



**Oregon  
Tradeswomen**

**Framing Your Future**

## **Curriculum for Educators:**

How to lead an interactive workshop teaching students how to build a picture frame.





# Organizational Background

## Purpose of Curriculum

Oregon Tradeswomen, Inc. wanted to have a fun, interactive way for young women to understand the great career options they have in the trades. Through a hands-on workshop, they can use tools and experience the satisfaction of building something with their hands.



Mechanical, construction, electrical and utility work is still often thought of as “men’s work,” with only 3% of the trades workforce being female. More and more, women are considering these careers because of the satisfaction and pay - ranging from \$26-\$32/hour with benefits after an apprenticeship, paid on the job training that allows workers to build a career without the expense of college.

Originally, OT coordinated workshops on-site with an experienced carpenter to show girls how to build a picture frame. In an effort to reach more youth, we developed this non-tradesperson friendly curriculum. *Leading a hands-on activity for your students is the best way for girls to understand what the trades entail and to see practical applications of math and science.*

## About Trades Offer Girls Options

The **Trades Offer Girls Options (TO GO)** program helps young women ages 10 to 18 explore trades careers. Through hands-on workshops and training center tours, we have tradeswomen role models expand the career possibilities girls envision for themselves. TO GO also offers technical assistance to educators about recruiting and retaining girls in professional technical classes, preparing students for paid-on-the-job apprenticeship training programs, and sparking young women’s interest in a trades career.

## About Oregon Tradeswomen, Inc.

Oregon Tradeswomen, Inc., (OT) is a membership-based, 501(c)3 organization. Established in 1990, OT has worked consistently to create safe workplaces for women, educate women and girls about opportunities in the trades, and enable fair access for women to apprenticeship training and the worksite. OT promotes success for women in the trades through education, leadership, and mentorship. OT began as a small group of tradeswomen — two carpenters, an elevator constructor and an operating engineer — who met regularly to encourage and support each other. Today, OT serves over 1,500 girls and 400 women annually.

OT’s programs are most visibly interconnected during the annual **Women in Trades Career Fair** that OT has planned and coordinated since 1992. The event draws together over 1,500 girls and women, employers, union and open-shop apprenticeship training representatives, community colleges and public organizations, as well as women employed in the skilled craft trades, for three days of interactive exhibits and workshops. Check out our website at [www.tradeswomen.net](http://www.tradeswomen.net) for information about this year’s Women in Trades Career Fair.

## Gratitudes

Many thanks to the Department of Education for making this curriculum possible. Our warmest appreciation for the TO GO Advisory Committee and tradeswomen who advise, mentor and inspire us daily.





# Materials List for Workshop

## **Materials:**

Mitre box (plastic is cheapest)  
Mitre saw (or back saw)  
screws (2 per mitre box)  
wood glue  
wood to protect table and clamps to secure it to down  
sandpaper  
masonite backing, cut into squares 9" by 11"  
masonite supports -2" by 9" long pieces and 2" by 11" pieces  
molding (any soft wood is fine, hemlock is standard)-  
cut at 45 degree cuts where the thick part of the molding is the longest measured side

## **Optional material:**

picture hanger  
paint pens  
wood putty

## **Amount of materials per student:**

1 masonite backing square  
3 masonite supports: (The 4<sup>th</sup> side is where the picture slides in.)  
one 2" wide by 7" long  
two 2" wide by 9" long  
Pre-cut molding with 45 degree cuts: (Ask your hardware store if they can prep materials.)  
one 9" (measured on the thick side of the molding)  
one 11" (measured on the thick side of the molding)  
Molding with one side cut at 45 degrees: (The other side is the one students will saw.)  
one minimum of 11" (students will cut to a 9" piece)  
one minimum of 13" (students will cut to a 11" piece)

## **Amount of materials for 15 students:**

15 plywood backing square  
15 7" plywood supports  
30 9" plywood supports  
15 9" molding with both sides pre-cut at 45 degrees  
15 11" molding with both sides pre cut at 45 degrees  
15 9" molding with one side pre cut at 45 degrees  
15 11" molding with one side pre cut at 45 degrees

## **A few places we recommend getting the material from:**

ACE Hardware stores- [www.acehardware.com](http://www.acehardware.com)  
Parr Lumber- [www.parr.com](http://www.parr.com)  
The Rebuilding Center- [www.rebuildingcenter.org](http://www.rebuildingcenter.org)  
Home Depot- [www.homedepot.com](http://www.homedepot.com)  
Lowe's- [www.lowes.com](http://www.lowes.com)





# Setting Up

## Group structure:

15 students is ideal for a workshop and 20 is about the maximum. A female-specific space can be great for young women to gain confidence using tools and try out their mechanical ability. If a group is co-ed, we recommend that at least half of the students be female. If you have access to two teachers/workshop leaders, you will be able to have someone circulate while the other instructor explains the steps.

## Tips for recruitment:

Many girls don't consider the trades as an option for elective classes, hobbies and especially careers. We've found that advertising the workshop as a picture frame building workshop rather than a 'carpentry' workshop is sometimes better received. As with most youth trends, if you can have another student give the workshop their seal of approval, others will likely follow. Check in with your math or professional technical teachers to pinpoint girls who have shown an interest in the trades, a kinetic understanding of math concepts, or students with good mechanical ability.

*For further technical assistance with recruiting and retaining girls in professional technical classes, contact Oregon Tradeswomen.*

## Workshop space:

Set up the classroom with at least 3 rectangular tables - one for materials, one for a gluing station, and one for the mitre boxes and saws. A horseshoe formation works well because most students will be able to see the demonstrations and you will be able to move easily from one area to another.

On the table where the mitre boxes are going to be placed, it is best to clamp a piece of plywood on the table to protect it from the saws. Screw the mitre boxes onto the wood - 1 screw at either end. It is best to lay newspaper across the table at the glue station.

Also, hang any of the visuals that you will be using. (See the back of the curriculum for reproducible handouts.) If you don't have a finished picture frame, print a copy of the last curriculum page showing a final product.

## Timeframe:

With two workshop leaders and 15-20 students, the workshop will take **a minimum of 40 minutes** if you have students gluing while the half of the group is sawing. The workshop can easily be elongated to 1 hour 15 minutes if you go over the history of women in the trades, do the group energizer, and allow for painting and decorating.

## Questions?

Give us a call! We would love to answer questions and give you the tools you need to lead a great "Framing Your Future" workshop.

☆ Molly Cochran 503-335-8200 x24 molly@tradeswomen.net  
☆ Elizabeth O'Neill 503-335-8200 x27 liz@tradeswomen.net





# Introducing the Workshop

## Objective:

Introduce relevance of a trades workshop.

## Materials:

Wage comparison chart

Visual timeline of women in the trades

(both found in the back of the curriculum)



## Discussion questions:

### What kind of jobs are 'trades' careers?

In a classroom, you can point out the air ducts to illustrate sheet metal workers, electrical outlets for electricians, plaster walls for dry wall finishers, and show the framing around a door for carpenters. Building a picture frame with 45 degree angles is the same process a carpenter would use when she is building the door frame. Students can easily identify the 90 degree angle, the square edge - the two pieces of wood are cut at 45 degrees to form the corner.

### If you walked onto a construction site and there were 100 workers, how many of them would be female?

Answer: Less than 3! The National average of women in the trades is 2.8%

### Why do you think women would want to go into a trades career?

- Paid education and on-the-job-training in an apprenticeship that prepares you for a life-long career.
- Satisfaction of walking away from a job and saying "I built that!"
- Financial independence. After a four year apprenticeship, trades workers make \$25-\$32 per hour with benefits and retirement.  
(See the Wage Comparison handout comparing traditional female job wages to trades wages.)
- Great alternative to college.
- Diversity of work and opportunities to grow professionally.

### How do you think math is used in the trades?

• Measuring wood, calculating the amount of water that can go through pipes, figuring out the right angles between a wall and a floor... the examples are endless. Math is essential in the trades. In fact, most trades programs require a "C" or better in HS algebra in order to get in.

• Use the next two pages as a way to identify how carpenter would use math in building a door similar to how the youth will build a picture frame.





# Picture Frames & Applied Math

If the picture frame's corner is a right angle at 90 degrees, what is the cut of the two pieces of wood that make up the 90 degrees?

$$2x = 90 \text{ degrees}$$

$$\frac{2x}{2} = \frac{90}{2}$$

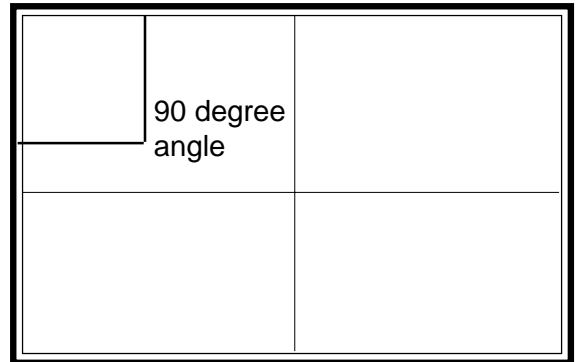
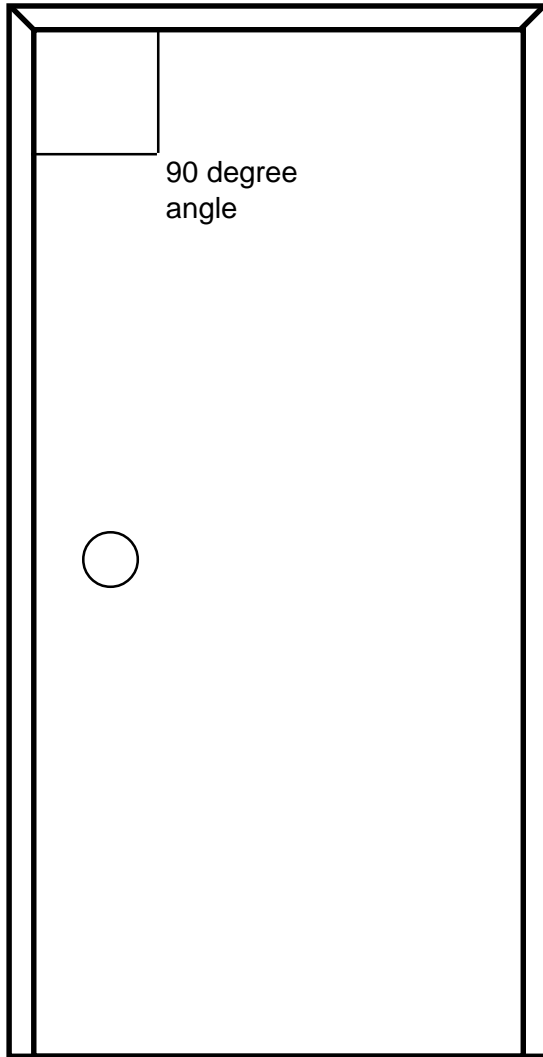
$$x = 90/2$$

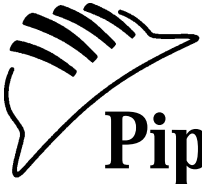
$$x = 45 \text{ degrees}$$





# How a Carpenter uses Right Angles





# Pipe Network Energizer – *Optional*

## **Objective:**

Energizers are good for motivating bored students and getting a group comfortable with one another. The “Pipe Network,” borrowed from the Clark County Skills Center, demonstrates consensus-decision making and illustrates the mechanics used in pipefitting, steamfitting, and plumbing.

*For a longer energizer, you can make the “Pipe Network” with larger material, such as PVC piping and marbles.*

## **Goal:**

To have students create a network of straws to collectively move their bead into a cup or bowl (finish line) first.

## **Time:**

5-12 minutes, depending on how far the finish line is from the starting point

## **Materials:**

4 packs of non-bending straws – sliced in half lengthwise as to make open “chutes”  
4-6 small round beads or even grains of rice (small enough to fit inside a straw)  
4 bowls or cups

## **Activity:**

- Depending on the size of the group, divide the class into groups of 8-10 students.
- Create the finish line (cup or bowl) far enough away from the starting point that students will have to move at least once to finish. They will line up holding the straws to create a continuous straw path.
- Give each group 1 straw for every 2 people.
- Each group sets up a straw chute system to get the bead to the cup or bowl.

## **Rules:**

- ◆ Once the bead is in a forward motion in the straw chute, members cannot stop it from rolling (touch it, reverse the marble, etc.)
- ◆ Marble must roll through all the straws.
- ◆ All members must keep at least one hand on their tube at all times.
- ◆ Team cannot move the cup/bowl.
- ◆ Team cannot use anything other than what is provided.
- ◆ If marble falls out, or any of the rules broken, the group must start again at the beginning.





# Safety and Steps

## Setting Up:

To secure the mitre boxes, drill them into a table, or a piece of wood clamped down onto a table.

## Sawing Safety:

This is not a highly dangerous activity, just have supervision at the sawing station.

To saw correctly, keep the back saw in the groove. Students have a tendency to pull it too far back where it will fall out of the groove. It takes quite a bit of sawing to cut the wood. The best way to is to hold the saw parallel with the table, rather than the tip pointed down.

Demonstrate holding the wood correctly. Don't cross arms while sawing, like having the left arm stabilize the right part of the wood. Workshop leaders or other students can help stabilize the wood as shown below.





# Measure and Saw

*Note: Half of the group can be measuring and sawing while the other half is gluing on the plywood supports detailed on the next page.*

1. Every student receives 4 total pieces of wood:

- 1 pre-cut 9" molding
- 1 pre-cut 11" molding
- 1 9" molding with 1 side precut
- 1 11" molding with 1 side precut

2. Have the students measure the two pieces of molding that need to be cut. Measure so that the thick piece of the molding will be the outer part of the frame - one piece at 9" and one at 11". Have the students figure which way the cut is going to go and draw an arrow. It can be easy for them to see the direction if they set up their pieces on the frame with the 2 precut pieces.



3. One piece at a time, line the molding up in the mitre box so that the non-sawing hand can stabilize the wood by either pushing it towards the front piece or pulling it to the back wall of the mitre box.

4. Align the saw in the 45 degree cut groove. The saws cut when pulled back, towards the person. Keeping the saw down, in the wood, is easiest. It will take a few minutes to get through the wood. After every workshop, we appreciate power tools even more!





# Glue plywood supports onto the plywood square backing.

☆ Using the wood glue, make medium sized “S” shapes down the plywood supports and place on the plywood square. Wood glue is very strong - it doesn't take a lot.

☆ When the glue is still wet, square up the corners so the supports match the corners on the backing.

☆ Have students write their name on the backing. In the center of the backboard is fine - it will be covered by a picture.



☆ The glue will have give for 10 minutes and does not fully set for 24 hours and it's best if students can leave the frame flat overnight.

☆ If any glue leaks out, it dries clear and can easily be sanded down.





# Sand Molding

Sanding will help even out the edges that became chewed up by the mitre saw. If you have two kinds of sandpaper, start with the roughest, or the lowest grade sandpaper, first.

Sand with the wood grain rather than against it. You can see the lines in the wood running the length of the wood.





# Glue molding onto the frame

The only trick with gluing molding is to not put glue all over the one piece that is open for the picture to slide into. (It is the fourth open side where there is no plywood support where you will just glue the corners.)

The back side of the molding is uneven. Put the glue on the part that will rest down.



Glue stuck on the table? Use warm water if it is still wet or wait for it to dry and either peel it up or sand it off.





# Decorate or stain

Voila! You are on the road to being a trades person yourself! Decorate with paint pens, glitter, seasonal plants, stickers or a wood stain.





# Synthesis

**Objective:**

Synthesize learning, find bridges to real life experiences

**Materials:**

none

**Instructions:**

Bring group around in a circle, leaving materials and supplies at their desk

**Discussion questions:**

What was it like to build \_\_\_\_?

Did you think you knew how to before today?

What did you learn about trade careers?

What project could you do at home that incorporates what you used today?

Transition:





# Let us know how it went.

**We'd love your feedback on our new curriculum. Drop us an email, or send in this form. Look for more resources on our website in the months to come. Thank you!**

Your name: \_\_\_\_\_

School/ Organization: \_\_\_\_\_

Number of participating youth: female\_\_\_\_ male\_\_\_\_ Age of participating youth: \_\_\_\_\_

Ethnicity of participating youth: (optional) \_\_\_\_\_

How did you found out about Oregon Tradeswomen "Framing Your Future" curriculum?

OT website

OT newsletter

OT staff

Colleague

Other: \_\_\_\_\_

On a scale from 1 to 5, 1 being awful and 5 being excellent, how would you rate:

Ability to understand how to lead workshop: 1      2      3      4      5

Success of students building frames:      1      2      3      4      5

Materials/handouts:      1      2      3      4      5

Overall curriculum:      1      2      3      4      5

What are some suggestions that could make the Framing Your Future curriculum better?

Any other comments?





# Additional Resources

## Oregon Tradeswomen, Inc.

### Women in Trades Career Fair

Mark your calendar: The Women In Trades Career Fair, produced by Oregon Tradeswomen, Inc., happens on May 13<sup>th</sup>, 14<sup>th</sup> and 15<sup>th</sup>, 2004. The Fair starts off with our Middle School Day May 13<sup>th</sup>, the High School day is next on May 14<sup>th</sup>, and Saturday May 15<sup>th</sup> is open to the public. It is hosted by Local 290 Plumbers & Steamfitters Training Center, 20220 SW Teton Avenue, Tualatin, Oregon.

The Women in Trades Career Fair features hands-on workshops, demonstrations and information about training and employment in high-paying construction, mechanical, technical, and utility trades. Learn about more than 75 different training programs and trades occupations, from auto mechanic to welder. Discover how you can earn a living wage through highly skilled, creative and rewarding work. Visit our website at [www.tradeswomen.net](http://www.tradeswomen.net) or call 503-335-8200 x21 for more information.

### Lending Library

Borrow videos or books from our library to assist with curriculum development and ideas of how to recruit and retain girls and women in the trades. Our complete list is available on our website at [www.tradeswomen.net](http://www.tradeswomen.net) under the Trades Offer Girls Options link.

### Pathways to Success Program

This self-paced program is designed to help women explore trades career options, and develop a career plan to successfully achieve their trades career goals. The Pathways to Success Program helped 34 women enter the trades in 2002. Their average wage after a year was \$11.34 per hour. You can be one of the women who enter the trades this year! Call 503-335-8200 x21 to find out upcoming dates and to sign up for a Trades Career Information Session.

## Additional Resources

- Oregon Tradeswomen works with Saturday Academy's AWSEM (Advocates for Women in Science, Engineering and Mathematics) clubs to give girls meaningful experiences in the trades. Clubs may arrange apprenticeship training center site visits and workshops. Visit AWSEM at [www.awsem.org](http://www.awsem.org).
- Teachers! Make use of these curriculum ideas and lesson plans that demonstrate construction applications of math and science concepts. Contact the Oregon Building Congress (OBC) at [www.obcweb.com](http://www.obcweb.com).
- The [www.ConstructMyFuture.com](http://www.ConstructMyFuture.com) site includes publications, facts, teaching aids, links, and ideas for helping young people learn about careers in the construction industry.
- PAVTEC Education Consortium at [www.pcc.edu/pavtec](http://www.pcc.edu/pavtec) enhances the access of high school and Portland Community College students to quality professional technical (vocational) education and hosts the Math, Science and Technology Conference for Middle School Girls April 16, 2004 at the Portland Community College Rock Creek Campus.

