Tackle Craft
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Introduction to Tackle Crafting

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Tackle crafting involves a wide variety of skills and interests. Some of them are simple and easily mastered. Others are complex, requiring a wide variety of skills. These activities may lead to entrepreneurial endeavors, careers or simply to expanding the recreational content of time spent fishing and preparing to fish. The volunteer working with these lesson plans and the youth involved in taking part in them are the best ones to determine which of these lessons will be used and which may wait until some later time. In general, tackle crafters with limited skills will learn best if simple skills are learned before they are applied to more complex projects. For example, simply learning how to attach a split ring and a hook to a pre-painted spoon or lure body is fun for the participant and teaches a basic skill that will be applied in many other activities. Building things to a pattern or model teaches the learner to follow that pattern or model - a step that should be taken before free-form creativity takes over. There are some good reference materials available to help the less experienced tackle crafter learn more about the projects before trying them on the youths in the club. For general tackle crafting projects I recommend "The Complete Book Of Tackle Making" by C. Boyd Pfeiffer, and "Luremaking" by A. D. Livingston. For fly tying there are many books (too many to list) available on this subject. There is a great deal of information available on videos, that teach many of the subjects, the advantage of videos is being able to see how things are put together. The use of this manual and the 4-H Sportsfishing booklets are good sources of projects and projects ideas. There are many other projects that your group can do that are not included in this material. Don't be afraid to try new projects that you think your group would like to try. Make sure you look at all the safety concerns of the project and take all the precautions need to make it safe. If you find your project was a success, please write it up and send it to us, if your group liked it other groups may like to do it also. Tackle crafting involves anything to do with the making of tackle or other items used in fishing. This includes projects making lures and baits, to projects making nets, traps, rod building and repair, boat repair and adding special thing to help fishing, etc.

Learning to assemble pre-cut and ready-to-finish woodworking projects is an excellent precursor to preparing them for finishing or cutting the pieces themselves. Several of the woodworking activities lend themselves nicely to that progression. If those products are then used in other activities, the value of the learning is enhanced. Clearly, more attention to hazards and safety is required when young people are using power tools, molten lead or sharp cutting instruments than when they are simply opening a split ring; but being prepared and covering safety is a leader responsibility. Since most of the baits we make that use lead can be purchased already made and the risk to young children from the lead is great, it is better to just buy the parts and finish them.

Several of the activities included in this set are developed in sequence. Where they are sequential (as in the fly tying material), lessons are designed to teach, then to reinforce, basic skills. As a result, the exercises or lessons are listed in sequence. For best results they should be taught in that same sequence. When that is done, the more basic skills are learned first and skills learned earlier in the sequence are reinforced and expanded in following lessons. Skipping the basic lessons often results in complications later. As a result it is strongly discouraged. Consult the "BEST TIME" section of the lesson plan for information about the sequenced plans and where they fit in the process. An astute reader of the manual may note that the lessons are placed in the manual in sequence for basic learning and that more advanced

lessons where free choice can be exercised tend to follow them.

Consider the age and skill level of your group members. Remember they learn at different rates and may have different levels of innate ability. Please remember that the product of these lesson plans is the young person participating, not the items that will be produced. Patient, positive leadership by an active listener and cooperative leader will reach the objective of helping kids to achieve their potential most effectively. Keep in mind the equipment the youths in your group have, if no one has a fly rod, then fly tying will not be of great interest to them. Not that these skill are not usable, but tying flies with no way to present them, to them will be pointless. Consider the waters they will be fishing and the type of fish they will be fishing for. Making trout flies is not important to youth that will be fishing a muddy river for catfish. At different ages the motor skills, hand eye coordination may not be at a level to do certain baits. An eight year old may not be skilled enough to make complicated flies, nor be at a point that they can fish with a fly rod.

Remember that the lesson plans are a guide, that learning never stops, and that, you are a role model and hero to kids whether you want that position or not. Help others to have some of the fun of teaching and draft your teen leaders as assistants. They will grow from it and so will your kids. Finally, if you have good ideas for activities in this area and are willing to share them with others, please send them to us. We will edit them for format and put them in the next edition, giving you credit for the content.

Welcome to some fun stuff! Have fun with the kids and try some new things yourself. Included in the next pages are some sources for materials and information. These are added to help you find the stuff you may need to teach tackle crafting, but remember if you need help, we will be available to give assistance if you need it. There are a few reasons why people make their own tackle. They are for their own pleasure, to save money, or to get the exact bait they want. Tackle crafting, as a hobby, is fun, and the kids love making lures. It is a relaxing (sometimes) hobby. Tackle crafting to save money can be misleading. Most of the time, if you figured all of the cost (including time) you will find that it may cost more to make it yourself. The biggest reason to make it yourself is to get what you want. Some times it will be you can't find the color, the shape, the quality, or the right design you want. This is in fact how I got started making baits. Mom wanted a pink worm (and you know what momma wants, momma gets!). At the time that color was not popular, so we found a kit in the Bass Pro Shop catalog to make worms. We ordered it; mom got her pink worms and the rest is history. As a bass fisherman, I found that modifying bait improved the number of fish I caught. This is important in tournaments, but also for your own enjoyment. By learning how to modify bait it wasn't hard to learn to make them. The most important thing you can pass on is your love and enthusiasm for sportfishing. This will not only enrich your life, but the lives of all those you pass this on to.

Happy tackle crafting!

Painting Leadhead Jigs with Powder Based Epoxy Paint

Andy Martin of American Sportfishing Association
Updated and modified by Wm. Jeff Farris

Objectives
Youth and adults will:

- Develop proper jig painting technique
- Learn the curing/drying process
- Critique painted jigs to improve painting skills
- Learn safety procedures while using a heat source
- Have fun while learning

Youth Development Objectives
Participating young people will develop:

- Enhanced hand-eye coordination
- Enhanced planning and execution skills
- Manage dangerous materials in a safe manner
- Practice cooperation

Roles for Teen and Junior Leaders:
Teen and Junior Leaders will:
1. Demonstrate uses of various types of jigs
2. Assist participants with jig painting technique
3. Demonstrate safe handling of heat source
4. Evaluate painted jigs and suggest improvements
5. Assist with set up and break down of painting area
6. Encourage young people as they learn painting skills.

Potential Parental Involvement:
1. See "Roles for Teen and Junior Leaders"
2. Arrange to provide equipment and materials
3. Arrange for or provide transportation

Evaluation Activities/Suggestions
1. Compare participant made jigs with model jig
2. Observe changes between first jigs painted and subsequent ones
3. Evaluate ability of participant to observe safety precautions

Best Time: Anytime

Best Location: Well lighted, dry, comfortable setting with a worktable of wood or metal, not plastic.

Time Required: 30 to 90 minutes (depending on how many kids and the number of jig they paint)

Equipment/Materials
Safety glasses and Dust mask
Matches or lighter
Powder Paint (many colors) Drying rack (see fact sheet)
Fire Extinguisher
Aluminum foil
Lead Jig heads
Locking forceps (best) or needle nose pliers
Heat source: Alcohol lamp and Denatured alcohol, Sterno can, Gas stove (camp stove will work)
Shallow containers with lids (8 - 10 oz.
Rubbermaid type containers with lids)

References
The Sportfishing Helper's Guide, 4HCC BU-07601, "Powder Painting Jigs", pages 12 and 13.
Component Systems - PRO-TEC Powder Paint, Directions for Use, Component Systems, 5003 Packer Drive, Wausau, WI, 54401, (715) 845-3009.

Safety Considerations
Probably the biggest safety concern is working with open flames. There are many things that can go wrong when working with an open flame, burns and starting a fire are the two biggest. Always keep a fire extinguisher handy. Burns resulting from heating the jighead beyond the melting point of lead is another. Lead melts at approximately 621□F at which point it will liquefy and drip, striking whatever is below. If your hand is in the way it will result in a nasty burn. If you are sensitive to fine powder, a dust mask will help.

LESSON OUTLINE

I. Introduction A. Preparing the working area B. Preparing the jigs, materials & equipment C. Painting the jigs D. Curing the jigs E. Adding eyes and/or glitter	Painting jigs with powder based epoxy paints is a fun and easy way to make manufactured quality jigs in just about any color. Using powder paint correctly takes a little practice, but once mastered becomes easy.
II. Preparing the working area A. Clean, dry surface B. Metal or wood surface C. Arrangement	**Select** a clean, flat surface of wood or metal with plenty of room to work. Lay aluminum foil or construction paper on surface in case of spills and to ease clean up. Arrange area so there no obstacles between the heat source and the drying rack.
III. Preparing jigs, materials, and paint A. Jigs 1. Wash in vinegar 2. Rinse and let dry B. Set up the heat source* C. Prepare powder paint 1. Pour paint into shallow bowl 2. Close container and shake to "fluff"	**Wash** jigs for about 5 minutes in a small bowl filled with vinegar to remove impurities such as oils and dirt. Rinse with running water and lay out on a paper towel to dry. Store jigs in a container or ziplock bag to keep them clean. **Put** on safety glasses The wide mouth of the bowl makes paint application easier. Loose, fluffy powder will help create a more consistent, thin finish on the jig head. After dipping a few jigs close the lid and fluff the powder, again.
IV. Painting the Jigs A. Grasp hook at bend with forceps B. Pass and rotate jig head through flame 1. Heat jig to approximately 350˚ 2. Quickly "swish" jig through powder 3. Tap to remove excess powder 4. Reheat if necessary to liquefy the paint	Use a pair of forceps to **Grasp** the jig head at the bend of the hook. **Rotate** the jig head through the flame heating both sides of the jig to heat it evenly. It helps develop a pattern for different sized jigs. Naturally, the lighter the jig head the less time you will need to heat it to reach 350□F. By count you can establish a pattern. A 1/16 oz. may heat to the proper temperature in a three or four count while a 1/2 oz. jig may require an eight to ten count. Once the proper temperature is reached, quickly **swish** the jig through the powder with a side-to-side motion to cover the entire surface**.** **Do not dip or push** the jigs into the powder. **Remove** the jig **immediately** and tap off the excess, the painted surface should melt and gloss. If the jig smokes, reduce the preheat time by a few counts. If the powder does not melt pass the jig head above (not in) the flame for a few seconds until it starts to melt and gloss over.

5. Place on rack to dry	Remember to **fluff** the powder after every five or six jigs painted. **Place** the freshly painted jig on a rack to dry and cool for a few minutes.
V. Curing powder painted jigs A. Clean out paint filled hook eyes before curing B. Turn oven to bake at 350˚ C. Place drying rack with jigs in oven for 30 minutes D. Remove from oven and let cool for 2-3 minutes	**Curing** powder painted jigs creates a "bomb proof" like finish that is highly resistant to chipping and flaking. The paint surface prior to curing trends to be brittle and chips off easily. Before curing **use** an “eye buster”, a large jig hook or other sharp object to remove any paint that may be blocking the hook eye of any jig you intend to cure. It is almost impossible to clean out the hook eye after the jigs have been cured. **Position** the jigs on the rack (metal one that can be placed in the oven), place aluminum foil under the rack in case the paint drips**. Place** the rack in an oven for approximately 15 minutes (350□F) Jigs with weed guards-25 minutes at 250□F. Remove and let cool for a few minutes and you’re ready to add eye or glitter or GO FISHING!
VI. Adding eyes and/or glitter A. Adding eyes 1. Stick-on eyes 2. Doll eyes using super glue 3. Paint the eyes B. Adding Glitter 1. Double dipping into clear powder paint with glitter mixed in. 2. Brush on clear epoxy or vinyl paint mixed with glitter	Many fishing experts think the placing eyes on jigs, flies, and other lures are critical to catching more fish. Adding eyes to jigs is easy and makes them look great! There are three easy methods to create eyes. Stick- on eyes have an adhesive back that **sticks** right to the jig surface. Doll eyes are **applied** using super glue. The head of a nail or small dowel rods can be dipped in liquid paint and then applied to either side of the jig head to fashion a set of eyes. It is recommended that you use a liquid epoxy or vinyl based paint. These paints, unlike lacquer or oil paints will not react with soft plastic lures. A topcoat of glitter to their jig heads can be accomplished in two ways. Double dip a jig head in powder paint to add a glitter topcoat. Immediately following the initial dip to paint the jig head, dip it again in clear powder paint mixed with glitter color of your choice. Or mix glitter in with some clear liquid epoxy or vinyl paint and brush it on the jig head.

Powder paint can be used on other metal parts (blades, spoons, etc.), but will be more difficult. Blades and spoons have large areas to heat and are hard to get the whole part heated evenly. Jigs with plastic weed guards can be painted this way, but care need to be observed keeping the heat (flame) away from the weed guard.

*Heat Source If using a gas stove (kitchen type) the likelihood of knocking over the heat source is slim, therefore the safest source to use. This would work best with a real small group, three or four kids tops. With larger groups you may need to set with multiple heat sources. Maybe set the drying rack in the middle with heat sources on both side. If your heat source is an alcohol burner you will need to fill it first. When filling the burner first put on safety glasses. Fill alcohol burner with denatured alcohol (available at most hardware stores) and light wick with match or lighter. With Sterno, open the cans and light. With the propane torch make sure that the base is steady. The fatter can used for propane stove and lamp found in the camping section work best. Point the torch in the safest direction possible and light. A camp stove can also be used, follow the direct in light it.

For jigs with weed guards I found holding the jig by the eye works better. By done them this way it makes it easier to keep the weed guard away from the flame.

Powder Paint Background

Powder based epoxy paints are fairly new to the home tackle crafting market but are quickly replacing liquid based vinyl and epoxy paints as a way to create a durable, high gloss, colored finish of leadhead jigs. Powder paint has many advantages. Its inexpensive, covers a jig head in one coat, and creates a durable finish that rivals many store bought jigs. Using powder paint is less messy and produces minimal odor.

Although powder paint is new to the tackle crafting industry it's been around a long time and has been used extensively to paint washing machines, dryers, refrigerators and other appliances. Powder paint is heat activated. It liquefies at approximately 350□F. Appliance manufacturers finish their products in huge ovens. The powder is sprayed on to appliances and melts on contact with the metal. In a final step, the appliances are cured under heat creating the shiny bombproof finish we all expect on a washer or dryer. Thankfully for the home tackle crafting market, powder paint colors have been expanded beyond the almond, white, and black found on most appliances. Powder paint comes in a rainbow of colors, including fluorescents and glows. A clear powder paint is also available that can be mixed with glitter to create a variety of finishes.

Sources for Powder Paint

Powder paint can be found at bait and tackle dealers. If your local dealer does not carry powder paint, it can be purchased through mail order or online at retailers such as: Bass Pro Shops, Cabelas, Janns/Netcraft, and Barlow's Tackle Shop. Powder paint costs between $5-$6 for a 4 oz. jar which should be enough paint to finish hundreds of jigheads. One manufacturer of powder paint is Component Systems, 5003 Packer Drive, Wausau, WI, 54401, (715) 845-3009.

Painting Lures

W. Jeff Farris

Objectives

Participating young people and adults will:

- Develop proper painting technique for different situations;
- Critique painted baits to improve painting skills;
- Learn safety procedures to prevent injury
- Develop creativity
- Have fun while learning

Youth Development Objectives

Youth will:

- Develop enhanced hand-eye coordination
- Develop enhanced planning and execution skills
- Increase creativity
- Learn and observe safety procedures
- Practice cooperation

Roles for Teen and Junior Leaders:

Teen and Junior Leaders will:

1. Demonstrate uses of various types of painting techniques
2. Assist participants with painting technique
3. Demonstrate safe handling of material
4. Evaluate painted techniques and suggest improvements
5. Assist with set up and cleanup of painting area
6. Encourage young people as they learn painting skills.

Potential Parental Involvement:

1. See "Roles for Teen and Junior Leaders" above
2. Arrange to provide equipment and materials
3. Arrange for or provide transportation

Evaluation Activities/Suggestions

1. Compare participant made baits with model
2. Observe changes between first lures painted and subsequent ones
3. Evaluate ability of participant to observe safety precautions

Best Time: Anytime

Best Location: Well lighted, dry, comfortable setting, with ventilation.

Time Required: Several hours over several meetings (depending on how much stuff needs to be painted). It is best to break up this project into painting of one type of bait at a time.

Equipment/Materials

Safety glasses — Dust mask
Gloves — Drying rack
Model car paints (Acrylic or Enamel)
Vinyl paints — Wooden plugs
Raw blades — Plated blades
Paint brushes — Eye dropper
Netting-small holes — Embroidery loop
Paper (blank) — Crayons or Colored Pencils
Utility Knife — Paint pens
Scissors — Sand paper
Masking tape — Paper plates
Lacquer paints — Dowel rods (small)
Unpainted Plastic Crankbaits
Nails (Finishing and some small box head)
Heavy Card Stock (60# or thicker)
Spray Paints (Krylon, Rust-Oleum, Enamels)
"Spike-It" blade dyes
Locking forceps (best) or needle nose pliers
Card Board box (medium to large) use as a paint booth

Safety Considerations

Safety will depending on the type of paint and what is used to apply the paint. Some paints are flammable, some can irate eyes and respiration system (nose, air ways, and lungs). Dust or respirator type mask need to be worn. A well-ventilated space is needed. Read and follow the directions.

References

"The Complete Book of Tackle Making" ***by C. Boyd Pfeiffer, has a good chapter on painting lures.***

Sources of paint:
There are many sources for paint. The introduction to Tackle Crafting section lists many suppliers of components, including paints. Craft stores (like Hobby Lobby, Joanna's, etc.), home centers (like Home Depot, Lowe's, etc.) and hardware stores carry many different paints and supplies. Some companies that make spray paints are Rust-Oleum and Krylon, but Testors (model car paint) carries spray enamel. Testors makes acrylic and enamels paints (my preference is the acrylic, easier clean up), sold as model car paints. Component Systems (Wausau, WI) make the vinyl jig paint, but you can get it from most of the tackle suppliers. There are also lacquer type paints. Rust-Oleum makes a spray version of lacquer paint. You can get a fluorescent version from Cabela's for dipping jigs, spoons and blades. Another way to color metal baits is using Spike-It brand blade dye.

Lesson Plan
Each type of painting discussed in this unit can be a project in itself or tied to another project such as painting a wooden bait that they have made, or painting blades for spinner bait they are going to make. Each technique used with a project, can take a considerable amount of time. You need to plan for this time in the project. **Note:** The first thing to do is to check to see if the paint you are using will react with the bait. Some paints will react with plastics and some types of paint will react with other types of paints. So always check to make sure they will not react with each other. Lacquer paints react with some plastics. Read all the direction on the paint before using. Each paint will have different drying times, how long you need to wait before applying second coats, and other information regarding it usage.

Painting plastic or wooden lures
Begin with unpainted lure bodies and the appropriate paint. Bodies are available from tackle craft suppliers or the student may choose to use a wooden lure they have made. Before painting have students decide what they want their finished lure to look like. Have the kids draw up what they want the finished lure to look like with crayons or colored pencils. They should draw up at least the side view, maybe even the top and bottom. (A good question to ask them is why they think these color combination will attract fish?) Make sure the bait body is "prepped" (ready to be painted). Additional sanding might be needed. For a smooth finished painted bait, you must have a smooth bait before painting. Some parts of the bait may need to be masked off to keep paint off, things like the bill, maybe the hook eyes. Teach your students that there is an order to what to paint first, next and so on. Start by putting a base coat of paint. Painting the whole lure with white (or other colors), spray paint can do this. (Maybe a quick drying paint like Krylon.) Let it dry. Two or three coats of paint will make the paint job hold up better. So repeat the base coat. It is always better to put on several light coats, as oppose to one heavy coat. Sanding between coats will also improve the smoothness of the finished lure. If a specific pattern is wanted, a template or stencil is strongly suggested. Painting "free hand" can be done, but the results may not look as good as using a template. If using stencils, spray paint will work, or model car paints and a brush can be used to apply the paint. To create a stencil or template, for the pattern, use heavy card stock or a paper plates can also be used. Cut the desired pattern out making both a right and a left side. If multiple color patterns are needed more then one set of stencils will be needed for each color. Paint each separately, with spray paint or painting by brush. Be sure to let dry before adding the next color or pattern. Once all the patterns, or colors have been painted on you may add eyes. Finish the lure by adding a clear coat finish, or three, to protect the paint job allowing the lure to last.

Painting raw (un-plated) metal blades:
Un-plated blades can be purchased and painted what ever color you desire. Un-plated blades are best for painting, because plated or blades that are finished will effect how the paint will stick to the blade. These techniques will work on other types of unfinished metal parts, like lead spoons. It is possible to powder paint the blades, but unless the entire body can be heated evenly and the temperature maintained the result may not be very good. It is difficult to keep the whole part hot enough so that the powder paint will come out looking good. I've gotten much better results using spray paint on these types of lures. Start by cleaning the lures with vinegar or alcohol. Then make sure they are dry. Using a cardboard box, on it's side as a paint booth, hang the blades or spoons with paper clips or wire from the top of the box. Put a glove on your left hand (if

you are right handed, or right if you are left handed) spray the lure with paint. You can use forceps or pliers to hold the bait, also. You may need to hold the lure from spinning with your glove hand, and then spin the lure to get all sides of the lure painted. You can let them sit in your "Paint Booth" if you don't need to paint other lures or you can hang them in your drying rack if more bait need to be painted. Some baits will need multiple coats of paint. You will want to apply a finish coat (or several) of lacquer or varnish to protect the paint job.

Painting finished (plated) blades:
Brass parts cannot be painted (and the paint to stay on) unless they have been painted before. To paint brass requires a chemical process to get the paint to stick. However, brass parts that are already painted can be re-painted to make them a different color. Painting plated parts can be done several ways. Because of the plating, the paint often peels off. Clean the part good with vinegar or alcohol, and then rough the blade up with a fine grit sandpaper. Another ways of coloring blades is to use a die. This works well in a pinch but it does come off. For longer lasting color, after dipping the blade apply a finish coat of clear lacquer or varnish. (Test to see if the die reacts with the lacquer or varnish) Other methods of painting blades include using lacquer or vinyl paints and dipping the part in them. Again, clean the part well and rough up the part for better results. To make the color stay on, after dipping the blade apply a finish coat of clear lacquer or varnish.

Painting eyes
There are many ways to add eyes to lures including adhesive lure eyes, gluing on doll eyes, or by painting. With the adhesive eyes it a matter of just place and press, and similarly with gluing doll eyes. Do this before you put on your finish coats of clear finish. You can also paint the eyes. You can use a paintbrush, but this may not be the easiest ways to get constant results. First, find a dowel rod of the diameter you desire the eye to be. Or if the dowel is too large a diameter, use a pencil sharpener to grind the dowel end to a point. Cut the dowel at the point where the dowel will be the size you need. To make oblong eyes cut the dowel at a 45 degree and use the flat oblong shape to make the eye. Dip the dowel in paint and place on the lure where you want the eye to be. Using a nail in the same manor will, also make a good eye on your lure. Finishing nails work well for this, but if you need a larger eye you can use a box or common nail. Using an eyedropper you can place a small drop of paint on a lure to make an eye or spots. Another easy way to paint on eyes is using a paint pen, just place a spot on each side of the lure for eyes.

Using patterns, templates and stencils.
Creating patterns, templates or stencil to decorate a lure is the best way to get the same look on many lures. Once the pattern is created it can be re-used over and over again. To make your pattern, first draw it out of heavy card stock or a paper plate. Next cut the pattern out using scissors or a utility knife. Set up your pattern to hold tight to the lure to keep over spray down. Depending on your design, you may need a pattern for the different sides of the lure, or for each different color you will be painting. You may want to set up a template so the lure is held in place to assure the same area gets get painted each time. These stencils will be set to mask off the part of the lure not to be painted. To make a lure like a "Red Devil" spoon, first the spoon is painted white, then the template covers the area of the lure that will stay white, and red is painted on. When creating your template the order that the lure will need to be paint needs to be considered. If you want to paint scales on a lure this can be done use nylon netting, you can get at fabric or craft stores. Place the netting in an embroidery loop, again available at fabric or craft stores, this will hold the netting tight. Mask off the areas of the lure that you don't want scales on, cover the areas you do with the netting and spray paint. Now remember that the area needs to be paint the lines of the scales will be first, then with the netting paint the color of the scale bodies. For silver scales with black lines, paint the area black first, and then, with netting, in place paint with silver. Remember that some colors paint over others better than others will, and that with the netting you need to get it right the first time, because putting a second coat will be impossible to get lined up. Other ways to decorate lures are by using adhesive tapes. These tapes come in many colors and patterns. Some are design with a pattern that shows up and some are transparent only showing lines allowing the color below show.

Comments:

Painting baits can be a time consuming process. Have the kids take the time to do it right. This will build pride in the baits they make. You cannot hurry things up and get good results when painting baits.

Spinnerbaits & Buzzbaits

Ron Howard, Texas Cooperative Extension
Wm. Jeff Farris -Missouri 4-H Sportsfishing

Objectives
Participating young people and adults will:
1. Understand and practice safety while building fishing lures
2. Select types of lures appropriate to their area and fishing preferences
3. Make decisions on colors, actions and types of lures to be made
4. Understand and demonstrate lure actions and their relationship to catching fish
5. Demonstrate ability to successfully build selected lures
6. Have fun while learning.

Youth Development Objectives
Participating young people and adults will:
1. Develop and enhance fine motor skills
2. Practice critical thinking and decision making
3. Enhance understanding of predator-prey relationships
4. Increase organization of work processes
5. Practice practical problem solving skills
6. Enhance spatial and color perception
7. Practice teamwork and cooperation

Roles for Teen and Jr. Leaders: By working one-on-one with the adult leader well in advance of this activity, Jr. Leaders can effectively teach and assist in supervising many parts of the lure building activities. It is important to be certain the teen actually has sufficient familiarity with the material and is capable of assisting correctly. Suggestions for teen leader involvement:

- Organizing tools and materials prior to activity
- Assisting with teaching by monitoring one or two youngsters
- Demonstrating what is shown by the adult leader
- Assisting with evaluation
- Assisting with those youngsters having difficulties
- Encouraging youngsters with their efforts

Best Time: Any time of year, excellent off-season activity. Lure building extends fishing to a year-round activity. It enables clubs to meet and do fishing related activities during bad weather, slow fishing periods and whenever fishing is not possible or an alternative is needed.

Best Location: Any well lighted area with adequate bench space for each participant

Time Required: Minimum 1 hour per session recommended, variable with group and activity

Number of Youngsters: Lure building is an intense, hands-on experience. The smaller the group, the more successful the activity. With one instructor, no more than ten youngsters is recommended and six is far better.

Outcome: The kids will have fun making baits. They will learn how the different components effect how their bait will perform. They will gain confidence in any bait they make. They will improve motor skills and hand eye coordination.

Equipment/Materials
Spinnerbait bodies (painted)
Selection of blades, beads, swivels, split rings, clevises, etc.
Skirt making kits with skirt making tool
Tools-Needle nose pliers, split ring pliers, scissors

Note: With the dangers of lead, and its fumes, I do not recommend pouring your own spinnerbait heads. Lead is very harmful to small children during the ages that they are developing. The cost to buy spinnerbait heads already painted is cheap enough that it is not worth the risk to the children

Safety Considerations
They will be working with hand tools and scissors, safety glasses are recommended.

References
"The Complete Book of Tackle Making" By C. Boyd Pfeiffer, The Lyons Press, 1999
"Luremaking" By A.D. Livingston, Ragged Mountain Press/McGraw Hill, 1994

Lesson Plan

INTRODUCTION:
Start with the information in "Spinner Baits 101" to explain the different components and what they do. Show the kids examples of spinner baits. Show the kids how to build a spinner bait one step at a time, so they can see how each part goes on. I recommend reading the information in "The Complete Book of Tackle Making" By C. Boyd Pfeiffer, and "Luremaking" By A.D. Livingston . Both books contain information that will help you be more knowledgeable on this subject. "The Complete Book of Tackle Making" covers most aspects on how to make a spinner bait, and "Luremaking" cover information on the different components and how they affect the baits action. Step by step instruction on how to make a spinner bait is in the narrative. For buzz baits the process is similar. The making of the skirt is the same, but instead of putting regular blades on the arm you install a buzz bait blade.

Narrative
Making a safety pin type spinner bait, (as opposed to an in-line spinner) you can start with making the skirt or putting the components on the arm it makes no difference, they will be put together later. Now the reference books will provide a lot more details of this process. "The Complete Book of Tackle Making" has good details on how to make the baits, with good illustrations. The book "Luremaking" has good details, but is better with details on the components and how they affect the bait performance. Another good reference is the instruction sheet that come with the Skirt Factory.

Making the Skirt:
Skirts can be made different ways. We will be using a "Skirt Factory", but they can be made with pre-cut silicone strips or tying feathers to the head. Start by clamping the table clamp to the table in front of you. The screw of the clamp should be down and screwed until snug, do not over tighten. Pick out a rubber collar, moisten the collar and slip it onto the end of the point of the pliers. Make sure the collar is on the pliers far enough that it is at or past the bend in the end of the pliers. Carefully open the pliers until the locking bar will fit into the hole, push the locking bar in to the hole. Do not open the pliers beyond this point, because the collar will rupture or come off. Cut off a length of the rubber skirt material. For most uses 5" to 6" of material will work. If you want to make the skirt multi-colored, break off pieces of the different color so that the total material is about the width of one strip. One width is about the right amount of material, you can use more if you want a thicker skirt, but it will be more difficult to get the material into the collar. Take a paper clip and open it up. Take the material and place it in the bend of the paper clip. Feed the other half of the paper clip through the collar, you should be pulling the skirt material towards the handle of the pliers, not towards the bend. Pull the skirt material through the collar enough to get half of the material through. Position the material so that one side is a little longer than the other, bend the material at the collar, the two end should be even. Remove the locking bar and allow the pliers to close. Remove the skirt from the pliers. Position the collar in the flat part of the pliers between the locking bar and the hinge. Squeeze the pliers holding the collar at the flat part. Slide the handle in the slot in the table clamp, the plier handle should go through both holes and should not move. Take your fingers and pull the rubber in a level or downward direction. Close to, but don't cut your fingers, cut the material slowly so that each strand separates from the other. You may need to break the material into smaller groups of strand to do this. Continue separating the material in this manner until all strands are separated. Remove the pliers, holding tight, and turn them around and repeat the process for the material on the other side. Remove the pliers from the clamp, you will have a skirt ready to be put on a jig, spinner bait, or buzz bait.
Using silicone skirts: When using pre-cut silicone skirt strips, it will take two strips per skirt. You can use the skirt factory tool to make these, or there are or tools available for making these skirts. All of these tools use some method to open the collar up to allow the skirt material to be inserted. We will use the skirt factory tool. As described earlier put the collar on to the pliers, open and lock in to position. Feed the

strips in to the collar using the paper clip. Position the strips, so when you hold the skirt up vertically both end meet. Since the material is pre-cut you will not need to pull on the skirt to cut it. Just cut where the ends are joined together.

If tying feathers or bucktail: If desired feathers or bucktail can be tied on the spinner bait head using the same techniques you would use to tie these materials on to a jig.

If tying skirt material on: Some people prefer to tie the skirt material on the head instead of using removable skirts. They believe that this make the skirt look fuller in the water. To do this you can us the rubber or the silicone strips. Instead of tying the material in the middle, you will tie it on at the end and layer it. Some use heavy tying thread, others have used heavy monofilament fishing line (25lb+), and other have used wire to attach the skirt to the head. Start by tying the thread to the head using a jam knot like you would if you were attaching the thread to a hook, but don't do it on the hook part of the head, place this in the saddle of the head collar. Wrap the thread on a few time to build and fill some of the saddle of the head. Tie the material on so that it going towards the wire, not the hook. The lengths of rubber will only need to be 3 to 4 inches long, if using the silicone strips tie on one end then bend over tie on the other and cut the material in half. Use more than one width of rubber to make the skirt thicker. Wrap each layer with the thread many times. Then finish with a whip finish or many over hand knots. Add some head cement to make the bait tougher.

Safety Pin-type Spinner Baits

Putting the Components on the Arm:

Take a spinner bait body (head with arm, painted ready to use). Select the components you will need. If making a single spin you will need a blade, swivel and split ring. If making a tandem spin you will need blades (at least two and they should be different size), a swivel, a split ring, a clevis for the second blade (if more than two blades you will need one each for the other blades), and some beads or spacers or combination of both. From here on we will be making a tandem two bladed spinner bait. For a single spin you will not need to add the parts for the other blade installed on the arm, for tandem spin with more than two blades just repeat the process for the inside blade for each of the inside blades. Take one bead and install it on the arm. Take the clevis and slide it through the hole of the smaller blade. Take this clevis holding the blade and install it by sliding the clevis on the arm. The blade should be positioned so that the curved side is towards the lead body of the bait. The clevis holding the blade should be able to rotate around the arm of the spinner bait. Next install another bead, this should sandwich the clevis between two beads. The beads act like bearing allowing the blade to spin around the arm. Next add spacers or beads to separate the lower blade from the end blade, or next blade. Space it down at least one inch, you do not need to fill the arm up. The thing to keep in mind is you need to space the blades so they will not hit each other, this will allow them to spin freely. Next take some needle nose pliers and grab the end of the spinner bait arm. You are going to bend this wire so that this end will hold the swivel, split ring and blade assembly. When doing this bend you will want to bend the wire towards the head, this keeps the bait from collecting as much debris. You will need to keep it straight with the rest of the wire, this will help the bait run straight. You have the wire gripped at the end in the needle nose pliers. Roll the wire down and back to form a loop. You should be able to set this assembly down without the beads and blades coming off. Next take a set of split ring plier and open up the split ring. In this open split ring slide the bigger blade in to it until the ring is in the hole of the blade. While the split ring is open, also slide the swivel in to it. Rotate the components around until the split ring closes. This assembly should have the swivel holding the blade, by the split ring. Next take the blade/swivel assembly and install it on to the arm. To do this slip the swivel in the loop you formed earlier in the arm. Close this loop so the swivel will not come off.

Putting the Bait Together:

At this point you have a skirt and a spinner bait body with the components installed on the arm. To

complete the bait you will need to install the skirt on the body. The skirt is longer on one side then it is on the other. Take the long side toward the hook and push the hook into the middle of the skirt, not through the collar. The hook will be in the strands of the skirt in the middle of the collar. Slide the skirt over the hook and up on the collar of the lead head of the spinner bait body. Your bait is complete and ready to be tied to your line and fished. For storage and handling you can cut pieces of surgical tubing (about 2" to 3") and slide the tubing over the hook to keep the hook sharp and out of your fingers.

Buzz Baits

The skirt is made the same way you make one for a spinner bait. The skirt is installed on the body the same as a spinner bait (See Putting the Bait Together, above) the body is different. The arm instead of coming from the lead head at an angle it will be straight. Another difference in the wire is that it will go straight up and then be bent again back towards the lead head. Most of the time the shape of the lead head will be different. Because this bait is meant to run on the surface of the water (top water) the lead head will, most of the time be flat on the bottom. This causes the bait to plane up faster and with less effort. To install the components on the arm you will need a buzz bait blade, some beads, a rivet, and a clacker blade (optional). If you are installing a clacker blade and the wire is already formed, you will need to straighten it first. Install a bead first, then the clacker blade, and then another bead. Then bend the wire back to the original position. Next install a bead, then insert the buzz bait blade on the wire. This blade should have the pointed part first with the cupped part at the back. Now put the rivet on, with the flat part next to the blade. Next bend the wire down towards the head, just behind the rivet, make sure that the components are not too tight that they don't move. Some other options you can do with buzz baits. Clacker blades should only be used with metal buzz bait blades, they would damage plastic blades. Instead of using a clacker blade, you can use a small spinner bait blade. To do this install some beads and use a snap swivel with the small blade on it, the some more beads. Instead of using a rivet, you can add some flash to the bait by install a willow leaf blade to the arm. To do this instead of the rivet put a bead (or two) behind the blade. Next make a loop in the arm the same way you would for a spinner bait. And install the blade in the same manor.

Spinner Bait Bodies: As stated before I do not recommend having the youths make their own heads. But I will tell you how to make them if you are dead set on doing this. You will need the lead mold for make the style of spinner bait you desire. You will need wire bent in to the desired shape, these can be purchased or you can get the equipment and bend your own wire. You will need some wire, stainless steel works best, different thickness will be need if you plan on make many different head weights, the mold manufacture will indicate what size is need for your mold. You will need a lead pot and some lead. You will need the proper hooks to fit the mold you are using. Then once you cast the heads you will need to paint the heads. Powder paint is the toughest, but is tricky to get on only the head, not the hook and wire. Heat the lead to the correct temperature. Set the wire and hook assembly into the mold. Pre-heat the mold to get a better flow. Pour the lead into the mold. Trim any excess lead off and paint.

Spinner Baits 101

Wm. Jeff Farris

When we talk of spinner baits, we are referring to a style of bait known as the safety pin spinner bait, opposed to the in-line spinner. This bait has four basic parts, the blade(s), the wire, the head, and the skirt. Now there are modifications, such as trailer hooks, plastic or pork trailers, etc. Commercially available spinner bait come in a wide range of styles, sizes, color, blade combinations, wire types, etc. To simplify this process, we going to keep it to the standard styles of spinner baits. This information is going to be somewhat basic, but you will need to explain it to the kids so that they will have an idea of what each component does. The first few chapters of "Luremaking" is on making spinner baits, it give more details on how to pick components for spinner baits. The choices they make on components will make a difference on how their bait performs. You need to let them know how to make their bait and how they can use this information to modify baits they have that are not performing the way they want them to. Another project idea is to have them bring in old spinner baits and repair them. Have them replace old skirts, damaged blades, repaint heads, or salvage parts from one to use on another. Another thing to keep in mind is what kind of equipment they are throwing this bait on. A light spinning rod cannot handle a heavy spinner bait, or a heavy rod will not be able to throw a small spinner bait.

Blades:

There are many types of blades. The most common are willow leaf, Colorado, and Indiana. There are other specialized blades, fluted willow leaf, Dakota, pro willow leaf or turtle, deep cup Colorado, tomahawk, and french. Some of these are just modified willow leaf or Colorado blades where as other are different shape altogether. We are going to focus on the three basic blades types, willow leaf, Colorado, and Indiana. The willow leaf gives more flash, where the Colorado gives more vibrations. The Indiana is in- between give more flash then a Colorado, and more vibration then a willow leaf. If using the same size willow leaf, Colorado, or Indiana blade, with the same weight head, with the same size line and the same speed of retrieve, the Colorado will ride higher in the water then others, followed by the Indiana, then the willow leaf blade. This is caused by the resistance the blade has in the water. The more resistance the more vibration, and the more it will force the bait up in the water.

Blades come in many sizes and colors. The bigger the size the more vibration and flash. Before you can pick which blade(s) you will put on your spinner bait, you need to know how it is going to be fished, and what type of water it will be fished in. You will need to figure out how deep you want the bait to run, and what you are trying to do with the bait. If you are going to "slow roll" the bait, you want blades to give you thump (vibration), but the bigger the blade the more the bait will ride up. You will need to run the bait real slow to keep it down with big blades, or add more weight to the bait. You will need to try to match the blades with the head you will be using, and how you will be using the bait. There are no "set in concrete" rules, a starting guide line would be for 1/4oz. head a #2-4 blade (any style), for 3/8oz. head a #3-5 blade, and for 1/2oz. head a #4-6 blade. That is for the main blade of a tandem spinner bait or the only blade on a single spin spinner bait. A tandem spin spinner bait is where there are two or more blades on a single wire arm. A single spin only has one blade on the arm, a double or dual or twain spin has two arms with blades on them. The tandem gives more flash or vibration, plus the second blade may counter some of the torque of the first blade allowing the bait to run straighter in the water. Some of the new baits have many blades on a single arm.

The water color is going to tell you what color blades to throw. Even though there is no "set in concrete" rules, most of the time in clearer water you would use nickel blades, and gold in stained to muddy. Painted blades are good for stained to muddy water, or sometimes when a certain color works well at a given lake. There are some specially painted blades that are used to imitate certain forage fish, and other special blades with reflective properties that are used in clear water, but these are the exceptions.

As far as having blades to make baits, try to match the blade size with the head size you are going to use. If you are using small head you will not need any big blades. Making tandem spinner bait they will need a

smaller blade and a bigger blade combination. That might be a # 2 and #4 on a 1/4oz. head, or a #4 ½ and a #5 on a 3/8oz head. Blade sizes go up as the size gets bigger. And one company's #5 may not be the same as another company's. Keep in mind they will want to make as many bait as they can, and that some parts will be lost, mostly clevises and beads.

Wire:

There are a few things you need to know about wire used on spinner baits. They are the bend, wire type and wire size. There are many styles of bend in the wire, the most common are "R" bend and closed loop. There are a few others, but are not used very often, and we will keep to the basics. The "R" bend looks like an R was bent in the wire, this allows vibration to transfer the wire better. The closed loop somewhat deadens the vibration, but the line tie will not more up on the wire.

Most of the old style spinner bait were made with stainless steel wire. It is strong, durable, doesn't rust, and was reasonable easy to work with. There are new ones made with titanium wire. It is stronger for it size then stainless steel, very durable, not easy to work with, and expensive. You can't bend it without a special process, this makes it very durable, it bends back to its original shape. But had to work with, you will need to get crimpers and crimping sleeves to put on blades, and if the crimps are not crimped properly the crimps will come undone and you will lose your blades.

With the stainless steel wire the wire size was another factor to consider. The thinner the wire the better the vibration would transfer from the bait, but the easier was to bend the bait up. Heaver wire held up better, but would dampen the vibration. Most manufactures would increase the wire size as the head size went up. Most wire was .032" for 1/4oz. heads and up to .040" for 1/2oz. heads, common was .035". If you are buying pre-made heads the wire type and size is figured out for you, all you need to decide is closed looped or "R" bend. If you make your own you can buy preformed wire for them (if making titanium the only way to go), or buy stainless steel wire in bulk and bend your own. This requires some special bending tool to get the bends correct. You will need some lead molds, plus all the hazards of dealing with lead.

Heads:

The head of the spinner bait comes in many sizes, colors and styles. The size of the head is measured by the weight of the head. Most spinner baits are made of lead, and come in sizes from an 1/8oz. to over an ounce. The weight of the head will determine size of the wire and the blade combination that would work with it. Along with the many sizes of heads, they can be in any color. Most of the painted bullet head style heads come in limited colors, usually white, chartreuse, and black. You can get them unpainted and paint them any color you want, the problem with painting the heads is trying to keep the paint off the hook. They make many styles of heads bullet and minnow styled heads are the most common. With the minnow style heads they are painted various ways to look like different bait fish. The head size, color and style is mostly preference, but how the bait will be fished will figure in this decision.

Skirts:

There are many types of materials to make skirts with and even more colors. The common types of materials are rubber (also called living rubber), silicone, hair, and feathers. Most of the skirts are rubber or silicone, but there are some that have hair or feathers tied on them. There are some that tie rubber or silicone skirts on, but most have a collar and slide on to the body. Even though the different types of material do react somewhat different in the water, for the most part the reason to use one over another is personal preference. The rubber comes in different ways, one is a pre-made skirt that is wrapped around the collar. Most of the time it is in flat strips, or a roll of the material that can be cut into strips. This type of rubber comes in two styles , flat and round. Both work the same in making baits. The silicone usually comes in pre-cut strips. Both the rubber and silicone are inserted in to rubber collars. As far as color of the skirt this is mostly personal preference, and the skirt material comes in most of the colors of the rainbow. There are many different tools to make skirts with, most of the tools have a way to open up the collar to insert the material.

Tying Marabou Jigs and Woolly Buggers

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Best Time: Any time, a good starter fly tying lesson
Best Location: Well lighted, comfortable setting
Time Required: 60 to 90 minutes

Equipment/Materials

Tying Vise
Hackle Pliers
Tying Bobbin
Bobbin threader
Dubbing needle (bodkin)
6/0 tying threads (assorted colors)
Head Cement
Scissors
Jig Heads painted without collars
Streamer Hooks, sizes 6 to10 in sizes (Mustad #79580 or #9672)
Chenille (assorted colors)
Marabou (assorted colors)
Saddle Hackle Feathers (black, grizzly, olive)
Lead Wire

Safety Considerations

Although relatively rare, some youth may have allergies to some fly tying materials. Treated materials may have toxic chemicals as residues from tanning, curing or coloring them. Some will have traces of noxious materials for moth control or control of beetle larvae. Advise young people to wash their hands after handling the materials and before eating or drinking. Exercise caution with bodkins, scissors or other sharp or pointed instruments. Use caution with solvents and glues.

References

"Reel In The Fun", 4HCCS BU-07599 Sportfishing Project Activity Guide Level 2, Pages 24 & 25
"Cast Into The Future", 4HCCS BU-07600 Sportfishing Project Activity Guide Level 3, Pages 10 & 11
"Fly Tier's Handbook", by Gene Kugach, published by Stackpole Books, Mechanicsburg,

Objectives

- Participating young people and adults will:
- Practice basic tying skills on simple flies;
- Practice following patterns;
- Practice manipulating thread and materials;
- Gain confidence in their tying ability; and
- Have fun while learning.

Youth Development Objectives

Participating young people will develop:
Enhanced communication skills;
Enhanced self-confidence and self-concept;
Enhanced motor skills;
Enhanced ability to interpret and follow directions.

Roles for Teen and Junior Leaders

1. Demonstrate and explain tying techniques
2. Assist participants as needed
3. Positively critique flies suggesting improvements
4. Encourage young people as they learn tying skills

Potential Parental Involvement

1. See "Roles for Teen and Junior Leaders" above.
2. Arrange for or provide teaching location
3. Arrange for or provide materials and/or equipment
4. Arrange for or provide transportation
5. Arrange for or provide refreshments.
6. Discuss personal experience in fishing

Evaluation Activities/Suggestions

1. Observe progress with basic tying skills
2. Observe ability to interpret and follow directions
3. Observe personal interactions among participants
4. Note changes in the level of questions being asked.

Lesson outline

PRESENTATION	APPLICATION
MARABOU JIGS	
I. Materials	**DISCUSS** the materials used in making a Marabou Jig.
A. Jig Heads	**DISCUSS** the reasons for using the size, color and style of
1. Size	jighead that will be used. **NOTE** that the color is mostly
2. Color	preference, but some fish will be attracted to some colors
3. Style	more than others, and that water color plays a big part in the
B. Thread 6/0 (Choice of colors)	choice of color.
C. Marabou (Choice of colors)	**NOTE** that the color of the marabou and chenille should
D. Chenille (Choice of colors)	work together to attracted fish.
II. Tying Procedure	
A. Jam knot	**DEMONSTRATE** how to tie a jam knot to attach the thread
B. Wrap to the back	to the hook part of the jighead. **DEMONSTRATE** how to
C. Attach Marabou	attach marabou and chenille to the hook.
D. Attach Chenille	
E. Wrap thread to the front	**DEMONSTRATE** wrapping the thread to the front of the
F. Wrap chenille to front	hook and that it needs to be there to tie off the chenille.
G. Tie off chenille and cut	**DEMONSTRATE** wrapping the chenille to the front and
H. Add some half hitches	how to tie it off, and then finish with half hitches and head
I. Finish with head cement	cement.
WOOLLY BUGGER	
I. Materials	**DISCUSS** the materials used in making a Wooly Bugger.
A. Hook	**DISCUSS** the reasons for using the size and style of hook
1. Size	that will be used. **NOTE** that the size and style is to match
2. Style	the presentation needed and the size of what is being
B. Thread 6/0 (Color to match)	represented.
C. Marabou (Color to match)	**NOTE** that the color of the marabou, hackle, thread and
D. Chenille (Color to match)	chenille need to match pattern of the woolly bugger being .
E. Hackle (Color to match)	made.
F. Lead Wire (optional)	
II. Tying Procedure	
A. Jam knot	**DEMONSTRATE** how to tie a jam knot to attach the thread
B. Wrap to the back	to the hook.
C. Add lead wire (optional)	**DEMONSTRATE** how to tie on the lead wire
D. Attach Marabou	**DEMONSTRATE** how to attach marabou, hackle and
E. Attach Hackle	chenille to the hook
F. Attach the Chenille	
E. Wrap thread to the front	**DEMONSTRATE** wrapping the thread almost to the eye of
F. Wrap chenille to front	hook and that it needs to be there to tie off the fly properly.
G. Tie off chenille and cut	**DEMONSTRATE** wrapping the chenille to where the thread stops and tie it off, and cut extra chenille.
H. Wrap the hackle to the front	**DEMONSTRATE** wrapping the hackle to where the thread
I. Tie off hackle and cut	stops and tie it off, cut off extra hackle.
J. Wrap the thread to form a head	**DEMONSTRATE** wrapping the thread to form a head.
K. Finish with half hitches	**DEMONSTRATE** finishing the head with half hitches and
L. Finish with head cement	head cement, make sure not to get it in the eye.

Summary Activity
Have the participants compare their Marabou Jigs and Woolly Buggers with model and determine how they could improve on the lures. Discuss how to fish these lures.

Lesson Narrative
The Marabou Jig and the Woolly Bugger are good starting flies. They are both simple to tie and good fish catchers. The two flies are very similar in how they are made and after teaching one the second is even simpler to teach.

Marabou Jig

This is a simple fly to tie and a good beginner fly. There are only a few materials needed to make this jig. This jig can get participant interested in fly tying when they do not own a fly rod, since it can be fished on a regular rod and reel.

The materials need to make a Marabou Jig are very common materials and are easy to get. The first thing that is needed is jigheads. The style needed is a bait holder or collarless jighead. The size needed is going to be determined by what they will be fishing for. For crappie, panfish and other fish of this size jigheads of an 1/16 to 1/4oz. would work, for trout smaller jigheads will be needed, and for larger fish like bass and walleyes maybe up to and 3/8oz. jighead could be used. To start out with jigheads of 1/16 to 1/4oz. work well and the participants can easily handle them. The color of jigheads can be anything they want. Normally I get unpainted jigheads and have the participants paint the jigheads the meeting before doing the tying. This allows them to paint them the color they want and teaches them how to paint jigheads. What the color is mostly personal preference, but some fish will be attracted to some colors more than others, and that the water color plays a big part in the choice of color.

The thread used is normally a standard 6/0 thread. For small trout jigs you may want a smaller thread. The choice of color is determined by the color the jig will be when finished. Since most of the thread will not show pick a color that will match the chenille used, this will hide it better. The marabou and chenille can be any color they want. The participant should try to make the color selection base on what color the fish they are fishing for would hit. This is hard to make an exact science, since water color, time of year, and weather conditions play a part in this.

Tying Procedure
Place the jighead in the vice. The hook shank of the jighead should be parallel with the floor and the participant's body and the jighead should point towards the participant's dominant hand. For right-handed people the head of the jig will be on the right side, for left handed people on the left. Only the bend of the hook should be in the vice, and do not over tighten the vice, but it should be tight enough to "bowink" the jig. The jig should not move in the vice.

As with most flies, the Marabou Jig starts with a jam knot. To tie a jam knot, take the thread bobbin in the right (dominant hand) and hold the thread with the other hand (To hold the thread better they can loosely wrap the thread around their forefinger two or three times). Holding the left hand down, with the thread and the right hand up, with the bobbin, make a "X" with the thread on the hook shank. Holding the left hand in place, take the right hand with the bobbin and wrap up over and down back and around once to the front of the "X". Wrap again, but this time cross over the "X" to the back of it. Wrap a few more times in this direction until the thread holds to the hook. At this point, if they let go of the bobbin the thread should hold without coming off. Wrap the thread to the back of the hook to where the hook bends down. At this point the participants can cut the extra thread off, the tag end, not the thread to the bobbin.

To attach the marabou to the hook, the participants need to select some marabou. Wet the end of the marabou by dipping in a cup of water; **DO NOT PUT MARABOU OR YOUR FINGERS IN YOUR MOUTH.** (See safety considerations) Rub the marabou to the end laying the feathers together to the end. This makes the marabou easier to work with. Measure the marabou by laying it against the hook; the marabou should be the same length as the hook. Grab the marabou with their non-dominant hand pinching it with just the thumb and forefinger. Now lay the marabou, holding it between the thumb and forefinger, on the hook at the bend. Take the thread and come up and bring it between the two fingers holding the marabou. Hold the thread with the fingers, and continue wrapping over and back down. Now pull on the thread so that it comes out of the fingers and tightens down over the marabou. Repeat this operation two or three times. Wrap the thread several more time to hold it on the hook. Cut off extra marabou just past these wraps.

Next attach the chenille in a similar way. Measure out about 6 inches of chenille. On one end of the chenille take a ¼ of inch of fibers off. To do this about a ¼ inch back from one end take the chenille between the finger nails of the thumb and forefinger and strip the fibers off. This will leave the threads of the chenille showing. Take these threads and wrap the tying thread around them in the same manor you tied the marabou on. Hold the chenille with the threads sticking out in your non-dominant hand between the thumb and forefinger. Take the tying thread and come up and bring it between the two fingers holding the chenille. Hold the thread with the fingers, and continue wrapping over and back down. Now pull on the thread so that it comes out of the fingers and tightens down over the chenille. Repeat this operation two or three times. Wrap the thread several more time to hold it on the hook. Now continue wrapping the thread around the hook until you reach the head of the jig. Next wrap the chenille around the hook until you reach the head of the jig.

Wrap the thread around the hook and in back of the chenille to hold it on. Wrap several times to hold the chenille on the jig. Cut off extra chenille, without cutting the thread, at the head of the jig. Next finish the marabou jig with four or five half hitches. To tie a half hitch, place your first two fingers over the thread. Next twist your fingers, with the thread still on them, around to form a loop in the thread with the thread crossed. Slide this loop over the jig head. Now pull the thread tight. Repeat this step four or five times. Finish by adding a few drops of head cement to the threads just behind the head of the jig.

Woolly Bugger

This is another simple fly to tie and a good beginner fly. There are only a few materials needed to make this fly.

The materials need to make a Woolly Bugger are very common materials and are easy to get. The first thing that is needed is a streamer type hook. A Mustad #79580 (4X Long) or #9672 (3X Long) will work. The size and style of hook used will determine how big the fly will be, if what is need is a bigger fly a bigger and longer hook is needed. The thread used is normally a standard 6/0 thread. The thread color should be black or olive for dark Woolly Buggers or white for light, but the pattern information will include this. The marabou, hackle and chenille colors will be listed in the pattern. For a black Wooly Bugger these will be black thread, marabou, hackle and chenille. If the Wooly Bugger is to be tied weighted then some lead wire will be needed, this is optional and may be left out for beginners.

Tying Procedure

Place the hook in the vice. The hook shank should be parallel with the floor and the participant's body and the eye of the hook should point towards the participant's dominant hand. For right-handed people the eye of the hook will be on the right side, for left handed people on the left. Only the bend of the hook should be in the vice, and do not over tighten the vice, but it should be tight enough to "bowink" the hook. The hook should not move in the vice. For simplicity we will not tie the Wooly Bugger weighted, the Sportfishing book, level 2's article on Wooly Buggers does describe this procedure.

As with most flies, the Wooly Bugger starts with a jam knot. To tie a jam knot, take the thread bobbin in the right (dominant hand) and hold the thread with the other hand. Holding the left hand down, with the thread and the right hand up, with the bobbin, make an "X" with the thread on the hook shank. Holding the left hand in place, take the right hand with the bobbin and wrap up over and down back and around once to the front of the "X". Wrap again, but this time cross over the "X" to the back of it. Wrap a few more times in this direction until the thread holds to the hook. At this point, if they let go of the bobbin the thread should hold without coming off. Wrap the thread to the back of the hook to where the hook bends down. At this point the participants can cut the extra thread off, the tag end, not the thread to the bobbin.
To attach the marabou to the hook, the participants need to select some marabou. Wet the end of the marabou by dipping in a cup of water; **DO NOT PUT MARABOU OR YOUR FINGERS IN YOUR MOUTH.** (See safety considerations) Rub the marabou to the end laying the feathers together to the end. This makes the marabou easier to work with. Measure the marabou by laying it against the hook; the marabou should be the same length as the hook. Grab the marabou with their non-dominant hand pinching it with just the thumb and forefinger. Now lay the marabou, holding it between the thumb and forefinger, on the hook at the bend. Take the thread and come up and bring it between the two fingers holding the marabou. Hold the thread with the fingers, and continue wrapping over and back down. Now pull on the thread so that it comes out of the fingers and tightens down over the marabou. Repeat this operation two or three times. Wrap the thread several more time to hold it on the hook. Cut off extra marabou just past these wraps.

Tie on some hackle. To do this take a complete feather of hackle, and tie it on in a similar manor as the

marabou. Tie it on by the small end or tip of the feather. It might be helpful to trim the tip of the feather to make it easier to tie on. Do this by taking the scissor and trim the fiber off the stem of the feather about ¼ of an inch. Lay the hackle, holding it between the thumb and forefinger, on the hook just in front of the marabou. Take the thread and come up and bring it between the two fingers holding the hackle. Hold the thread with the fingers, and continue wrapping over and back down. Now pull on the thread so that it comes out of the fingers and tightens down over the marabou. Repeat this operation two or three times. Wrap the thread several more time to hold it on the hook. Place the hackle end out of your way for the time being, use the material clip on the vice if it has one.

Next attach the chenille in a similar way. Measure out about 6 inches of chenille. On one end of the chenille take a ¼ of inch of fibers off. To do this about a ¼ inch back from one end take the chenille between the finger nails of the thumb and forefinger and strip the fibers off. This will leave the threads of the chenille showing. Take these threads and wrap the tying thread around them in the same manor you tied the marabou on. Hold the chenille with the threads sticking out in your non-dominant hand between the thumb and forefinger, just in front of the hackle. Take the tying thread and come up and bring it between the two fingers holding the chenille. Hold the thread with the fingers, and continue wrapping over and back down. Now pull on the thread so that it comes out of the fingers and tightens down over the chenille. Repeat this operation two or three times. Wrap the thread several more time to hold it on the hook. Now continue wrapping the thread around the hook until you reach an eyes length in from the eye of the hook. Next wrap the chenille around the hook until you reach the same place you stopped with the thread.

Wrap the thread around the hook and in back of the chenille to hold it on. Wrap several times to hold the chenille on the hook. Cut off extra chenille, without cutting the thread, at this point.
Now wrap the hackle around hook until you reach the point where the thread stops. The hackle should be wrap about a 1/8 to ¼ inches between wraps. Wrap the thread around the hook and in back of the hackle to hold it on. Wrap several times to hold the hackle on the hook. Cut off extra hackle, without cutting the thread, at this point.

Wrap the thread around the hook at this point and forward to the eye of the hook to form a head for this fly. Next finish the Woolly Bugger with four or five half hitches. To tie a half hitch, place your first two fingers over the thread. Next twist your fingers, with the thread still on them, around to form a loop in the thread with the thread crossed. Slide this loop over the eye of the hook. Now pull the thread tight. Repeat this step four or five times. Finish by adding a few drops of head cement to the threads of that form the head.

Exhibit or Sharing Suggestions

1. Prepare a poster, models or photographs to show the steps in tying one of these flies.
2. Study fly-fishing books or magazines to see patterns that might be close to these patterns. Share some of your results with others in your group.
3. Prepare a method demonstration on tying one of these patterns and present it appropriately.
4. Prepare a photographic story of tying these flies from the beginning of the tying process to using them. Share the story with your friends or in some other setting.
5. Record your experiences with tying and using flies in a tying and fishing journal. Share that journal with others in an appropriate setting.
6. Make a series of flies and fly pattern cards that can be exhibited at a fair or similar gathering.
7. Try variations as suggested or as your mind suggests. Try your patterns on fish and record your results. Share those results with your group if desired.

Community Service or Give Back Activities

1. Consider ways of helping other young people learn how to tie flies, setting up tying clinics or instructional programs for interested people.
2. Tie a set of flies that can be used as auction items or door prizes in community events or fund raisers.
3. Donate flies to a local fishing program.

Extensions or Ways of Learning More

1. Observe fish and the foods that they eat on your local waters. Using what you know about tying flies, try to develop a pattern that imitates or suggests a food the fish seem to prefer. Research existing fly patterns to see if someone has developed a fly that does what you want. Modify existing patterns or create your own pattern in an attempt to catch the fish you are seeking.
2. Collect stomach contents from fish you like to catch. Observe the contents of those stomachs and record what you find in a notebook. Determine if their food habits are the same all the time or if they change with the time of day and season. Use references to entomology or other fields to assist in identifying what the fish are eating and attempt to create a seasonal reference to their favorite foods.
3. Observe fish actively feeding on a local stream, pond or lake. By careful study, see what they are eating and how they feed. Do they take everything that is a potential food item, or are they selecting something from a set of food choices? What characteristics seem to determine which food items are taken and which ones are rejected? How can that apply to your fly tying efforts?
4. Observe reactions of fish to your flies. Try different types of retrieves to see if fish behave differently to flies sitting still, slowly sinking, moving slowly, being twitched, or swimming steadily. Speculate on why any observed differences may exist.

Links to Other Programs

The link to the rest of the Sportfishing program is obvious. Fly tying is a natural link to fly fishing as well as to crafting other types of tackle. Rod building can be a means of having an excellent fly rod at a lower cost. The feathers, furs and other materials needed by a fly tier can lead to interests in hunting, trapping, waterfowl, poultry science or other seemingly unrelated fields. Understanding aquatic ecology as well as keen observation skills is important to success in both tying and fishing flies. This can provide entry into the sciences, either as a future vocation or as a vocational activity. Fishing flies can lead to an interest in several fields of engineering as well, including materials science. Tying flies can be a great introduction to economics and marketing for young entrepreneurs. Finally, the hobby of tying flies is both craft and art. It can lead into many other areas of activity from writing and photography to science.

Wooden Baits/Crank Baits from Kits

Jeff Farris, Mo. Sportfishing Team

Objectives

Youth and adults will:

- Create a lure from their own ideas
- Learn painting techniques
- Learn fish attracting qualities of a lure
- Learn why lures run and dive differently
- Practice safety procedures
- Have fun while learning.

Youth Development Objectives

Participating young people will develop

- Enhanced hand-eye coordination
- Enhanced planning and execution skills
- Manage materials in a safe manner
- Practice cooperation
- Increase self-confidence

Roles for Teen and Junior Leaders:

Teen and Junior Leaders will:

1. **Demonstrate and explain lure building techniques;**
2. **Assist participants as needed;**
3. **Positively critique lures suggesting improvements**
4. **Encourage young people as they learn new skills.**

Potential Parental Involvement

1. See "Roles for Teen and Junior Leaders"
2. Arrange for or provide teaching location
3. Arrange for or provide materials and/or equipment
4. Arrange for or provide transportation
5. Arrange for or provide refreshments.
6. Discuss personal experience in fishing
7. To provide supervision when the participants operate power tools

Best Time: Anytime

Best Location: Well lighted, dry, comfortable setting, easy to clean space

Time Required: 30 to 90 minutes (per session). Multiple sessions:
Wooden lures require a lot of time:
Introduce the project at one meeting, then send youth home with the material required to make the project and have them bring back their complete bait at the next meeting. If done only at the group meetings, Painting will take several coats each requiring time to dry.

Equipment/Materials

Safety glasses	Needle Nose Pliers
Dust mask	Crankbait kits
Wood Block	Treble Hooks
(Basswood, Cedar,	Split ring pliers
Balsa, etc.)	Split rings
Misc. Hardware	Work Gloves
Dremel Tool	Electric Drill/Bits
Epoxy Paint (Spray,	Wood Rasp
Model Car type, etc.)	Saw (hand or power)
Sandpaper	Contour Gauge
Push Pins	Ruler/Tape measure
Utility Knife	Paint Brushes (small)

Safety Considerations

Youth will be working with shape tools (knives), so adult supervision is required. If using power tools adult supervision is required. Follow all safety instructions that come with the power tools. Safety glasses should be worn when working with power tools, while sanding, when putting on split rings, installing hardware and painting these baits

Evaluation Activities/Suggestions

1. Compare peer projects (lures)
2. Observe the process
3. Have students self-evaluate project
4. Observe youth's ability to interpret and follow directions
5. Observe personal interactions among participants
6. Note changes in the level of questions being asked

LESSON OUTLINE

PRESENTATION	APPLICATION
I. Materials	**Discuss** the different types of wood that can be used to make wooden lures. Have examples of several kinds on had to show students. **Note** the special features of each wood, working qualities, and special care/considerations necessary to make a quality lure.
A. Wood block	
1. Basswood	
2. Cedar	
3. Balsa Wood	
4. Other woods	
B. Hardware	
1. Screws	**Discuss** the different types of hardware, their usuage, installation, and other features. **Show** examples of several.
2. Screw eyes	
a. open	
b. closed	
3. Bills	
a. plastic	
b. metal	
4. Hook Hangers	
5. Washers	
a. disc washers	
b. cup washers	
6. Propeller Blades	
7. Eyes	
8. Beads	
9. Hooks	
10. Other	
C. Paints and Finishes	**Discuss** and **illustrate** types of paint.
II. Bait Design	**Create** a plan for the bait. To be successful at making a lure youth will need a design and a plan on how to make the lure. Plan will include choice of wood, pattern, hardware, how to cut the pattern, finish, and paint.
A. Create a design	
1. Selecting the wood	
2. Creating the pattern	
B. Putting pattern onto wood	
C. Getting the hardware	
III. Building the Lure	**Discuss** how to block the pattern, curve it out to a rough form, and then sand it smooth.
A. Blocking out the pattern	
B. Shaping it into rough form	
C. Sanding smooth	**Discuss** how to install the hardware and ways of making hardware.
D. Adding the hardware	
IV. Finishing the Bait	**Discuss** painting techniques, type of paints available for use, making eyes for the lure, and how to finish the bait.
A. Choosing the paint scheme	
B. Painting	
C. Adding eyes	
D. Finishing coat(s)	

CRANKBAITS FROM KITS

PRESENTATION	APPLICATION
I. The Crank bait A. Complete kits B. Components (for kits) 1. Crankbait bodies a. Painted b. Unpainted 1. sand/finish body 2. paint body 2. Split rings 3. Hooks	**Discuss** the components of the crankbait kits and how they go together. If using unpainted bodies, **demonstrate** finishing techniques -sanding, painting, etc.
C. Assemble crankbaits 1. Add split rings to bodies 2. Add hooks to split rings	**Demonstrate** how to assemble the crankbaits.

Summary Activity

Have participants compare their lure with other participants and determine how to improve on their lure making skill. Discuss how to finish lures.

Preface

Reading the chapter on wood plugs in the book ”The Complete Book of Tackle Making” by C. Boyd Pfeiffer before starting on this project is strongly recommended. The section on painting lures is also very helpful. It is not realistic to expect to become an expert by reading a few pages in any book - that only comes with time and experience. Reviewing other sources of information along with some good old fashion “trial and error” will be of great benefit in preparing for this project. It is recommended to building one yourself. That experience will provide useful and will show when working with the participants.

Making a wooden plug involves a lot of different skills and knowledge. Some of these are knowledge of how lure will perform, understanding the attracting qualities of a lure, woodworking skills, painting skills, using tools safely, and working with epoxy. As with anything, the job must start with a plan. Next the proper materials must be secured and then skills must be utilized to do the job. Lure making is a complex project with a lot of details. Each detail, each skill builds on another until the project is completed. An understanding of crankbaits and how they work is preferred prior tackling this project. It is suggested that students possess some basic painting skills techniques before beginning the project. A teaching session on painting with ample practice time is advisable. Safety must be strongly stressed and continually practiced.

LESSON NARRATIVE

Wooden Lure

Begin the lesson by going over the wood to be used, the different types of hardware, and then painting techniques. Once participants understand the parts of the project they will have a better chance of success. The wood to be used may be what is available to you to use. Some fishing will have found basswood (Netcraft), but most tackle catalogs don’t show any wood for lure-making.

(haven't checked woodworking catalogs). Other wood is available from these types of source or good lumberyards or woodwork stores. Basswood is very easy to work with and curves great. I do know that manufactures have used other woods. Poe's uses cedar, Bagley's uses balsa wood, and I not sure what type of wood Rapala uses, but these are three of the leading manufactures of wooden lures. In Pfeiffer's book, many more woods that would work are listed.

Discuss the different types of hardware they can use and when that type of hardware should be used. Some of the different types of hardware are screws (regular type for attaching other hardware); screw Eyes, both open and closed (use to attach hooks to the lure, open is use to connect to the hook directly, then it is close, close you will need a split ring to connect the hook); bills, both plastic and metal (attached to the front of the lure to make it dive in the water); hook hangers (another way to attach hooks to the lure); washers, both disc and cup (used add a more finished look to the lure, to protect the areas where the hooks are attached or to add spacing for other hardware); propeller blades (used on prop baits to add action to the lure); eyes (used to make the lure more realistic, they can be stick on, doll eyes, painted on, etc.); beads (can be used for many things, they can add to the front to attack fish, used as spacer for props, used to make eyes, etc.); hooks (the selection of hooks is important, to big or to small of hook will affect the action, make hook setting more difficult, cause wear on the lure, etc.) and other types of hardware (this can include wire to make screw eye when they need a longer then available screw eye, special bills to make the bait a popper type like a "Jitterbug", other anything else the can use to make the lure). Old lures (not collectables) can be a good source for hardware.

Discuss the different types of paint available and when each should be used. To paint their lure the participants will use several color and or types of paint. A base coat of paint should be used, normally white; this covers the lure making it easier to get a consistent paint job with the other paints. I have use model car paints to paint lures with, spray paint (certain types) work, and lacquer-based work on wooden lures.

The participants must create a design for their lure. The design must include what shape they want the lure to be, what colors it will be decorated with, what hardware will be needed, and a plan on how it will be put together. Have the participants draw out their design and then have them make a pattern from these drawings. With these patterns they will transfer the design onto the wood. They will need to make sure that they have all the hardware they will need, if not they will need to find it or buy it. If you are supplying the wood they will have the wood to make the lure, if not they will need to get some wood of their choice. Discuss with them things they to think about when picking out their design. Like what the bait will represent, how it will run in the water, and why they believe it will catch fish.

The steps in building the lure will be blocking out the pattern, curving it into a rough form, sanding it smooth and adding the hardware. Discuss with the participant how to block out their design in the wood. If your location will let you can show this, but unless your meeting in your shop this is not always practical. Once they have the pattern blocked out, discuss with them how to get it in to rough form. The shape at this point will be close to the final shape, but in need of sanding. Sanding it to a smooth finish to get it ready for painting. In this process some minor correction can be made to get the lure balanced. Discuss how to install the hardware, and ways of making hardware they don't have. Let them know that they will need to pre-drill the screw holes, make sure the hardware will fit, that none of the hardware interferes with each other, and stuff like that. That they can make some hardware by using wire to make long screw eyes or metal plates to make fins. Discuss with them ways to add rattles, or weigh to the lure, or techniques for making a jointed lure.

Before one starts to paint a lure one must figure out what they want it to look like when they are done. Have the participants draw up what they want the finished lure to look like with crayons or colored pencils. They should draw up at least the side view, maybe even the top and bottom. Next make sure the bait body is ready to be painted. Some extra sanding might be needed. To get a

good smooth finished painted bait, you need to start with smooth bait in the first place. Some parts of the bait may need to be masked off to keep paint off, thing like the bill, maybe the hook eyes. Teach them there is an order to what to paint first, next and so on. Start by putting a base coat of paint. Painting the whole lure with white spray paint can do this. (Maybe a quick drying paint like Krylon, because the lure is wood a lacquer based paint can be used) Let it dry. Two and sometimes three coats of paint will make the paint job hold up better. So repeat the base coat. It is always better to put on several light coats, as oppose to one heavy coat. Sanding between coats will also improve the smoothness of the finished lure. It they want to make specific pattern on the lure, a template or stencil may be needed. Painting the bait free hand can be done, but the results may not look as good as using a template. If using stencils spray paint would work, but you can use model car paints and a brush to apply the paint. To create a stencil or template, for your pattern, use heavy card stock or a paper plates can also be used. Cut the desired pattern out making both a right and a left side. If multiple color patterns are needed more than one set of stencils will be needed for each color. Paint each separately, this can be done with spray paint or painting by brush. And let dry before adding the next color or pattern. Once all the patterns, or colors have been painted on. You may want to add eyes on the bait at this time. Adding a clear coat finish, or three, will protect the paint job allowing the lure to last.

Crankbaits from Kits

Making crankbaits from kits can be as simple as buying a kit and have the participant assemble the components. Or it may be you get the lure bodies unpainted, have them paint and finish them, and then have them put the hooks on. Some suppliers carry the crankbait bodies and you have to get the other hardware need to finish them. Some suppliers have complete kits with everything you need to make the lures. Some suppliers have unpainted bodies and you would need to supply the hardware needed. Each way will offer different challenges and would work for different participants with different skill levels. It the supplier doesn't have complete kits they will have the information you need to get the other components needed to finish the lures. Any of these means are a good way to introduce your young participants to how lures are made.

Exhibit or Sharing Suggestions

1. Prepare a poster, models or photographs to show the steps in building one of these lures.
2. Study books, catalogs or magazines to see lures might be close to theirs lures. Share some of your results with others in your group.
3. Prepare a method demonstration on building one of these lures and present it appropriately.
4. Prepare a photographic story of building their lure from the beginning of the process to using them. Share the story with your friends or in some other setting.
5. Record your experiences with building and using their lure in a fishing journal. Share that journal with others in an appropriate setting.
6. Make a series of cards show each of the steps in building a lure that can be exhibited at a fair or similar gathering.
7. Try variations as suggested or as your mind suggests. Try fishing with your lure and record your results. Share those results with your group if desired.

Community Service or Give Back Activities

1. Consider ways of helping other young people learn how to make lures, setting up a clinic or instructional programs for interested people.
2. Build some lures that can be used as auction items or door prizes in community events or fund raisers.
3. Donate lure to a local fishing program.

Extensions or Ways of Learning More

1. Observe fish and the foods that they eat on your local waters. Using what you know about making lure, try to develop a pattern that imitates or suggests a food the fish seem to prefer. Research existing lure designs to see if someone has developed a lure that does what you want. Modify existing lures or create your own pattern in an attempt to catch the fish you are seeking.
2. Collect stomach contents from fish you like to catch. Observe the contents of those stomachs and record what you find in a notebook. Determine if their food habits are the same all the time or if they change with the time of day and season. Use references to entomology or other fields to assist in identifying what the fish are eating and attempt to create a seasonal reference to their favorite foods.
3. Observe fish actively feeding on a local stream, pond or lake. By careful study, see what they are eating and how they feed. Do they take everything that is a potential food item, or are they selecting something from a set of food choices? What characteristics seem to determine which food items are taken and which ones are rejected? How can that apply to your lure choices?
4. Observe reactions of fish to your lures. Try different types of retrieves to see if fish behave differently to lures sitting still, slowly sinking, moving slowly, being twitched, or swimming steadily. Speculate on why any observed differences may exist.

Links to Other Programs

The link to the rest of the Sportfishing program is obvious. Lure making is a link to determining what types of lure to use in a give situation. Studying how lures work can teach many different things about fish behavior. Understanding aquatic ecology as well as keen observation skills is important to success in both making and fishing lures. This can provide entry into the sciences, either as a future vocation or as a vocational activity. Fishing can lead to an interest in several fields of engineering, biology, zoology, and fisheries management. Lure building can be a great introduction to economics and marketing for young entrepreneurs. Finally, the hobby of making lures is both craft and art. It can lead into many other areas of activity from writing and photography to science.

Wooden Plug Project

Name:

Due:

Project Requirements:

- Must show your design, using colored pencils or crayons draw up the design. Show how you plan to decorate it. Bring in the plans.
- Make a pattern, for both the top and side views of the bait. Bring this with you.
- The bait must have part of the wood in it.
- Write a sentence or two on why you picked this design.
- Write up what this bait represents (crawfish, minnow, shad, bluegill, etc.).
- Write why you believe this bait will catch fish.
- Write how you think this bait will run in the water, how deep it will run, will have a tight wobble or a wide wobble, will it suspend in the water, will it float, will it sink, etc.

The design can be anything you want, a top water bait, popper, crankbait, propeller bait, etc. You can use any parts you have available; you can salvage parts from old baits (if your parents will let you). You can tie feathers to hooks to dress them up. You need to remember that this bait will be used in water. We will test it at the meeting for different things, but we will test at a later date in the water to see if it will catch fish. **Safety must be observed!!!** If you need to cut it with power tools have your parent help. Be careful when using sharp knives and other cutting tools.

Making Plastic Worms

Wm. Jeff Farris, Missouri Sportfishing Team

Objectives
Participating young people and adults will:
Create plastic lures-to fish with
Learn about fish attracting qualities of a lure;
Learn proper safety procedures, and
Have fun while learning.

Youth Development Objectives
Participating young people will develop
- Enhanced hand-eye coordination
- Planning and execution skills
- Manage materials in a safe manner
- Practice cooperation

Roles for Teen and Junior Leaders:
Teen and Junior Leaders will: Demonstrate and explain lure building techniques;
1. Assist participants as needed
2. Positively critique lures suggesting improvements
3. Encourage young people as they learn new skills.

Potential Parental Involvement
1. See "Roles for Teen and Junior Leaders"
2. Arrange for or provide teaching location
3. Arrange for or provide materials and/or equipment
4. Arrange for or provide transportation
5. Arrange for or provide refreshments.
6. Discuss personal experience in fishing
7. To provide supervision for the participants while making lures

Best Time: Anytime

Best Location: Well lighted, dry, comfortable setting, good ventilation easy to clean space

Time Required: 45 to 90 minutes

Equipment/Materials
Safety glasses Dust mask (optional)
Heavy Gloves or hot pad
Utility Knife Liquid Plastic
Color for Plastic Scents or salts
Scissors Aluminum Foil
Stirring sticks (Popsicle or wooden sticks)
Heat Sources: (one of these)
Stove, Hot Plate, Microwave Oven
Lee's Production Plastic Pot
Creepy Crawlers Oven (found in toy stores)
Small Pans or microwaveable glass cups
Worm Molds:
Flat Molds
Injector Style Molds and Injector
Rods for making tube baits

References
"Sportfishing Helpers Guide", 4HCC BU-07601, Making Worms, pages 14 and 15
"The Complete Book of Tackle Making" , by C. Boyd Pfeiffer
Also see Fact Sheets on Pouring Worms and mold making

Safety Considerations
Youth will be working with hot molten plastic, so adult supervision is required. Whenever working with a source of heat or flames burns are always a possibility. Safety glasses and gloves should be worn when working hot plastic. A well-ventilated area is needed; an exhaust fan or other fan to remove orders and fumes.

Evaluation Activities/Suggestions
1. Compare participant lure with others
2. Observe the process of making lures
3. Evaluate the results of their bait and compare it to models.
4. Observe ability to interpret and follow directions
5. Observe personal interactions among participants
6. Note changes in the level of questions asked

Lesson Outline

Presentation	**Application**
I. Set up work area A. Determine heating source B. Lay out aluminum foil C. Set out all equipment & supplies D. Fill pan with water	**Discuss** the features of the heating source, safety procedures, equipment that will be used, etc. **Set-up** the work area, lay down foil to protect work surface. **Lay out** the molds, liquid plastic , colors, scents, worm oil, pans/cups, and a pan of water in which to cool the worms.
II. Using a Flat Mold A. Pick a mold B. Heat the plastic to 340˚ C. Pour in plastic D. Remove form from mold E. Cool and add worm oil	**Demonstrate** how to use of the mold, how to heat plastic, how to pour into mold, how to remove when cool, add worm oil
III. Injector-style mold A. Select a mold B. Heat the plastic C. Pour the plastic 1. Set up the Injector 2. Fill chamber with plastic 3. Push the plastic into the mold D. Remove from mold E. Cool and add worm oil	**Demonstrate** how to use the injector style molds. How to heat plastic; pour plastic into chamber; push plastic into mold; remove when cool; and add the worm oil
IV. Making Tube Baits A. Heat plastic B. Dip the Rods C. Let Cool D. Cut tentacles E. Remove from rod F. Add worm oil	**Demonstrate** how to make tube baits. Demonstrate: How to heat plastic How to cut tentacles How to remove them How to add worm oil
V. Laminating plastic A. Select a mold B. Heat plastic – at least 2 colors C. Pour the plastic 1. Pour the first color 2. Pour second color D. Remove from mold E. Cool and add worm oil	**Demonstrate** some of the techniques for laminating plastic worms.
VI. "Creepy Crawlers" Oven	**Follow** directions from the manufacturer in regards to operation of this heating source.

Summary Activity

Have the participants compare their lure with other participants lure and determine how they could improve on the lures. Discuss how to fish these lures.

Methods of Heating Plastic

Stovetop

This is the most conventional method for heating plastic. It requires an aluminum pan to hold the plastic that is large enough to safely fit on the burner. Simply heat the plastic on low heat, and stir frequently. The heat temperature should be around 340 degrees F. The advantage of a stove is more stable less chance of burns, and they are easier to control the heat.

Hot Plate

Like a stove, a hot plate can be used. This is a good choice for portable locations. The hot plate can be set almost anywhere. I normally lay down aluminum foil down over the area I will be working. Simply heat the plastic on a low heat and stir frequently. The heat temperature should be around 340 degrees F. The advantage of the hot plates is it can go most anywhere. A disadvantage is heat control, with a gas type stove if you change the heat setting the heat level changes nearly instantly. With an electric stove or a hot plate the heat coil doesn't change instantly it takes a little time for it to change. This heat source is fairly safe, but caution still is needed to prevent burns.

Production Pot

This device is like the production pots use to melt lead. The Lee's company makes them and they look like their lead production pot, but the heat settings are for plastic, not lead. This cost more then a hot plate and pans, between fifty to sixty dollars. They are better for volume or product operations. They are a safe way to pour worms, but take a little getting use to. I would not recommend this for the occasional user, it for production operations.

Microwave

This is the fastest method of heating plastic. You will need microwave safe glass cups to heat the plastic in, Pyrex type cups. Because of the difference in microwave ovens and their power levels the time to heat the plastic will vary between the different ovens. I recommend setting for a short time, check the plastic and stir, and add a little time if it not heated thoroughly, continue this procedure until you figure out about how long to set the oven for. The plastic will be the thickness of syrup at room temperature, it should pour easily. The main thing to remember is do not over cook the plastic, if it starts to smoke you are over cooking it. Plastic scorches real easily and smells real bad when you do. Microwaves are safe way to heat plastic, but the cups do get hot so caution needs to be observed when handling the cups. This is the least expensive way to make plastic lures, if you have a microwave oven. The only cost other then the plastic, molds, color and scents, which you need for any method, is the cups.

"Creepy Crawler Oven"

This is the safest, but slowest method for making plastic lures. The Creepy Crawler oven uses a 60-watt light bulb to heat the plastic and has many safety features on it since it was designed for kids to play with. The molds are limited, but they do have some neat bug molds. The plastic they use is different and I have not tried using regular plastic with them. I have tried using the molds with regular plastic, heating the plastic up using other methods, and this worked fine. This device will work, but for the cost the other methods would be better. But if someone has one of these "Toys" it will work for making plastic lures.

Lesson Narrative

No matter which method of heating up the plastic you use; all methods will need the following to make plastic lures. You will need some liquid plastic; this is available through many suppliers. Other things that are needed are some color for the plastic, worm oil, and scents, optional thing like salt, and glitter can be added to the worm. Because different manufactures make the liquid plastic there are some differences between each company's formulas. Most of these differences will not affect your efforts to make worms. But you do need to know this. Some formulas may have higher or low working temperatures. You will need to read any information supplied with the materials you purchase. I have yet to have any problem mixing plastic from different companies and don't expect to, but it could be a possibility. Some companies have different formulas for different effects; some have additives to put in the liquid plastic to create the type of worm you want. Some of these additives are hardener, to make the worm tougher, and softener, to make more pliable. By making the worm tougher it will last longer and stay on the hook better, but be more difficult to get the hook through the plastic for hook sets. Softer worm may not stay on the hook or hold up as well, but the plastic will not hurt you in hooks sets. You will need to find a balance, between the original formula and adding hardener and softener to get what you like. The regular colors can be added to the plastic before heating or during heat, but fluorescent and some other special colors need to be added before heating the plastic. The additives some can be added during heating some need to be added before heating and some it don't matter. This is why you need to read all information from the company about the uses of their product. Some companies send the information to you when they ship it, for others it is in their catalogs. Other safety data concerning the things like first aid information in case of accidental ingesting of the product or what to do if it gets in someone's eye should be available from the manufacture. You should request a "Material Safety Data Sheet" on all products you have.

Setting up the Work Area

Set up the work area you will be using for making worms (or other plastic lures). Once you have determined the heat source, lay out the work area near this heat source. Discuss with the participants other ways to heat plastic. Have these spaces close to each other to prevent spills or the need to carry the hot plastic any distance. Lay aluminum foil down over the work area to make clean up easier. Using foil instead of paper will create less of a fire risk. Lay the molds, liquid plastic, colors, scents and other stuff out in a convenient way to help organize the activity. Some other items that can be use such as salt, garlic salt, glitter, etc. should also be conveniently located. Discuss with the participant what each item is need for and how to use it. Set a pan of water near the work area to put worms in to cool. This can be a bucket of water, but what would work best is a shallow pan. This allows the worms to lay straight. If they cool in a weird position they will form that way and not lay straight.

When heating the plastic if you heat it slowly (on the stove or hot plate) this will prevent scoring the plastic and causing it to smoke (and stink). When heating in the microwave don't leave it in for long periods of time. Use short time setting and stir the plastic each time, to prevent scoring. Using the stove or hot plate if you need to increase the heat, do it slowly and just a little at a time. If you are using a production pot start out at the lowest setting an increase it until the temperature is works without creating smoke, slowly remember it that's time to heat up. If starting with liquid plastic add whatever additives that are needed before heating the plastic, this includes hardeners, softener, etc. While heating the plastic add color, but remember that in a big pan the color might not be the same, as you want. The best thing to do is make a test worm, if it is okay then continue pouring your worms, if not add more color if it is weak, or more plastic if it is to strong. It is best to start out with a little color and add more. Adding more plastic is not the easiest way, you may not have a big enough pan to add enough plastic to get the color the way you want. If your test worm

are not the way you want them to be just stick them back in and re-melt them. Keep track of how much of the color, plastic used, what additives, etc., so when you create that perfect worm color, you can duplicate it later, write it down. Now you can start by re-melting plastic form the last time you poured worms or reuse old worms (see note about this later). Once you have the color the way you want add scents, salts or glitter at this time, stir them in good before pouring. The plastic is ready to pour into molds when it is the consistency of corn syrup. You should have something to wipe the pan or cup with, to prevent from this plastic from burning, a paper towel or cloth or a block of cooled plastic will work.

Using flat mold

Once the plastic is heated and read to pour, set your mold out and pour the plastic. You will need to pick the mold you plan on using. Lay the mold out on a flat surface. Start in any small detail part of the mold, like tails or legs, and carefully and slowly pour the plastic in the mold. To make worms with a rounder profile you can slightly over fill the mold, but not too much. A better way to make a rounded worm is to pour a partial worm, the straight part first and let cool and remove it from the mold, and then pour a full worm and lay the partial on top of it. This is the same way to laminate a worm, described later. If the mold gets really over filled the excess be trimmed off after it cools. Any excess or spills can be re-melted and used.

Injector style mold

Injector style mold are two-part mold that are held together and the plastic is forced into it. There are a few styles available for the hobbyist, but not vary many. These mold will make a completely rounded worm, unlike the flat mold were one side will be flat. Start by taking the two halves and clamping them together. Now depending on the mold, some stand up and some need to be laid down, but both types have a chamber that needs to fill with plastic and pushed in with an injector. Set the mold up to have the plastic poured in, I recommend wearing heavy gloves for this operation. Pour the plastic into this chamber and set the injector on the mold and push the plastic in. This should fill the cavity with plastic, and some might squirt out of the vent hole. Any excess can be trimmed off later and reused. From time to time add a little cooking oil to the injector to keep them working better.

Making Tube baits

To make tube bait requires make a special mold/tool. This mold is nothing more than some metal rod glued to a board. The metal rods need to be the diameter of the inside of the tube bait you want. The length needs to be longer than any tube you plan on making, but not too long, mine are about six inches long. Drill holes in the board, but not all the way through, the size of the rods, and use epoxy to glue them in. You can place more than one rod on a board, but you don't want them to close or where you can't get the tube baits off when you are done. I have one with two rods that I found works okay. I also beveled the end of the rod so it would not cut the baits. To use this mold, you dip the rods into the plastic and turn over to cool. Sometimes you may want to swirl the rod in the plastic to get a longer bait, or tilt the cup or pan to give you more depth. The plastic needs to be cooler then that need for pouring. Heat the plastic up normally adding whatever you want to put in it. Then let a cool some, but not completely. This will allow the plastic to be somewhat thicker on the rod, if it too thin it runs off too much and needs to be dipped several time to make one that is thick enough. To make thicker tube dip more than once, but wait for the plastic to cool some between dippings. To remove the tube bait from the rod, wait until it has cooled and roll them up and off. You can cut tentacle into the bait with a utility knife or they do make special cutter for this. The cutter is a series of razor blades mounted together about a ¼ inch a part. These baits normally have tentacles on the open end of the bait, this tentacle covers about the lower 1/3 of the bait.

Laminating Plastic

Making laminated bait can be done with both the flat mold and the injector style mold. To laminate a worm you are basically taking two pieces of worms and putting them together. You will need two colors of plastic ready to use to laminate worms. To do this with a flat mold you can start by taking and making a partial worm with the mold. Remove this part and fill the mold and lay the partial on the newly poured part while it is still hot. This will cause the partial to melt into the newly poured part. You can also do this by only filling the mold up half way and adding the second color on top of it. To do it with the injector type mold fill it with the bottom color, and the remove it from the mold cut off the top part place it back in the mold and fill with the top color. This is how you would make an injector style worm with the tail a different color then the body. This can also be done with a tool called a "Wormizer", this tool is basically a small soldering iron for plastic worms. It allows you to melt the two halves and stick them together. Other tricks that can be done are making strips on worms, and adding eye using a stick of plastic in a hot melt glue gun. To add a strip, using a flat mold take and run a small line or strip down the mold with one color before adding the other. To put eyes on a plastic worm use a hot melt glue gun and stick instead of glue in it use a worm the color you want the eyes to and the size of the glue guns tube. You can make three colored worms, or whatever you would like once you mastered these techniques of laminating worms.

Remove from Mold, Cool and add Worm Oil

No matter what type of mold you use, you will need to let the worm cool enough before removing. They don't need to be cooled completely, but enough they will not deform while removing them. Now to complete cool them you can stick them in water. Be careful doing this, you want the worm to lay in the water the way it would in the mold. If the worm is bent while cooling it will form this way. You can let them cool on a piece of foil, by laying them out straight to cool. You want the worms to cool completely before trying to place them in a plastic bag. But once they can be bagged up you might want to add some oil to them to keep them from sticking together. They make worm oil for this purpose, but you can use scented cooking oils, like garlic oil. By using this type of oil you can scent the worm and keep them from sticking.

"Creepy Crawler Oven"

Follow the Direction from Manufacture on how to use this device. The directions list how long to heat the plastic, and they go through all the safety device of the toy. These safety devices are there to prevent kids from burning themselves

Making Your Own Molds

Making your own mold is the only way to create your own type of lures. A fact sheet will be added to this manual that will go over how to make your own mold. Mold making is not a difficult task. They can be made with plaster of Paris, but I like the ones made from RTV. Some suppliers sell the materials to make mold from RTV. These mold allow for more detail and place were the worm is undercut. And since they are flexible removing worms from them is easier.

Reusing old worms

You can reuse old worms. To do this keep worms separated by color. And melt the worms by color to keep this color. If you put all the old worms together and melt them they will become a brown color. This is fine if that is the color you want, but trying to change this color will take a lot of color additive, and the best you can hope for is changing the brown to a different shade of brown.

Exhibit or Sharing Suggestions

1. Prepare a poster, models or photographs to show the steps in building one of these lures.
2. Study books, catalogs or magazines to see lures might be close to theirs lures. Share some of your results with others in your group.
3. Prepare a method demonstration on building one of these lures and present it appropriately.
4. Prepare a photographic story of building their lure from the beginning of the process to using them. Share the story with your friends or in some other setting.
5. Record your experiences with building and using their lure in a fishing journal. Share that journal with others in an appropriate setting.
6. Make a series of cards show each of the steps in building a lure that can be exhibited at a fair or similar gathering.
7. Try variations as suggested or as your mind suggests. Try fishing with your lure and record your results. Share those results with your group if desired.

Community Service or Give Back Activities

1. Consider ways of helping other young people learn how to make lures, setting up a clinic or instructional programs for interested people.
2. Make lures that can be used as auction items or door prizes in community events or fund-raisers.
3. Donate lure to a local fishing program.

Extensions or Ways of Learning More

1. Observe fish and the foods that they eat on your local waters. Using what you know about making lure, try to develop a pattern that imitates or suggests a food the fish seem to prefer. Research existing lure designs to see if someone has developed a lure that does what you want. Modify existing lures or create your own pattern in an attempt to catch the fish you are seeking.
2. Collect stomach contents from fish you like to catch. Observe the contents of those stomachs and record what you find in a notebook. Determine if their food habits are the same all the time or if they change with the time of day and season. Use references to entomology or other fields to assist in identifying what the fish are eating and attempt to create a seasonal reference to their favorite foods.

3. Observe fish actively feeding on a local stream, pond or lake. By careful study, see what they are eating and how they feed. Do they take everything that is a potential food item, or are they selecting something from a set of food choices? What characteristics seem to determine which food items are taken and which ones are rejected? How can that apply to your lure choices?

4. Observe reactions of fish to your lures. Try different types of retrieves to see if fish behave differently to lures sitting still, slowly sinking, moving slowly, being twitched, or swimming steadily. Speculate on why any observed differences may exist.

Links to Other Programs

The link to the rest of the Sportfishing program is obvious. Lure making is a link to determining what types of lure to use in a give situation. Studying how lures work can teach many different things about fish behavior. Understanding aquatic ecology as well as keen observation skills is important to success in both making and fishing lures. This can provide entry into the sciences, either as a future vocation or as a vocational activity. Fishing can lead to an interest in several fields of engineering, biology, zoology, and fisheries management. Lure building can be a great introduction to economics and marketing for young entrepreneurs. Finally, the hobby of making lures is both craft and art. It can lead into many other areas of activity from writing and photography to science.

Dressing Treble Hooks With Flashabou

Step 1 of 6
Figure 1
Cut about twenty (20) strands of Flashabou approximately 2" - 3" long (see Figure 1)

Step 2
Dip the Flashabou into a small bowl of water. This will help you keep it in a small bundle.

Step 3
Take your treble hook and feed one end of the bundle through the eye of the hook. Make sure that you place the hook eye in the center of the bundle.

Step 4
Fold the Flashabou bundle down towards the points of the treble hook.

Step 5
Take a small rubber skirt collar and place over the eye of the treble hook. The collar should rest just under the eye. This holds the Flashabou in place. (see figure 2)

Step 6
Figure 2
Trim Flashabou to desired length. Experiment with different colors and lengths to find out what works best in your area.

From Jann's Netcraft's web site
"Tackle Building Tips from the experts" section

An Introduction to Fly Tying

Ronald A. Howard Jr. TAMU Professor and Extension 4-H Specialist

Objectives

Participating young people and adults will:
1. Explore the series of lessons on fly tying
2. Understand the content and approach to the lessons
3. Construct some tools they can use in the lessons
4. Explore ways of obtaining fly tying materials
5. Have fun while learning

Youth Development Objectives

Participating young people will:
1. Become more comfortable in the youth-adult learning environment
2. Enhance hand-eye coordination
3. Enhance problem solving and decision making abilities
4. Practice social interactions in the group

Roles for Teen and Junior Leaders

1. Assist in set-up and break-down of teaching area
2. Assist participants as needed
3. Evaluate equipment and assist in improvement
4. Discuss personal uses of materials and tools
5. Demonstrate tool making techniques

Potential Parental Involvement

1. See “Roles for Teen and Junior Leaders” above
2. Arrange for or provide teaching space
3. Arrange for or provide materials
4. Arrange for or provide transportation
5. Arrange for or provide refreshments
6. Demonstrate/assist with dyeing materials

Best Time: As an introductory lesson (any time of year)
Best Location: Comfortable, well-lighted work area
Time Required: 60 to 90 minutes
Materials/Equipment
spring-type clothespins (straight grained)
small rubber bands
whittling knives
150 grit sandpaper
epoxy cement

1/8 to 3/8 inch dowel cut in 2-4 inch sections
sewing needles (large darners best)
locking pliers
wire cutters
heavy copper or soft iron wire
medium sized nail (6-10d)
needle nosed pliers
4-8 pound mono fly tying thread
wooden matches
head cement
samples of fly tying materials
fabric dye (e.g. RIT or Tintex)

Evaluation Suggestions

1. Observe interactions with peers, teen leaders and adults, and promote positive interactions
2. Evaluate tools and procedures, suggesting ways to improve using the "oreo" method
3. Observe levels of interest and involvement, attempting to involve every youth positively
4. Observe improvement in skills with repeated efforts

Lesson Outline

Presentation	Application
I. What is fly tying and why do it?	
A. Making light weight fishing lures	
1. Tying or winding material on a hook	
2. Basic techniques built by practice	
B. Fun and economical	Ask a few teen leaders or adults to **DISCUSS** why they tie flies and what values they derive from tying flies. Keep the comments brief and stress having fun or relaxing as significant benefits.
1. Tying alone or with friends	
2. Tying special patterns for your area	
3. More involvement in fishing	
C. Avocation or profession	
1. Hobby	
2. Source of income	**NOTE** that many hobby fly tiers earn a little money by tying for friends or friends of friends. Most professional fly tiers started with a tying hobby that grew. STRESS that professional tying is a business and often less fun than recreational tying.
a. Casual tying for friends	
b. Professional tying	
c. Handling materials and equipment	
II. Cost and difficulty	
A. Costs	
1. Tools	**DISCUSS** some of the myths about fly tying costs, noting that much of the equipment and materials can be found in many homes or in sewing and craft stores. **NOTE** that several useful items will be made and that most materials will be provided for the teaching sessions.
a. Some tie with nothing but scissors	
b. Some use many, expensive tools	
c. Basic needs	
1) Tying vise	
2) Scissors	
3) Dubbing needle	
4) Hackle pliers	**DISPLAY** and **DISCUSS** various items of equipment. **AVOID** emphasis on top dollar equipment and materials, but answer questions as they are asked.

2. Materials
   a. High cost materials
      1) Hackle capes
      2) Specialized materials
   b. Low cost materials
      1) Many found at home or in sewing or craft stores
      2) Inexpensive materials adequate for many patterns
   c. Materials for this course provided
      1) Cost if any
      2) Any payment requirements

DISPLAY an array of tying materials, including high quality capes and those that are acceptable for learning and most tying applications.
EMPHASIZE the availability of materials from sources other than tackle supply houses.
NOTE that tying materials are not overly expensive when compared to the value of the finished flies.

B. Difficulty
   1. Learning basic skills
   2. Sequences of skills
   3. Learning to read patterns
   4. Applying basic skills to complex patterns
   5. Practice and critical evaluation

NOTE that some types of flies do take some time and practice, but that everyone will learn the basic skills needed to tie any pattern they wish at a pace they can handle. **EMPHASIZE** that there is no magic involved, just learning skills and applying them.

III. Making fly tying tools
   A. Hackle pliers
      1. Commercial hackle pliers
      2. Clothespin hackle pliers
         a. Good spring clothespin
         b. Small rubber band
         c. Fine sand paper
         d. Excellent performance

PASS AROUND several types of commercial hackle pliers, then **SHOW** a hackle plier made from a spring clothespin.

   B. Dubbing needle
      1. Commercial dubbing needles or bodkins
      2. Dowel and needle bodkins
         a. Short piece of dowel for handle
         b. Heavy sewing needle (darners)
         c. Epoxy cement
         d. Inexpensive and functional

DISPLAY one or more types of dubbin needles or bodkins and
COMPARE them to one made of dowel and a sewing needle.

   C. Whip finisher
      1. Commercial whip finish tools
         a. Several designs
         b. Reduce waste of thread
         c. Excellent finish on heads
      2. Match stick and monofilament tool
         a. Match stick
         b. Light monofilament line
         c. Tying thread
         d. Head cement or lacquer
         e. Functional and easy to use

DEMONSTRATE one or more types of whip finishers and a simple whip finishing tool made of monofilament and a match stick.

   D. Bobbin
      1. Commercial bobbins

DISPLAY several types of bobbins, including a simple one made of heavy copper wire.

a. Many designs
b. Provide tension for no-knot tying
c. Reduce thread damage in tying

2. Wire bobbin
a. Heavy gauge copper wire
b. Twist around a nail to form eye
c. Form legs about spool width apart
d. Indent legs to hold a rubber band
e. Insert tag ends of wire in spool

DIVIDE the group into smaller ones and let each youngster build a set of equipment with the assistance of teen leaders and adult volunteers.

NOTE that commercial sources usually have well-handled and properly prepared materials at reasonable to modest prices for beginning level materials.

IV. Locating fly tying materials
A. Commercial sources
1. Excellent availability
2. Quality control and customer service
3. Costs reflect market value
4. Purchase for anticipated needs

B. Collecting your own materials
1. Feathers
a. Domestic birds
1) Waterfowl wings and flank feathers
2) Gamebird body feathers, wings, tails, capes
3) Domestic chickens and roosters
a) Hackle capes
b) Saddles and schlappen
c) Wings and body feathers
4) Domestic turkeys
a) "Marabou" feathers
b) Body feathers
c) Wing and tail feathers
5) Miscellaneous birds
a) Peafowl
b) Ostrich, emu or rhea feathers

ASK if anyone knows someone who raises chickens, gamecocks, waterfowl, turkeys, or other domestic birds. **NOTE** that these birds are excellent sources of tying materials for many types of flies, with body feathers, wing feathers, tail feathers, and specialized hackles (head and neck or rump on roosters) being useful.

NOTE that most marabou used today comes from downy feathers taken from white turkeys rather than from marabou storks.

POINT OUT that nearly any species of bird has some tying value, but that protected species may not be used because of legal restrictions. Even birds like ostriches and emus have useful feathers.
NOTE that nearly all game birds and wildfowl have numerous uses for the fly tier, and that nearly anyone who hunts is willing to share some feathers with those who are interested in tying flies. Often a few flies can bring a bonus in tying material from a friend.

b. Wild game birds
1) Upland game birds
a) Grouse, pheasant, quail, partridge
1) Body plumage
2) Wings and wing coverts
3) Tail and rump feathers
b) Turkey
(1) Body feathers
(2) Dark "marabou"
(3) Wing feathers
(4) Tail feathers
2) Waterfowl
a) Wing feathers and coverts
b) Flank feathers - most species

EMPHASIZE the value of the mottled or "speckled" secondary feathers for many patterns.

RE-EMPHASIZE the importance of using only legally obtained feathers from birds that may be taken legally.

3) Migratory birds
a) Crow wings and tail
b) Mourning dove wings
c. Unprotected species like starlings
2. Fur and hair
a. Most species useful in some way
1) Assortment of textures and colors
2) Fur for dubbing
3) Hair for wings and tails
b. Methods of obtaining
1) Buying pelts, tails or pieces
2) Personal hunting or trapping
3) Friends who hunt or trap
4) Fur buyers - ruined pelts often free
5) Road kills, where legal
6) Fur trim on old garments
7) Craft stores
c. Dying or coloring fur and hair
1) Easiest with light colored material
2) Wash thoroughly with detergent
3) Rinse
4) Immerse in fabric dye of choosing
5) Simmer until the desired shade
6) Drain
7) Rinse in hot water
8) Rinse in cold water
9) Dry on newsprint
10) Steam to shape if needed
3. Other materials
a. Floss, yarn and artificial fur
1) Fabric or sewing stores
2) Craft stores
3) Scraps from embroidery or knitting
b. Chenille, braided tinsel
1) Sewing centers
2) Craft stores
3) Party supply stores
c. Tinsel, flash, flash tinsel
1) Party supply stores
2) Craft stores
3) Holiday decorations

V. Following patterns and creating your own
A. Importance of following patterns
1. Proven effective - fish catchers
2. Learning to read and understand

NOTE that species as diverse as domestic rabbit, moles, woodchuck, foxes, coyote, raccoon, bears, opossum, muskrat, mink, otter and beaver all have useful guard hairs, tails, and fur. Even parts of animals may be useful, like porcupine quills, bucktails, or the masks from rabbits or hares..

EMPHASIZE the need to know the laws in your area before picking up road killed animals for fly tying.

NOTE that most furs and hair can be dyed to the desired color with simple fabric dyes. **EMPHASIZE** the need to clean all oil and grease off the fur first. **SUGGEST** using vinegar to aid in setting the dye in the material and keeping the dye bath hot while waiting for the right shade to develop. **NOTE** that the hot water rinse removes most of the dye that is not set in the material.

SUGGEST thinking about tying materials when looking at sewing, cross stitch or embroidery materials. **EMPHASIZE** the need to have permission to use materials belonging to someone else BEFORE using it.

NOTE that chenille, tinsel chenille and braided tinsel are often sold as piping material in sewing or craft stores. Frequently the pricing is well below what one may expect from supply houses.
DISCUSS some items that can be located as substitutes for tinsel, oval tinsel, flash tinsel, or flash fibers and locations where they can be found or salvaged. **RE-EMPHASIZE** the need to ask before using these materials.

EMPHASIZE the need to stick with known patterns and to use an organized approach to learning fly patterns and basic skills when beginning.

patterns
3. Planning for needs in later steps
4. Developing basic skills

B. Developing basic skills
1. Attaching the thread properly
2. Hold tightly, bind tightly
3. Thread control
4. Materials control
5. Proportion and detail
6. Finishing flies
7. Understanding pattern elements
8. Self-critique and learning
9. Practice, practice, practice

C. Making your own patterns
1. Basic skills and pattern understanding
2. Keen observation
3. Handling materials to reach objectives
4. Field testing for results
5. Evaluation and refinement
6. Examples of successes
   a. CK Nymph (Chuck Kraft)
   b. Sulfur spinner (Ron Howard)
   c. Rick's Special Alewife (Ron Howard)
   d. Schmidtmann-Valla Smelt (Ed Schmidtmann and Mike Valla)
   e. Lefty's Deceiver (Lefty Kreh)
   f. Muddler Minnow (Don Gapen)

REVIEW some of the basic skills that will be taught in the lessons. **ASSURE** the kids that they will learn these things while having fun and with all the help they need to be successful.

NOTE that practice reinforces whatever is being done. Only perfect practice makes perfect. **COMMENT** that the difference between and beginner and a professional is only about 5000 to 10,000 flies and the skills and speed that came with tying them.
Ask participants to **SPECULATE** on some of the skills and processes needed to create a new fly pattern.

SHARE one or more of the examples given here or some of your own experience. Be sure to **DISCUSS** modifications or rejections on the way to the final pattern.

End with a reminder of the next meeting time and location and any material or equipment needs.

Summary Activity
If desired, have each of the participants go through a round-robin of preparing a set of tools for their use in later lessons.

Lesson Narrative
Fly tying is a wonderful hobby for many people and a lucrative business for others. It is the process of making very light weight-fishing lures by tying or winding materials on a hook. It involves some basic skills, which are developed through practice and critical evaluation of the results of each tying effort. Once the basic techniques are mastered, beginners can attempt patterns of greater difficulty or complexity, learning tricks of the trade as they progress. This series is designed for beginners with a series of lessons and patterns that lead to an intermediate level of fly tying skill. Once it is completed, the youngster is capable of tying nearly all types of patterns in common use today and is ready to continue their development as a fly tier on their own or with friends they have made through their tying or fishing experiences.

Fly tying involves some costs in materials and equipment, like most other recreational or avocational pursuits. Equipment costs are minimal if long-term use is considered, and there are many ways to save on materials. Savings in flies can be substantial when high quality flies are being produced. Many patterns can be tied for less than a quarter per fly, when their comparable value from quality supply houses or local stores may run in excess of $1.50 or more. The fun of fishing is expanded with fly tying to include the time and relaxation at the tying bench. Tying can be shared with friends or done alone. It allows the angler to customize patterns to his or her area and needs. It leads to better understanding of the life cycles and ecology of fishes and their forages. The result is deeper involvement with fishing and the issues related to fishing and aquatic ecology.

Even youthful fly tiers can expand their hobby and enjoyment into a casual or serious business by tying for friends, special niche markets, or local businesses. Some entrepreneurs find their way into handling materials for fly tying instead. They may raise chickens for the hackle trade, or buy, process and sell furs, bucktails or other materials. Some find sources of fly tying materials at low cost and re-sell it in smaller quantities at a profit. Fly tying becomes work when it is taken on as a profession, and many prefer to leave it as a hobby and a means of relaxing or just having fun.

Cost and Difficulty

Costs can be extremely variable in fly tying. A few skilled fly tiers use only their hands and a pair of scissors. Others have very expensive tools and a bewildering array of gadgets to do everything imaginable with feathers and fur. Most people fall between these extremes, using some type of vise, hackle pliers, scissors, a dubbing needle or bodkin, and one or more bobbins to hold thread or materials. Costs for each of these items are extremely varied. In general, cost and quality are related; but every fly tier would be wise to consider their needs and desires before investing. Poor equipment is a poor investment and makes learning or later tying a challenge. Quality equipment at modest prices will serve for a lifetime if it is cared for properly. One may spend well over $300 for a tying vise or somewhere in the vicinity of $20.

Reading materials supply catalogs can be discouraging for beginners. Hackle capes can cost nearly $100 on the high end, but these are not required for leaning or for tying quality flies. (Super capes are wonderful to work with if you can afford them, but they are beyond our needs here.) Some specialized materials are priced much higher than most people can justify as well. On the other hand, the vast majority of materials needed to learn fly tying (or to continue tying as a professional) can be obtained at little cost or at modest costs from a wide variety of sources. Sewing stores, craft stores, party supply stores, and modest cost materials from tackle suppliers are excellent sources of tying material. Many patterns work better with these materials than they do with much more expensive materials through the premium supply houses. It simply takes more work getting what you want, and you may need to modify it to meet your needs. Materials for this course will be provided for consistency and to keep costs to a minimum while you are learning. [State any cost and have it written for parents.]

Some people view fly tying as an extremely difficult skill. We can maintain that illusion, but it is not true. Fly tying involves learning some basic skills, then applying those basic skills to progressively more complex patterns. This series of lessons is designed to teach those skills in a progression, adding new skills and reinforcing earlier ones. It will teach the beginner to read

patterns, plan for proper application of materials, and apply all their skills to flies as needed. The skills will be taught in a context of cooperative coaching. Model flies will be prepared as demonstrations. Evaluation of each pattern tied will take place personally and with others, with a view to improving later attempts or refining techniques as needed. Every participant must understand that fish are much less critical of our attempts than we are ourselves. Flies we would reject are often accepted readily by fish.

Making Fly Tying Tools

A tying vise is very important to most fly tiers. Although a pair of locking pliers or even a hemostat or needle holder can be used as a vise, specialized fly tying vises are used by most people. Many quality vises with a wide variety of costs and options are available. We will not attempt to make one.

Hackle Pliers - Many styles of hackle pliers are available as well. A very gentle and serviceable pair of hackle pliers can be made from a spring clothespin with fairly straight grain. The jaws of the clothespin are carved down on either side to about 1/8 to 3/16 inch wide. The top and bottom of the jaws are rounded to form a relatively fine tip that holds at its very edge. Once the jaws are shaped to the satisfaction of the maker, a small rubber band is stretched and crossed over the spring area to provide added holding power. A piece of sandpaper (about 150 grit) is placed between the jaws, the pliers are allowed to close, and the sandpaper is pulled out, alternating jaws until a smooth, even surface is formed. Usually this takes only a few passes. These hackle pliers grip well but do not cut fine hackle tips. They may not look professional, but they work very well if carefully made.

Dubbing Needle - A dubbing needle or bodkin is used for picking out dubbing to form a rough body, lifting hackle fibers or other materials that have been bound down inadvertently, applying head cement, or in tying a whip finish without tools. Many commercial varieties are available, but an excellent dubbing needle can be made by inserting a heavy sewing needle, like a darning needle, into the end of a short piece of dowel with a bit of epoxy for security. These tools are very inexpensive and quick to make, so the fly tier can have several. This allows one to be used for cements and others to remain clean and smooth for other uses.

Whip Finisher - Several types of whip finishers are available commercially. All of them save a bit of thread on each fly and make whip finishing easy and quick -- once you learn to use them. Of course a whip finish can be accomplished without tools, but a very simple tool for whip finishing flies can be made with a match stick, a short length of monofilament, a tying thread wrap, and some head cement or glue. Start by tapering a matchstick on one end. Using about 6 inches of 4 to 8 pound test monofilament, form a loop with one tag end of the monofilament on each side of the taper. The loop beyond the tip of the stick should be only about 1 to 2 inches in length, and the tag ends should be left fairly long. Wind over the monofilament from near the tip to about 1 inch up the matchstick, then reverse the tag ends and wind back toward the tip. Repeat this process as you near the tip, winding back toward the far end of the matchstick. Trim the ends of the monofilament, and wind over them to keep the surface of the windings smooth without projections. Whip finish the thread and apply a drop or two of head cement, epoxy or super glue to bind everything together.

This tool is easy to use. Just lay the loop along the head of the fly with the handle toward the tail of the fly. Wind over the loop from the back of the head to the front. Holding the thread in place with a finger, trim the tag end, insert it through the loop, and pull the loop through the windings. [Caution: Do not let the loop go around the hook or it cannot be removed without breaking the monofilament.] Pull the tag end of the thread tight, trim it neatly, and apply head cement to finish the fly.

Bobbins - Commercial bobbins are very useful with many designs available. Some use spring tension. Some use as series of turns in the thread. Some use tension supplied by sidepieces of the frame. All of them allow the tier to provide tension for no-knot tying while reducing thread damage. A serviceable bobbin can be made using about 8 to 10 inches of heavy copper wire. Start by bending the wire in the middle around a 6d to 8d nail. Use the nail and pliers to twist the wire together for an inch or two. Bend the open loop to about a right angle with the twisted stem. Spread the "legs" of the wire to slightly over the width of a thread spool, and form an angle that keeps the legs parallel to each other. Bend the tips of the legs inward at right angles so they would meet if long enough. Cut the ends of the wires to leave about 3/4 inch stubs to insert into the spool holes. Attach a spool, and put several wraps of a rubber band across the parallel parts of the legs to provide the desired amount of tension.

Locating Materials

There are hundreds of commercial sources for fly tying materials. Most of them provide excellent quality, ready availability, good customer service and reasonable costs. Using commercial sources allows you to purchase what you think you need at any given time, minimizing storage of extra materials and having known quantities of known quality materials on hand.

Most fly tiers, however, collect many of the materials they use from other sources. They are constantly on alert for materials that might be useful in tying their favorite patterns or for something new that might allow them to tie something special. Once these materials are popularized, they often become commercially available. Some years back the only commercially available peacock feathers were the rump (herl or eye feathers) and sword feathers. Today tiers can purchase primary feathers, secondary feathers, body feathers of several types, and the traditional feathers. That change is the result of tiers who had access to the birds using the materials and creating a demand for them by others who did not have access to peafowl.

Feathers - Fly tiers use feathers for hackles, legs, tails, wings, nymph wing pads, body materials and posts for wings. Many types of feathers from many types of birds are useful. One must make sure that the feathers are legal to possess and legally obtained. Domestic birds are excellent sources of fly tying material. Waterfowl wing feathers, tail feathers and flank feathers are used in many patterns, either in natural colors or dyed to any color desired. Domestic ducks and geese can provide these feathers either by picking up molted feathers or by assisting in plucking fowl destined for the table. Domestic game birds, like gray partridge, quail, or pheasants have useful body feathers, wing feathers and tails that are used in many patterns. Some birds are skinned to obtain entire capes for easy location of any feather type desired. Domestic chickens, both cocks and hens, provide useful hackles from their head and neck feathers and from their saddles or rump feathers. Feathers at the bases of the wings are also used in some patterns. Wings and body feathers may be used in some patterns as substitutes for other types of feathers. Domestic turkeys

provide wing and tail feathers that are either dyed or used in the natural form. Bronze birds have highly desired mottled secondary feathers and body feathers that are popular for some types of no-hackle flies. White varieties provide most of the commercial "marabou" from their fluffy body feathers. This can be dyed to nearly any color desired and re-fluffed with some steam. Other domestic birds also provide useful feathers. Peafowl have a wide variety of useful feathers. Ostrich, emu and rhea feathers form additional types of "herl" that can be used in bodies or as tails or wings on some patterns.

Wild game birds are also very useful to the fly tier. Upland game birds like grouse (all kinds), pheasant, quail, or partridges are useful for their body plumage, wings and tails. Even the marginal feathers on the wings and the wing coverts are useful in tying some patterns. Wild turkeys provide the same types of feathers found on the domestic birds, even to having a dark "marabou." Waterfowl yield wing and tail feathers, as well as flank feathers that provide wing and tail materials. While wood duck and mallard flank is most commonly used in patterns, nearly any duck provides useful materials for fly tying. Other migratory birds, like rails, gallinules, coot, crow, mourning dove (where legal), woodcock, and unprotected species like starlings provide materials for some types of flies.

Fur and Hair - Most types of fur and hair can be used in tying flies. Patterns call for an assortment of colors and textures that can be obtained from many different species. Some domestic animals have very useful fur or hair. Mohair and wool are used in some patterns. Under fur from deer, caribou or bison is useful as well, although few people use it. The fur is generally used in dubbing for body materials, while guard hair or tails are most often used as wings or tails. Some hair is wrapped as body material -- porcupine quills, horsehair and moose mane are good examples.

There are many ways to obtain fur and hair for tying. Some furs and hairs can be picked up from fences or as excess on a shearing floor. Others can be bought across the counter as pelts, pieces, tails or scraps. Personal hunting or trapping can provide fur and hair specimens from the wild, as can friends who hunt or trap. A few flies can aid in that process. Fur buyers often purchase pelts that are damaged from youngsters, even though they cannot sell them. They may sell or give these pelts to fly tiers to get them out of their fur sheds. Where it is legal, road kills can be salvaged for either hides or pieces of fur or tails. Fur trim on old garments can be a good source for some types of fur or hair. Craft stores also carry artificial hair or fur that can be used in tying flies. Finally, many a pet dog or cat has been combed for fur that is just the right color by fly tiers who discovered that color when the animal was shedding.

Dying Fur, Hair or Feathers - Fur, hair and feathers can be used in their natural color or dyed to any color desired. Very expensive dyes can be obtained from some fly shops, but common fabric dyes are effective for most purposes. Light colored materials dye best, although dark hair often produces very useful colors as well. Start the dyeing process with a thorough washing to remove all oils and grease from the fur, hair or feathers. Common laundry or dishwashing detergent does an excellent job. Rinse the material thoroughly, and immerse it in a fabric dye of your choosing. Add a bit of vinegar as a mordant to aid in getting the dye into the material, and simmer the material and dye until it is the color desired. Drain it carefully and rinse it twice, first in cold water then in hot water. This removes excess dye that is clinging to the outside of the material instead of penetrating it. If the desired color is not obtained, return to the dye bath for

additional time. If the color is satisfactory, squeeze the material to remove excess water and arrange it on several layers of newsprint (and away from dogs or other critters) to dry. If it dries to a matted condition, hold the material in a jet of live steam to fluff it back to normal.

Other Materials - Many other types of materials are useful to the fly tier. Floss, yarn of several types, artificial fur or hair, tinsel, braided tinsel, latex sheets, chenille, flash tinsel, flash fibers, and much more can become part of ones fly tying collection. In addition to the commercial tying outlets, many of these items can be purchased from fabric, sewing, craft, or department stores. Free samples can be obtained as scraps from sewing, embroidery or knitting. Often a useless few inches of yarn or floss can tie several flies. Chenille, braided tinsel and similar products are sometimes sold through sewing centers or craft stores as piping. Mylar tinsel, flash tinsel and flash fibers are used in many holiday ornaments, party arrangements, or similar applications. Locating their sources or watching for end-of-season sales can yield excellent materials at bargain prices.

Fly tying materials are everywhere. All we need to do is to recognize them and put them to work for us.

Fly Patterns and Creating Your Own

There is a very strong temptation among beginning fly tiers to create their own patterns. We strongly recommend that beginners learn to tie using standard patterns designed to teach basic or more advanced tying skills. There are several advantages to this approach. First, proven patterns are more likely to be effective in catching fish. Second, using these patterns teaches the participants to learn how to read and follow pattern directions. This helps them learn to plan ahead for steps that come later but must be initiated early in the tying process, like binding in a ribbing tinsel before body materials are applied. Finally, and most importantly, the selected patterns are designed to teach the skills necessary to tie any pattern.

Basic Skills - Some of the fundamental skills required in tying flies are easily overlooked. The first one is learning how to put a hook in the vise securely. Immediately after that is the challenge of attaching the tying thread to the shank properly. The hold-tightly-and-bind-tightly technique is common to nearly all fly tying situations, as are control of various materials, thread control, and a sense of proportion. Proper fly finishing techniques are important to tying durable and well-proportioned flies. An understanding of pattern elements and basic materials is important to growing as a fly tier. All of this requires that the beginner be self-critical while learning. The first flies will take a long time and be somewhat crude, but progress will be rapid as the skills and sense of proportion develop. All of this takes practice with the intent to improve with each pattern tied.

Making Your Own Patterns - Once the basic skills and pattern design elements are understood, keen observers of the waters and behavior of fish can lead to development of patterns that work better than current types. Knowing how to handle materials to make them achieve desired results aids in pattern development, and field testing of various models can lead to refinement. Several examples are listed here (but you can add your own).

The CK Nymph - A Virginia professional, named Chuck Kraft, invented this general nymph pattern many years back. A major outdoor magazine wrote it up as the “Miracle nymph.” This

pattern looks like a wooly worm with a crew cut and a bushy wood duck flank tail. Most of the material used in tying it is "waste." That is, the hackles are too big for most other flies in its class, and the wood duck flank is the webby material that cannot be used for good dry fly wings. A simple combination of a black wool body over a lead wire core with a short, bushy wood duck flank tail and a palmered grizzly hackle clipped to about 1/3 inch, this fly is outstanding for trout, smallmouth bass and other species in rivers or streams with heavy current. It suggests lots of things but does not really imitate any specific insect or fish. It is big, buggy and heavy enough to get to the bottom. It also works all over the country.

Sulfur Spinner - This pattern was developed in response to a tremendous hatch on a Central New York stream by the author. It started with a poly-winged spinner design, added polypropylene dubbing in a liquid sulfur color, split tails and a bright yellow egg sac. After several iterations the combination was worked out and became a staple of the anglers on that stream during the hatch.

Rick's Special - This pattern was the fourth of a series of patterns using mylar sheeting as a broad flash in an attempt to create an alewife pattern by the author. The others are lost in obscurity because they did not produce. This pattern with a combination of light dun and green hackles proved very effective on lake trout, browns and Atlantic salmon in the Finger Lakes region. It remains unknown except for some specialists in the area and the originator.

Schmidtmann-Valla Smelt - This is a mylar bodied fly developed by Ed Schmidtmann and Mike Valla as a slim, flashy version of a smelt to be used in fishing concentrated salmon and trout in the warm water outflow of a power plant. An underbody of curon foam and a body of large mylar piping is attached to tandem hooks with a pronounced eye on the large head, a ring of pale dun hackle at the cheek, and a dun hackle tail. The back is colored with a permanent marker (black worked best). Fished on a sinking line, the fly had a crippled minnow action, lots of flash, and excellent fish catching ability. It was complex to tie, but worth the effort.

Lefty's Deceiver - One of the classic saltwater patterns with plenty of utility in freshwater as well, this fly is the product of Lefty Kreh. A relatively simple pattern that has lots of action and a fairly wide profile, like a small menhaden, this hackle and bucktail fly has been a favorite since its introduction.

Muddler Minnow - Don Gapen is generally credited with the development of this classic pattern. It was designed with a broad deer hair head and a flared deer hair collar to suggest a sculpin, a favorite food of the God's River brook trout. This pattern has evolved into a general searching pattern, a grasshopper imitation, and a great streamer fly. Other sculpin imitations may be better, but this one is still effective.

You may want to add some customizing efforts of your own to bring the process home to the kids.

Exhibit and Sharing Suggestions

1. Exhibit your personally constructed tools or other home-built fly tying equipment at a suitable event.

2. Prepare a poster or an illustrated talk on making fly tying equipment or preparing fly tying materials.
3. Give a demonstration on making an item of fly tying equipment or preparing some type of fly tying material.
4. Prepare a consumer decision making exercise on some item of fly tying equipment or on an entire set of equipment. Use the exercise with your group or another interested one.

Community Service Suggestions

1. Set up a fly tier's equipment or materials exchange.
2. Make kits of materials that can be used in teaching other youth about fly tying or fly-fishing.
3. Make kits of equipment that can be used in teaching other youth about fly tying.
4. Plan an exhibit at a local Hunting and Fishing Day celebration and staff the exhibit demonstrating fly tying to those in attendance.

Links to Other Programs

The relationship of this lesson to others in the fly tying and tackle crafting section is obvious, as is its relationship with other elements of the Sportfishing program. Links to basic woodworking, sewing and crafts projects may develop through exposure to the materials used in some fashion in this project. Deeper study of the content can lead to exploration of fishery biology, the ecology of prey species, and the behavior of local fishes. Exploration of science can be stimulated through the chemistry of dyes, evaluation of patterns using statistics, and identification of the sources of fly tying materials.

Some Fly Tying References

Ronald A. Howard Jr.

Trout. 1952. Ray Bergman. Alfred A. Knopf. New York, NY.
A classic on trout fishing with many painted color plates of flies popular at the time of the writing. Appendices contain numerous patterns for the interested tier. Fly tying directions may prove challenging.

McClane's Standard Fishing Encyclopedia. 1965. A. J. McClane, ed., Holt, Rinehart and Winston. New York. Broad coverage of fish and fishing. Instruction on fly casting and fly tying with numerous patterns and color plates to provide graphic support for them.

Streamer Fly Tying and Fishing. 1966. Joseph D. Bates, Jr. The Stackpole Company. Harrisburg, PA
Comprehensive reference to the history and development of streamers and bucktails in North America. Extensive patterns and numerous color plates. The reference for streamer and bucktail tying.

Art Flick's New Streamside Guide to Naturals and Their Imitations. 1969. Arthur B. Flick. Crown Publishers, Inc., NY. Introduction to the Catskill school of fly tying. Patterns for the major hatches and stories to go with them. Most patterns useful in much of North American trout habitat.

A Book of Trout Flies.1970. Preston J. Jennings. Crown Publishers, New York.
Patterns for Eastern trout flies suggestive of the major hatches. Many dressings have been

supplanted by later patterns, but the book remains an excellent reference for tiers on the East Coast.

Selective Trout. 1971. Doug Swisher and Carl Richards. Crown Publishers, Inc., New York.
The introduction of the Swisher and Richards school of fly tying for selective trout, including extensive hatching tables, hatch matching suggestions based on their patterns, no-hackle patterns, emerger patterns and much more.

Salt Water Flies: Popular Patterns and How to Tie Them. 1972. Kenneth E. Bay and Hermann Kessler, J. B. Lippincott Company. Philadelphia. An early work on salt water flies and fly fishing with step-by-step illustrations of tying steps in 8 featured flies and 50 additional patterns. Color and black-and-white photographs.

Master Fly Tying Guide. 1972. Art Flick, ed., Crown Publishers, Inc., New York.
Illustrated instruction on fly tying skills by master tyers Art Flick, Lefty Kreh, Ted Niemeyer, Carl Richards, Ernest Schwiebert, Helen Shaw, Doug Swisher, and Dave Whitlock, each featuring patterns in their area of special expertise. Excellent support and instruction.

Fly Tying Problems and Their Answers. 1972. John Veniard and Donald Downs. Crown Publishers, Inc., New York Primarily a text on fly tying materials, problems encountered, and solutions to those problems.

Nymphs. 1973. Ernest Schwiebert. Winchester Press, New York.
Extensive guide to larval aquatic insects and patterns to match them by the author of *Matching the Hatch*.

The Handbook of Fly Tying. 1989. Peter Gathercole. Stoeger Publishing. South Hackensack, NJ.
Well illustrated steps in fly tying, leading to development of many fundamental and advanced skills. Excellent for the visual learner. Many fly patterns provided.

Bug Making. 1993. C. Boyd Pfeiffer. Lyons and Burford Publishers. New York.
Complete guide to making hair and hard-bodied, soft-bodied, and hair or fur bugs. Excellent illustrations. Some patterns need to be expanded for the fly tyer.

Flytyers Masterclass. 1995. Oliver Edwards. Stoeger Publishing, South Hackensack, NJ.
Excellent illustrations and explanations of tying procedures, primarily British patterns, although many of them are adaptable to or useful in American waters as well.

Illustrated Dictionary of Trout Flies. 1995. John Roberts. Collins Willow, Harper Collins Publishers, London. Extensive coverage of British and European patterns for trout and grayling arranged in alphabetical order by their pattern name.

The Art of Fly Tying. 1996. Claude Chartrand. Firefly Books. Buffalo, NY
Outstanding illustrated guide for the fly fisher, basic entomology, collecting advice, discussion of fly tying materials and skills and illustrated introductions to 116 patterns, mostly American, but some European and British patterns as well. Well-designed and thought through.

Angler's Fly Identifier. 1996. Dr. Stephen J. Simpson and Dr. George C. McGavin. Running Press. Philadelphia. Excellent fly angler's entomology text coupled with fly tying instruction and specific patterns.

Flies: The Best One Thousand. . Randle Setzer.
Excellent selection of patterns and photographs of all types of flies.

CAROLINA CLACKER AND STEEL LEADER

W. Jeff Farris, Missouri Sportfishing Team

MATERIALS:

Nylon Covered Steel Cable	Crimpers	Crimps
Brass Bullet Weights	Glass Beads	Swivels
Snap Swivels		

ASSEMBY PROCEDURE:

Carolina Clacker

Determine the size of steel cable you need for your application. The cable or leader wire is sold by the diameter, which determines it strength or pound test. Determine what size crimps (or leader sleeves) you will need for this size cable. The supplier will list this information for you. For the Carolina Clacker I prefer .028 inch or 45 pound test cable, in black. Cut the cable to the length you desire, remember that during the crimping process some of this length is used. This process will use an extra ½ to 1 inch for each crimp. Take the cable and slide on one crimp. Put a swivel on the cable. Now bend the cable back through the crimp. Slide the crimp up or pull the cable to make the loop smaller, but not to tight. Now using the crimpers, crimp the crimp. After crimping the crimp should have some cable sticking out on one side and the long length of cable on the other. They should be lying side by side. The crimp itself should look like a ”B” on its back. The cable should not move in the crimp. On the open end of the cable, slide the brass bullet weight on with the point towards the crimp on the cable. Now add two glass beads. Next slide a crimp on this end, followed by a swivel. Again take the cable back through the crimp and crimp like before.

Steel Leaders

The steel leader is made the same as the Carolina Clacker, but without the weight. For steel leaders some will prefer to use snap swivels instead of just swivels, you can use just snaps or any combination you prefer. On each end you will install the crimp and swivel or snap, and then bend the cable back through and crimp.

Uses for Carolina Clackers and Steel Leaders

Carolina Clackers are used to rig for Carolina rigs. You tie the swivel to the line going back to the rod with the bullet weight point towards the rod. Then you tie some line to the other swivel and then a hook with a worm, lizard or other plastic bait.

For steel leaders they are used fishing where the line is at risk of damage. Like fish for toothy creators, pike, muskies or walleyes. Or fishing in rocky areas.

Carolina Clacker