


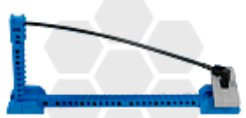







FLL 2006 Nano Quest Missions

<p>Individual Atom Manipulation (30 or 40 points)</p> <p>Move individual atoms accurately. The robot must remove at least 1 white atom from the blue surface without removing any red atoms. Counting atoms left on the surface, a count of fewer than 8 red atoms is worth no points. A count of 8 red atoms and 7 or 6 white atoms is worth 30 points. A count of 8 red atoms and 5 or fewer white atoms is worth 40 points.</p>	
<p>Smell (5 to 30 points)</p> <p>Transfer molecules from the pizza toward the nose. The robot must get pizza molecules completely off the paper plate for 5 points each, and transferred to the yellow or black areas of the person's head or neck for an additional 10 points each.</p>	
<p>Stain-Resistant Fabric (3 to 70 points)</p> <p>Test some stain-resistant fabric. The robot must deliver the dirt trap to its location mark and completely dump out the tester's dirt dumper. The dirt trap at its mark is worth 15 points, and the dirt dumper when empty is worth 15 points. The 8 dirt pieces are Bonus Objects, worth 5 points each in the dirt trap, and 3 points each everywhere else on the table. When removing dirt for a Bonus Loss, the referee takes stray pieces first, then pieces from the dumper, and pieces from the trap last.</p>	
<p>Atomic Force Microscopy (40 points)</p> <p>Free the probe's nanotip. The robot must separate the nanotip from the material surface. The nanotip separated from the surface is worth 40 points.</p>	
<p>Self-Assembly (30 points)</p> <p>Start the self-alignment of atoms. The robot must cause the angled blue nanotube segments to align horizontally end to end. This alignment is worth 30 points.</p>	
<p>Smart Medicine (50 points)</p> <p>Target medicine to reach only a specific problem spot. The robot must release the Buckyball containing medicine into the person's arm. The Buckyball is placed anywhere in the red/yellow channel of the arm bone is worth 50 points (even if it hasn't reached the problem spot).</p>	
<p>Nanotube Strength (20 or 40 points)</p> <p>Lift the truck by a thin cable of carbon nanotubes. The robot must move the truck onto the lift frame and activate the lift. The truck completely on the frame is worth 20 points. The truck and frame supported completely and only by the cable is worth an additional 20 points.</p>	
<p>Molecular Motor (40 points)</p> <p>Deliver an adenosine triphosphate (ATP) molecule to power a molecular motor, causing it to spin and release energy. The robot must deliver 1 of the 2 ATP molecules through the molecular motor's black frame for 40 points (even if nothing else happens). The second ATP molecule represents a second chance to complete this mission, but points are only given for 1 delivered molecule.</p>	
<p>Space Elevator (40 points)</p> <p>Operate the space elevator. At least one robot must cause the car with the yellow cargo to come down. If this mission is completed, no matter which robot or robots worked on it, both teams get 40 points.</p>	
<p>Fairness Bonus (20 points)</p> <p>For 20 bonus points, an RCX robot must earn points in any 3 missions, or an NXT robot must earn points in any 6 missions.</p>	