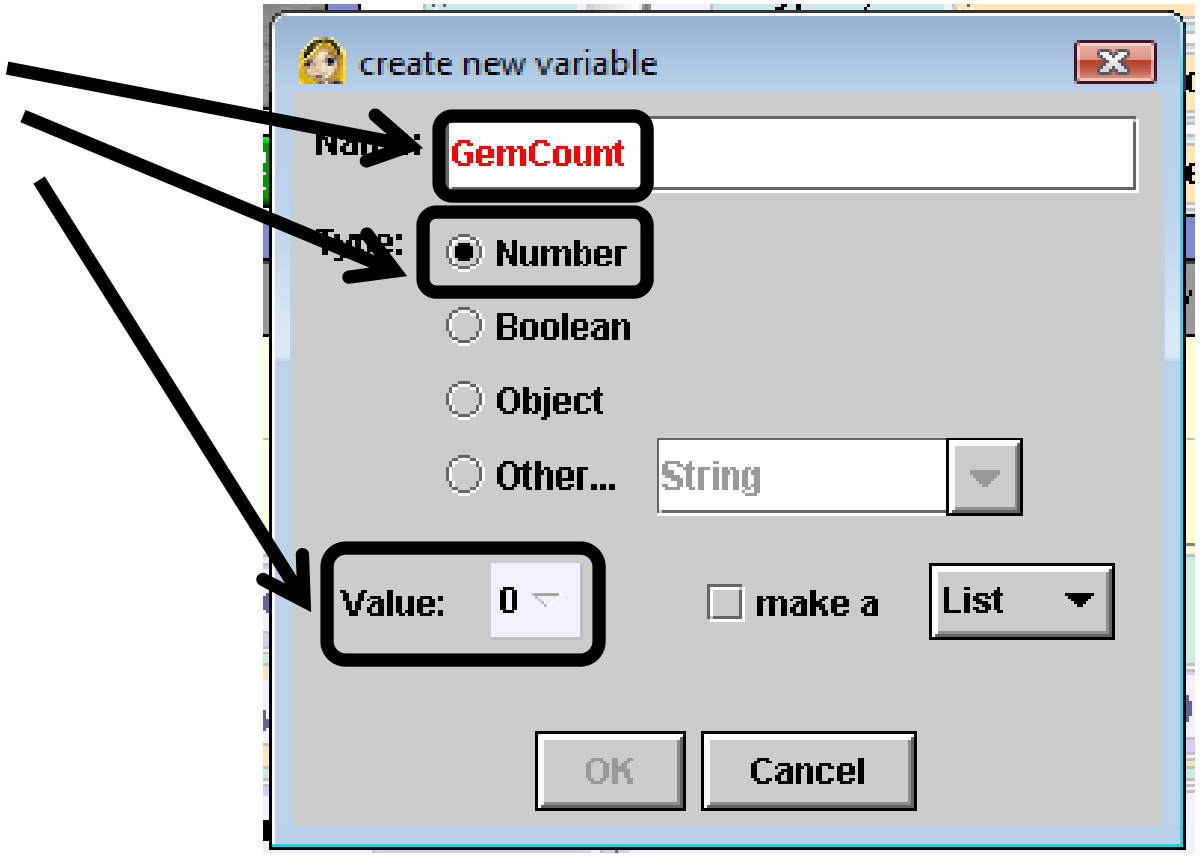
Creating the Variables

Name your variable Mana (Magical Energy). Make sure that it is a number variable, and set its initial value to 100.



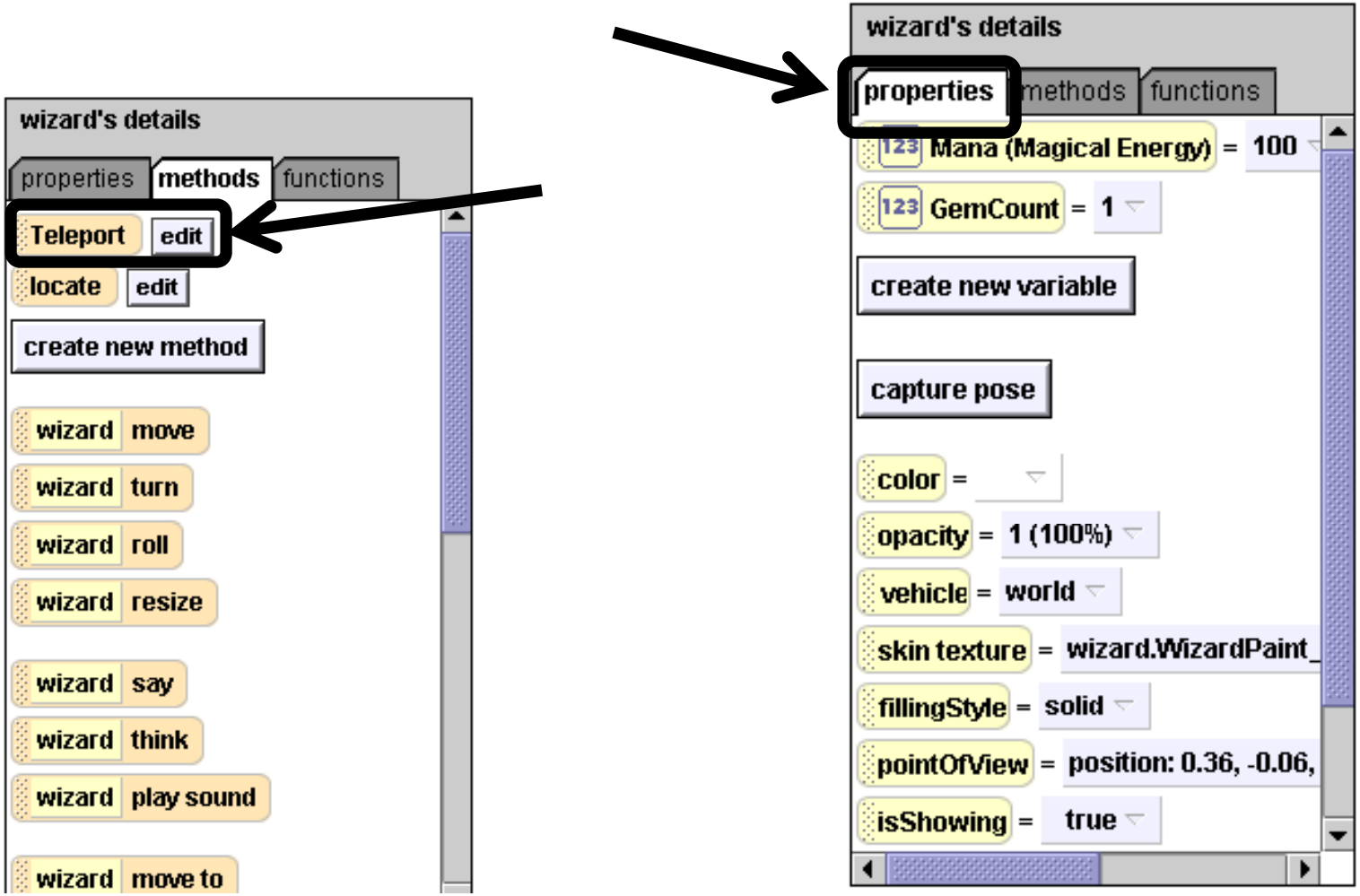
Creating the Variables

Now create another variable to store the number of gems that the wizard has collected so far. This will help so we can create a condition so we know when the game has been won. Call it GemCount and set its starting value at 0.



Setting Up the Mana

-Now we want to make it so that when the wizard does magic (either teleport or locate) his mana goes down. Click on the wizard in the object tree. Go to methods and click edit next to the Teleport method. Then go to the wizard's properties pane.

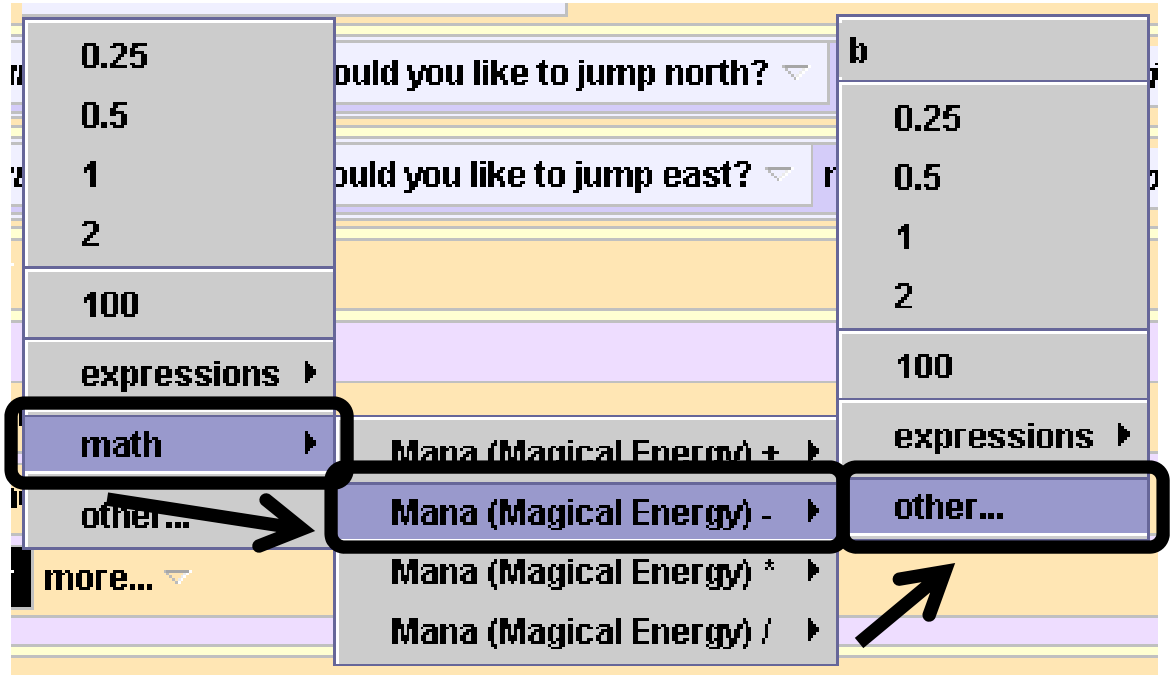


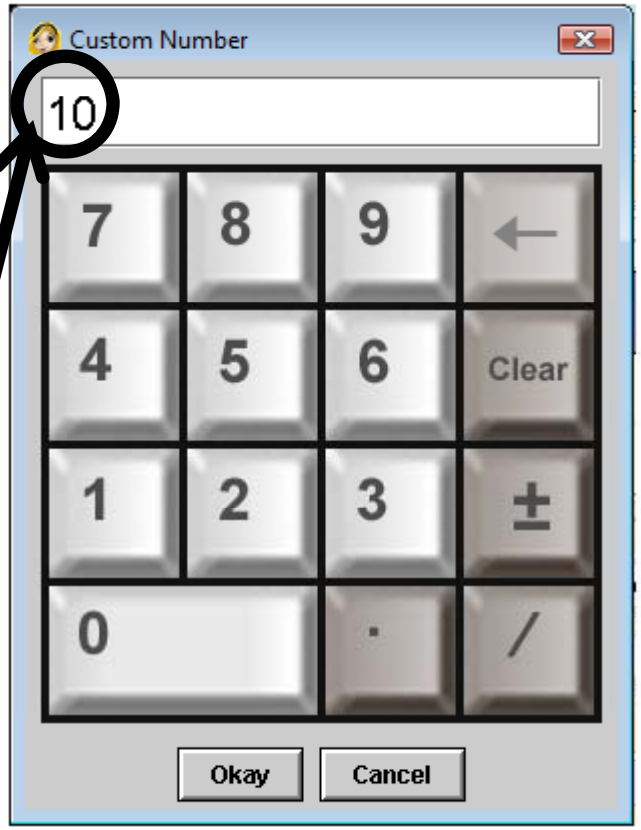
Setting Up the Mana

Now drag-and-drop the Mana (Magical Energy) variable to the top of the Teleport method. Then select set value, expressions and wizard.Mana(Magical Energy). Your code will look like this when you're done:

Setting Up the Mana

Click the down arrow next to the second wizard.Mana(Magical Energy) and then select math, and then Mana(Magical Energy)- and then other…. On the calculator that pops up, enter in 10, and then click Okay.





This will take away 10 from your Mana whenever the Transport method is called.

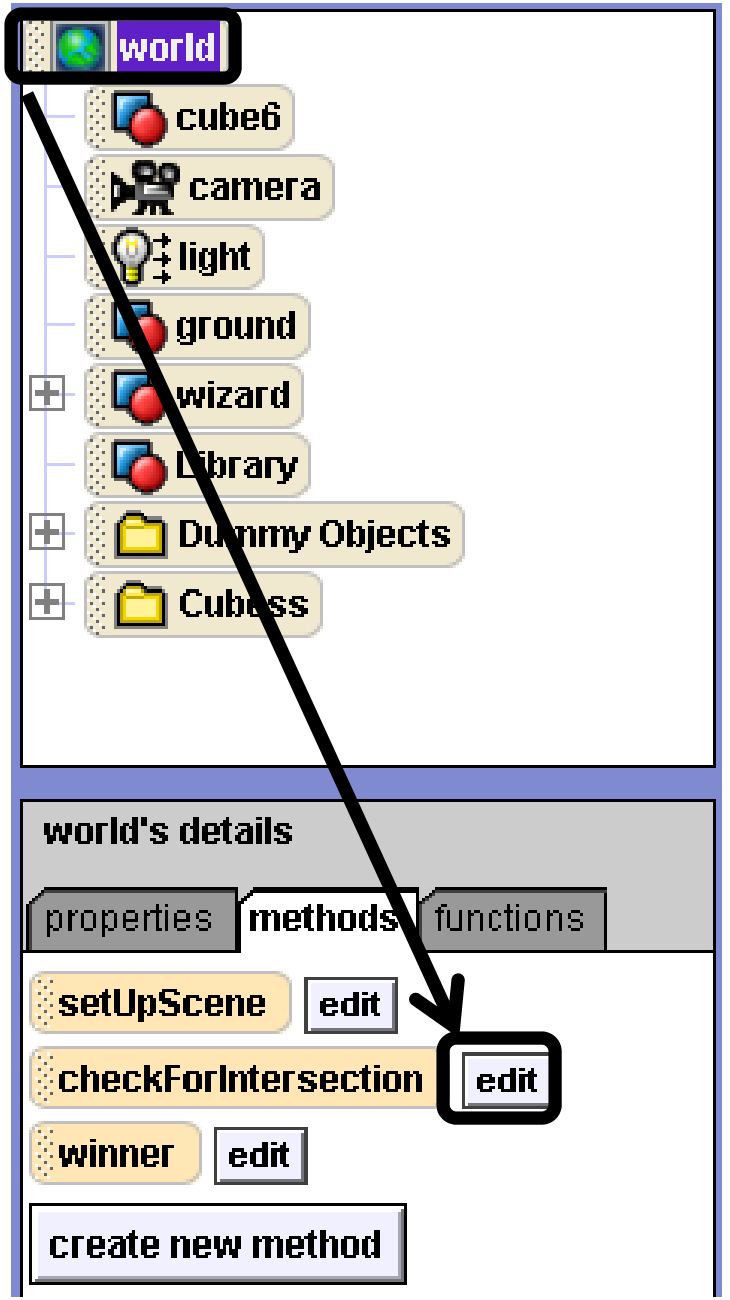
Setting Up the Mana

Now repeat the same process for the wizard's locate method. This time, instead of subtracting 10 from the mana, subtract 30. Your locate method will look like this when you're done:

This will subtract 30 from your mana whenever you press F to use the locate method.

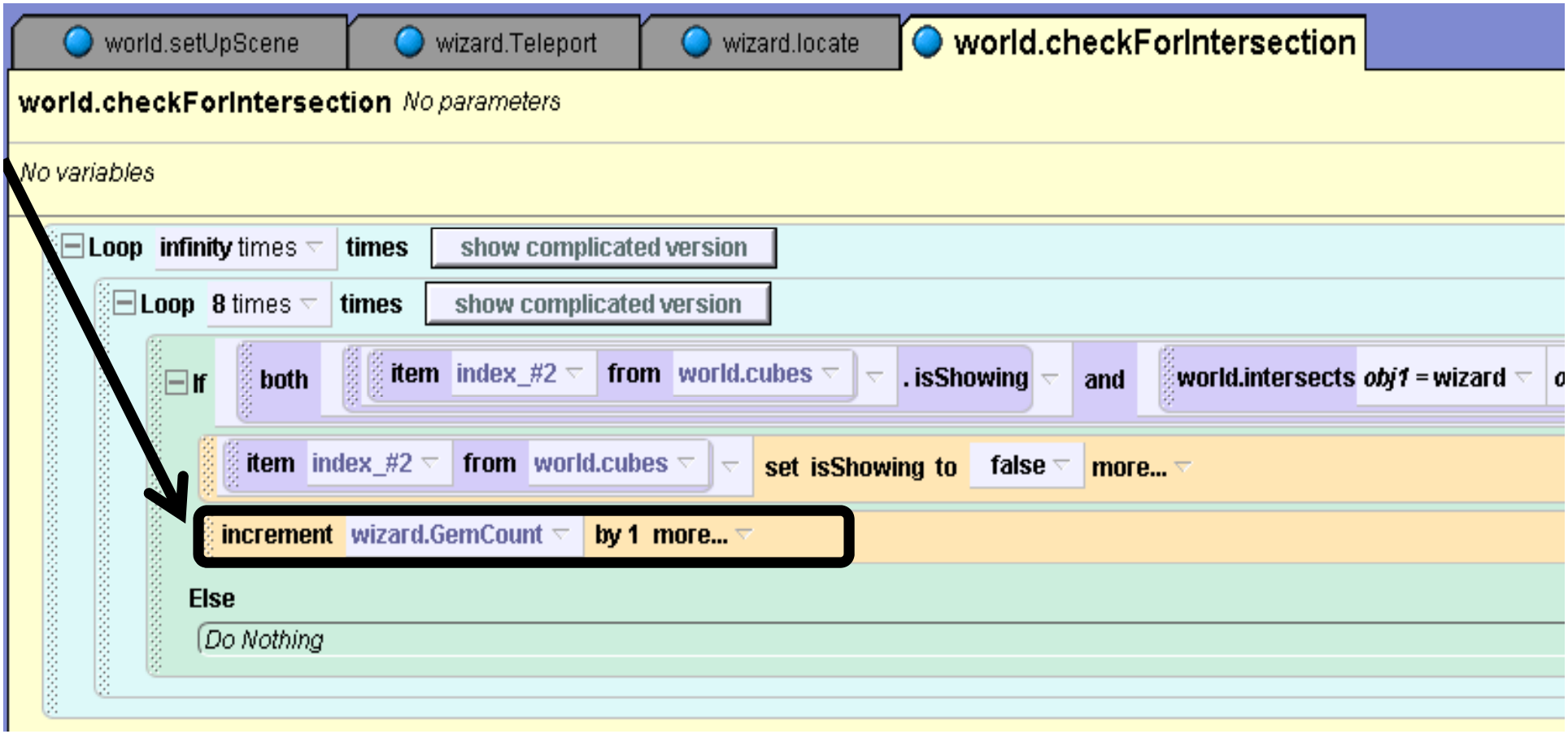
Setting Up the GemCount

Now we want the GemCount to increase whenever a gem is found. Click on world in the object tree, and then go to the methods pane. Click on edit next to the checkForIntersection method.



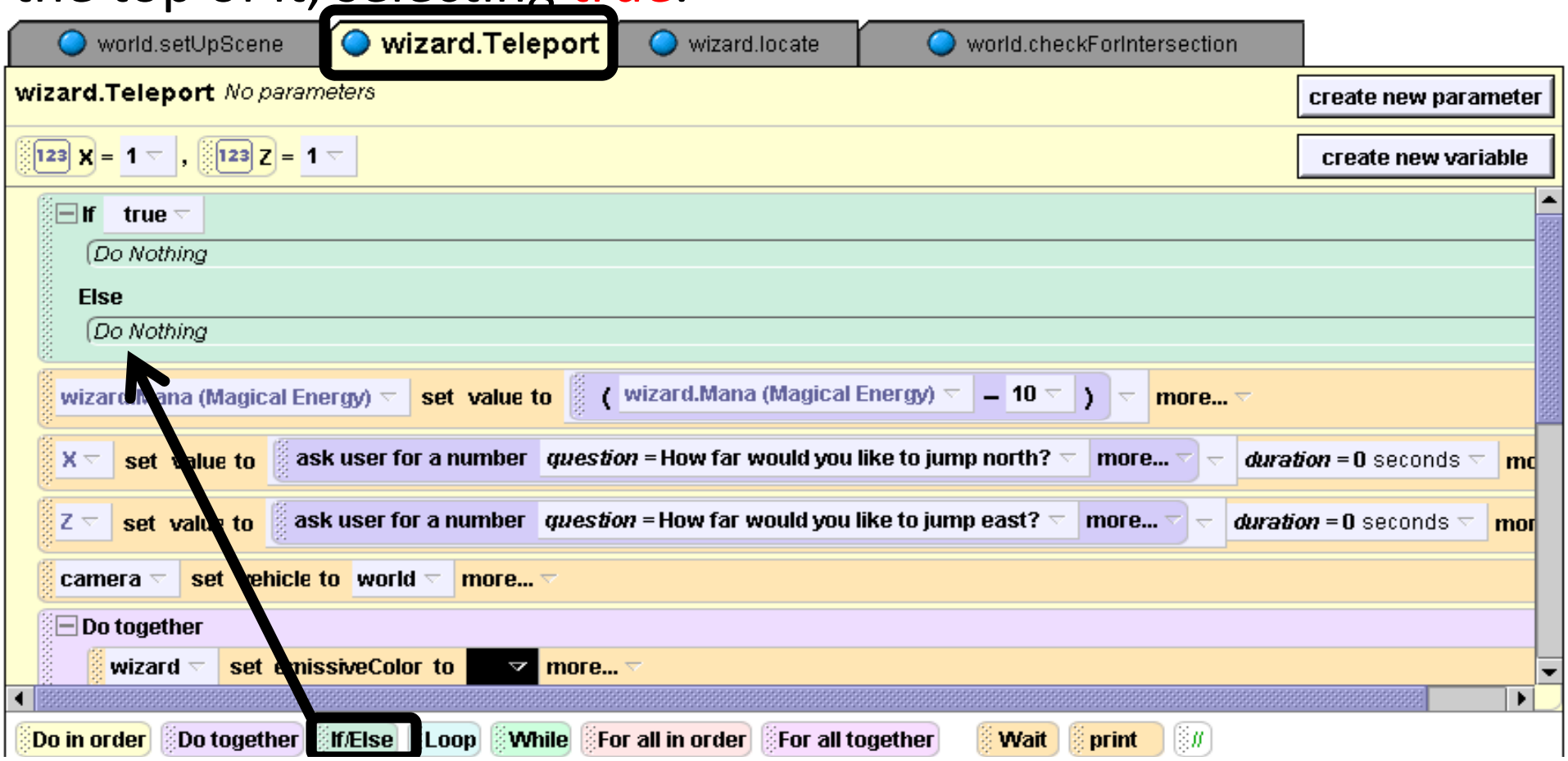
Setting Up the GemCount

Now click on wizard in the object tree and go to the properties pane. Drag the GemCount variable into the If Else statement and drop it there. Then select Increment wizard.GemCount by 1. Your checkForIntersection method will look like this when you're done:



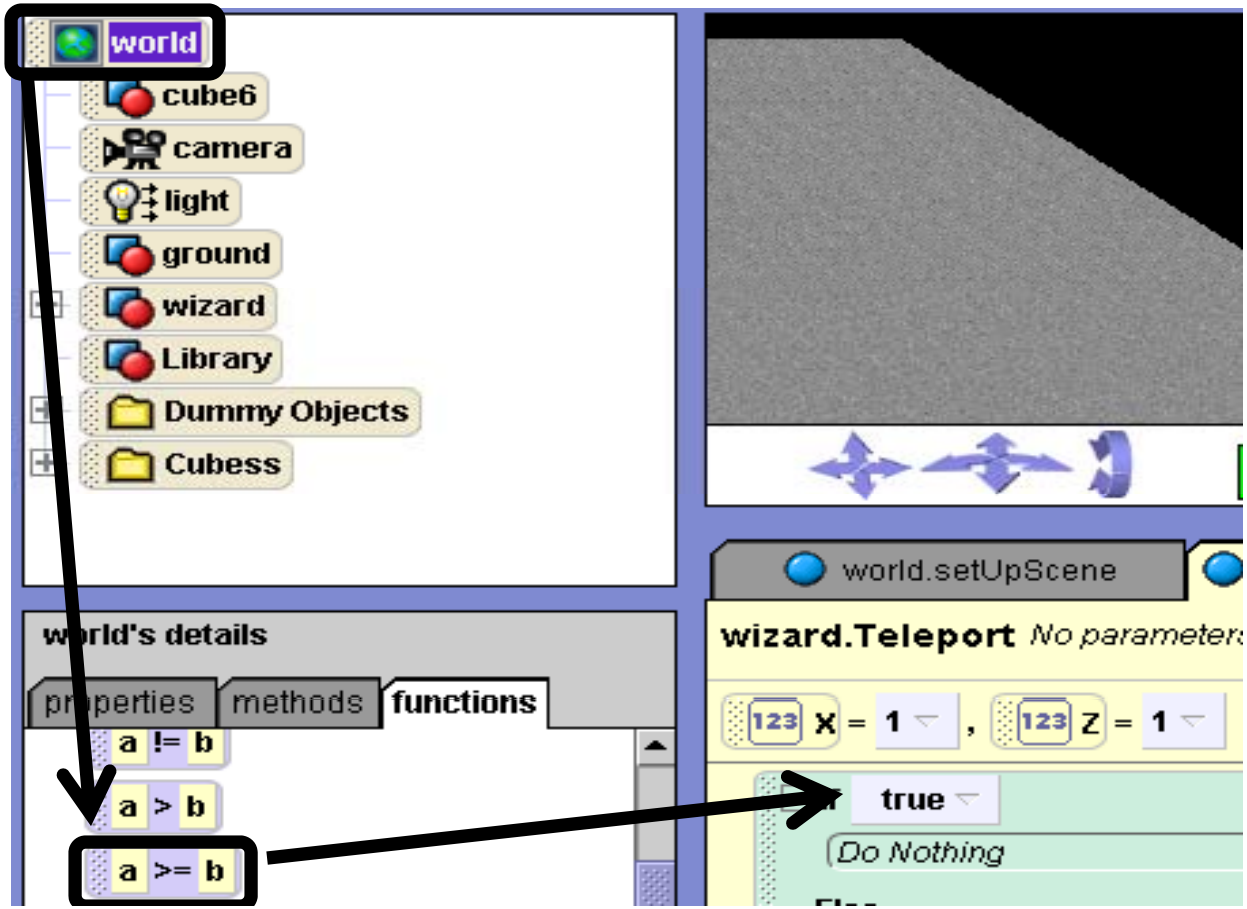
Creating Restrictions

Now we need to restrict the wizard so that he can't keep using negative mana into infinity. We need to make it so that when he runs out, he can no longer do Teleport or Locate. Go back to the Teleport method, and drag an If Else statement to the top of it, selecting true.



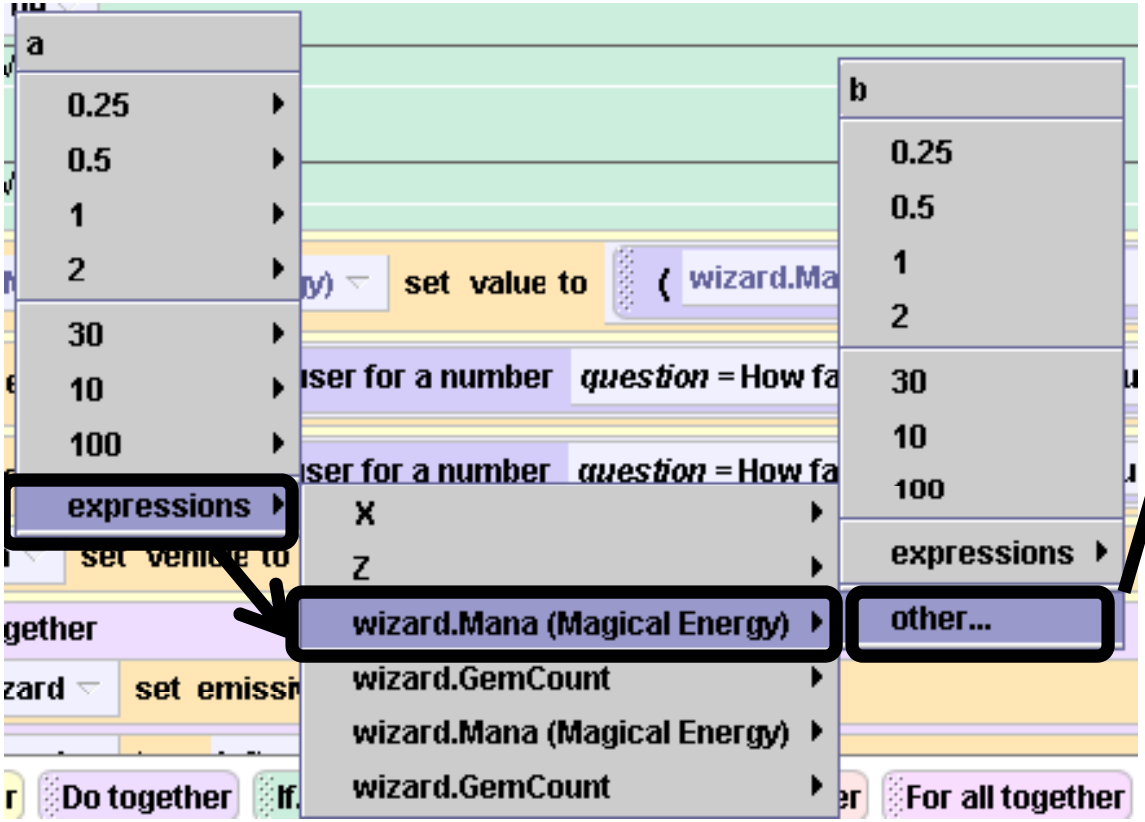
Creating Restrictions

Now, we only want him to teleport if his Mana is greater than or equal to 10, because that's how much Mana it takes to teleport. For this, we need a >= sign. Click on world in the object tree and then go to the functions pane. Find a>=b and drop it over the true on your If statement.



Creating Restrictions

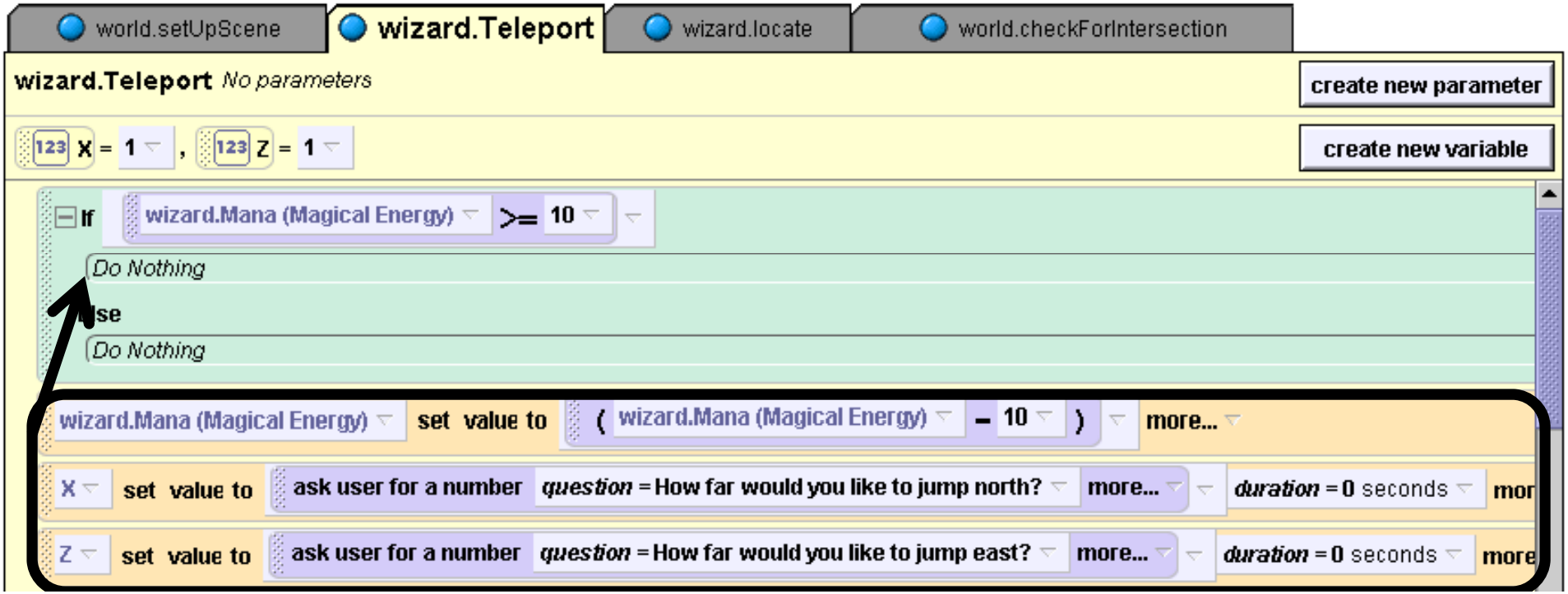
On the menu that pops up, select expressions, then wizard.Mana(Magical Energy), then other…. Then type in 10 on the calculator, and press Okay.

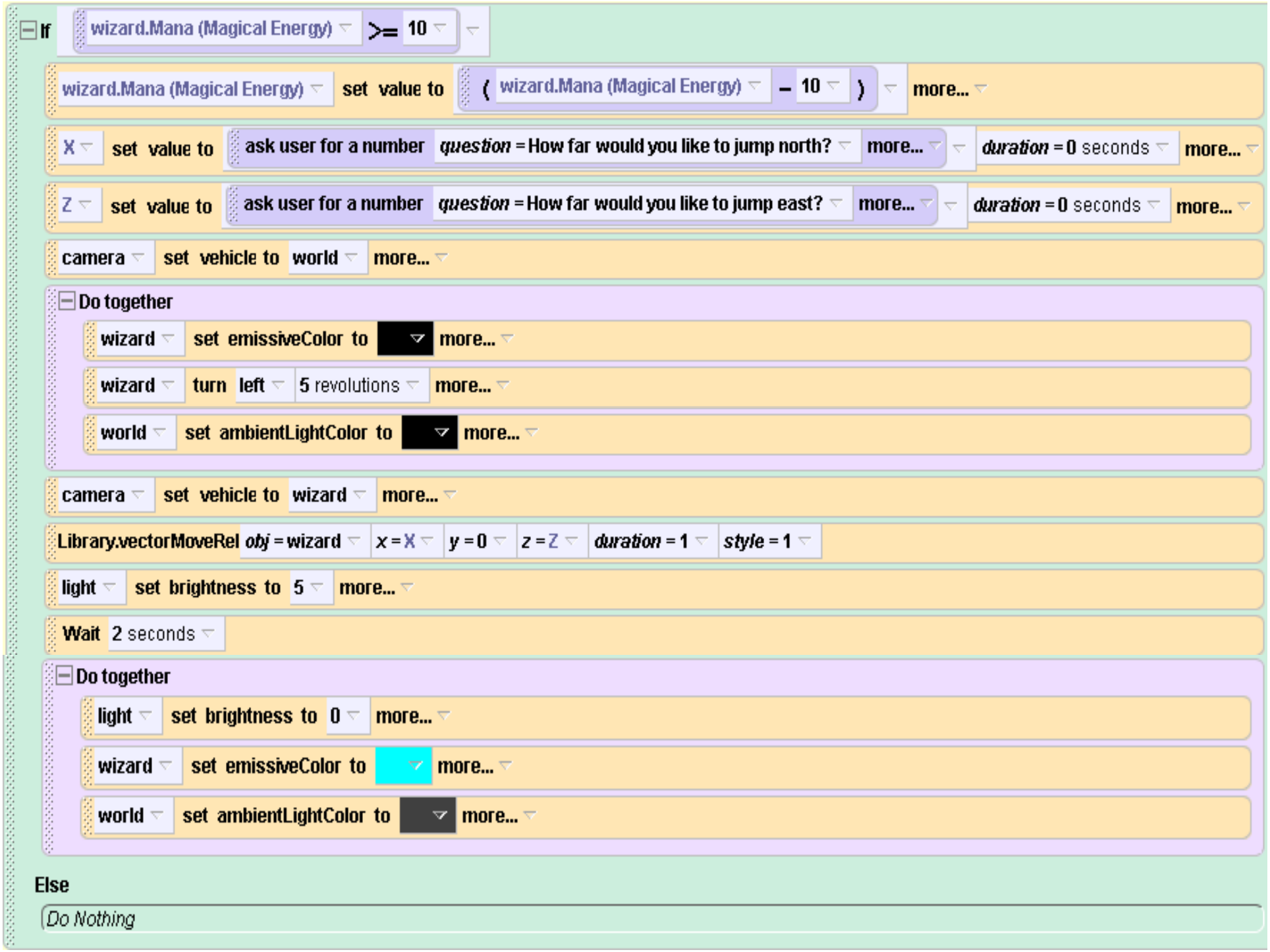


Your finished If Else will look like this: →

Creating Restrictions

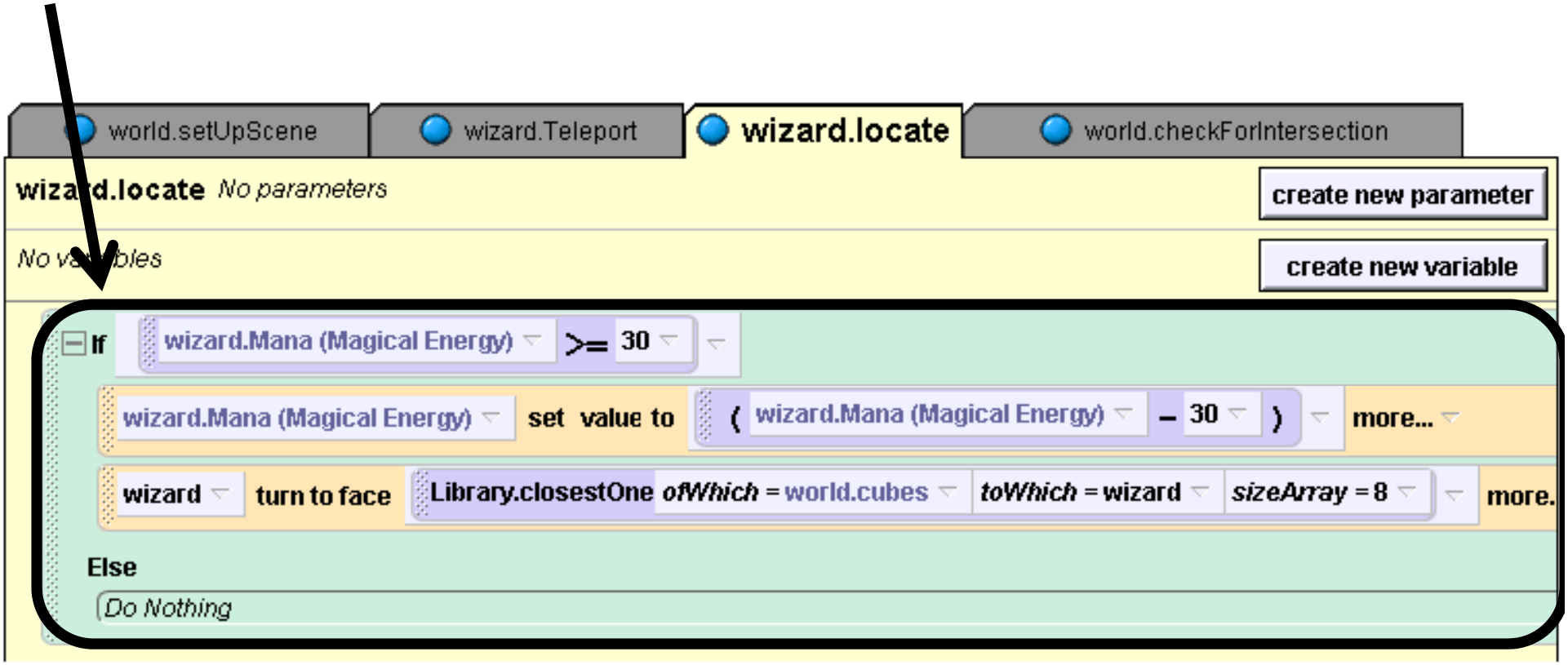
Now, we only want Teleport to work if the mana is greater than 10. This means we have to drag and drop *all* of the code in the rest of the method into the top of the If Else statement. You will have to drag each piece one at a time, making sure to keep them in the right order. See the next slide to see what your Teleport method will look like.




If
wizard.Mana (Magical Energy) >= 10
wizard.Mana (Magical Energy) set value to (wizard.Mana (Magical Energy) – 10) more...
X set value to ask user for a number question = How far would you like to jump north? more... duration = 0 seconds more...
Z set value to ask user for a number question = How far would you like to jump east? more... duration = 0 seconds more...
camera set vehicle to world more...
Do together
wizard set emissiveColor to more...
wizard turn left 5 revolutions more...
world set ambientLightColor to more...
camera set vehicle to wizard more...
Library.vectorMoveRel obj = wizard x = X y = 0 z = Z duration = 1 style = 1
light set brightness to 5 more...
Wait 2 seconds
Do together
light set brightness to 0 more...
wizard set emissiveColor to more...
world set ambientLightColor to more...
Else
Do Nothing

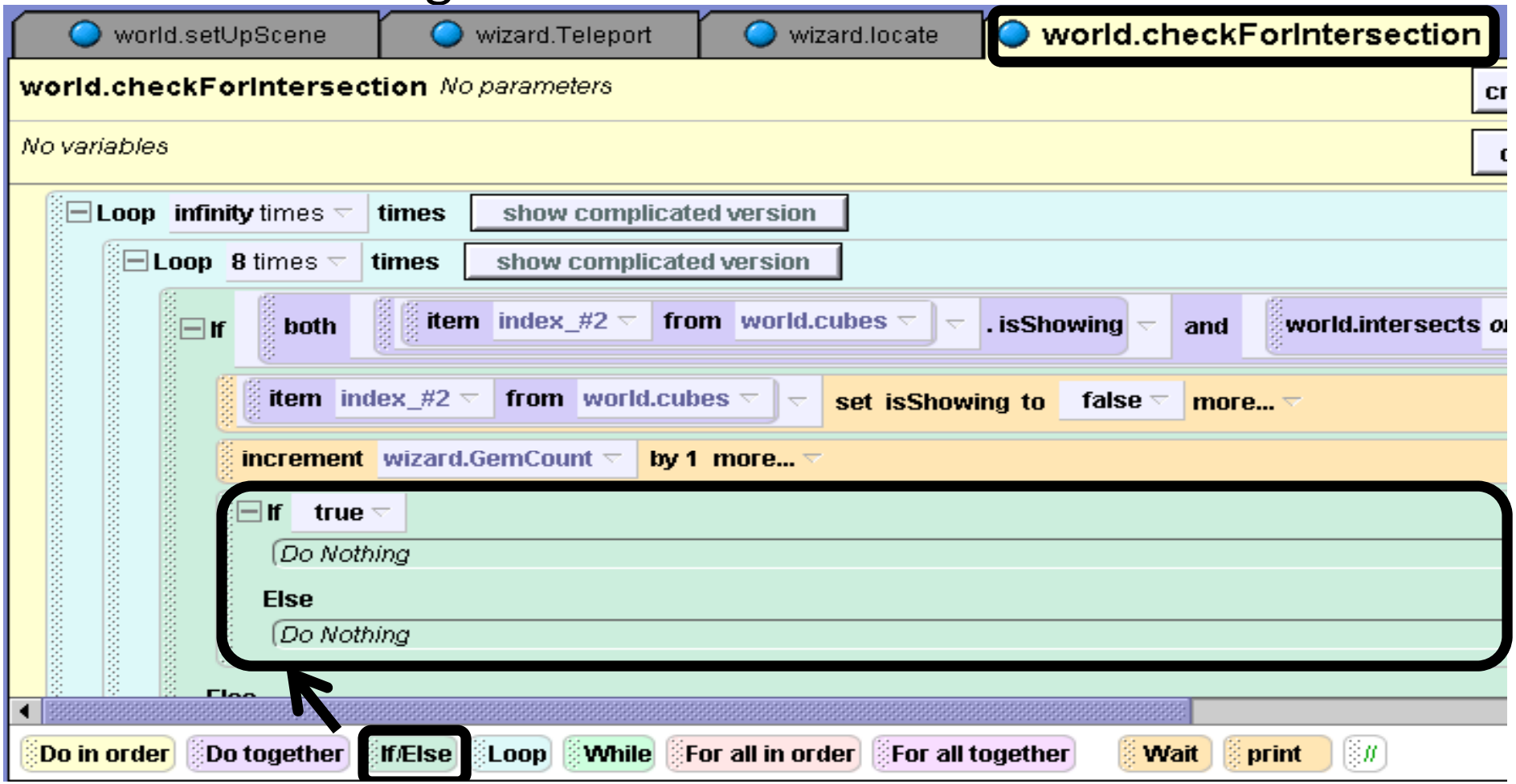
Creating Restrictions

Now do the same steps with your Locate method. In an If Else statement, make the statement If wizard.Mana(Magical Energy)>=30, and drag all of the code in the method into it. It will look like this when you're done:



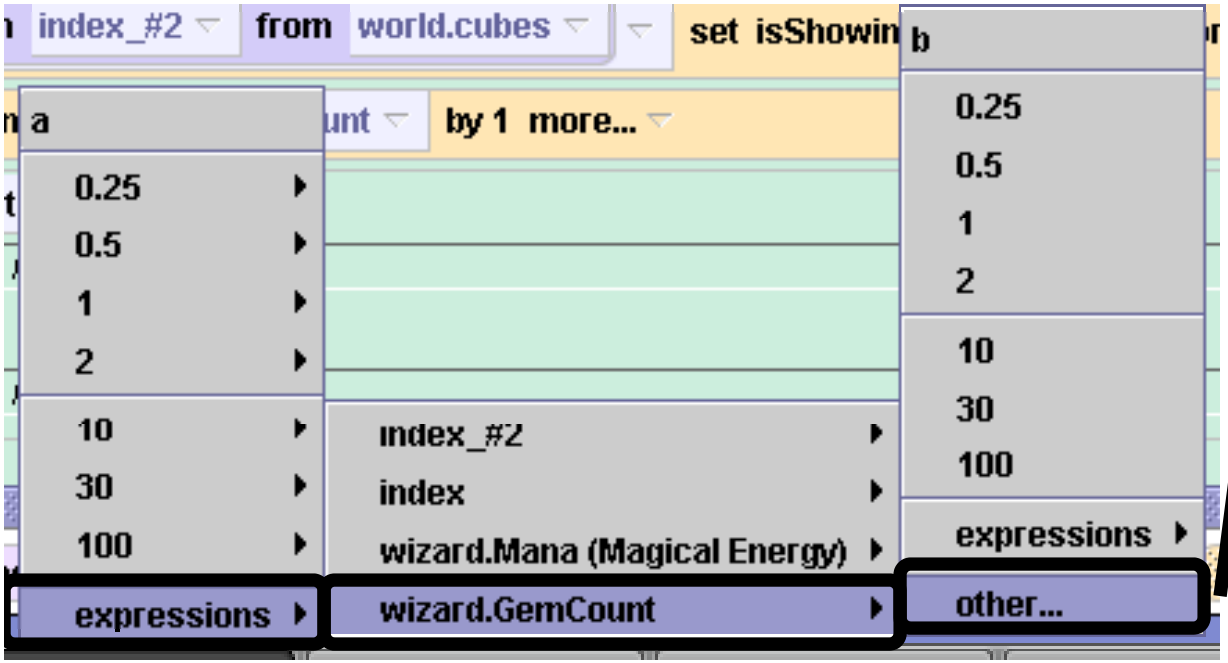
Ending the Game

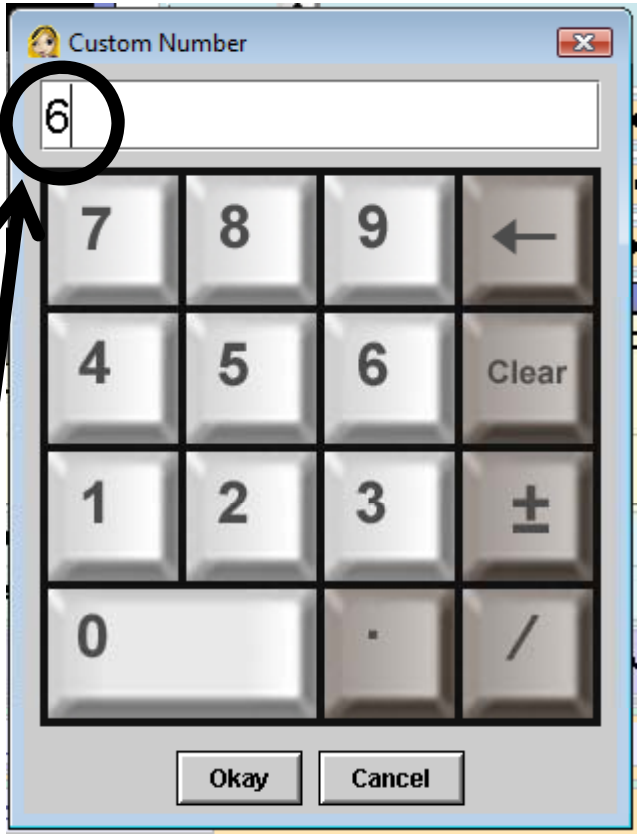
Now we need to make it so that when all 6 gems are collected, the winning sequence plays (located in world.winner). Open up world.checkForIntersection. Add an If Else statement right below the increment method.



Ending the Game

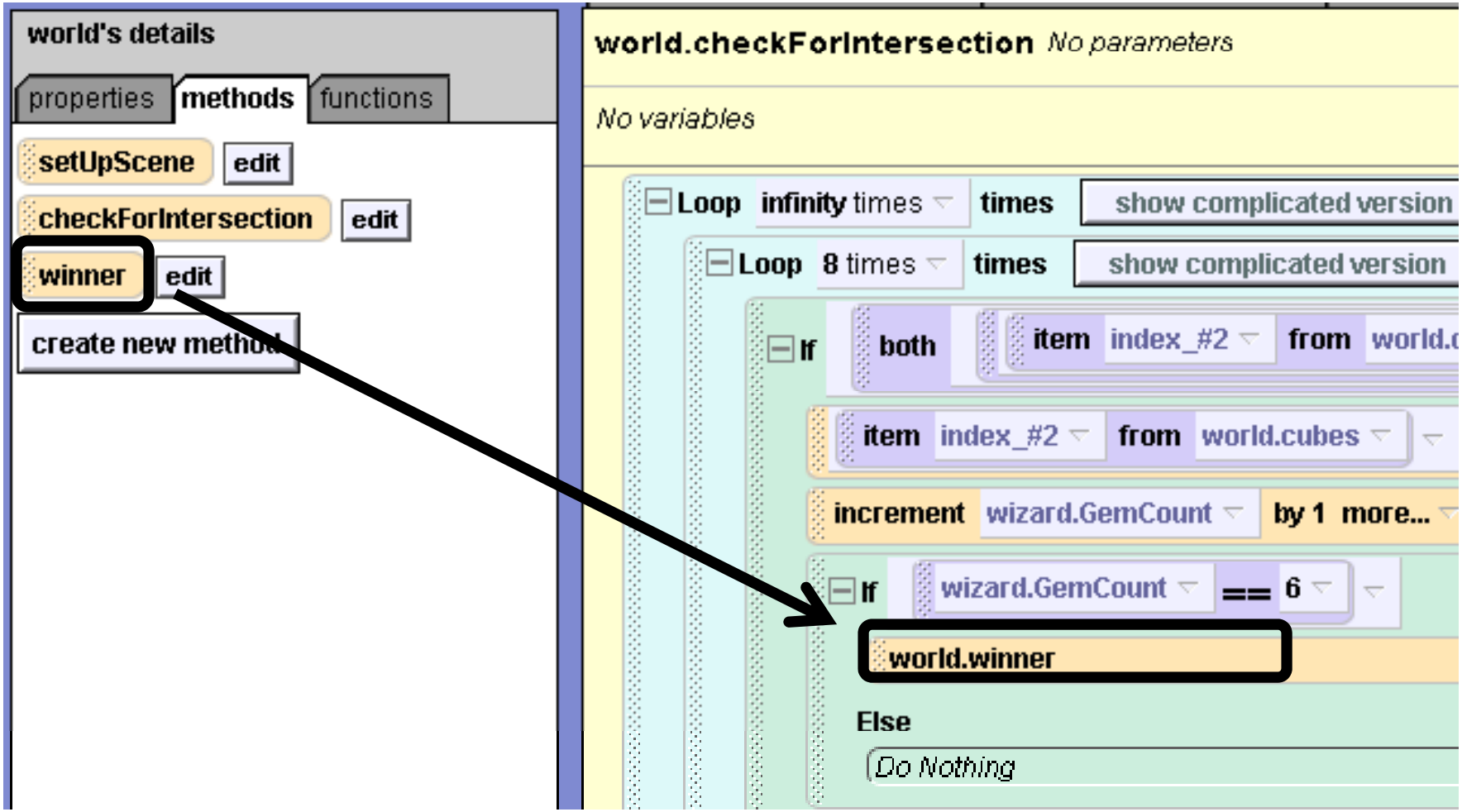
Now we need to complete the If statement. Click on world in the object tree and go to the functions pane. Find a==b and drag and drop it over the true in your If Statement. Select expressions, then wizard.GemCount, then other…. Type in 6 on the calculator and click Okay.





Ending the Game

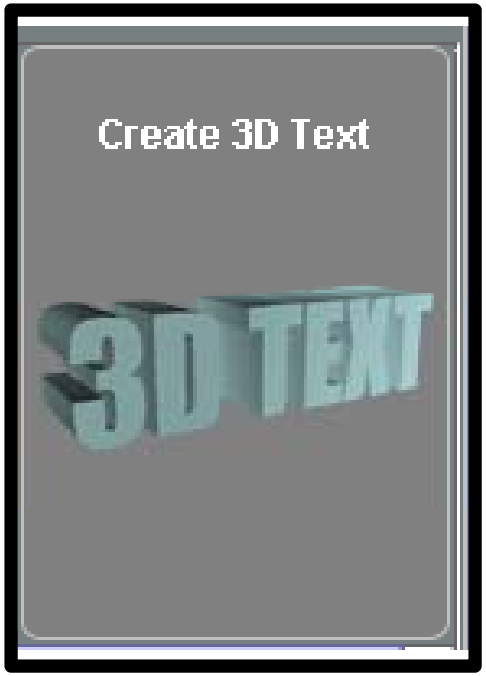
Now go into the world's methods pane, and drag and drop winner into your If Else statement.

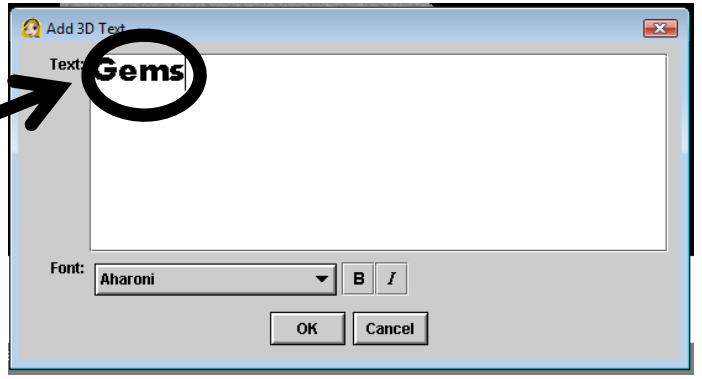


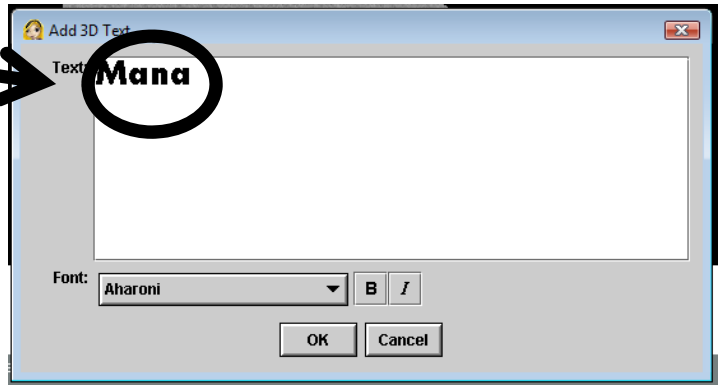
Now your game should be functional!

Showing Mana and the GemCount

Now there's only one problem: we can't tell how much mana we have left, or how many gems we have collected, unless we keep track in our heads! We can fix this by adding text objects that display both of these numbers. Go to the add Objects screen and scroll to the end of the folders to find 3-D text object. Add two of these, one called Gems and one called Mana.

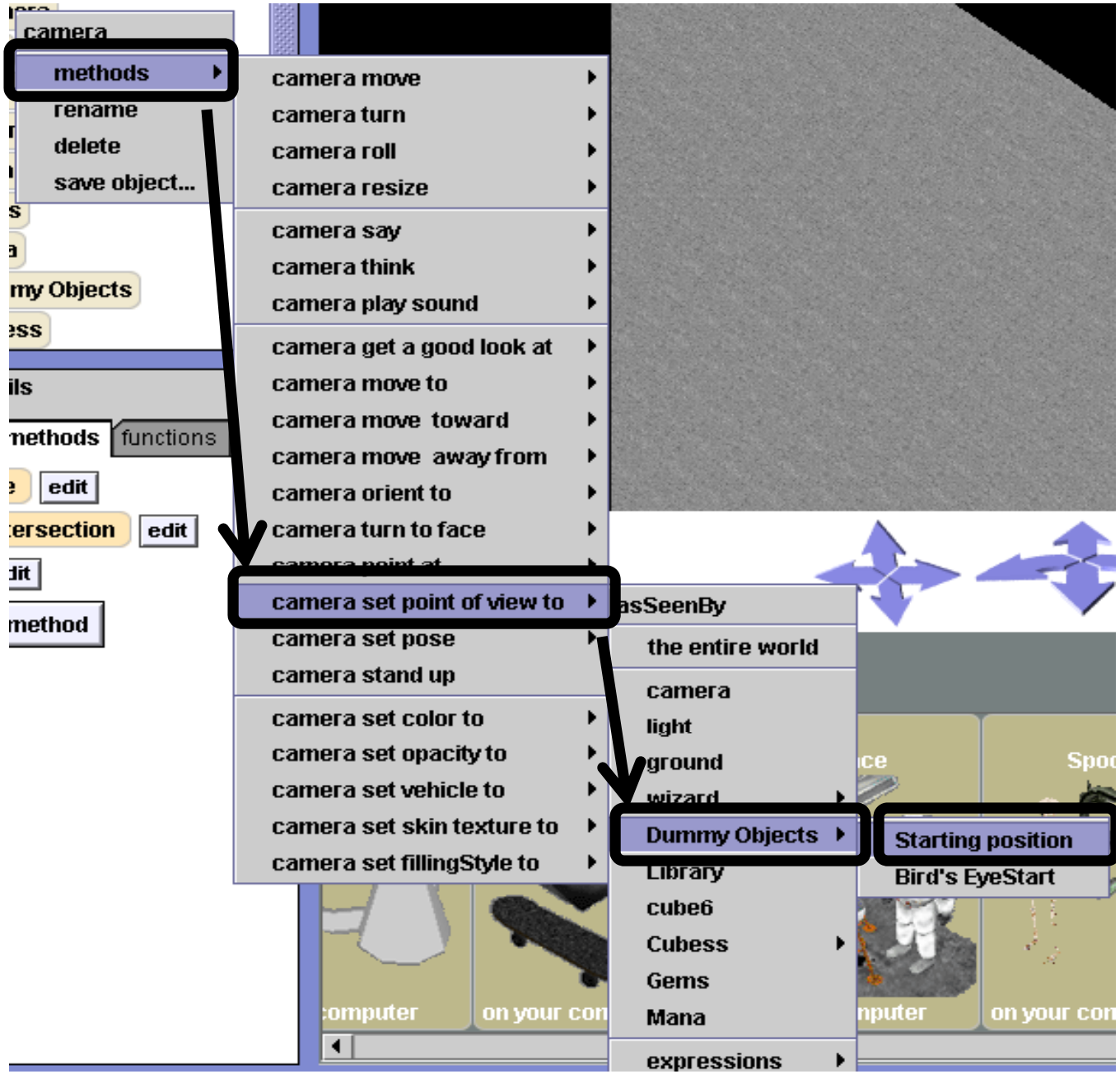






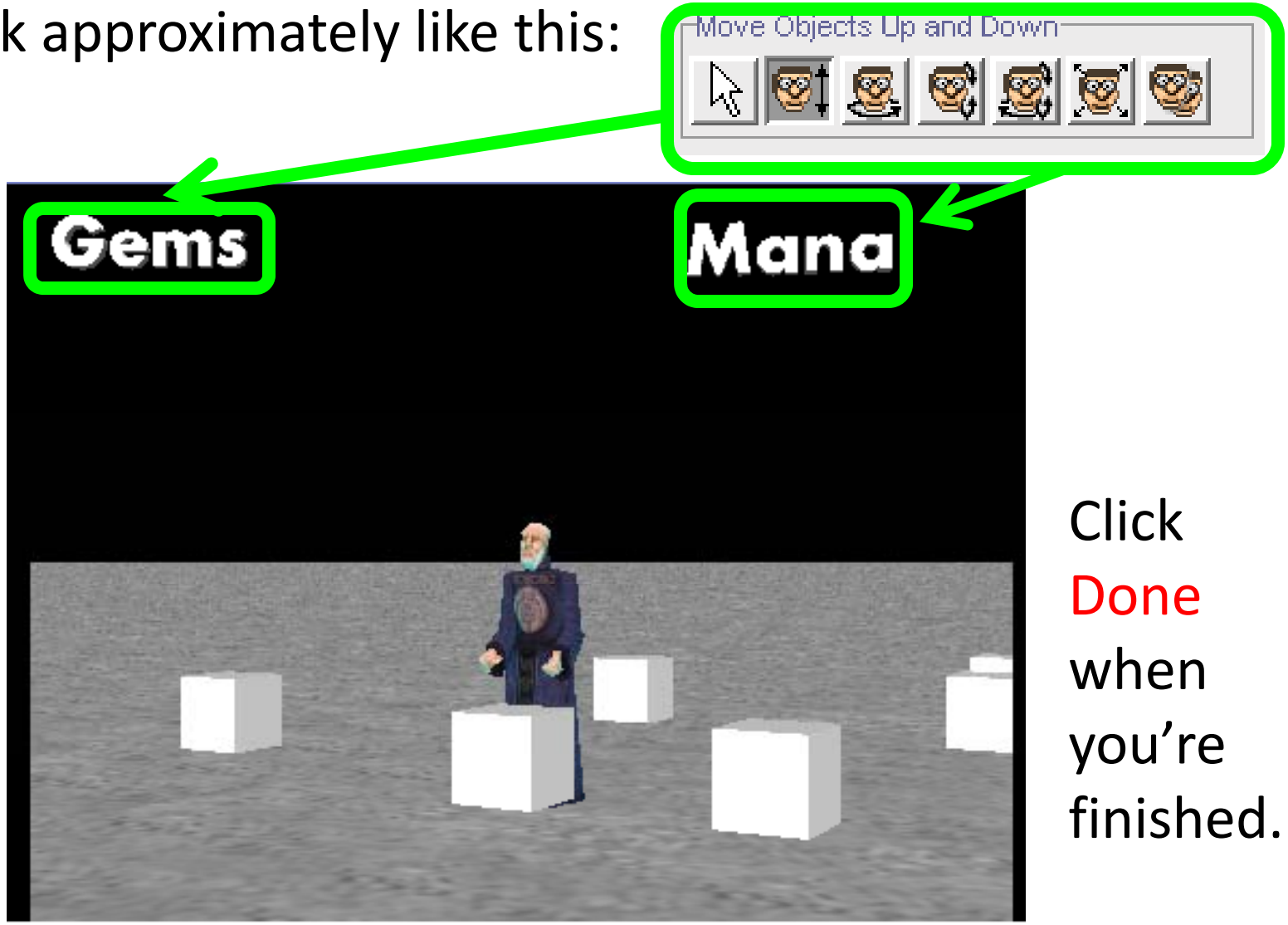
Positioning the Text Objects

Now you need to move your camera position so you can see the text objects and the wizard. Right click on camera in your object tree, then select methods, then camera set point of view to, then Dummy Objects, then Starting Position.



Positioning the Text Objects

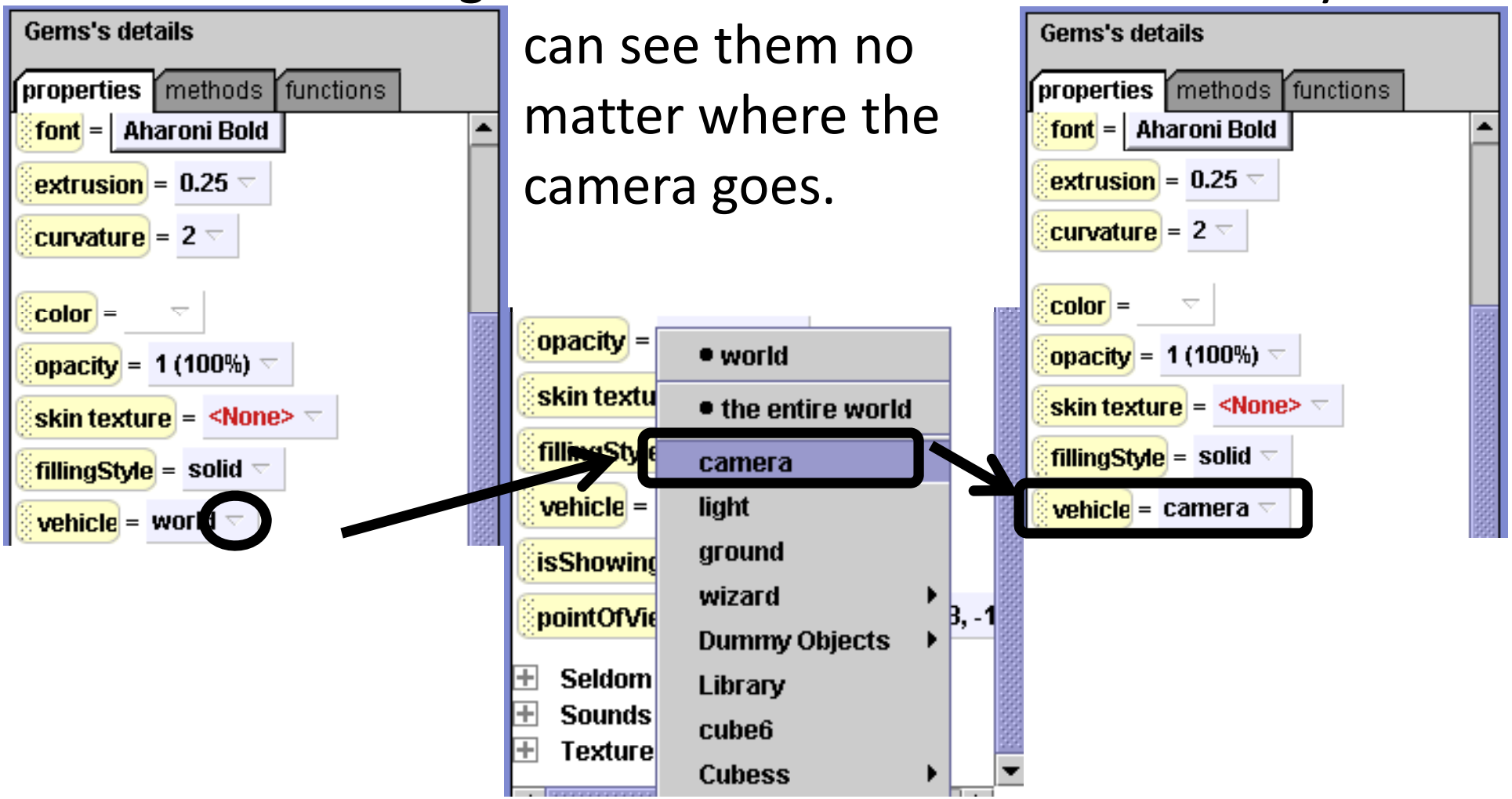
Now use your object positioning buttons to push the text objects back from the camera, and then up in the sky, until they look approximately like this:



Click Done when you're finished.

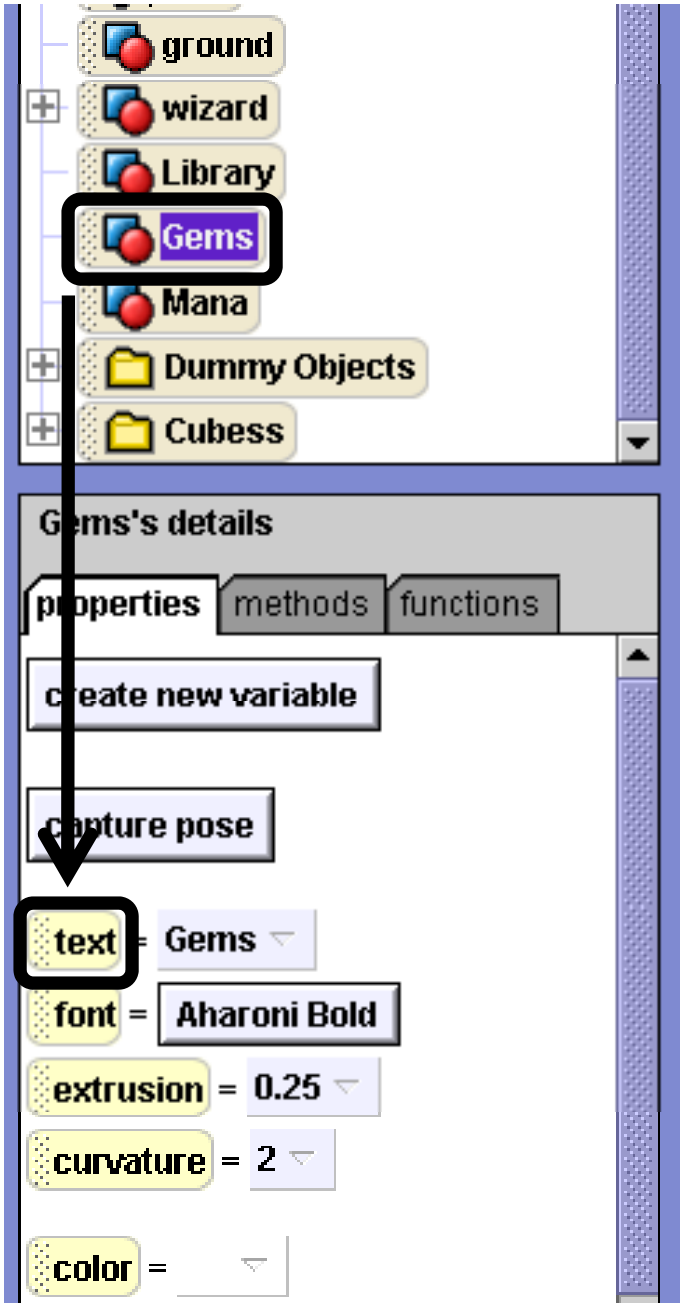
Setting the Text Objects

Now click on Gems in the object tree and go to its properties pane. Find the small button that says vehicle. Click on the down arrow next to world, and select camera. Do this same thing for Mana. This will make it so that you can see them no matter where the camera goes.



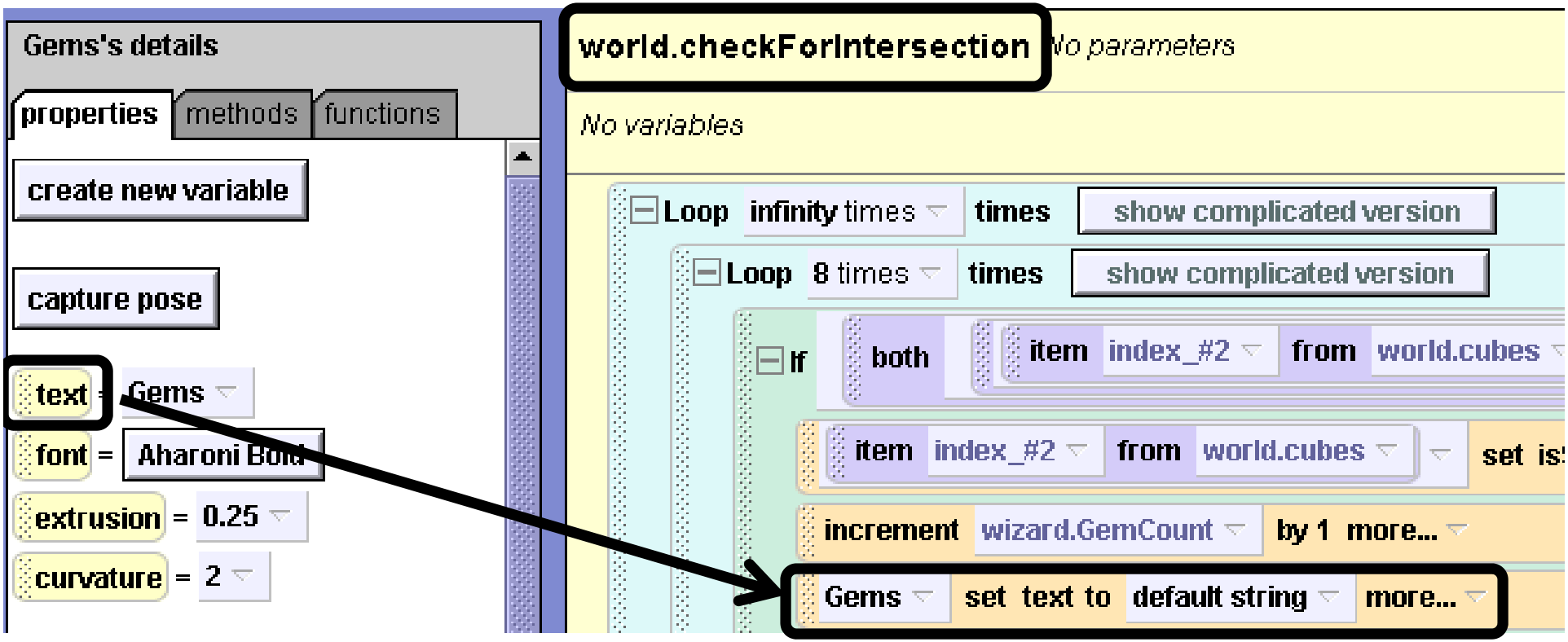
Showing the Gem Count

Now we need to put code in our checkForIntersection method that connects the GemCount variable to the Gems text object. First, make sure that you are looking at checkFor Intersection in your method editor. Then click on Gems in the object tree, and go to its properties pane. Find the small button that says text.



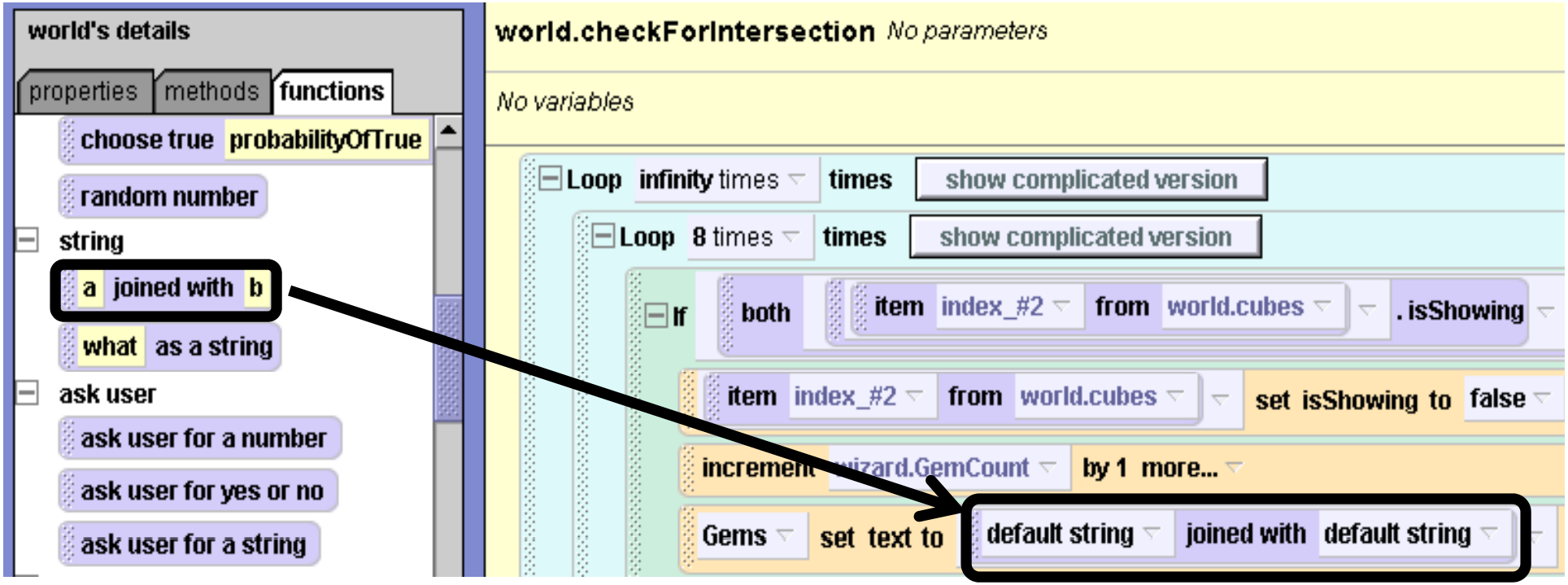
Showing the Gem Count

Drag and drop the text button into the checkForIntersection method right under the increment command. Select default string for now.



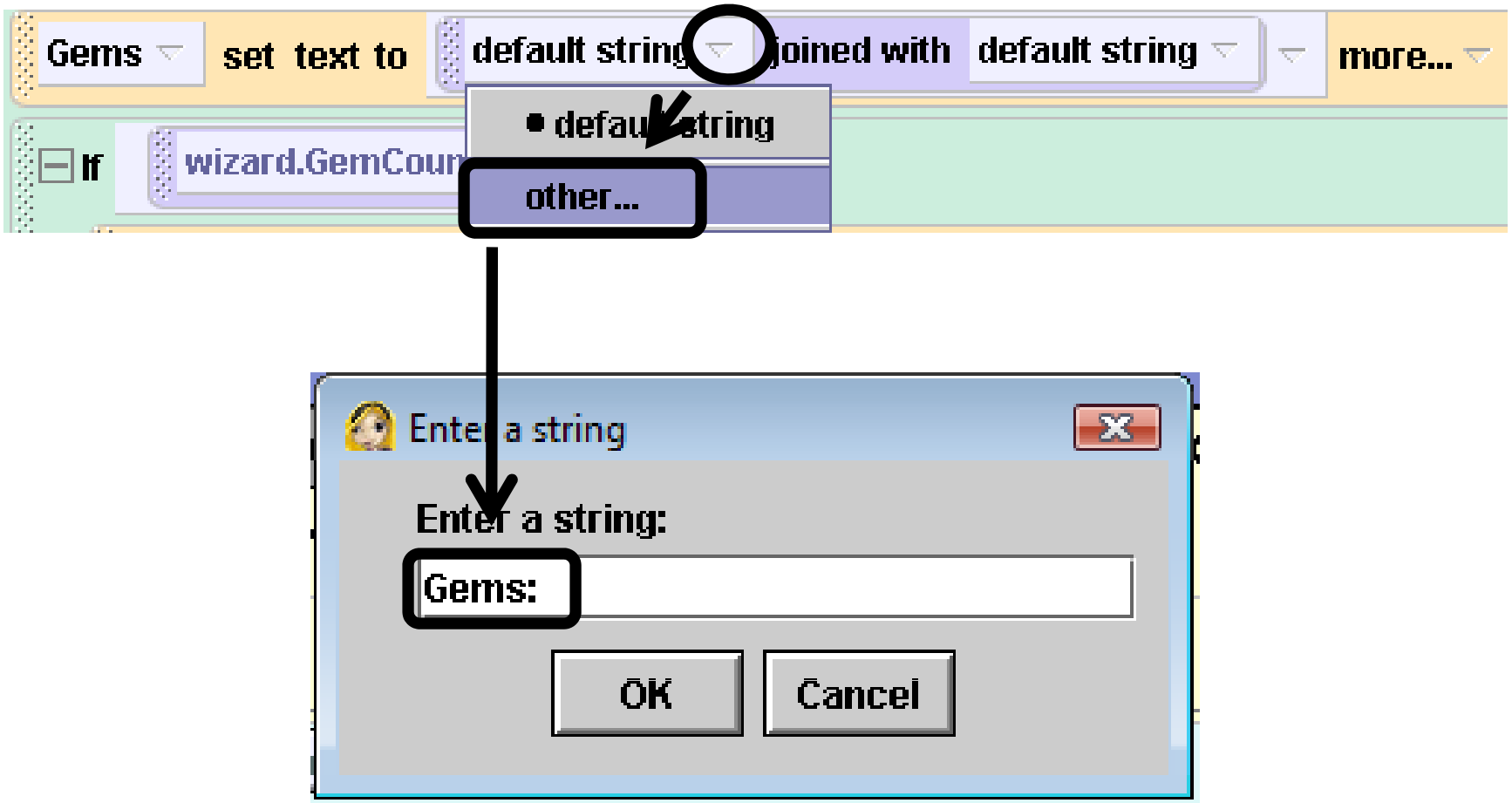
Showing the Gem Count

Click on world in the object tree and go to the functions pane. Find a joined with b, and drag and drop it onto your set text to command where it says default string. Just select default string again.



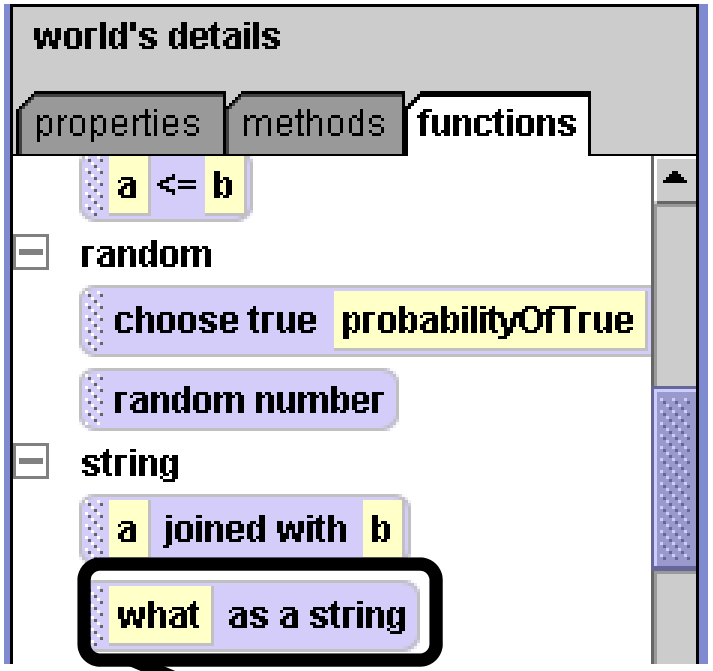
Showing the Gem Count

Now click on the small down arrow next to the first default string on your set text to command. Select other… and then type in Gems:. Then click OK.



Showing the Gem Count

Now look back at the world's functions. Find what as a string and drag and drop it on top of the second default string on the set text to command. Select expressions, and then wizard.GemCount.

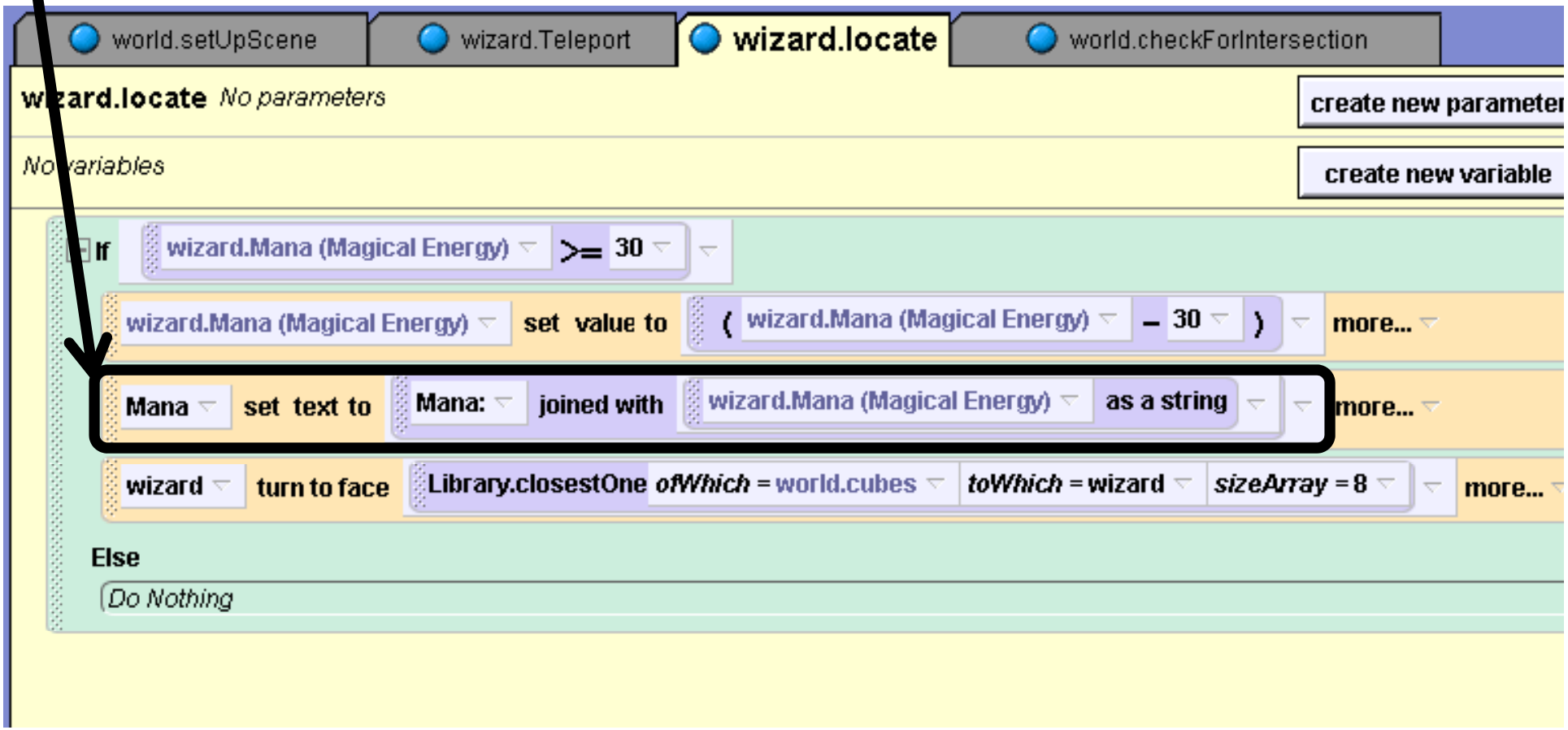


Showing the Mana

Now open up the Teleport method, go to Mana's properties pane, and repeat all of those steps for the Mana, typing in Mana: for the first default string, and selecting wizard.Mana(Magical Energy) for what as a string. Your Teleport code will look like this:

Showing the Mana

Now repeat those steps *again* for the locate method. Your code will look like this when you're done:



Testing out the Game

Now play the game. It should go through the opening as usual, except now there are two text objects on the screen also. Whenever you find a cube, your gem count should go up, and whenever you use either Teleport or locate by pressing T or F, your Mana should go down!

Now try winning the game. Can you do it?
After you win, try winning without using Mana!