

ONCE UPON A TIME IN A GALAXY ...

AN EGG - UNIT IN SEARCH FOR A FRIEND

Maybe You Will Build One For Him?



Welcome to my instructables.

This time I want to share with you how to build R2D2 based on an egg-shell.

I call him the REGG2-D2!

It has got a turnable head, a blue diode to transmit the hologram of Princess Leia, and fully adjustable legs.

If you are one of the older folks, be patient! I really appreciated having small fingers for that job. I hope you'll have some fun building and playing. :-)



Obviously you need to start with choosing the right egg. To make it easier, take an XXL sized one. The brown ones tend to have a stronger shell. The hardest part is in the very beginning, to draw an equator that is really running equally around the shell.



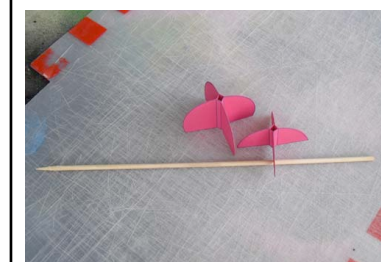
For the equator, this egg-bot machine would have really made a difference. My first attempt wasn't ideal, but every later try with other eggs got worse and worse. This picture was taken to roughly catch the outside shape before cutting the egg, to be later used in a vector program.



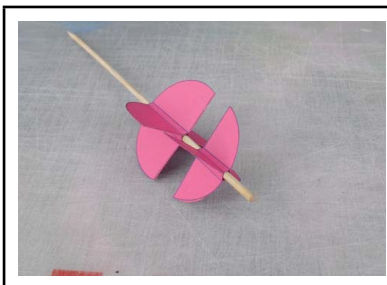
Cutting the unopened egg: note that the head is smaller than the body... it's approx. a ratio of 3,5 to 4,5. To support the hand-drawn line I used elastic tape, that served also as a lead to the drill. The turn of the cut-off wheel, once it went too deep into the body, pulled out the egg-white – yummy!



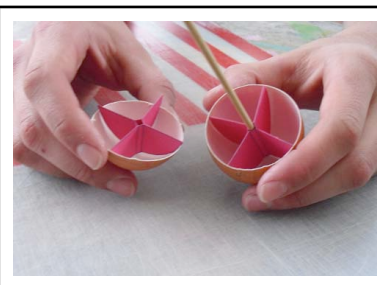
The egg is free! You can see the two „halves“ with very jagged edges. Don't worry. But they need to be sandpapered if the two parts are to turn smoothly against each other. See the three stripes on the table? That's the white of the egg pulled out by the drill. :-)



Now you should turn to the PDF-file for the interior crosses. I didn't have a turning head in mind from the start, just to stabilize and connect the two parts. But then I thought why not? I took photo nr. 2 and drew the halves, then added a 3mm stripe for the center axis.



The wooden shashlik stick going through the two stabilizers, made from 250 gr/m² paper.



Fixing the stabilizers into their corresponding pieces showed, that some fine tuning on the outer edges of the paper was still necessary, despite the preparation done.



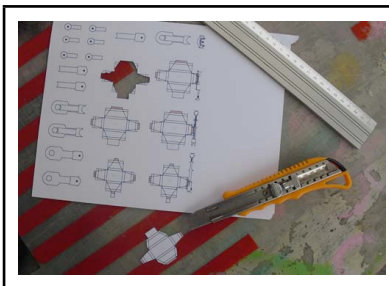
The Body stabilizer already glued in, using epoxy-glue. Very important to start with the long part of the axis and get it straight into the egg. The stick is already cut to fit.



Now the head: thanks to the fixed axis in the body I just had to add glue and make the seams of the egg align. By pure coincidence the body cross opened to the sides, front and back, while the top was turned 45 degrees, dividing each bottom space in half. Good for the later electric installation...



Another view of the two parts, both sandpapered by now. Note that I used another load of glue to reinforce the delicate shell. To hide the gap (and it's irregularities) between the shell parts, I glued a 5 mm ring around the body, it's ends meeting in the back. Then I used some filler to connect ring and body.



So far the body. For the legs and feet we have to print out the next PDF file on 250 gr/m2 paper. Cut out the three feet and leave some lashes to connect the corners. Then cut out once the three layers for the leg and the joint.



Three feet to be folded and glued. The three parts of the leg and the joint to be transferred to a 2mm thick cardboard. Recycle your shoe boxes, if you can...



The pieces for the legs already cut out. The one with the arch goes in the center. I used an office perforator to punch out the holes (I did it after I cut the pieces, be clever and do the punching first and then draw the shapes on the cardboard).



Here I glued the pieces of the individual legs together, closing the space front and back for the future joint. The feet have got little rectangles cut out on the top surface to allow the joints to be glued in. The magnets will give the feet some weight to anchor the heavy egg to the ground)



Another word to the magnets: the walls have got an angle so make sure that the glued magnets don't block the closing of the feet. I put a second one in each foot (epoxy) and still had space for the joint to go in-between. Watch out that the magnets have the same orientation towards the bottom. This Picture: legs with filler.



The feet half closed, the joints glued in. The 2nd magnets didn't go in so smoothly, because they were pulled in by the first ones. So they are glued too far out and closing the feet made them bulge. If you don't want your robot to climb the side of your car, just use simple metal as weight.



The feet with filler. I got concerned that the magnets might be too strong for that thin paper, so before the filler I glued another rectangle of that cardboard to the sole. Stabilization and reduction of pull in one go.



Starting the decoration of the head: This time I punched out the hole first! :-) ...and then cut the shape around. I tried to draw lines to indicate the height of each further decoration, then drilled a 3mm hole for the blue diode.



Again using filler...



See how nicely the gap hides behind the ring.



The sandpapered legs and eye of the head.



Not planned but felt that it was needed: the cone that is to form the bottom ring of R2D2. Make a cone with the desired bottom width, then cut of the tip to create the recessing ring.



I glued the ring with epoxy glue, that helped equalize any existing gaps. It also made the very thin paper stiffer. Notice that the body is divided (according to the interior stabilizers) into eight „equal“ stripes.



I freely cut out eight small trapezoids that I wanted to add to the ring to add some texture – to be open, all quite improvised. The ideas just developed while working on the project.



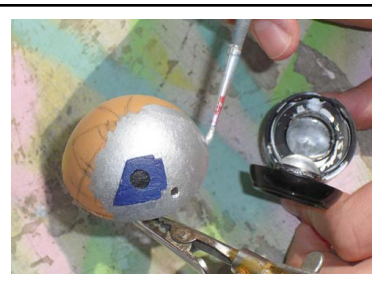
The pieces are glued according to the lines on the body. This thin cardboard, cut to such little pieces, tends to loose it's separate layers, so watch out!



The ring is complete, with fitter (putty) and sandpapered, the ring, too, is ready to be painted.



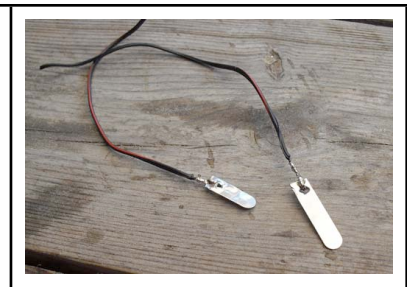
The first coating of the body, with a color that later turned out to be not white enough for the stickers. So it had to be sprayed again.



The head and the eye being colored. With that the basic outside of Regg2D2 is ready.



Now the electric inside, nothing complicated. I cut of the tongues of an old 4,5V battery, that would serve as a switch.



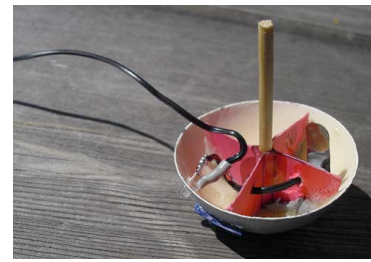
The cables connected to the tongues (switch).



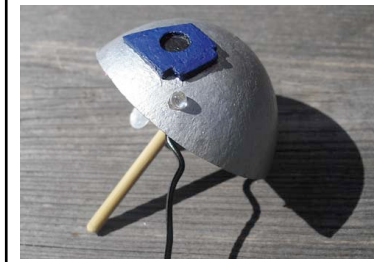
Here you can see the complete electric device: in the center the blue diode, and a 3V battery connected.



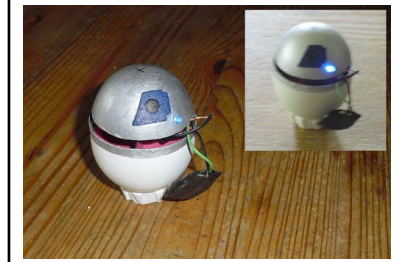
One tongue connected to the head, it's cable going through the diode hole. The bottom shows the 2nd tongue fixed in the back space, the battery placed in the front compartment. (Left and right compartments free for the leg magnets)



I glued the diode to the head and fixed the cables (the longer stick of the diode is the plus, to go to the plus of the battery). The tongue is positioned so as to switch on the light when R2 turns his head 45 degrees (and not more). A magnet can be used to lock the switch.



An outside view of the fixed diode.



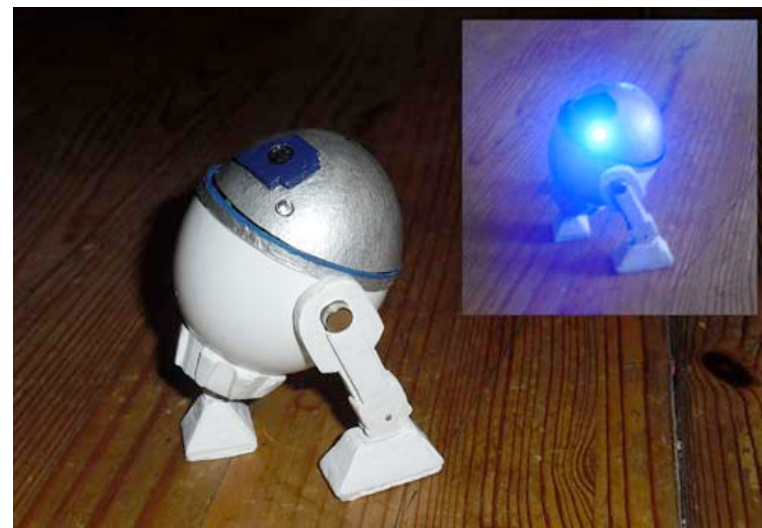
The pieces put together – and voilà, everything works.



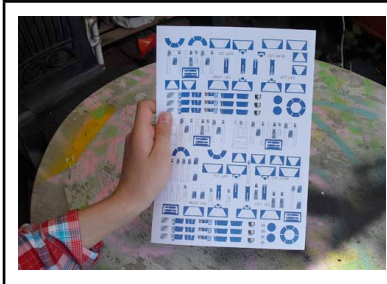
Painting the parts a second time with a brighter white. On the next picture, though sprayed already, one can still see a difference between the sticker white and the white of the legs.



The legs assembled: In the punched-out holes I nested a magnet each (orientation!). The joint is drilled with a 1mm tip, a nail shortened and pushed through the hole, glued in front (later covered by a sticker), kept by it's head on the inside of the leg.



Glue two magnets to the inside, fix the legs to it's side, and Regg2D2 is on his way!



The next PDF is to print out the stickers to be glued on leg, body and head... It's decorating time! I tried to find enough side views of R2D2 to be as correct as possible, but he's mostly depicted from the front. Scaled and reduced towards the top and bottom. I went to a printing office with laser printer and self-adhesive paper.



Very hard to get an equal spaced line. I measured the remaining space (circumference), minus 1cm for an extra eye in the back, minus the bottom length of all parts – I ended up with a 2mm space between the individual stickers.



Once that line is glued, it's easier to see where the top center and the top deco line is. I drew some invisible lines on the silver to help dividing areas. The result is quite okay.



After glueing the stickers, I covered them with 2-3 layers of varnish. Spraying from a very big distance to just add thin covers of varnish (1 - 1,5 m). Still some corners lifted off slightly, but once lacquered you can use super-glue to fix that.



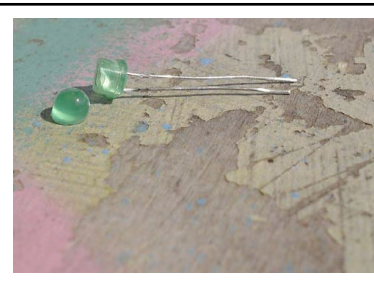
The stickers for the body: the center should be the easiest task, then do the place under the legs, finally the space between center and leg. The same from behind: center, legs, in-between. The trapezoids on the bottom ring also offer some point of orientation.



Legs with stickers. Note that the feet have the crescent moon on the back of the foot. There's a sticker for the magnet, too. But it doesn't connect too well, even with varnish.



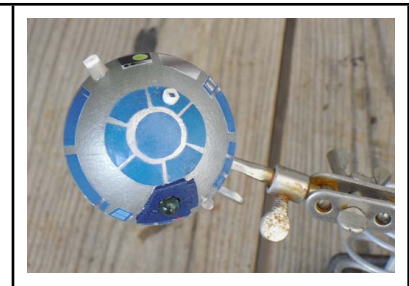
Final decorations for the head: I'm cutting off the of a green diode that I want to glue into the punched out hole of R2D2's eye.



The cut-off tip of the diode. The bottom of that dome I will color black, as to pretend that we've got some greenish-black lens here.



I don't eat sweets usually, but this time this lollipop came in handy. It's plastic stick is a thin tube. Cut in a slight angle it will make beautiful lens extensions to Regg2D2's head.



The open barrel tube with the front keeper of the laser-tip. Notice that this closed section is quite shorter than the laser to be accommodated. That's because the laser-tip has to still go all the way through the T-junction.



The head: you can see the green diode fixed, and the lens extension glued to the back head. Originally I wanted to fix the front foot with some plasticine and just stick it in. This solution is better: a thin metal stripe glued in to allow for another few magnets to connect there.



The foot trapped between two magnets, and connected to the metal stripe. In addition, the shiny magnets look like a real small-scale joint. The projects done, Regg2D2 can travel the space...



And off he went to help somebody in the Dagobah system.
See you later, buddy!