Electrochemistry

Your team of roving troubleshooters has been assigned to the Research and Development department of the company. The boss has discovered a stock of metals that she had forgotten about. She has had the brilliant idea that they could be used to generate electricity to power some of the lighting fixtures around the factory. She thinks this could be a cost saving measure, and has put you to work on the problem.

In this project your ultimate goal will be to construct an electrochemical cell or battery. You will be provided with a range of metals and stock solutions, and you may use any materials you consider useful after you have checked with your TA. The final product of your project should be a more or less permanent construction, which will deliver the maximum possible voltage, and light a light bulb.

Before you begin your laboratory experiments there are various factors you should take into account.

1. Which metals should you use for your electrode? Does the surface appearance of the metal make a difference? Will a simple metal strip work, or can you devise other kinds of electrodes?

2. What will you use for solutions? What concentrations will be best? How will you change the concentrations of the stock solutions? Will changing the concentrations change the cell potential?

3. What is the purpose of the salt bridge? How will you construct one that will be more or less permanent?

4. What kind of container will hold your cell? Does the size of the cell make a difference to the voltage?

5. What kind of things can you do with your cell?

6. What happens when you connect your cells together? Does how you connect them make a difference?

For your preliminary experiments you should use the microscale equipment (cell wells etc.). When you have devised what you think will be the optimum kind of cell, with the best electrodes, solutions and salt bridge you can find, then you should scale up your cell and construct a container for it.