THE BATTERY

Start With A Review ... What you’ve learned in the classroom is just the start. Here’s your chance to show what you know in the shop. To meet your learning objectives, there are four “jobs” to perform on The Battery. This page reviews some key concepts.
Identify Terms Relating To Battery Operation And Construction

YOUR JOB  (READ ALL INSTRUCTIONS BEFORE STARTING!)

1. Refer to page 97 in your workbook.

2. Identify the numbered battery parts by placing the correct number next to the part name below.

    _____ Case
    _____ Plates
    _____ Cell Divider
    _____ Cell Connectors

    _____ Terminal Post
    _____ Vent Cap
    _____ Electrolyte

3. Then, place the number of the correct part next to the phrase that describes it.

    _____ Allows checking of electrolyte.
    _____ Provides outlet for current.
    _____ Separates battery cells.
    _____ Holds all parts and electrolyte.

    _____ The number and size determine current.
    _____ Connects plates of one cell to those of another.
    _____ A mixture of sulfuric acid ($\text{H}_2\text{SO}_4$) and water ($\text{H}_2\text{O}$).

4. Complete this job within 5 minutes.

Stop here and have instructor signoff.
Job 1 complete: _____________________________
Conduct A Visual Inspection Of A Battery

YOUR JOB  *(READ ALL INSTRUCTIONS BEFORE STARTING!)*

TOOLS/EQUIPMENT

1. Refer to page 104 in your workbook.  

1. Vehicle

2. Inspect the battery on the vehicle assigned.
   - Check each item listed.
   - Record your findings as indicated below.

3. Complete this job within 5 minutes.

TEST RESULTS

<table>
<thead>
<tr>
<th>Check</th>
<th>Condition</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Case</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Terminals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Cables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Connectors</td>
<td></td>
<td></td>
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<tr>
<td>5. Hold-Down</td>
<td></td>
<td></td>
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<tr>
<td>6. Drive Belt</td>
<td></td>
<td></td>
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<tr>
<td>7. Electrolyte</td>
<td></td>
<td></td>
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<tr>
<td>8. Plates</td>
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</tr>
</tbody>
</table>

QUESTIONS

Listed below are three situations in which a battery might explode. First, identify what may cause an explosion in each situation. Then, identify how to prevent an explosion; the precautions you would take in each situation.

<table>
<thead>
<tr>
<th>Situation</th>
<th>Cause</th>
<th>Prevention or Precaution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. During charging (on vehicle, by alternator)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. During charging (off vehicle, by battery charger)</td>
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<td></td>
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<tr>
<td>3. During jumping (by another battery)</td>
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</tbody>
</table>

Stop here and have instructor signoff.  
Job 2 complete: ____________________________
A. Test The Specific Gravity Of Battery Electrolyte

CAUTION: Wear safety glasses while doing this job.

YOUR JOB (READ ALL INSTRUCTIONS BEFORE STARTING!)

1. Test the specific gravity of the electrolyte in each cell of the assigned battery.
   - Follow the Performance Procedures.
   - Record your findings as indicated.

2. Refer to pages 106 and 107 in your workbook.

3. Complete this job within 10 minutes.

<table>
<thead>
<tr>
<th>CELL</th>
<th>SPECIFIC GRAVITY</th>
<th>TEMPERATURE</th>
<th>ADJUSTED S.G.</th>
<th>% CHARGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<tr>
<td>2.</td>
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<tr>
<td>3.</td>
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<td>4.</td>
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<tr>
<td>5.</td>
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<td>6.</td>
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</tbody>
</table>

RECOMMENDATIONS:

- Battery good, ready for use.
- Battery OK, but needs a charge.
- Battery bad, should be replaced.
- Battery questionable, further testing required.

Explain: ________________________________

(Go on to the next page)
B. Check A Battery For Open-Circuit Voltage And Current Drain

CAUTION: Wear safety glasses while doing this job.

YOUR JOB  (READ ALL INSTRUCTIONS BEFORE STARTING!)

1. Perform open-circuit voltage and current drain tests on the battery assigned.
   - Follow the Performance Procedures.
   - Record your findings as indicated below.
2. Refer to page 105 in your workbook.
3. Complete this job within 15 minutes.

TOOLS/EQUIPMENT
1. Voltmeter
2. Ammeter
3. 12 Volt Test Light
4. Battery Terminal Tools
5. Vehicle
6. Safety Glasses

TEST RESULTS
- Open-Circuit Voltage Test: Voltmeter reading _____ volts
- Refer to page 107 of the Student Workbook. What is the state-of-charge of this battery? _____ %

BATTERY DRAIN TEST (Parasitic Load)
1. Disconnect battery ground (−) cable from battery post.
2. Select proper ammeter scale and “zero” meter.
3. Connect ammeter between battery post and ground cable.
   [Red (+) to ground cable and Black (−) to battery post.]
4. Record ammeter reading.
5. Reconnect ground cable to battery.

Battery Drain Test: Ammeter reading _____ amps

RECOMMENDATIONS:
- No drain, everything is OK.
- Slight drain, but normal.
- Excessive drain, further testing required.
   Explain: ____________________________

Stop here and have instructor signoff.
Job 3 complete: ____________________________
Perform A Battery Heavy Load Test

CAUTION: Wear safety glasses while doing this job.

YOUR JOB (READ ALL INSTRUCTIONS BEFORE STARTING!)

1. Load test the battery assigned.
   - Follow the Performance Procedures.
   - Record your findings as indicated below.
2. Refer to page 108 in your workbook.
3. Complete this job within 15 minutes.

TOOLS/EQUIPMENT

1. Battery
2. VAT-40 Tester or Equivalent
3. Safety Glasses

PERFORMANCE PROCEDURES

1. Check electrolyte specific gravity.
   CAUTION: Do not proceed with load test unless specific gravity is above 1.190 and
   spread between the highest and lowest cell is within 50 points.
2. Determine the test load of the battery required
   for the vehicle being tested.
   Battery Rating:
   _______ Amp-Hours or _______ Cold Cranking Amps
   Test Load: _______ amps
   Test Time: _______ seconds
3. Prepare VAT-40 tester according to manufacturer’s instructions.
4. Connect VAT-40 to battery terminals. [Red to (+) and Black to (–).]
5. Connect amps pickup clamp around either (+) or (–) tester cable.
6. Set the Test Selector Switch to #1 STARTING.
7. Load the battery by turning the Load Increase control until the ammeter reads 3 times the
   amp-hour (AH) rating or one-half the cold-cranking ampere (CCA) rating.
8. Maintain the load for no more than 15 seconds and note the voltmeter reading.
9. Immediately turn the Load Increase control OFF.

TEST RESULTS

Voltage under load: _______ volts

RECOMMENDATIONS: _______ Battery passed test.
                    _______ Battery passed test, further testing required.
                    _______ Battery failed test, further testing required.
                    Explain: ___________________________

Stop here and have instructor signoff.
Job 4 complete: ___________________________