**Electricity, Current, Static, and Magnetism**

**Sample Student Prior Knowledge (Misconceptions)**

[**http://www.homeofbob.com/science/misconceptions/electMagnet.html**](http://www.homeofbob.com/science/misconceptions/electMagnet.html)

**Concepts**

Static electricity is an electrical charge produced by friction.
All matter is made of particles (electrons, protons, neutrons)
Electrons move from one atom to the next.
Usually matter has the same number of protons (+) and electrons (-) that result in a neutral charged.
Electrons are moved by rubbing.
Electrons can be moved in either direction depending on the material of the objects being rubbed.
More electrons than protons cause a negative charge, less electrons than protons cause a positive charge.
Objects with different charges can attract or repel (++ or -- repel) (+- or -+ attract).

**Students’ Alternative Conceptions about Electricity that They Bring to the Classroom**

A thing you plug something into.
Stuff in the wires.
Electricity flows like water in a pipe to the receiver. Only needs one wire.
Flows from negative to positive. Negative side of the battery to the bulb to the positive side of the battery through the stuff in the battery and back to the negative side.
Electricity is not energy.
Batteries make, create electricity. or chemicals in batteries make it.
Generators make, create electricity
Electrons flow at the speed of light.
Electricity leaves one battery plate and returns to the other.
There is positive and negative electricity that come from the battery and meet in the light bulb to make light. Nothing returns to the battery.
The battery has the electrons, electricity there are none in the wires or receiver.
Is not on the electromagnetic spectrum.
Static electricity is the opposite of current electricity.
Each electron carries energy
Conductors allow charges to pass.
Electricity is used up by the receiver. Doesn’t complete the circuit. Like water flowing from hose or pipe.
Water, coal, oil, nuclear power causes electricity.
Electricity vibrates in the wires until it is used.
Electric companies supply electrons to your house.
Insulation holds electricity in like the walls of a pipe for water. Causes the electricity to turn corners.
If the switch is on electricity is flowing. Even if no receiver, bulb in socket, TV off…

**Students’ Alternative Conceptions about Magnetism that They Bring to the Classroom**

Magnets only attract
Magnets repel non metals
Magnets stick to everything. Magnets attract to all metals. Stick to anything metal.
Magnets are made of plastic.
Magnets only attract to iron
The larger the magnet the stronger the pull
Magnetism is like iron filings
Magnetic fields are two dimensional like the pictures in the book.
Only magnets have magnetic fields.
Magnetism causes the objects to attract and repel.
Larger magnets are stronger.
Magnetism is magic.
Magnetic poles = n and s pole.
Magnetism doesn’t go through objects. Magnetism will be blocked by materials that are insulators.