

**Using the Hunter model, please write a lesson plan for one of the following: Change a [bicycle] tire...**

### Hunter Model for Lesson Planning

Teacher: Keith Alcock

Subject Area: Transportation systems (or mechanics, unit on exercise in health, physical education)

Grade Level: Middle school through adult

Unit Title: The bicycle

Lesson Title: Got air?

State Standards: AZ-DOT 5.21.06 Users of wheeled vehicles with pneumatic tires on public streets must demonstrate competency in repairing or replacing wheels that have suffered catastrophic air loss. (Yes, this is fictitious.)

Objectives (Write 2-5 objectives stating expected learner outcomes.): Students will 1) identify and name the tools and replacement parts needed to repair a flat tire, 2) remove and replace a wheel from a bicycle, and 3) change an inner tube.

Materials/Resources Needed: Each student must have a bicycle with a wheel, tire, and tube to work with on. To test their work, students will have to ride the bike, so a helmet is also required. The class should be conducted somewhere with easy access to a suitable outdoor riding area. The school/teacher provides wrenches for wheel removal and two tire levers (irons) per student. One or more pumps can be shared among students. Items are placed on a table or spread out on the ground. Pieces of corrugated cardboard are supplied to protect seats of inverted bikes if necessary. The teacher needs a demonstration bike with an old tire and tube and a piece of wood with a nail sticking through it to pop the tire (for effect). A teacher unfamiliar with the repair procedure should have a copy of *Richards' Bicycle Repair Manual* or similar book for study. A digital camera, computer, printer, and certificate template are needed for printing of certificates at the end. Students are required to complete the review sheet in order to receive their certificate. A finish line should be decorated for the test ride.

Anticipatory Set (List specific statements or activities you will use to focus students on the lesson for the day.): Imagine riding down the street on your way home from a friend's house and [whack, use the board and nail to pop the tire], you hear this sound. How many of you have heard this before? It's only fifteen minutes until Survivor (some popular television show) comes on and you already used up your cell phone battery. There's no rescue in sight. What is a biker to do? Or how about this, you get up in the morning to go to school, open the garage, and there your bike is resting on the rims. Are you tardy again? Who here has already had a flat and can tell me what happened? We will have a better solution shortly.

Objective/Purpose (For the student's benefit, explain what students will be able to do by the end of the lesson and why these objectives are important to accomplish.): At the end of this lesson you will be able to tell me what tools are needed in order to fix a flat tire and be able to

recognize them in your house or at a store when you go to put your toolkit together. You will be able to remove the wheel from your bike and put it back on. While it's off, you'll replace the inner tube. We'll practice enough that you'll be your own self-sufficient pit crew when it comes to flats.

Input (What information is essential for the student to know before beginning and how will this skill be communicated to students?): Students should know how to use a wrench, be able to unscrew the cover on the valve stem (e.g., know clockwise from counter-clockwise), understand the difference between different kinds of valve stems, have a basic idea of how air pressure works. They should have basic familiarity with wheel measurements (donuts) so that the proper sized replacement inner tube can be purchased. (In this lesson, we will simply take out and put back in the same tube.) Students should be able to read the pressure gauge on the pump. Most of these can be taught as needed.

Model (If you will be demonstrating the skill or competence, how will this be done?): The skills will be demonstrated, starting with tools, then wheel removal, tube replacement, and finally wheel installation. The demonstration will be followed by guided and independent practice.

Tools come in various shapes and sizes. Hold up an example of the wrench, tire levers, and pumps. Name the tools and say what they are for. Hold them up in random order and have students name them. Address any questions that arise, such as the advantages of an adjustable wrench. In a real situation, students will also need to have a new tube. They will see what one looks like shortly.

Demonstrate removal of the wheel by first turning the bike over if possible (protecting the seat and any attachments on the handlebars) or explaining that the wheel-less bike can be laid on its left side. Check the tire for the tube size and announce it. Disable the brakes. For a rear wheel with gears, shift into the outermost gear. Loosen the bolts on the axle until the front or back wheel falls out of the fork or stays. If anyone has a coaster brake, explain that it has to be unhooked. Also check for anyone with quick releases. Have students list the steps that were just taken.

Change the tube next. Prepare the valve (dust cover and locknut) explaining that there are two major types of valves and checking which are represented on students' bikes. Let the remaining air out of the tire and free it from the rim. Unhook the tire using tire levers, starting at the end opposite the valve. After one side is off, pull out most of the tube. Inflate the tube slightly and listen for air leaking. Check the inside and outside of the tire for foreign objects, in particular at the place on the tire corresponding to the leak in the tube. Finally poke the valve through and remove the inner tube and then tire. Replace the tube after inflating slightly, being sure that it isn't twisted or bunched up in the tire. Fit the tire back on the rim without pinching any tube between the tire and rim. Partially inflate the tire and check for problems, then fully inflate. That's a lot to remember, so solicit volunteers to describe one step each in order.

Reinstall the wheel on the bike using the same steps for removal, but in the opposite order. Verify that the brakes and gears still work and that the tire is round.

Check for Understanding (Identify strategies to be used to determine if students have learned the objectives.): Each of the procedures above is made up of many steps, so understanding is sampled after each part. If students sound confident in their answers and after any questions are answered, the students proceed to guided practice.

Guided Practice (List activities which will be used to guide student practice and provide a time frame for completing this practice.): Students should visit the table to pick up a wrench and tire levers. They can circulate once through a line to first observe the variety of shapes and sizes before choosing on the next time around. Rear wheels are more difficult, so students can practice on the front first if there is time for both. It usually takes 25 minutes for the first tire and 20 minutes for the second. If time is limited, work on the rear wheel in class and save the front wheel for optional independent practice. Have students alert you when they have removed the wheel and are half finished pulling out the tube. If they are in agreement, take their picture for use with the certificate. (If they don't want their picture taken, they get the default picture on the certificate, which is of the instructor.)

Closure (What method of review and evaluation will be used to complete the lesson?): As students complete the repair, check their work, discuss any problems, and send them toward the finish line for a test ride. Take their pictures standing next to the reassembled bicycle at the finish.

Independent Practice (List homework/seatwork assignment to be given to students to ensure they have mastered the skill without teacher guidance.): After students cross the finish line and have their pictures taken, present them with a ribbon printed on a review sheet which they can complete on their own. The review sheet reiterates the story from the anticipatory set, but then completes it with the biker riding happily ever after. It includes pictures of the tools, different valves, a tube, variously shaped pumps, quick releases, etc. for identification. Next it lists the steps in random order for the entire procedure for students to sort out. There is also a space for the tire measurement. Students complete the worksheet at home and present it the next day in exchange for a personalized certificate which pictures of them next to a disassembled bike and the repaired version.