1) Many types of battery powered electric drills can be used as a hand generator to charge small rechargeable batteries. A hand crank is made and mounted in the chuck of the drill and cranked by hand. The trigger is held down and power is generated on the terminals that would normally connect to the battery. The voltage at hand crank speeds is usually enough to change one or sometimes 2 cells at a time.

2) Many types of self standing exercise bicycles and supported regular bicycles can be converted to generate power. One way is to use two battery powered electric drills facing each other with a lawn mower wheel on a shaft between them mounted in each chuck. The lawn mower wheel is spring loaded to rest on the tire of the bicycle that has the drive chain.

3) In a primitive environment the most damage one will see to vital electrical items will occur due to voltage surges. Lighting and electronics are partially sensitive to over voltage surges. Assign someone in the group to monitor and periodically watch for this condition. If over voltage is measured at any time the engine governor and(or) voltage regulator will need to be adjusted low enough that the voltage never gets above a given limit. For the USA this would be 120 V AC and 14.4 V for 12 DC sources.

4) Run Tungsten filament bulbs at reduced voltage to get longer lifetime. A typical 40 watt and 60 watt wired in series running off 120 Volts will last 22 years running full time. Using a tungsten filament bulb and lowering voltage to 94, 89, 82, 78, 68, 64, 56, or 50 percent increases life time respectively 2, 4, 10, 20, 100, 200, 1000, or 4000 times for the typical 1000 to 2000 hour lifetime.

5) Run LEDs at reduced current to get longer lifetime. One can control the current of an LED by use of a series resistor, a simple LM317 constant current circuit, or number of series connected mini-x-mass tree bulbs. Run typical 20 ma max rated white LEDs at 10 ma and solid color LEDs at 15 ma to get longer life.

6) X-mass tree bulbs can be used for light when little power is available. X-mass tree bulbs, both tungsten filament and LEDs can be chopped up and rewired to run at many different lower voltages. Adding extra bulbs in series for a given voltage will lower voltage on each bulb to make the result last longer. To determine typical run voltage for a given bulb, take the overall voltage and divide it by the number of bulbs in the series string. As an example use 6 or 7 (longer life) of the 50 bulbs/string-type in series for 12 Volt operation.

7) Hook cells or batteries of the same current capability in series (end to end or positive of one battery to the negative of the next battery) to get the sum of there voltages. Hook cells or batteries of the same voltage in parallel (side by side or positive to positive and negative to negative) to gain more power or current with the same resulting voltage.

8) Lead-Acid Batteries should not be discharged below 12 volts DC (nearly discharged). Full charge is about 12.8 or higher. Voltage is measured in resting state of no flow in or out. Lead-Acid batteries will sulfate and will not fully charge if left discharged for too long a time (several weeks to months). Over charging from time to time at or near 15 volts at a slow charge can sometimes help to recover from sulfation and will help to equalize charge on all cells.

9) Too many batteries in parallel can be troublesome in the long run. Typically one cell in one battery will go bad (leaks down to 0volts) and can potently cause all the rest of the batteries to go bad if not soon spotted. One rotten apple in the basket will make all the rest go bad applies to batteries wired in parallel also. When hooking batteries in parallel only use equal ages or better equal tested condition of batteries.

10) Constantly monitor and remove leaky batteries from any battery bank as quick as they are suspected or found. Take one battery off line from a parallel combination for a while (days to a week). Look for weak cells by measuring the cell voltage at start and end of the time and determine overall condition by how

well it holds a charge on all cells. Give it a condition rating.

11) Primitive batteries of very low power can be made from almost any liquid that is basic, acid, or salt solution and two dissimilar metals as electrodes. Common battery materials like lead for electrodes and sulfuric acid for the electrolyte will produce much more power over the long run.

12) Sulfuric acid can be made from earth venting of sulfur gas (found near volcanic activity) by passing it through water. Use distilled water if possible.

13) Mine useful materials like refined metals, old battery carbon posts, and lead plates from land fills where past garbage was dumped.

14) Distillation of water can be done any place a temperature gradient (a hot and a cold) can be made or found in close proximity to each other. The greater the difference in temperature the faster the distillation. Hot earth and cold flowing water or air are conditions that can be used.

15) To establish Radio communications use the basic agreed upon emergency calling frequencies to establish first contact. Each band has one primary calling frequency. Keep a list at hand with your equipment.

16) A crude compass can be made from a steel sewing needle rubbed on one end of a magnet or laded in a north-south direction and gently taped with a rock for a while. A few drops of candle wax is then melted over the needle near the center. If enough wax has been added it will float in a small cup of water and work as a compass.

17) Ashes and water makes a crude basic lye solution. Mixed with animal fat can be used to make soap.

18) Charcoal can be made by heating wood (at wood fire temperatures) in a nearly closed container. For example a 30 gallon oil drum (small hole in bottom) held up inside a 55 gallon drum full of wood fire held by several rebar supports

would work.

19) In a pinch ground charcoal can be used in conjunction with sand or fine weave cloth to filter water. The slower the flow the better it works. Charcoal can remove heavy metals, and hydro carbons from water. Fine weave cloth packed into a small pipe can be used as a particle filter and to slow the flow at the outlet to this filter. The water could still have pathogens in it. So boiling, adding Chlorine, Iodine, Colloidal Silver, or a few drops of Grapefruit seed extract would be needed.

20) Protect the dry left over burnable material (charcoal, dry wood etc) from previous fire to help start the next fire. While a fire is burning put future wet burnable material close to the fire to dry it for future fires.

21) The trick to fire starting, is knowing materials enough to put together the proper gradient of highly flammable at the intended fire starting point to less burnable materials on the outside. Fires can be started using, a flammable liquid, or dry highly flammable materials by using, a match, flint and steal to produce a spark, magnesium chips and flint spark, spark from electrical source, a glowing wire (example: car cigarette lighter), spark from a piezoelectric crystal (some gas stove, and baroque start this way or from one of those hand click on utility lighters).

22) Blacksmithing Basics: Fire can be made hot enough by pumping air at the base of burning charcoal and laying the metal on top of the coals. When the steel is just hot enough that a magnet will no longer stick to it then it is the right temperature to work. Remember this color and you don’t need the magnet test each time. Starting with good steel as in car leaf springs and axels will produce high quality knifes or tools that do not easily dull or break. Final test for a knife blade is to bend it and see it spring back and to pound the knife into a ¼ iron rod to show the blade does not dent but the rod is nearly cut in two.

23) Fires burning with wet wood or materials will spit, sputter and pop a lot of

hot burning material in all directions. Use a screen to cover the fire and use leather, Nomax, welding blankets, or other materials to avoid catching cloths on fire.

24) Use of car or vehicle parts: The alternator and in some cases the radiator fan motor can be used with run off water and a water wheel (made from wood and car wheels) with a belt speed changing rig to generate power. They can also be made into a windmill with a bit more effort and parts to make a tower and the proper speed. Axel-spindle and break drum or disk can be made into an alternator for wind or water power given a bit of magnet wire and some permanent magnets. The radiator can be used as a heat exchanger to condense water after it has been vaporized. The steel leaf springs and axel and steering parts can be blacksmithed into quality steel knifes and gardening tools. All of the metal parts become a blacksmith resource. Given lots of available water power the engine can be made into a compressor and used to drive air powered tools. A standard transmission (hand cranking point) and rear end can be made into a winch (cable or rope around the wheel without tire) to pull a load up a hill. With a bit more effort they can be made into wind driven grain grinder. A bit of steel brake or gas line in the hands of a skilled fire starter can apply the right amount of well directed air to change a smoldering coal in contact with some readily burnable material into a flame and get a fire back going again. Rubber heater hoses could be used with water filtering. The gas tank once cleaned of its gasoline could be used to collect the resulting water. Rubber from the tires cut up into shoe soles along with wires for straps from under the hood could be used to make sandals. The rear end, springs and wheels could be used as is with a light wagon type bed build on top to make a push or pull cart. The horn can be temporally hooked to the battery to call all back to base in case of emergency. The battery power lights can be used for light. The head lights used to spot at distance. The tile lights and interior for general task lighting. The seat covers and floor mats can be used for shelter or tough clothing or shoes or to hold water. The spring wire in the seats along with some of the under dash wiring can be used to make animal trap snares. The glass windows even if broken can be melted down and blown into other objects. Use some steel break or gas line to assist with the blowing of glass. Melt a blob on the

end and blow. The windshield washer plastic container makes a small container for water. The hub caps if metal can be used over a fire to cook in. This is not a comprehensive list it is only to get one started to thinking on the subject.