

# VEX IQ Elementary School Reverse Engineering Online Challenge

## “Taking Apart A Power Drill”

By Kyo and Brennan  
Team Number 2718Z, Hilo, Hawaii



## Kyo with Drill picture 1

Q:What type of device did you choose to explore and why?

A:We chose the Ryobi power drill because it was hard and challenging. We also chose it because the drill is one of the main power tools that people use consistently and it would be nice to know how it works.



## Parts List picture 2

1.Outer Casing

The outer casing's role is to keep all the parts inside.

2.Magnet



The magnet's role is to keep the drill bit and screws on.

### 3. Forward Reverse Selector

The Forward Reverse Selector's role is to take out screws and put in screws.

### 4. Gear Changer Knob

The Gear Changer Knob's role is to change the direction of the drill bit.

### 5. Level

The Level's role is to make sure the thing that you are drilling is the angle you want it.

### 6. Gear Box Assembly

The Gear Box Assembly's role is to transfer the power of the motor to the drill bit.







## Planetary Gear Set pictures 3 - 5

### 7. Ball Bearings

The Ball's role is to level out the gears.

### 8. Pins

The Pin's role is to hold the drill together.

### 9. Washer [8 millimeters]

The Washer's role is to make sure the drill is sealed.

### 10. Data Label

The Data Labels role is to give you the percentage the drill is at.

### 11. 18 Volt Battery

It powers the drill.

### 12. Motor Assembly

The Motor Assemblies role is to keep the drill bit going.

### 13. Spring Washer

The Spring Washer keeps the drill sealed.

### 14. Screw

The Screws are to hold the drill together.

### 15. Logo Label

The Logo Labels role is to show their company's logo.

Q: What did you learn from exploring your electronic device?

A: We learned that the Ryobi power drill is a cool machine because it has lots of complicated gears and we also

learned that Planetary Gear Sets have lots of gears and when the motor turns the middle gear all the gears spin around it. We also found out that the motor for the drill is magnetic! We thought it was magnetic because of all the copper windings in the motor. We did some research online and found the Fun Science Demos video called “The Electric Motor: Magnets and Electricity” and we learned that the battery puts electricity in the copper wire and then it works together with the magnet which makes your electric device turn on and spin!

Credits:

Kyo - Disassembly and research

Brennan - Write up and pictures

Reference: Fun Science Demos YouTube video

“The Electric Motor: Magnets and Electricity”

Ryobi Power Drill Manual