

# Product Decomposition




**Product Decomposed:** Black + Decker 8V Cordless Drill

**Date:** 3/20/2022

**Description:** A rechargeable cordless electric drill designed for home improvement projects and DIYs.

**How it Works:** Once the drill is charged, the user selects a drill bit (a phillips head and flathead are included). The user twists the black front portion to secure the bit and then uses the black switch to determine the direction of the drill. The user then continuously holds the trigger to turn the bit.

## Parts:

Part #	Part Name	# Requ'd	Material	Mfg Process	Image
1	Bit	1	Steel	Flat Head: Machine Pressed and Grinded  Phillips Head: Swaging, Grinding, Tipping, and Profilating	

2	Bit Holder	3	Steel	Forging and Milling	
3	Bit Holder Holder	1	Steel	CNC Turning	
4	Motor	1	Copper Wiring, Ferrous Core	Die Press, Punching, Indirect Extrusion	
5	Motor Cover	1	Steel	Sheet Metal Bending	
6	Motor Cap	1	Polymer	Injection Molding	
7	Motor Cap 2	1	Polymer	Injection Molding	
8	Trigger	1	Polymer	Injection Molding	
9	Trigger Spring	1	Steel	Wound Wire	


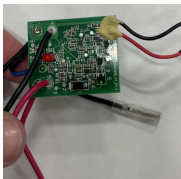
10	Trigger Metal Piece	1	Steel	Sheet Metal Punching, Blanking, and Bending	
11	Washer	1	Steel	Sheet Metal Blanking and Punching	
12	Ring	2	Steel	Sheet Metal Blanking and Punching	
13	Snap Ring	1	Steel	Stamping	
14	Sun Gear	1	Polymer	Injection Molding	
15	Sun Gear 2	1	Metal	Hobbing or Shaping	
16	Gear Carrier	1	Metal	Injection Molding	

17	Gear Carrier 2	1	Steel	CNC Turning + Milling	
18	Metal Top	1	Steel	Punching Blanking, Die Press	
19	Bit Ring 1	1	Steel	Injection Molding	
20	Bit Ring 2	1	Steel	Injection Molding	
21	Thrust Ball Bearing	1	Polymer + Metal Bearings	Look at ball Bearing, Polymer Punching and Blanking, Pressing	
22	Metal Gears	3	Steel	Hobbing	






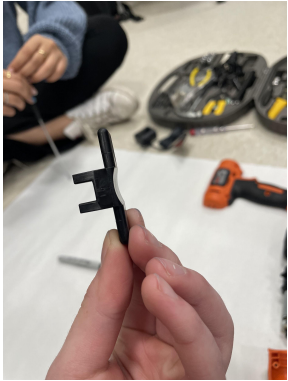

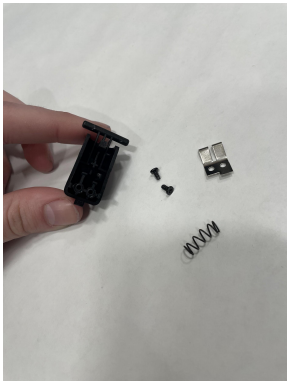
23	Polymer Gears	3	Polyamide (Possibly PA6)	Milling	
24	Tightener	1	PA6	Injection Molding	
25	Sungear House	1	PA6	Injection Molding	
26	Reverse/Forward Adjuster	1	Polymer	Injection Molding	
27	Polymer Cap	1	Polymer	Injection Molding	
28	Shell Left	1	Polypropylene	Injection Molding	



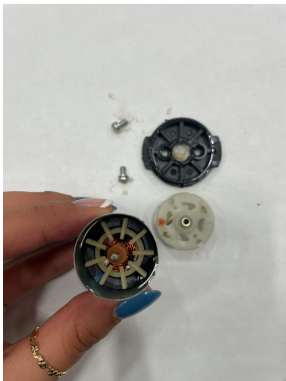

29	Shell Right	1	Polypropylene	Injection Molding	
30	Battery	2	Lithium, Paper,	Deep Drawing, Injection, and Sealing	
31	Trigger Screw	2	Steel	Thread Rolling	
32	Motor Screw	2	Steel	Thread Rolling	
33	Outer Casing Screw	8	Steel	Thread Rolling	
34	Bit Holder Screw	1	Steel	Thread Rolling	
35	Motor Cap Metal Piece	1	Metal	Extrusion, Heading, and Filing	



36	Bearing Sphere	13	Steel	Heading and Filing	
37	Circuit Board	1	Fiberglass, Copper, Tin-Lead, Nickel	Spray Lay-Up	

## Disassembly:

Step #	Procedure	Part #s Removed	Image
1	Unscrew outer casing screws		
2	Split open case	28 and 29	

3	Remove trigger	8, 10, 31	
4	Remove switch	26	
5	Remove internal components from casing		
6	Disassemble trigger	10 and 31	

7	Separate electronics from batteries	30 and 36	
8	Separate electronics from motor		
9	Separate motor components	4, 6, 7, 14, 32, 34	
10	Remove sun gear from motor	15	

11	Removal of gears from sun gearhouse	16, 22, 23	
12	Separation of chuck (done by professors)	2, 3, 12, 13 17, 18, 19, 20, 21, 24, 25, 27, 35	

Team Member: Cynthia Jelke

Team Member: Hannah Loly

Team Member: Disha Narain