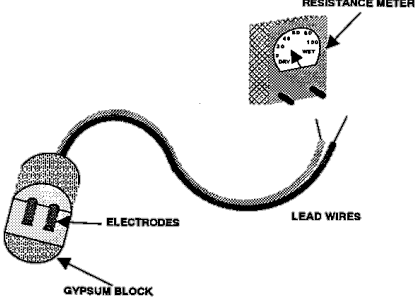



# Introduction to Electronics 110



Jan 21-5:44 PM



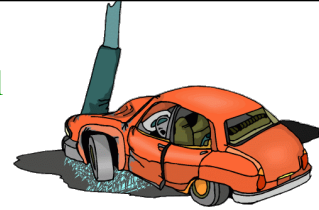
# Intro Lesson

# Safety



Jan 21-7:28 PM

Next to motor vehicles, the home accounts for most fatal accidents each year in Canada.



What are some accidents that occur around the house that could be fatal?

Falling down stairs

Getting electrocuted

Drowning

Jan 21-6:05 PM

### Electrical Hazards in the Home

- 1) No extension cords under rugs or used as wiring
- 2) Do not yank cords from outlets
- 3) Cover unused outlets (Baby safety)
- 4) To avoid shocks never use water around outlets, appliances, fuse boxes
- 5) Never use water to put out electrical fire
- 6) Do not over load plugins or chords
- 7) Turn off main electrical switch before working on switches
- 8) Avoid using 2 heating appliances on one outlet ( Iron and Hair dryer)
- 9) Replaced frayed cords



Jan 21-6:46 PM

Safety in Schools Electronics

- 1) USE COMMON SENSE
- 2) Follow Rules (to protect you and others around you)
- 3) Report any safety hazards or injuries
- 4) Never work on LIVE circuits unless supervised
- 5) Stand on dry, non conductive surfaces when working with live circuits
- 6) Wear safety glasses
- 7) No horseplay
- 8) Know where the fire extinguisher is located
- 9) Check all "Dead" circuits before touching



Jan 21-7:12 PM

Electricity deals with the flow of electrons, which are charged particles.

THUS

There is danger of SHOCKS



Jan 21-8:16 PM

### 3 Electrical Factors Involved in Electric Shock

#### 1) Electrical Resistance

- Denoted by "R"
- Oppose to the flow of the current (goes against)
- measured in ohm ( $\Omega$ )
- the **smaller** the number for the body resistant the **GREATER** the chance of shock (  $R \downarrow$  means  $\$ \downarrow$ hock)
- the **BIGGER** the number for the body resistant the **less** the chance of shock (  $R \uparrow$  means  $\$ \uparrow$ hock)

Area of skin and condition of skin effects resistance

<u>Skin type or Area</u>	<u>Resistance Value (R)</u>	<u>Shock</u>
1) Dry Skin	100 000 to 600 000 $\Omega$	less
2) Wet Skin	1000 $\Omega$	
3) Hand - Foot	400 to 600 $\Omega$ <b>big</b>	
4) Ear - Ear	About 100 $\Omega$	most

Jan 21-7:36 PM

### 3 Electrical Factors Involved in Electric Shock (Continued)

#### 2) Electromotive Force (or Voltage)

- Denoted by "V"
- the pressure that causes the flow of electric current
- measured in **volts**
- higher the volt the more dangerous
- **ABOVE 30V is considered dangerous**

(Think pushing, force that moves electrons)

#### 3) Electric Current

- Denoted by "I"
- rate of flow of electrons (how fast)
- measured in **ampers**

Jan 21-8:43 PM

don't copy

### Effect of Electric Current

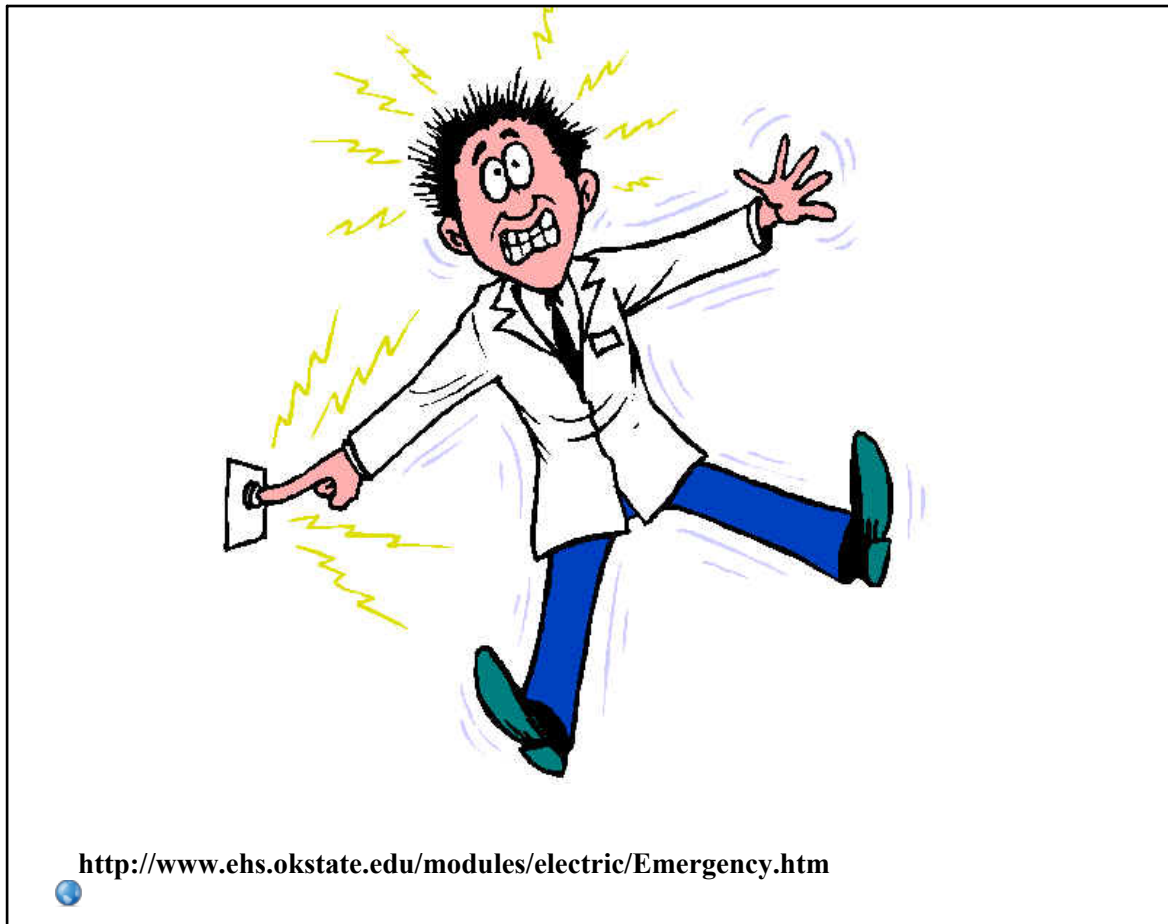
1000 mA = 1 A  
milliamperes      ampers

1 A is the current in a 100W lamp and can electrocute 20 adults at one time

Current (mA)	Effect
1000	
50	heart convulsions (Usually fatal)
20	painful shock can't let go since muscles contract
5	safe current
1	
0	

Currents above 5 mA is dangerous enough to kill but resistance of the human skin is high enough to limit the flow of electricity.

Jan 21-8:43 PM



<http://www.ehs.okstate.edu/modules/electric/Emergency.htm>

Jan 21-7:33 PM

# First-Aid Videos

 <http://mycontent.discoveryeducation.ca/>

## First Aid Video Questions

look at materials for mod on discover ed that goes with this video

Jan 21-9:16 PM

## First-Aid

### 1) Bleeding

- apply direct pressure to the wound with a clean cloth or hand
- raise arm, leg, or head above heart level

### 2) Burns

- immerse injured area in cold water or apply cold packs
- Do not break blisters
- Do not put grease on burns

### 3) Shocks

- turn power off and use a dry board or stick to remove electrical contact
- use CPR if person is not breathing
- keep head low and turned to one side to keep blood flow

Jan 21-7:36 PM


# Intro Lesson 2


## Tools Used by Electricians



Jan 21-9:24 PM


Some you may not have heard of...

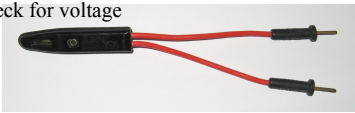
 Voltmeters - measures voltage

Ammeters - measures currents 

Ohmmeters - measures resistance

Multimeter - measures voltage, current and resistance  
<http://www.youtube.com/watch?v=bF3OyQ3HwFU>

Clip-on Ammeter - measures current flow without touching electrical circuit  
<http://www.youtube.com/watch?v=u7rIaocm9Pw> 

Neon Test Light - lights up when voltage is present  
cheapest to buy to check for voltage 

Jan 22-12:02 AM



Some you already know...



**Screwdrivers**  
 Phillips-x shape   
 Slot head(Flat) -   
 Robertson - Square   
 should only be used to tighten or loosen screws nothing else


**Claw hammers**  
 - head is for driving nails  
 - claw is for pulling nails 





**Pliers**  
 - Side-Cutting Pliers  
 gripping, twisting and cutting wire   
 - Diagonal-Cutting Pliers  
 close cutting jobs, trimming wire   
 - Needle-Nose Pliers  
 looping ends of wires to connect to screws   
 - Curved-Jaw Pliers  
 are adjustable to grip work   
 - Vice-Grip Pliers  
 can lock onto an object 

Jan 22-12:15 AM

**Saws**  
 cross-cut saw : is a wood saw   
 Hacksaw : cuts metal   
 Keyhole saw: cut holes in walls for outlets 

**Drills & Bits**  
 Electric Drill: uses a Twist drill bit  
 : used to drill into hard surface (metal)   
 Brace Drill Uses Auger Bit  
 : Drills holes in wood 

**Center Punch**  
 mark place for drilling 

**Wrenches**  
 Open-End : for use in close quarters  
 : different size on each end   
 Box-End:   
 Sockets: place on nut (Faster to use)  
 : Attach to ratchet  
 : Use on machine nuts   
 Adjustable: uses for odd size nuts 

Jan 22-12:38 AM



Nut Driver  
-used on hexagonal nuts  
-hallow



Allen Keys  
- used on screws with hexagonla heads  
- claw is for pulling nails



Wire Stripper  
- removes plastic coating over wires without damaging wire  
- can use a knife instead if you are careful



Files  
- metal files remove sharp metal from cutting or drilling  
- wood files



Chisels  
- Cold Chisles are for metals  
- Wood chisles are for wood



Jan 22-11:12 AM

<http://www.youtube.com/watch?v=WaNLoUcCQdg>

Fish and Tape Reel  
- pull wire through wall partitions



Sodering Gun  
- for hand wired circuits



Sodering Pencil  
- for circuit boards



<http://www.youtube.com/watch?v=BLfXXRfRIzY>

Jan 22-12:56 PM

## Care & Use of Tools

- 1) Clean
- 2) Proper storage
- 3) right tool for the right job
- 4) replace damaged or broke tools
- 5) Do not use pliers on nuts
- 6) pull rather than push a wrench
- 7) Keep tips of sodering tool clean

Jan 22-1:13 PM

Test on Safety & Tools

Jan 29-12:19 PM

## Attachments

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Intro To Electronics - First Aid Video Quiz.docx