Tire Repair

Description
This Activity Plan is designed as one among many through which students will rotate in small groups. The activity involves repairing damage to the tread part of the tire. Damage is usually incurred via nail, screw, tack puncture, etc. It is important to note that the only acceptable method of repairing a tire is via the patch method, not the plug method. The plug method is dangerous, out of date and not acceptable in today’s modern automotive world.

Lesson Outcomes
The student will be able to properly repair a puncture wound in the tread area of a tire.

Assumptions
Before trying themselves, students will have been given some theory and the instructor will have demonstrated the proper procedure for repairing a tire. In addition, this activity should be introduced after the tire change activity.

Terminology
Drill bit: a cutting tool used in conjunction with a drill to create a cylindrical hole.

Hand drill: a tool used in conjunction with a drill bit to create a hole.

Plug/patch material: usually a patch that also incorporates a small plug in the middle of the patch.

Puncture wound: a piercing of the tire tread usually caused by a foreign body (e.g., screw, nail or small piece of metal).

Side cutting pliers: a style of pliers that is useful for removing a foreign body from the tread of the tire.

Tire awl: an awl used to slightly enlarge the puncture in order to properly install the tire patch.

Tire buffer: a course circular wheel designed to prepare the inner surface of the tire.

Tire cement: the glue used to adhere the patch to the inside surface of the tire.

Tire chalk: a special type of chalk used to mark the tire.

Tire stitcher: a device used to ensure that the tire patch sticks onto the tire properly.
Estimated Time
30–45 minutes

Recommended Number of Students
20, based on the BC Technology Educators’ Best Practice Guide, groups of 2–3 students

Facilities
Automotive shop

Tools
- Tire changing machine
- Drill
- Tire stitching tool

Figure 1—Tire stitching wheel

Materials
- A few loose tires that can be intentionally damaged to provide tire tread material to repair
- Assortment of patch plugs

Figure 2—Patch plug (sometimes called a mushroom plug)
Optional

A typical plug repair kit could be presented to show students how tire repair used to be done. This type of repair is considered inferior to the patch repair.

Resources

Flat Tire Repair Plugging vs. Patching—This is why good shops will not plug your tire!
www.youtube.com/watch?v=iPRUdaxXgVw

How to Repair a Car or Light Truck Tire
www.youtube.com/watch?v=wi5uBUaMsrA
Activity

1. Remove the tire from the rim (or simply work with a loose tire).
2. Intentionally pierce the tire tread using pliers and a typical foreign object (screw, nail, etc.).
3. Mark the foreign object location with tire chalk on the inside of the tire.
4. Remove the foreign object with pliers.
5. Drill a $\frac{3}{16}$" hole through both the inside and outside of the tire where it was punctured.
6. Buff the inside of the tire around the puncture wound using a buffing wheel and drill. The buffed area should be slightly larger than the tire patch.
7. Apply contact cement to the buffed area.
8. Apply contact cement to the inside area of the puncture wound. This can be done by applying cement to the tire awl and then inserting the awl into the puncture wound.
9. Let the area dry 3–5 minutes.
10. Remove the protective film from the patch/plug repair component and insert the plug from the inside of the tire.
11. From outside of the tire, pull the patch/plug repair component through as far as you can.
12. From inside the tire, use the tire stitching tool to firmly stitch the tire patch/plug to the inside of the tire by rolling it over the patch for 1–2 minutes in multiple directions.
13. Remove the protective plastic film from the tire patch/plug.
14. Remount the tire and inflate it to the proper specification.
15. Cut the protruding plug from the outside of the tire to approximately $\frac{3}{8}$" above the tire surface.
16. Reassemble the tire and wheel. Check to make sure the tire patch/plug is not leaking.

Evaluation Guidelines

Tire Repair Rubric (see next page)
## Tire Repair Rubric

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Poor</th>
<th>Below Standard</th>
<th>Satisfactory</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the $\frac{3}{16}$&quot; hole drilled from both the inside and outside of the tire?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Is the buffed area consistent and buffed slightly larger than the patch?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Has the plug/patch been installed properly?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Has the tire been remounted properly and inflated to the correct specification?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Does the repair hold air?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>/25</strong></td>
</tr>
</tbody>
</table>