

**Wheels for Winners**  
**Mechanics Training Class**  
**for Kids**

Curriculum and Materials

Wheels for Winners  
Earn-a-Bike Program

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Based in large part on New York City's Recycle-a-Bicycle Curriculum

## **Curriculum for Wheels for Winners Mechanics Training Class for Kids**

This is a hands-on bicycle mechanic training course for kids ages 11-18. The course should be taught with no greater than a 4-to-1 student to teacher ratio. Ideally, the ratio would be closer to 2-to-1. It is recommended that there be 4 to 8 students in a class with two instructors.

### **Class #1: Introduction**

#### Preparation

1. Make copies of pretest survey
2. Purchase or gather pencils, pens, colored pencils
3. Purchase/make large scale bike drawings and labels for pin the part on the bike

#### In Class

1. Go over rules and expectations.
2. Complete the pretest survey
3. introductions
4. Draw a bike (use the back side of the pretest survey)
5. Interactive labeling of bike parts on drawing
6. Contest: pin the part on the bike
7. Introduce tools and proper treatment of tools. Stress is placed on the fact that they will be doing "real" work with "real" tools, which calls for a responsible, hard-working attitude.
8. Introduce various tools

### **Class #2: flat change**

#### Preparation

1. Bring bikes to Site
2. Gather aprons, hand wipes, and paper towels and bring to Site
3. Assemble basic tool kit to bring to Site
4. Gather tire levers, tire pump, and patch kit to bring to site
5. Set up class room so that bikes can be handled

#### In Class

1. Roll-call
2. Review parts of the wheel
3. Review treatment of tools
4. Fixing a Flat covers removing a front and rear wheel, using tire levers to remove the tire, pulling out the tube, finding and properly patching the hole (or replacing the tube), and putting everything back in place.
5. Show how to patch a tube
6. Have kids do at least one tire on their own, more if time allows. Include the part about removing the wheels from the bike (front and back)
7. Review parts of bike learned that day and tools used
8. Have kids clean up area and put bikes away

## **Class #3: brakes**

### Preparation:

1. Make sure that you have aprons, hand wipes, and paper towels
2. Make sure that you have tools for brakes: wrenches, allen wrenches, screwdrivers, needle-nose pliers, third hand tool or large clamp, cable cutters, crimp ends, extra cables and housing
3. Bring samples of glazed brake pads and new brake pads
4. Bring samples of different kinds of brakes and brake levers
5. Make sure you have bikes at site to work on
6. Set up class room

### In Class

1. Roll call
2. Have kids retrieve bikes for class
3. After defining the various types of brakes (caliper, coaster, disk, and cantilever), a standard caliper cable is removed and replaced. The brake is then adjusted with the "third hand" (a name every kid remembers), lubricated, and checked. The difference between the adjusting nuts (which hold the caliper arms together) and the "main" nut (which holds the brake onto the frame) is clarified. Cover glazed pads and worn pads and replacement (proper pad placement on rim)
4. Have kids remove the brakes on a bike and replace and adjust them
5. Review parts of bike learned that day and tools used
6. Have kids clean up area and put bikes away

## **Class #4: derailleurs/chains**

### Preparation

1. bikes on hand
2. tools on hand, chain tool, wrenches, allen wrenches, screwdrivers, needle-nose pliers, cable cutters, crimp ends, extra cables and housing
3. Bring an extra old chain for chain tool demo
4. clean up materials on hand
5. set up classroom

### In Class

1. Roll call
2. Have kids retrieve bikes for class
3. Go over and have the kids clean and lube a chain
4. Cables and derailleurs. Many kids don't have the foggiest notion of what goes on when a shift lever is pulled (that goes for adults, too). Demonstrate how to shift gears on an elevated bike. There's usually a "wow" or two when they see the chain jump from one cog to another. Remove and replace a cable and perform the various adjustments. Introduce limit screws and cautions. If there's time, demonstrate the proper way to use a chain-link tool (use an old chain)
5. Have kids do one front and one rear derailleur adjustment
6. Review parts of bike learned that day and tools used
7. Have kids clean up area and put bikes away

## **Class #5: hubs and bottom bracket**

### Preparation

1. bikes on hand
2. tools on hand: cone wrenches, very large wrenches, allen wrenches, screwdrivers, needle-nose pliers
3. If possible, bring some loose ball bearings
4. clean up materials on hand
5. set up classroom

### In Class

1. Roll call
2. Have kids retrieve bikes for class
3. Explain why bikes have ball bearings (to reduce friction). If you have loose ball bearings, you can put them under a book or other heavy item and show how much easier the book slides across a desk.
4. HUBS: Have the kids take apart a hub, clean and repack, then re-assembled.
5. HUBS: Explain, but do not do, a rear hub overhaul (the added challenge of removing the freewheel). The bench vise is introduced (but not available at Site).
6. BOTTOM BRACKET: Quality bikes come with 3-piece cotterless cranks, but our introduction to the heart of the bicycle always starts with the Ashtabula, or 1 - piece, crankset. It's the most common in the shop and is the easiest for kids to work with.
7. BOTTOM BRACKET: Have the kids take apart and service a 1 piece crankset
8. Review parts of bike learned that day and tools used
9. Have kids clean up area and put bikes away

## **Class #6: headset**

### Preparation

1. bikes on hand
2. tools on hand: cone wrenches, very large wrenches, allen wrenches, screwdrivers, needle-nose pliers
3. clean up materials on hand
4. set up classroom
5. bring forms for kids to take home and have parents sign

### In Class

1. roll call
2. Have kids retrieve bikes for class
3. The last of the overhauls. This class also includes stems and handlebars, which are areas of potential danger if not maintained properly. For this reason, stem expander bolts are explained in detail. Explain the parts of the headset. Single-speed, coaster-brake bikes may be easiest to use for this class because there are no cables to complicate the job.
4. Have the kids take apart, service, and reassemble a headset assembly
5. Review parts of bike learned that day and tools used
6. Have kids clean up area and put bikes away
7. Hand out parent forms for kids to take home and get signed

## **Class #7: safe bicycling & mapping/choosing Safe Routes**

### Preparation

1. arrange for tv/vcr or bring one
2. bring videos
3. bring forms for kids to take home and have parents sign
4. bring pens, pencils, colored pencils
5. bring City of Madison maps
6. bring copies of final exam for review

### In Class

1. roll call
2. Watch Kid's Eye View video and discuss (10 min)
3. For older kids only, Watch Effective Cycling Video or Enjoy the Ride and stop between each section and discuss (45 min)
4. Distribute City of Madison maps and trace routes from home to school and from school to Site
5. Help kids pick the safest routes
6. go over questions that will be on final exam
7. collect parent forms from last class or remind to bring next time
8. make sure that kids have a way to take stuff home after the last class (parent or bus)

## **Class #8: Wrap Up**

### Preparation

1. transport bikes, helmets, locks, tools, and stipends...alternatively arrange for kids to come to shop
2. make sure that kids have a way to take stuff home after the class (parent or bus)
3. bring copies of final exam
4. bring tools and tire pump for last minute bike adjustments

### In Class

1. final exam
2. distribute the bikes, books, helmets, locks, tools, and stipends
3. match bike registrations to inventory numbers
4. go over the ABC Quick Check: air, brakes, chain/crank, quick releases, overall check
5. safety check bikes, air tires, set seat heights
6. fit helmets
7. collect parent forms

## Wheels for Winners Mechanics Class Pretest Survey

**Name:**

**Date:**

**Age:**

**Grade:**

**School:**

### Your responsibilities:

1. Good attendance
2. Be respectful of others
3. Treat tools with care (they are expensive and can hurt people)
4. Try your best
5. Never be afraid to ask a question
6. Help clean up at the end of class

### Your privileges:

1. To learn
2. To have fun
3. If you attend ALL 8 SESSIONS you will receive a FREE bicycle, lock, helmet, tools, bike mechanics book, and \$50
4. If you attend AT LEAST 6 of 8 SESSIONS you will receive everything EXCEPT the \$50.
5. If you attend less than 6 sessions you will not receive any special gifts

**1. Do you know how to ride a bicycle?**

**2. Do you wear a helmet when you ride?**

**3. Are bikes good for the environment? If so, why?**

**4. What is the longest bike ride you've ever been on?**

**From \_\_\_\_\_ to \_\_\_\_\_**

**or about \_\_\_\_\_ miles**

**(if you don't know how far it was, guess).**

**5. Do you have a bicycle of your own?**

**a. Does your bicycle have gears?**

**b. Does your bicycle have hand brakes?**

**c. What color is your bike?**

**Draw a picture of a bicycle. Then label the parts from the list.**

- A. Rim
- B. Tire
- C. Spoke
- D. Hub
- E. Rear brake
- F. Front brake
- G. Rear derailleur
- H. Front derailleur
- I. Bottom bracket
- J. Top tube
- K. Seat tube
- L. Down tube
- M. Head tube
- N. Head set
- O. Seat stay
- P. Chain stay
- Q. Brake lever
- R. Shifter
- S. Stem
- T. Cables/cable housing

## Wheels for Winners Mechanics Class Final Quiz

Name:

Age:

Date:

PART I: Multiple Choice. Circle the correct answer.

1. The purpose of ball bearings is to:
  - a. Reduce friction
  - b. Slow the bike down
  - c. Look very clean and shiny
  - d. Keep the grease from falling out
  
2. Finish this sentence: "If my brakes are properly adjusted ---"
  - a. "—my brake pads should strike the tire."
  - b. "—my brake levers should touch the handlebars when I squeeze them."
  - c. "—the pads will made a very loud squealing noise."
  - d. "—the pads will touch the rim when I squeeze the lever and there will be about 1 inch between the handlebars and the lever."
  
3. If you have 2 chainrings and 6 cogs on the cogset, how many speeds/gears does your bike have?
  - a. Eight
  - b. Twelve
  - c. Ten
  - d. Eighteen
  
4. What happens when you turn most nuts to the right?
  - a. It tightens
  - b. It loosens
  - c. It falls off
  - d. Nothing happens
  
5. In the video on bike safety, what did they tell you to do before you leave your driveway on your bike?
  - a. Ride out into the street really fast so you don't get hit by a car
  - b. Look left, right, left and check for traffic
  - c. Signal
  - d. Watch what your friends are doing

6. What does a derailleur do?
  - a. Holds the chain on
  - b. Moves the chain from one chain-ring or cog to another
  - c. Helps French people ride bicycles
  - d. Helps you shift gears/speeds
  - e. Both b and d
  
7. Why should you be careful when using tools?
  - a. They can hurt you if you are careless
  - b. They are expensive
  - c. If you have borrowed them, you should respect other people's stuff
  - d. All of the above
  
8. When you change a tire, start removing the tire
  - a. From the part of the tire opposite the stem
  - b. From the part of the tire near the stem
  
9. To take off a wheel that doesn't have a quick release, what kind of tool do you use?
  - a. A screwdriver
  - b. A tire lever
  - c. An allen/hex wrench
  - d. A wrench
  
10. How do you know how much air to put into a tire tube?
  - a. Guess
  - b. Fill the tire with air until it explodes
  - c. Look at the side of the tire for the number (recommended pressure)
  - d. Squeeze the tire and add air until the tire feels half full

PART II: Matching. Label each picture with the correct letter from the list.

- A. Cone wrench
- B. Adjustable wrench
- C. Cable cutter
- D. Chain tool
- E. Tire levers
- F. Allen wrench or Hex wrench
- G. Phillips head screwdriver
- H. Flat head screwdriver



- A. Rim
- B. Tire
- C. Spoke
- D. Hub
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- F. Front brake
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- J. Top tube

- K. Seat tube
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- Q. Brake lever
- R. Shifter
- S. Stem
- T. Cables/cable housing



### PART III: Essay Question

Pretend it is the year 2020 and you have grown up to become a great architect. You have just received a letter from the President of the United States. She is planning to build BIKOPOLIS, the world's first car-less city. She would like to hire you to design it, but wants to hear your ideas first. Write a letter describing how your city will look and work. Remember: All transportation must be done on bikes or other human-powered vehicles.

Dear President:

Signed,

**Wheels for Winners PARENTAL LIABILITY WAIVER AND PHOTO/VIDEO**

CONSENT

Dear Parent or Guardian:

Please fill out this form and return it to Wheels for Winners, Inc. 2310 Pennsylvania Avenue, Madison, WI 53704, (608) 249-2418 before your child submits his or her bicycle for repairs by Wheels for Winners.

I understand that this document is a liability waiver and release of liability that I am entering into with Wheels for Winners, Inc. (hereinafter referred to as Wheels for Winners), a Wisconsin non-profit corporation. I am agreeing with the terms and conditions of this liability waiver both on my own behalf and on behalf of my child,

\_\_\_\_\_ as parent or guardian of my child. In consideration for the repairs performed on my child's bicycle by Wheels for Winners' staff and volunteers, I, on behalf of my child, myself, our heirs, executors, administrators, successors, and assigns hereby agree to release from liability, defend, indemnify and hold harmless Wheels for Winners, Inc. and its Board of Directors, paid staff, volunteers, and affiliated or related entities and their employees or agents from any claims or lawsuits whatsoever that may arise by virtue of my child's use of his or her bicycle following maintenance by Wheels for Winners, including, but not limited to, claims for personal injury and property damage to my child or to third parties. I am a financially responsible party.

Wheels for Winners has made no representations regarding the suitability of the bicycle for my purpose or for use by my child and I understand that Wheels for Winners has made no guaranties or warranties, either express or implied, with regard to the service work performed on this bicycle. I acknowledge that the bicycle is a used instrument of transportation that may have defects, both hidden and latent, as well as open and obvious, on parts of the bike worked on by Wheels for Winners mechanics or as well as other parts of the bicycle, that could impair usage. I agree that I will assume responsibility for any and all consequences of the use of this bicycle resulting from any such defects.

I realize that I have a duty to inspect the bicycle before my child rides it. I also understand that I have the right to have the bicycle inspected, at my own cost, by a professional bicycle mechanic before my child rides it. I understand that if I find defects or problems with the bicycle, I should notify Wheels for Winners, Inc. immediately, prohibit and prevent my child or any other person from riding the bicycle, and return the bicycle to Wheels for Winners within five business days of the date of the repair. I understand and agree that it is my duty to provide my child with adequate bicycle safety training before my child is allowed to ride the bicycle. Furthermore, I understand and agree that it is my responsibility to insure that my child wears an approved bicycle safety helmet while using the bicycle and otherwise operates the bicycle safely.

I also consent to the use of photographs or videos of me or my child taken during community service and Wheels for Winners activities by any representative or agent of Wheels for Winners in any media (newsletters, recognition brochures, promotional posters, publications, television, etc....) and in exhibits.

I agree that this liability waiver and photo/video consent constitutes the whole agreement between myself, individually and on behalf of my child as parent or guardian, and Wheels for Winners, with regard to any and all repairs or maintenance performed on my child's bicycle. No additional terms or representations shall be binding upon Wheels for Winners unless set forth in writing and signed by myself and an authorized member of the Wheels for Winners Board of Directors. I understand that there may be legal consequences resulting from my agreement with the terms of this document and that I have the right to consult with an attorney of my choice before entering into this liability waiver and photo/video consent. By signing this waiver and consent form, I acknowledge that I have entered into this agreement freely and voluntarily, and I agree to be bound by all the terms contained in this document.

Parent Name: \_\_\_\_\_

the parent or guardian of \_\_\_\_\_  
(name of child)

Address: \_\_\_\_\_

Phone: \_\_\_\_\_ (day) \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Internal Use Only

WFW bike inventory #: \_\_\_\_\_

City of Madison Registration #: \_\_\_\_\_