Student rubric for Lab Activity 1: Which metals make the best lemon battery?

Activity	Acceptable	Unacceptable
Measure voltages from metal combinations and predict if electron gain or loss occurred.	Voltage polarities are correct and magnitudes are realistic.	Voltage polarities and magnitudes are incorrect or magnitudes are unrealistic.
Check your understanding of voltages and redox.	Student correlated all observed voltages with occurrence of redox reactions.	Student was unable to correlate all observed voltages with occurrence of redox reactions.
Check your understanding of electrochemistry in building a battery.	Student could select optimum combination of metals from hierarchy table to build battery.	Student was unable to select optimum combination of metals from hierarchy table to build battery.
Put the information together.	Student could relate overall voltage pattern to an electrochemical hierarchy.	Student was unable to relate overall voltage patterns to an electrochemical hierarchy.

Student rubric for Lab Activity 2: Lighting an LED with a lemon battery.

Activity	Excellent	Acceptable	Unacceptable
Prediction and design	Student utilized Lab Activity 1 data and previous knowledge of circuits to design a workable circuit.	Student utilized Lab Activity 1 data and previous knowledge to design a circuit, but required assistance for a workable arrangement.	Student was unable to utilize Lab Activity 1 data and previous knowledge to design a circuit.
Testing	Student built, tested, and adjusted circuit such that LED lit.	Student required more than minimal help to build, test, and adjust circuit such that LED lit.	Student was unable to build, test, and adjust circuit such that LED lit.
Translation of circuit into formal notation	Student translated working circuit into correct circuit symbols.	Student translated working circuit into correct circuit symbols with assistance.	Student was unable to translate working circuit into correct circuit symbols with assistance.
Extension and	Student extended	Student extended	Student was unable

challenge activity	circuit to provide increased voltage with little or no assistance.	circuit to provide increased voltage with substantial assistance.	to extend circuit to provide increased voltage.