Electrical Energy

9/24/14

Why does your hair stand on end when it's charged?

A. Charges want to discharge to the air

B. Ionic Bonding

C. Charged hair wants to get as far apart as possible

D. Scientists do not understand this phenomena

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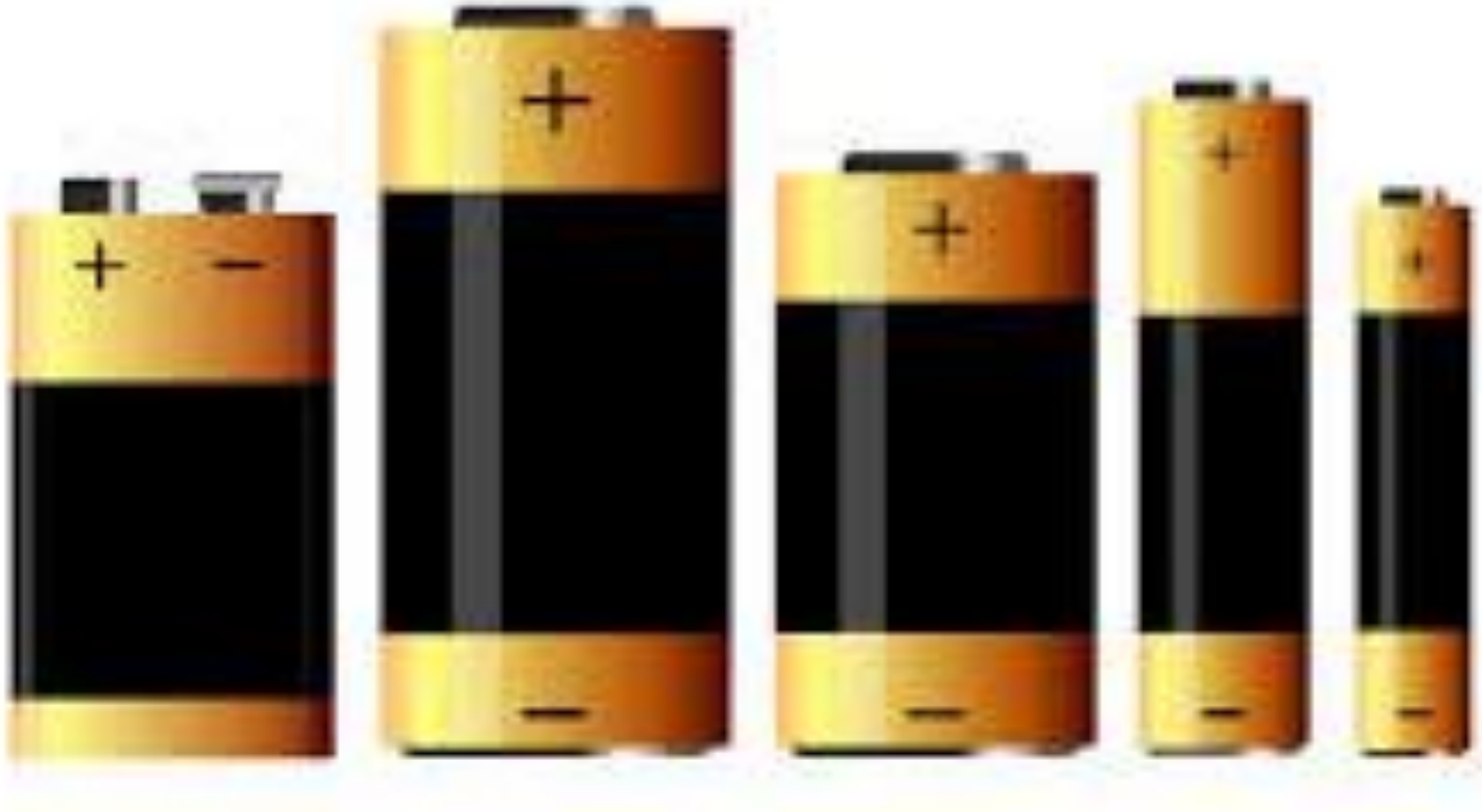
Contacts have opposite charges

Caused by a chemical reaction inside. Once the reactions are complete, the battery is dead.



Contacts have opposite charges

Which end are electrons attracted to?

A. +

B. -

C. Both

D. Not enough info

Contacts have opposite charges

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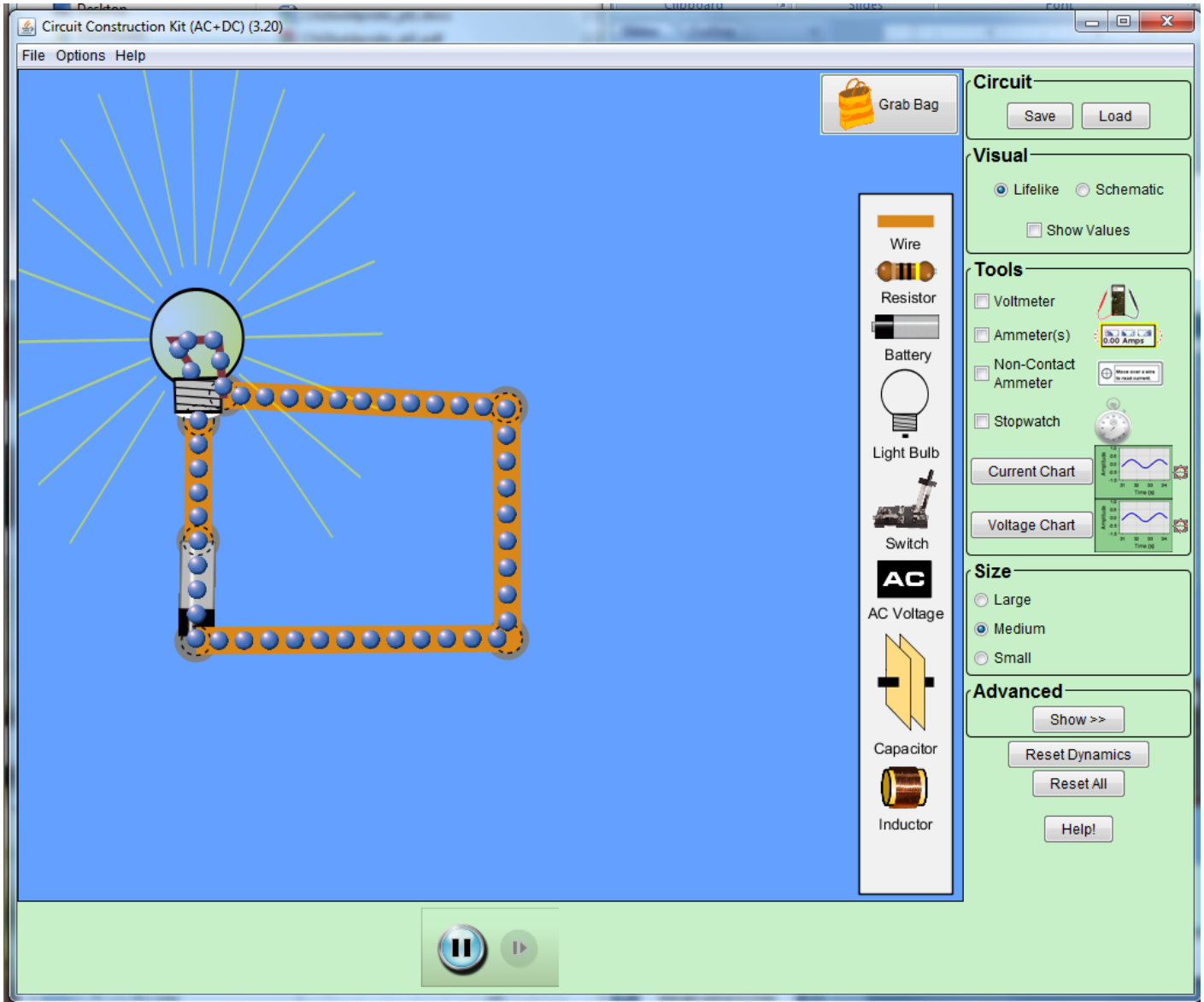
Contacts have opposite charges

Electrons are attracted to +

Electrons are repelled by -

PhET - CCK


Circuit Construction Kit (AC+DC) (3.20)
File Options Help
Grab Bag
Wire
Resistor
Battery
Light Bulb
Switch
AC
AC Voltage
Capacitor
Inductor
Circuit
Save
Load
Visual
Lifelike
Schematic
Show Values
Tools
Voltmeter
Ammeter(s)
0.00 Amps
Non-Contact Ammeter
Stopwatch
Current Chart
Voltage Chart
Size
Large
Medium
Small
Advanced
Show >>
Reset Dynamics
Reset All
Help!

Bottom line

- **Current** is *flow of electrons* caused by opposite charges attracting and repelling.

- **Resistance** is *friction* acting on the electrons.

That's it!

What gets used up in a circuit

A. Current
B. Electrons
C. Voltage in the battery
D. Chemical Energy of the battery
E. None of the above

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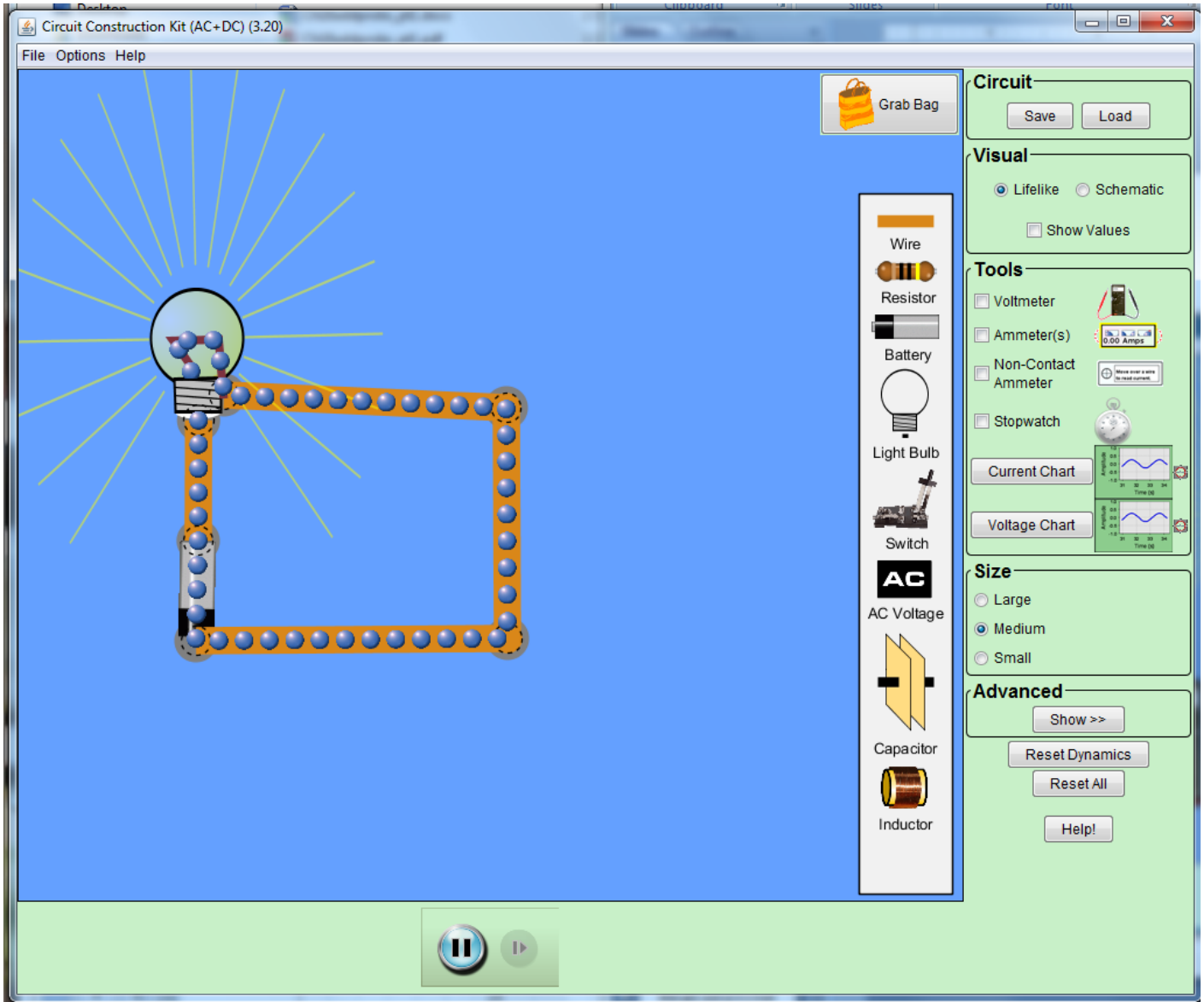
Chemical Energy of the battery…

Or power from power plant

- Burn Coal or Natural Gas
- Covert to mechanical energy
- Then to Electrical

PhET - CCK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AC Power in US

Everything is waves/oscillations

How many cycles per second is the sim?

A. ½ a cycle
B. 1 cycle
C. 2 cycles
D. 4 cycles

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60 Hz or 60 cycles per second

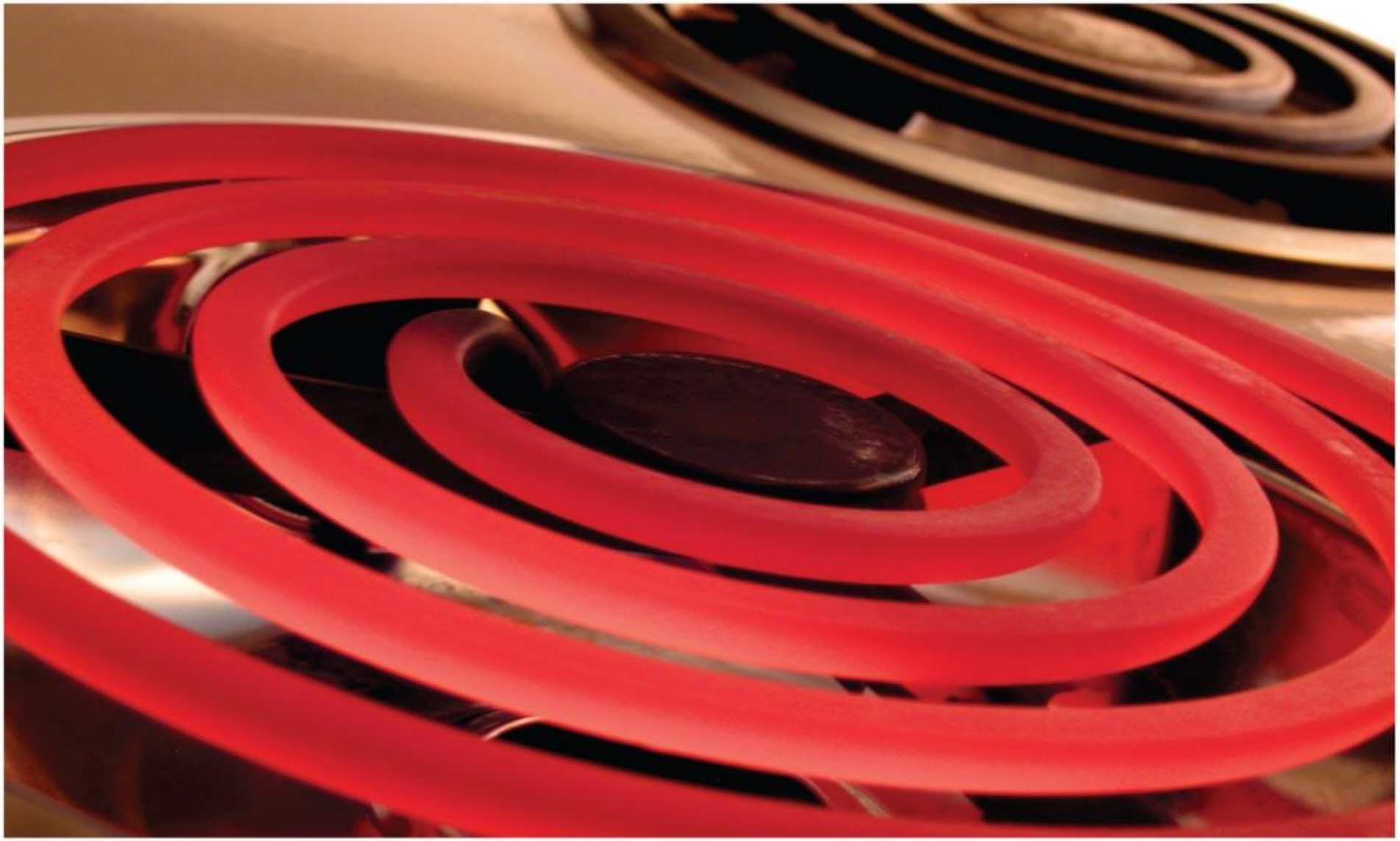
String circuit

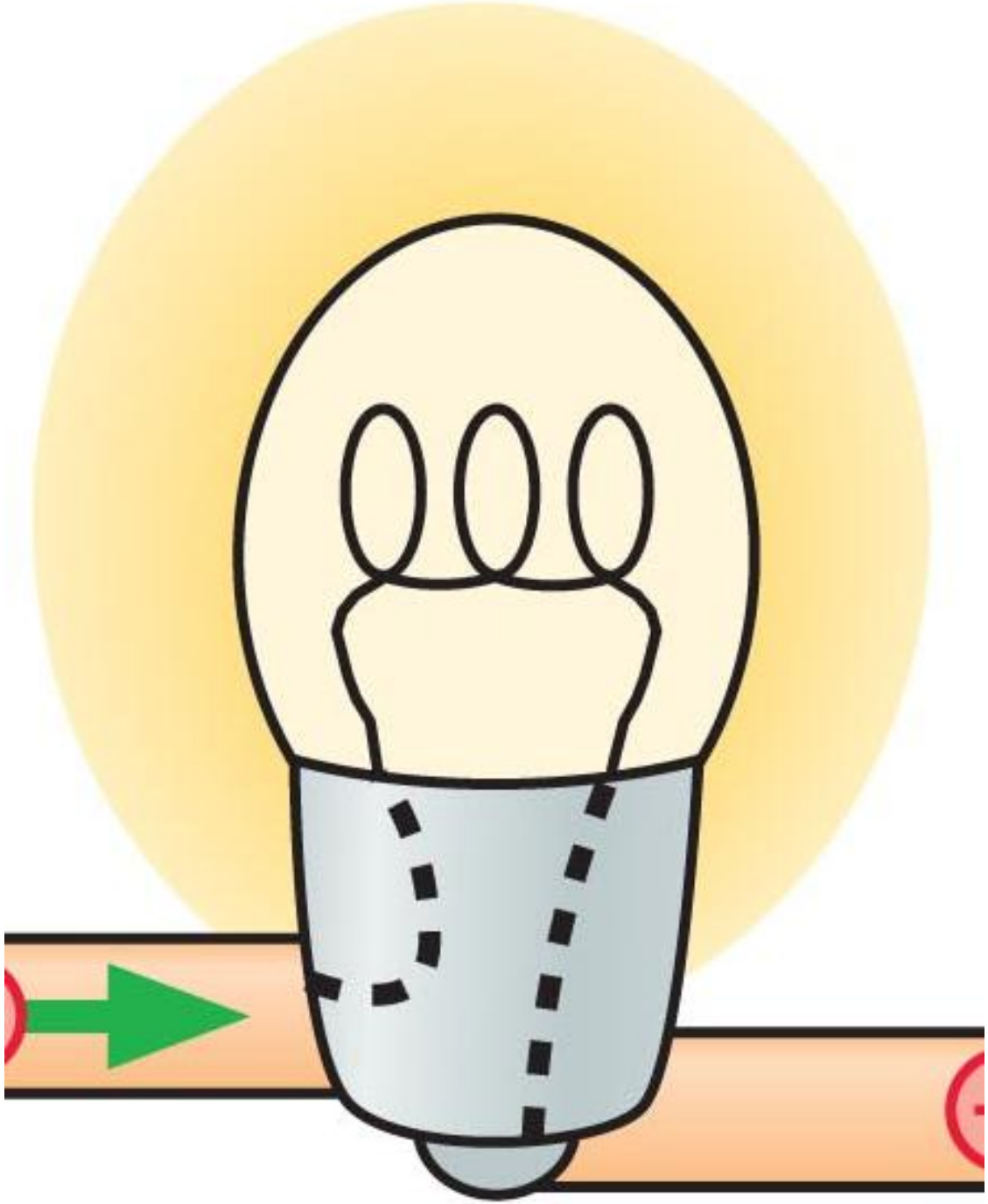
Any idea what could cause a burner to heat up?

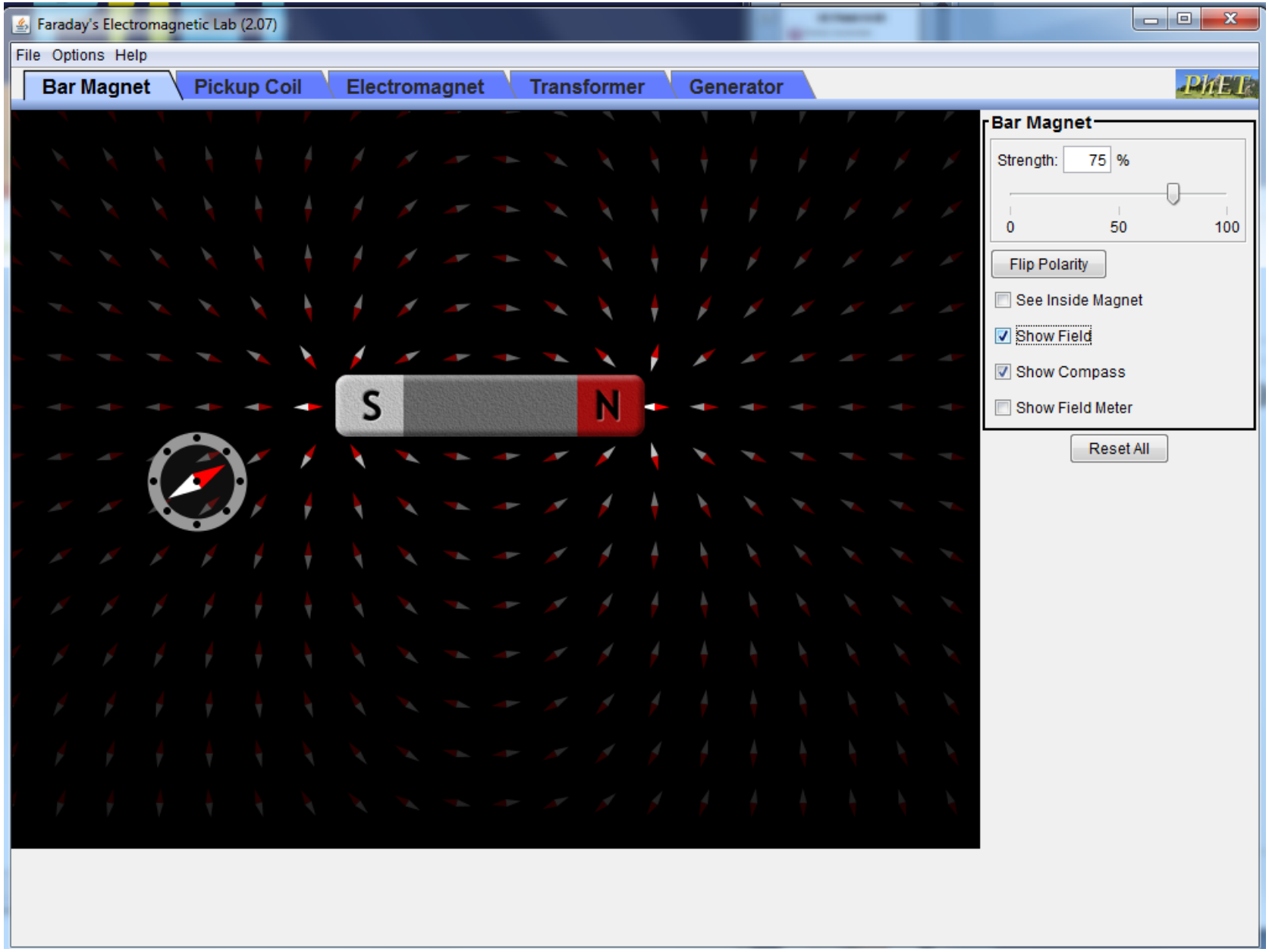
What causes a burner or a toaster to heat up?

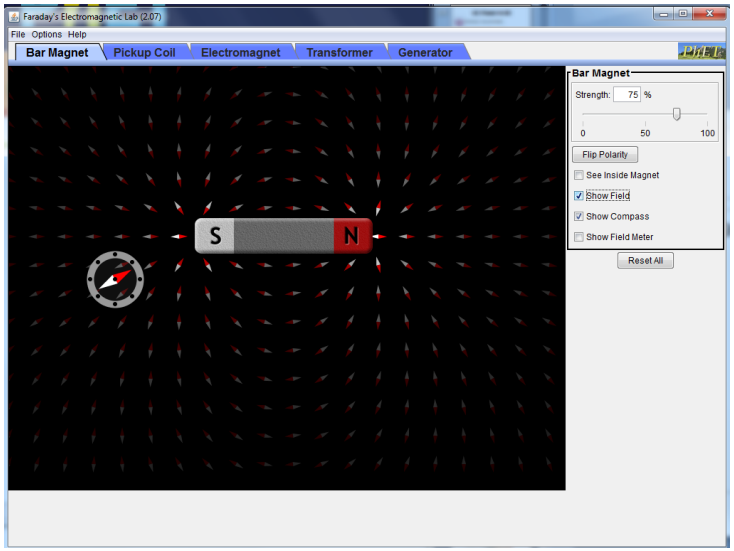
A. Complicated electronics
B. Magic
C. Simple circuit with lots of resistance
D. Other

Lots of resistance so lots of friction






Faraday's Electromagnetic Lab (2.07)
File Options Help
Bar Magnet
Pickup Coil
Electromagnet
Transformer
Generator
PhET
S
N
Bar Magnet
Strength: 75 %
0
50
100
Flip Polarity
See Inside Magnet
Show Field
Show Compass
Show Field Meter
Reset All



When working on the homework, I felt

A. Comfortable that I figured it all out
B. Like I got a lot from the sim but missed some key concepts
C. Lost, I just couldn't figure out how things connected
D. I didn't try it.

Magnets

In lab, magnets *strongly* attracted

A. Nail, paper clip
B. Nail, Paper Clip and Aluminum rod
C. PVC Pipe, plexiglass, glass
D. A and C
E. B and C

Magnets

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Magnets

1. Magnets have nothing to do with electrical charges.
2. Magnets always have a North pole and a South pole. North attracts South and North repels North.
3. Students often confuse magnets with electric charges because they follow the basic rule of opposites attract and likes repel. However, it's for different reasons.

Magnets

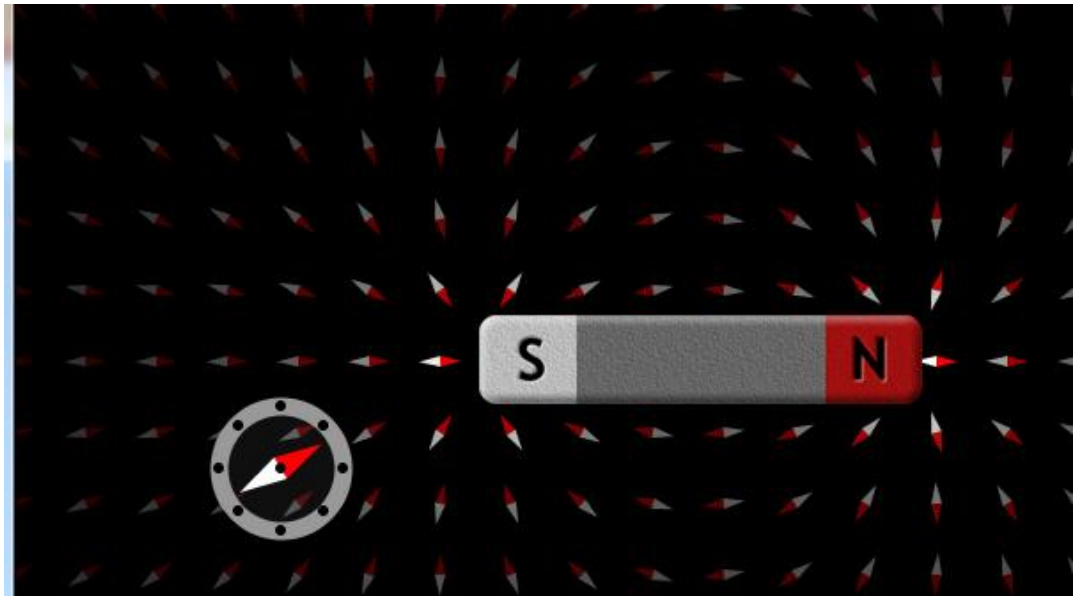
Which end of the compass is attracted to the Magnet?

A. Same color

B. Opposite Color

C. Both

D. Not attracted



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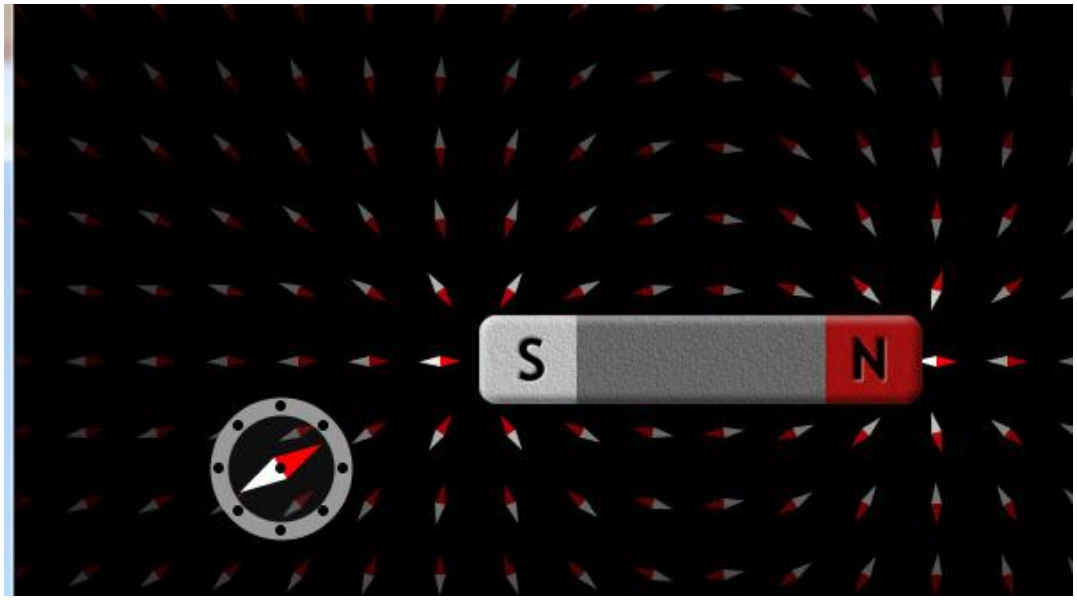
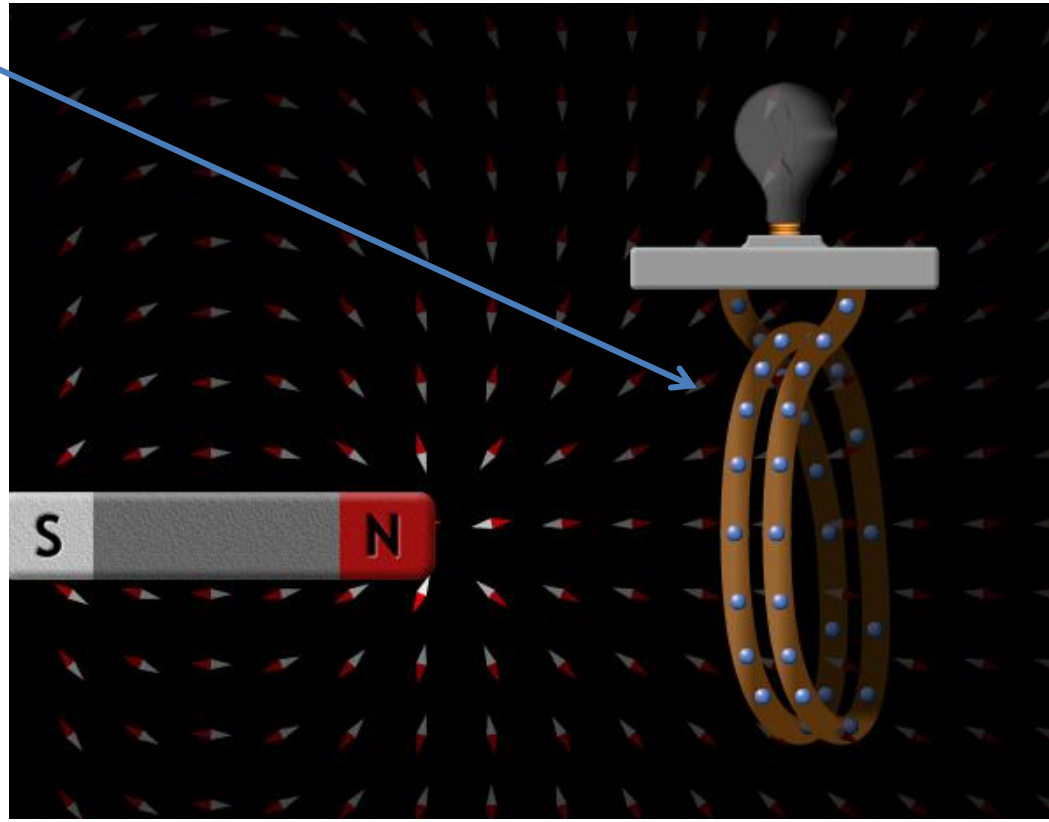


What are the blue dots?

A. Magnets
B. Magnetic field
C. Electrons
D. Protons



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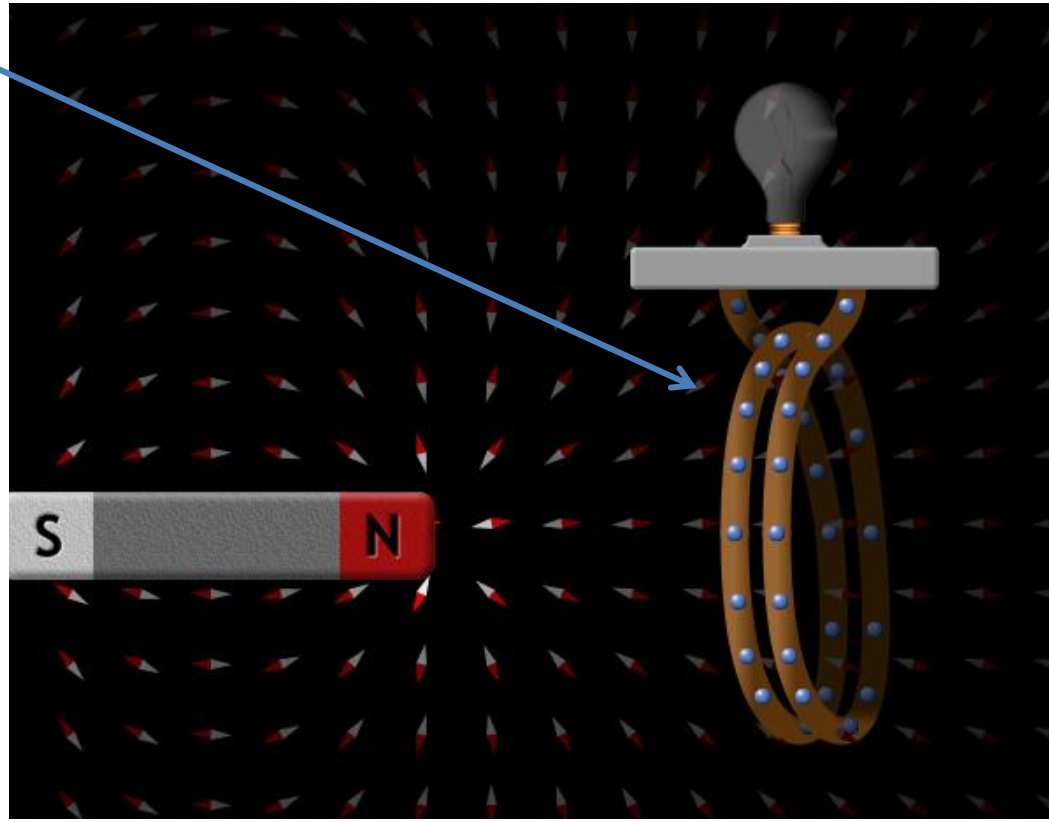
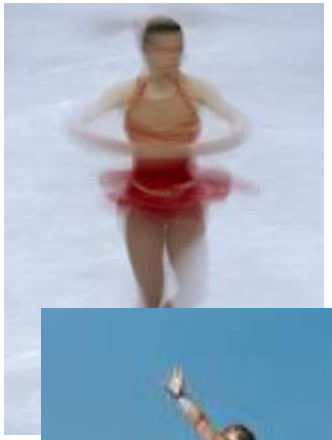


Compare magnet to electromagnet

- Compare “Electromagnet” tab to “Magnet” tab
- Compare “Pickup Coil” tab to “Transformer” tab.

Energy Forms

Kinetic – Energy of Motion



Rotational Kinetic – Energy of motion (spinning)

Gravitational potential – position allows gravity to move it.

Elastic potential – something elastic is stretched or compressed

Rotational Energy

- Energy of motion

Picture of Earth

Where is the sun?

A.

B.

D.

C.

E. Can’t tell

Rotational Energy

- Energy of motion

Efficiency

Why do runners get better times in cool rainy races?

Who's faster?

Same Energy Source

Heat!

All energy transformations transfer some to heat.

To be more efficient, less transfer to heat.

Cars get hot

Generators get hot

Windmills get hot

Often due to friction or just burning fuel.

Energy Drinks

Sugar – if not sugar free

The only actual energy

<u>Stimulant Drugs</u>

suppress the bodies natural reaction to exhaustion.

Not healthy