Fire Building

Click on the button for the level you need:

- **Brownies**
- **Juniors**
- **Cadettes**
- **Seniors and Ambassadors**
Step 1:  
Learn fire safety

Materials Needed:
- Something to represent a fire/fire pit (Example: tissue paper fire, picture of a fire, outdoor fire pit)
- Fire safety protocol (see resources)
- Paper/markers

Lesson Plan:
1. Set-up a fire circle (actual fire circle/pit or a model of one) and have the girls gather around it.
2. Say “Who has ever been around a fire before? They’re cool aren’t they? But they can also be very dangerous. In order to keep ourselves safe, there are a few things that we should do around fires. As a group, we are going to come up with some ways that we can stay safe around fires.”
3. Have a girl (or 2-3) volunteer to be the writer for the Fire Safety Pledge. Give these girls the paper and markers.
4. “If there was a real fire going in the pit that we’re sitting around, what would be some things that we should do to keep us all safe around the fire?”
   a. Have the girls give ideas on ways to stay safe around the fire. The girls who are the writers should be writing the different ideas down on their paper.
   b. The safety points do not need to match the same wording as on the fire safety sheet (see Resources at the end of the step); just be sure they have the concepts there.
   c. Try to phrase things positively and modeling what the girls should be doing around the fire, not what they should not be doing. (Ex: A girl says “don’t run.” Rephrase her with “yes, we should all be careful to walk when we are near the fire.”)
5. Once girls have said all their ideas, check the list and see if there are other important ones to add.
   a. When you are adding things to the list suggest it to the girls instead of telling them to put it on the list (Ex: say “Do you think we should include making sure someone always stays by the fire?” “Why?”)
6. Once you have talked about all the fire safety pieces, review with the girls what they have written on their piece of paper. Have the girls all sign the piece of paper saying that they promise to follow fire safety whenever around fires. (You may need to have the girls re-write their safety points on another sheet of paper for everyone to sign.)
7. For more fun! – Have the girls come up with a song or a skit about fire safety. Getting them active will help them remember it better when it comes time to start building fires!
8. Whenever the girls are around fires, have their Fire Safety Pledge nearby so you can refer back to it often (the more you refer to it, the more they will remember it).
Step 2:
Learn to light matches

Materials Needed:
- Fire safety pledge (from step 1)
- Matches (box matches tend to be easier)
- Bucket of Water
- Fire pit with tinder (tiny sticks) to light [optional]

Lesson Plan:
1. Explain to the girls: “We are now going to learn how to light matches. Can matches be dangerous?” “Yes matches can be dangerous, but today we are going to learn how to light them safely. Before we start what do you think we should talk about before going near fire?”
   a. Girls should then bring up the Fire Safety Pledge, if not, help lead the girls to it by asking leading questions.
2. As a group review your Fire Safety Pledge.
3. Let the girls know “The most important thing to remember after we learn matches is that matches are not toys. We should always make sure that we have an adult nearby when using matches and that they are helping us stay safe.”
4. Have girls gather around a leader or older girl as she demonstrates how to properly light a match and talk the girls through what she is doing.
   a. Make sure the girls are at least an arm lengths away from the person lighting the match.
   b. Have the demonstrator be in the three points of contact pose (see image to the right) next to a water bucket.
   c. The demonstrator should then talk the girls through the process by stating:
      i. “First, I’m going to take one match out of the box, then close the box so it’s all together again.”
      ii. “Next, I’m going to grab the match about halfway up the stick.”
      iii. “I’m then going to start at the side of the box closest to me and slide the match along the box away from me while pushing down on the match.”
      iv. “Once my match is lit I can hold onto it for a while over the bucket or I can drop it straight into the bucket of water. If I’m going to hold onto my match how should I hold it? With the flame side up or the flame side down?”
         1. Answer: Flame side up. Because fire burns up and if it is down, below our hand, it can burn us.
      v. “After the match is lit, I should also slide my fingers down the matchstick so I’m holding closer to the end and let the match burn longer.”
      vi. Drop the match into the bucket of water.
4. Now it is time for the girls to start lighting the matches. Dependent on the number of girls, you may want to split the girls into smaller groups each with a box of matches, a bucket of water, and an adult. You can also have some girls lighting matches while others are working on a different project.
5. Have girls then copy what the demonstrator did one at a time per bucket of water: Get in the three points of contact stance next to the bucket, take a match out, light it, and either hold onto it or drop it in the water. Make sure an adult is kneeled next to her, helping guide her.
   a. Some girls may need more assistance than others.
   b. Some hints and tips if girls are struggling:
      i. Many times girls are not pressing hard enough or sliding fast enough. Try to encourage girls to try pressing harder or sliding faster if she is not being successful.
      ii. Sometimes girls have difficulty holding the match box steady enough. You can assist her by holding the match box with her while she strikes the match.
   c. Girls really love lighting matches once they get ahold of it. Be sure to have lots of matches on hand!
7. Once a girl is able to light matches over a bucket and hold onto the match, you can have her move onto a fire pit if you have one available.

8. Make sure to have an adult supervising the fire pit the same way as with the bucket of water. Have some tinder (width is smaller than your pinkie finger; like pencil lead or a match stick in thickness) or a full frame set up (see Step Two for directions) for the girls to practice lighting the sticks from a match.

9. Once the girls have all had a chance to practice lighting matches, gather them in a circle to talk about the experience.

10. Pass out matches so that each girl gets 1 match as a souvenir (put in a Ziploc baggie for them; be sure their adult knows they are coming home with a match). Say to the girls “This match is to remind you about what we have practiced today and what you are capable of doing. How did it feel to light a match? Is it something you’ve done before? If not, how did it feel to try something new? If you’ve done it before, what is something new you learned?” Have the girls volunteer to share their answers only if they want to.

11. Remind them about what they talked about earlier: “Remember, matches are not toys. We should always make sure that we have an adult nearby when using matches and that they are helping us stay safe.”

**Step 3: Build and start an A-frame fire**

**Materials Needed:**
- Fire safety pledge (from step 1)
- Matches (box matches tend to be easier)
- Bucket of Water
- Established Fire Pit
- Wood of varying sizes
- Marshmallows or food to cook over the fire

**Lesson Plan:**
1. Explain to the girls: “We are now going to build a campfire. What do you think we need before we start our fire?”
   a. Possible answers: Wood, matches, water bucket, etc.
2. Ask: “What is something we should review before we start trying to make our fire?”
   a. The Fire Safety Pledge! Review with girls their Fire Safety Pledge and ways that we can all stay safe around fires.
3. Explain, “Before we can start building a fire, we need to collect wood for our fire. There are three different types of wood we need to collect and put into three different piles: (It is helpful to have examples of these types of wood while explain to the girls)
   a. Super tiny stuff. This is also called tinder. These sticks should be really thin. They should be skinner than your pinky finger and about the thickness of a pencil lead or match.
   b. Medium sized stuff. This is also called kindling. These sticks should be about the thickness of your thumb.
   c. Big stuff. This is also called fuel. These should be at least the thickness of your arm. Many sites will have chopped logs available to use as fuel.
   d. Whenever we collect fire wood we want to be sure not to break branches off of living trees and bushes. We only want to pick up stuff off the ground that is already dead.
4. “Now it is time to go collect wood! First I want everyone to collect the super tiny stuff. Remember it should be about the size of the lead in a pencil. I want everyone to try and collect a handful of the tinder. Please stay within [set boundaries for the girls; keep them within eyesight of an adult]. Once you have your handful, come back and show me and put it into the pile.” You can have the girls go in groups as well so it is a team effort.
   a. Girls may struggle with collecting the super small stuff. If they bring back sticks that are too thick, have them place it in a separate pile to be used as kindling or as sticks to be added once the fire is started. Try to not tell them to find “smaller” sticks, this often
translates to shorter in their minds and girls will bring similar thickness sticks that they have broken into “smaller” pieces.

b. You will want to collect about double as much as you think you will need, especially as the girls are first learning.
c. Once you have collected what you think looks like enough, gather the girls back together.

5. “Whoa! You girls are awesome stick collectors! I think that we are going to be able to start a great fire using all the small sticks you collected. Now we are going to do the same thing, but finding medium sized sticks, called kindling, instead. These are the ones that about the thickness of your thumb. What amount of these sticks do you think everyone should collect? (About an armful is a good start for the girls.) Remember to stay within the boundaries. Once you have your sticks, come back and we can add it to our pile.”

a. Start a second pile for these sticks so you can still access your small stuff when it comes time to start your fire.
b. Collect a large pile, then gather the girls back together.

6. “Gee-wiz! You all have impressed me again. This is a lot of sticks that you have gathered. But since we’ve put the time to gather these sticks first, it will make it easier once we have our fire going.”

7. “We have one more set of sticks to find. We have tinder and kindling – what else do we need?" (FUEL!) These are the ones that about the thickness of your arm. What amount of these sticks do you think everyone should collect? (About an armful is a good start for the girls.) Remember to stay within the boundaries. Once you have your sticks, come back and we can add it to our pile.”

a. Start a third pile for these sticks so you can still access your tinder and kindling when it comes time to start your fire.
b. Collect a large pile, then gather the girls back together.

8. “Now we need to start building our A-frame to start our fire with!” Have girls volunteer for different parts of the fire building process. Different tasks include: building the frame, lighting the match, and feeding the fire.

9. Lead the team of girls with the following steps:

a. Before starting any fire, be sure there is a water bucket available next to the fire pit.
b. Make the letter “A” out of large kindling or small fuel in the center of your fire pit. Make sure all logs are short enough to fit completely within the ring.
c. Place the tiny stuff (tinder) inside the top triangle of the “A” so that one end of each twig is resting on the floor of the fire pit and the twigs are all leaning against the crossbar of the “A”. The result should be a sort of miniature lean-to of twigs. Don’t pack your tinder too closely – make sure you’re leaving enough space for good ventilation.
d. Using three points of contact, have a girl light a match and light the tiny tinder from underneath. As the fire catches add more tiny sticks gradually.

10. As the fire is burning, gradually place bigger sticks. Remember to try and place only sticks that you will burn through completely on the fire.

11. Once the fire is going, pass out some marshmallows, or cook hamburger for dinner, or sing a song. Fires are a great place to bring people together and reflect!

12. Once the girls are done using the fire we need to be sure to safely put out the fire. See the Fire Safety Pledge for directions.

Note: Please make sure that the girls are actively participating in the fire building process in order to complete this step. You may need to build multiple fires in order for each girl to have a hands-on experience of helping.
Resources:
Fire Safety Protocol

Fire Safety Protocol
1. Walk when around the fire.
2. Use designated fire rings.
3. When collecting wood, only collect dead wood from the ground.
4. Always have a bucket of water and shovel at the fire ring BEFORE you start a fire.
5. Everyone should have their hair pulled back and secured with a bandana, hair tie, or hat.
6. Everyone should make sure that all loose fitting clothing is taken off, all long sleeves are pulled up, all strings or anything else that would fall over the fire is tucked back.
7. Everyone should be wearing closed toed shoes.
8. Build a fire just big enough to do the job. Rarely do you need a roaring fire, but make one large enough to produce enough coals to cook your food.
9. Make sure someone is always watching the fire and not leaving it unattended.
10. Adults should be nearby when around a fire.
11. When a stick goes into the fire, it should stay in the fire. We should not play with burning sticks.
12. Make sure your fire is completely out before leaving. You should be able to feel no more heat from the coals.

Match Safety
1. Have the wind at your back before lighting.
2. Make sure everyone else is an arm's length away when striking a match.
3. Strike the match away from you.
4. Make waterproof matches by coating stick match ends with clear nail polish and allow them to dry completely before putting back into the container.

Tips for Successful Fires
1. When adding wood to your fire, place it carefully. Throwing wood onto the fire causes embers to fly outside of the fire.
2. Fires need oxygen to burn. Be careful when placing your wood to allow space for air to flow through between branches.
3. Larger sticks and logs should be added as the fire is going well. Thicker sticks are harder to start, but will burn longer.

Putting Out a Fire
1. Let the fire die down until only ashes are left. This should not be a problem if you only built a fire big enough for your needs.
2. Stir the ashes with the shovel. Sprinkle water on ashes. Stir again and repeat until no more heat is felt with your hand above the coals.
3. Clean up the fire circle before leaving on your last day of camp, there should be no warm coals left.
Step 1:
Learn about the 3 different types of wood

Materials Needed:
- Pre-collected wood of the 3 sizes
- A wooded area to collect wood from
- Something to time with (a phone or watch works!)

Lesson Plan:
1. Review the Fire Safety Pledge; ensuring all pieces are being followed including having the water bucket present.
2. In a pre-established fire pit have 3 large pieces of wood (fuel) randomly placed within it. Say to the girls “Okay, today we are going to learn how to start fires. As you see here I’ve gathered all the wood I need, now I’m just going to strike my match and just like that we’ll have fire!”
   a. Light your match and try to start the large logs on fire. There should be some resistance from the girls.
   b. After a couple of matches (or if the girls are really protesting) ask them “Why is it not working for me to light these logs and make fire?”
   c. “Oh the logs are too big for my match to light? I need to collect smaller pieces of wood? You girls are right! I wonder where you learned to be so smart! But you’re right, different sized pieces of wood do different things for fires and today we’re going to learn about them.”
3. “There are 3 different types of wood including Fuel, Tinder, and Kindling. If you had to order these sizes from smallest to largest, what order would they go in?”
4. “First we are going to talk about Tinder.”
   a. “What size should tinder be?” Very Small
   b. “What objects can we compare tinder to that would be similar thickness?” Pencil lead, matches
   c. “What purpose does tinder serve?” To catch the spark and light the kindling
   d. “What would make good tinder?” Small twigs, shavings of wood, dry needles, bark
   e. “What should we not use as tinder?” Leaves (mainly smoke), Paper (ashes fly as it burns)
   f. “Now we are going to have a little competition, I’m going to give everyone 2 minutes to find as much tinder as they can. At the end, we are all going to come back and count the number of pieces of tinder we have and see who has collected the most! Remember to walk and stay within these boundaries. [You can have the girls pair up as well.]
   g. “Great job collecting tinder girls! This will come in handy when we build a fire later!”
5. “Next up was what size again?” “Oh that’s right Kindling!”
   a. “What size should kindling be?” Medium thickness
   b. “What objects can we compare kindling to that would be of similar thickness?” Pinky to thumb size, pencil to Twix bar size.
   c. “What purpose does kindling serve?” To burn long enough and hot enough to set fire to the fuel around it
d. “Now we are going to have a similar competition as earlier, but I want everyone to collect kindling instead of tinder. You will once again have 2 minutes to find as much kindling as you can. At the end, we are all going to come back and count the number of pieces of kindling we have and see who has collected the most! Remember to walk and stay within [these boundaries].” [You can also have them come back with a set number of pieces instead of taking 2 minutes.]

e. “Wow these are great sizes of wood to be used as kindling! These will definitely help us build our fire up!”

6. “What’s the last type of wood” “Fuel you’re right!”
   a. “What size should fuel be?” Really thick
   b. “What objects can we compare fuel to that would be of similar thickness?” Arm to leg size
   c. “What purpose does fuel serve?” Keeps the fire going and burns into good hot coals
   d. “What do you think we should keep in mind when collecting fuel pieces?” We should only pick pieces that we can burn completely during our fire. We don’t want it to be too thick.
   e. “Now I want everyone to go find one good piece of fuel. Remember to keep in mind thickness and a piece that will fit into our fire pit. Remember to walk and stay within [these boundaries]”

7. “You guys are really the best firewood collectors around! I’m so glad I have you on my team to help build fires. Sometimes it can be hard to remember all these different types of wood though. So now that you’ve practiced finding the different types, I want you to come up with a song or rhyme to help us remember the different types of wood in the future!”
   a. Give them some time to come up with their song or rhyme. Make sure they include the different names of the wood and hints to help remember which size is which!
   b. You may want to have the girls write it down to help them remember for the next time you need to collect some firewood.

8. “You girls have done a really great job today! I can’t wait to start building fires with you!”

Step 2:
Make an emergency fire starter

Materials Needed: (Dependent on the fire starters you choose to make – see instructions below for exact materials)
   o Wax paper
   o Broken, old candles or broken up paraffin wax (found at Walmart or Craft stores)
   o Paper egg cartons
   o Dryer lint
   o Cotton balls
   o Vaseline
   o Stove and double broiler set-up to melt wax
   o A fire pit or safe location to light your fire starters
   o Matches
   o Bucket of water
Lesson Plan:
1. “Sometimes it can be hard to start fires for reasons like wet wood, not enough tinder, wind conditions, and so forth. So today, we are going to make fire starters to use when we need a little more help starting our fire.”
2. Using one or more of the following methods, make fire starters with your group. Be sure to have the girls do as much as possible with making the fire starters. Give them the overview of what needs to happen and have them help decide the process of completing the task at hand (yes, it takes longer, but the girls will be more engaged and will need to work together).
   - **Campfire twist**
     - Materials: Wax paper, broken candles or wax, dryer lint
     - Take a small section of wax paper, place a small amount of dryer lint and a section of wax in the middle of the sheet. Roll the wax paper around the lint and wax and twist the ends to close them (similar to a tootsie roll).
     - When ready to use, light one of the ends!
   - **Egg carton cup**
     - Materials: Paper egg carton, dryer lint, wax or candles, stove and double broiler set-up
     - On a stovetop, melt the candles or wax using a double broiler. Smaller chunks will melt faster.
     - Cut the egg carton apart so each cup is separate.
     - Stuff each cup with dryer lint.
     - Once the wax is melted, pour the wax over the lint in the cup.
     - When ready to use, light one of cardboard flaps.
   - **Cotton ball**
     - Materials: Cotton balls, Vaseline
     - Cover cotton balls with Vaseline, the better coated they are, the longer they will burn.
     - Store cotton balls in a Ziploc bag until ready to be used.
     - When ready to use, pull the cotton ball apart a little bit and light directly.
     - Be sure to have soap on hand or have the girls where gloves when they do this as Vaseline is hard to wash off their hands.
3. After completing fire starters (make enough for each girl to have at least 3) gather the girls back together and talk about why we use these fire starters.
4. “Do you think we should use fire starters all the time?” “Why not” “When are time that you think we should use fire starters?” Wet wood, windy conditions, almost out of matches.
5. “Should we ever use liquid igniters to start our fires?” No, because they light and spread too quickly
6. Next, give girls the chance to practice lighting a fire starter using matches. Make sure you light them in a fire pit and have a bucket of water nearby to help extinguish them.

**Step 3:**
**Build and start 3 different kinds of fires**

Materials Needed:
- Fire safety pledge (from Brownie step 1)
- Matches (box matches tend to be easier)
- Bucket of Water
- Established Fire Pit
- A wooded area
Lesson Plan:
1. These fires can be built in one session or throughout multiple camping occasions. Fires once started can be used for cooking, heat, bonding, or anything!
2. When building the fires, please have the girls collect the wood, build the frames, light the matches, feed the fire, and tend to it. **Always review Fire Safety before beginning fire building.**
3. If you need guidance on how to help girls through this process please refer to Brownie Fire Building Step 3.
   - **A-Frame**
     - Make the letter “A” out of large kindling or small fuel in the center of your fire pit. Make sure the logs are short enough to fit within the fire pit.
     - Place the tiny stuff (tinder) inside the top triangle of the “A” so that one end of each twig is resting on the floor of the fire pit and the twigs are all leaning against the crossbar of the “A”. The result should be a sort of miniature lean-to of twigs. Don’t pack your tinder too closely – make sure you’re leaving enough space for good ventilation.
     - Using three points of contact, have a girl light a match and light the tiny tinder from underneath. As the fire catches add more tiny sticks gradually.
   - **Teepee**
     - The picture shows how to build a small teepee of tinder and kindling to use in lighting a larger fire. It uses a ball of fibrous tinder, which is just another tinder option.
     - To make a cooking or bonfire sized teepee, start by making a small A-frame in the center of your fire pit. Take small fuel and create a teepee of wood around the a-frame (the picture will show you the general idea – just upsize the scale significantly). Make sure you leave at least one opening large enough for you to reach the A-frame inside, and make sure that the sides of your teepee are close enough to the A-frame to catch when you light the fire.
   - **Log Cabin Fire**
     - This fire is great for creating a bed of coals. Start by making a small A-frame or teepee in the center of your fire pit. Build a miniature log cabin of small or medium sized fuel around the A-frame or teepee. The size of wood you choose will be determined by the size of the fire you wish to have.
     - Gradually lay the logs toward the center as you build the cabin. Remember to leave plenty of space for good ventilation. In the end, it will have the appearance of a pyramid.
   - **Star Fire**
     - This fire is good for cooking or maintaining with little effort. Start by laying 5-6 pieces of fuel in a pattern similar to the picture. Leave a space in the middle to build the start of your fire. Build a small A-frame or teepee in the center.
     - Once started, add kindling until the center ends of the logs are started. As the fuel is burned, push the ends closer to the center to keep the fire going.
Resources:
Fire Safety Protocol

Fire Safety Protocol
13. Walk when around the fire.
14. Use designated fire rings.
15. When collecting wood, only collect dead wood from the ground.
16. Always have a bucket of water and shovel at the fire ring BEFORE you start a fire.
17. Everyone should have their hair pulled back and secured with a bandana, hair tie, or hat.
18. Everyone should make sure that all loose fitting clothing is taken off, all long sleeves are pulled up, all strings or anything else that would fall over the fire is tucked back.
19. Everyone should be wearing closed toed shoes.
20. Build a fire just big enough to do the job. Rarely do you need a roaring fire, but make one large enough to produce enough coals to cook your food.
21. Make sure someone is always watching the fire and not leaving it unattended.
22. Adults should be nearby when around a fire.
23. When a stick goes into the fire, it should stay in the fire. We should not play with burning sticks.
24. Make sure your fire is completely out before leaving. You should be able to feel no more heat from the coals.

Match Safety
5. Have the wind at your back before lighting.
6. Make sure everyone else is an arm’s length away when striking a match.
7. Strike the match away from you.
8. Make waterproof matches by coating stick match ends with clear nail polish and allow them to dry completely before putting back into the container.

Tips for Successful Fires
4. When adding wood to your fire, place it carefully. Throwing wood onto the fire causes embers to fly outside of the fire.
5. Fires need oxygen to burn. Be careful when placing your wood to allow space for air to flow through between branches.
6. Larger sticks and logs should be added as the fire is going well. Thicker sticks are harder to start, but will burn longer.

Putting out a Fire
4. Let the fire die down until only ashes are left. This should not be a problem if you only built a fire big enough for your needs.
5. Stir the ashes with the shovel. Sprinkle water on ashes. Stir again and repeat until no more heat is felt with your hand above the coals.
6. Clean up the fire circle before leaving on your last day of camp, there should be no warm coals left.
Outdoor Skills Patch
Fire Building – Cadettes

Learn the skills needed to thrive in an outdoor environment. Do you know how to safely be around a fire? Can you start a fire with something other than matches?

**Step 1:**
Learn and start 3 different fires for 3 different reasons

**Materials Needed:**
- Fire safety pledge (from Brownie step 1)
- Matches (box matches tend to be easier)
- Bucket of Water
- Established Fire Pit
- A wooded area

**Lesson Plan:**
1. These fires can be built in one session or throughout multiple camping occasions. While building the fires, talk about how the different structures make them useful for different activities. After starting the fire, make sure to use it for the intended reason!
2. When building the fires, please have the girls collect the wood, build the frames, light the matches, feed the fire, and tend to it. **Always review Fire Safety before beginning fire building.**
3. If you need guidance on how to help girls through this process please refer to Brownie Fire Building Step 3.

- **A-frame (used for light)**
  - Make the letter “A” out of large kindling or small fuel in the center of your fire pit. Make sure the logs are short enough to fit within the fire pit.
  - Place the tiny stuff (tinder) inside the top triangle of the “A” so that one end of each twig is resting on the floor of the fire pit and the twigs are all leaning against the crossbar of the “A”. The result should be a sort of miniature lean-to of twigs. Don’t pack your tinder too closely – make sure you’re leaving enough space for good ventilation.
  - Using three points of contact, have a girl light a match and light the tiny tinder from underneath. As the fire catches add more tiny sticks gradually.

- **Teepee (used for warmth)**
  - The picture shows how to build a small teepee of tinder and kindling to use in lighting a larger fire. It uses a ball of fibrous tinder, which is just another tinder option.
  - To make a cooking or bonfire sized teepee, start by making a small A-frame in the center of your fire pit. Take small fuel and create a teepee of wood around the A-frame (the picture will show you the general idea – just upsized the scale significantly). Make sure you leave at least one opening large enough for you to reach the A-frame inside, and make sure that the sides of your teepee are close enough to the A-frame to catch when you light the fire.
• Log Cabin Fire (used for cooking)
  o This fire is great for creating a bed of coals. Start by making a small A-frame or teepee in the center of your fire pit. Build a miniature log cabin of small or medium sized fuel around the A-frame or teepee. The size of wood you choose will be determined by the size of the fire you wish to have.
  o Gradually lay the logs toward the center as you build the cabin. Remember to leave plenty of space for good ventilation. In the end, it will have the appearance of a pyramid.

• Star Fire (used for community building/social gathering)
  o This fire is good for cooking or maintaining with little effort. Start by laying 5-6 pieces of fuel in a pattern similar to the picture. Leave a space in the middle to build the start of your fire. Build a small A-frame or teepee in the center.
  o Once started, add kindling until the center ends of the logs are started. As the fuel is burned, push the ends closer to the center to keep the fire going.

Step 2:
Start a fire using 2 non-traditional methods

Materials Needed:
  o Fire safety pledge
    (from Brownie step 1)
  o Bucket of Water
  o Established Fire Pit
  o A wooded area
  o Flint and Steel
  o 9 volt battery, Fine steel wool
  o Magnifying glass

Lesson Plan:
1. These fires can be built in one session or throughout multiple camping occasions. Fires once started can be used for cooking, heat, bonding, or anything!
2. When building the fires, please have the girls collect the wood, build the frames, use the fire starters, feed the fire, and tend to it. **Always review Fire Safety before beginning fire building.**
3. Use any structure you’d like to start these fires.
   • Flint and Steel
     o If you have dry grass, make a little "bed" for the flint shavings (the "bed" also keeps your shavings from being blown away). Put the "bed" on some smaller twigs and have other pieces ready to put on the fire. The shavings and dry grass will burn quickly, so be ready!
     o Now, take the flint, and pocket knife (if there’s no scraping tool), and scrape some of the flint off of one side (if you see sparks, flip it over; you’re using the wrong side). You should be making a nice little pile of flint shavings in the "bed" of dry grass. A pile of shavings about the size of a nickel should probably work; you can always add more if need be. Now you’re ready to light it.
     o This time you will use the other side of the flint (the side that makes sparks). Hold the flint down next to the "bed" at an angle so the sparks fall into the "bed." Take the scraper, or pocket knife, and scrape down the flint towards the "bed." You should see sparks, if they don’t catch right away, keep scraping. This may take a few swipes. Once a spark hits the shavings, it should light the rest of the "bed." When you have a small flame, add some of the smaller twigs. Once the fire is going, continue to add increasingly larger pieces of wood. And that’s it, you made fire with flint!

- **Battery and Steel Wool**
  - Take a piece of steel wool (fine grade works the best) and pull it a part a little bit.
  - Mix these pieces of steel wool in with tinder in an established fire pit.
  - To light the steel wool, you'll take the battery and touch the 9 volt connectors and touch them against the steel wool – it will ignite quickly.
  - Place tinder on the glowing steel wool until it catches fire.
  - Be sure not to breathe in the steel wool as it is burning; keep your head back away from the fire.
  - You can look up Fire Building with Batteries and Steel Wool on the internet for videos and step-by-step instructions if needed.

- **Magnifying Glass and Sun**
  - This method works best during a clear and sunny day.
  - In the fire pit, place only tinder. You want to bundle your tinder together so it looks like a bird’s nest almost (pieces of pulled apart bark, dry meadow grasses, etc. work well).
  - Then take a piece of bark and pull it apart so it is kind of stringy. Then wrap it up so it represents a ball-like shape. This is going to be your ember.
  - Hold the magnifying glass in front of the sun so that a small bright dot will appear on the ember. Adjust as needed to get the dot as small as possible. The dot must be a circle and as small as possible.
  - Be patient. It may take a long time to actually get the ember to light (5-10 minutes).
  - Once the ember is lit, you can place it in the bird’s nest and wrap it up in the nest. If you are comfortable with it, you can pick up the bird’s nest and shake the ember around inside, having it help catch the nest on fire (blowing air into it as needed as well).
  - Once the bird’s nest is lit, you can start adding more tinder to it, building your fire.
  - You can look up Fire Building with a Magnifying Glass on the internet for videos and step-by-step instructions if needed.

**Step 3:**

**Start a fire in non-ideal conditions**

**Materials Needed:**
- Fire safety pledge (from Brownie step 1)
- Matches (box matches tend to be easier)
- Bucket of Water
- Established Fire Pit
- A wooded area

**Lesson Plan:**
1. Using any of the methods you’ve learned in the previous steps, light a fire and keep it burning for at least 30 minutes in non-ideal conditions.
2. Non-ideal conditions can include: while it is raining or snowing or using wet wood (after a rain shower).
   a. When wood is wet or when it is raining, it may take longer for wood to light. As your fire grows, place wet wood near the fire to help it dry before placing it on the fire.
3. Please do not try lighting a fire in windy conditions as Utah is prone to wildfires; especially during the summer months.
Resources:
Fire Safety Protocol

Fire Safety Protocol
25. Walk when around the fire.
26. Use designated fire rings.
27. When collecting wood, only collect dead wood from the ground.
28. Always have a bucket of water and shovel at the fire ring BEFORE you start a fire.
29. Everyone should have their hair pulled back and secured with a bandana, hair tie, or hat.
30. Everyone should make sure that all loose fitting clothing is taken off, all long sleeves are pulled up, all strings or anything else that would fall over the fire is tucked back.
31. Everyone should be wearing closed toed shoes.
32. Build a fire just big enough to do the job. Rarely do you need a roaring fire, but make one large enough to produce enough coals to cook your food.
33. Make sure someone is always watching the fire and not leaving it unattended.
34. Adults should be nearby when around a fire.
35. When a stick goes into the fire, it should stay in the fire. We should not play with burning sticks.
36. Make sure your fire is completely out before leaving. You should be able to feel no more heat from the coals.

Match Safety
9. Have the wind at your back before lighting.
10. Make sure everyone else is an arm’s length away when striking a match.
11. Strike the match away from you.
12. Make waterproof matches by coating stick match ends with clear nail polish and allow them to dry completely before putting back into the container.

Tips for Successful Fires
7. When adding wood to your fire, place it carefully. Throwing wood onto the fire causes embers to fly outside of the fire.
8. Fires need oxygen to burn. Be careful when placing your wood to allow space for air to flow through between branches.
9. Larger sticks and logs should be added as the fire is going well. Thicker sticks are harder to start, but will burn longer.

Putting Out a Fire
7. Let the fire die down until only ashes are left. This should not be a problem if you only built a fire big enough for your needs.
8. Stir the ashes with the shovel. Sprinkle water on ashes. Stir again and repeat until no more heat is felt with your hand above the coals.
9. Clean up the fire circle before leaving on your last day of camp, there should be no warm coals left.
PLEASE NOTE: This guide is written in a way that a girl can pick it up and go through the steps without having a Troop Leader lead the session for her.

### Step 1:
**Start a one match fire**

**Materials Needed:**
- Fire safety pledge (from Brownie step 1)
- Matches (box matches tend to be easier)
- Bucket of Water
- Established Fire Pit
- A wooded area

**Lesson Plan:**
1. Using any of the fire building methods you have learned, try to start a one-match fire.
   a. Please refer back to the Junior Fire Building: Step 3 in order to learn about fire building methods.
   b. Successful one match fires tend to have well placed tinder with lots of extra tinder on hand to keep the flame going once it starts.
2. In order for it to count as a one match fire:
   a. Using only one match from the box, you should light your match, light the tinder, and build your fire so it burns for at least 15 minutes.
   b. Fire starters should not be used (ex: lint, paper, flint and steel, wool and batteries, magnifying glass, candles, wax paper). The match should light the wood directly.
   c. If you are unsuccessful with a match:
      i. Take apart your frame and rebuild it again from the beginning.
      ii. **Warning:** Be careful when handling wood that has attempted to be lit or has been lit. Make sure all sticks are fully extinguished with a little bit of water before attempting to move them.
3. Enjoy your fire that you’ve started using a single match! Celebrate a little you’re now a master fire starter!

### Step 2:
**Teach younger Girl Scouts fire building**

**Materials Needed:**
- See lesson plan for corresponding age level

**Lesson Plan:**
1. You can do this as an individual or in a group of 4 Seniors and Ambassadors or less.
2. Teach at least 6 Brownies, Juniors, and/or Cadettes two of their three Fire Building steps.
   a. Be sure to look over their Fire Building pieces prior to teaching it to them.
   b. Ensure you have all the necessary supplies ready.
   c. Be sure to ask questions if you aren’t sure how to teach something.
3. If you don’t know any younger Girl Scouts, work with your Troop Leader or the Juliette Program Specialist to connect with other girls in your Community. You can offer to teach these at a troop meeting, an overnight campout, an outdoor skill day at a park, a Day Camp, and so forth.

**Step 3:**

**Learn how to use a bow drill**

**Materials Needed:**
- Fire safety pledge (from Brownie step 1)
- Bucket of Water
- Non-Flammable work surface (gravel area ideal)
- Bow Drill Kit
- Tinder

**Lesson Plan:**
1. The basic set-up
   - A bow drill set should include the following: hearth board, drill, bow with string, bearing block, ember pan, and some tinder. (picture A)
2. You may either make the bow drill yourself or buy a pre-made kit.
   - If you would like to make the kit yourself please refer to the How to Make a Bow resource at the end of this document.
   - Please note there are many ways to build a bow drill and a lot of resources available online that you can use.
   - If you are making your own bow drill kit, please have an adult help you if the directions have you using tools that you are not familiar with.
3. Getting your posture correct:
   - Ideally you should be in a position that is comfortable, stable and one that allows you to breathe properly.
   - Picture B shows the most practical and frequently used drilling position.
   - The hearth board is pinned to the ground by your foot to stop it moving. The bearing block is held against your shin to keep the drill from wobbling about.
4. The drill is twisted into the string, ideally with the loop on the outside of the bow. (picture C)
5. Place the ember pan under the notch. Now you can begin drilling; give it everything you’ve got! (picture D) Apply pressure from the top with the bearing block and bow smoothly and quickly. Once you get a good rhythm going try to maintain it. Smoke will soon start to rise and will get thicker. The time it takes to create an ember will depend on the properties of the wood and how good your technique is. If you don’t apply enough downward pressure, the surfaces in contact with each other will polish and begin to screech; causing insufficient friction.
   - If your technique is good (which usually takes lots of practice), and all the conditions were right, then you'll most likely get an ember.
6. If there is an ember, the pile of black dust on your ember pan will continue to produce smoke by itself. Encourage the ember a little by gently wafting air over it with your hand. This short time also allows the ember to 'solidify'. If left longer you’ll see the hot glow rise to the surface. (picture E)
   a. Peel back the hearth board away from the ember. Now you’re ready to transfer it to the finest part of your prepared tinder. (picture F)
7. Once you have the ember on your tinder, fold the tinder around it gently but confidently. Now hold the bundle and begin to blow. Don’t blow too gently, this little smoldering pile of dust needs feeding with plenty of oxygen if it is to burst into flames. Also, do not blow too close, otherwise the moisture from your breath can discourage it. With more and more air the ember will grow stronger and the tinder will begin to burn, and then eventually burst into flames! (picture G)
8. Congratulations if you achieved fire!

Adapted from: http://www.jonsbushcraft.com/bowdrill%20tutorial.htm

**Resources:**
- Fire Safety Protocol
- How to Make a Bow Drill

**Fire Safety Protocol**
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4. Make waterproof matches by coating stick match ends with clear nail polish and allow them to dry completely before putting back into the container.
**Tips for Successful Fires**

1. When adding wood to your fire, place it carefully. Throwing wood onto the fire causes embers to fly outside of the fire.
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**Putting Out a Fire**

1. Let the fire die down until only ashes are left. This should not be a problem if you only built a fire big enough for your needs.
2. Stir the ashes with the shovel. Sprinkle water on ashes. Stir again and repeat until no more heat is felt with your hand above the coals.
3. Clean up the fire circle before leaving on your last day of camp, there should be no warm coals left.

**How to Make a Bow Drill**

- Adapted from: [http://www.jonsbushcraft.com/bowdrill%20tutorial.htm](http://www.jonsbushcraft.com/bowdrill%20tutorial.htm)
- You can search How to Make a Bow Drill on the internet for more instructions, videos, and for bow drill making kits.
- Please have an adult help you if the directions have you using tools that you are not familiar with.

1. Making the components
   a. You will need two different types of wood. A harder wood should be used as the drill with a softer wood as the Hearth board ideally.

2. Making the Hearth board (picture A)
   a. First of all you will need to select a suitable wood to carve your hearth board from. Lime (Basswood), Willow & Sycamore are some of the best woods to use. However many more can be used, and part of the fun is choosing and experimenting with your own choice of wood and getting familiar with the properties of each kind.
   b. Dry dead wood is more suitable than fresh wood. Either cut wood and leave it to season, or select already dead pieces. Dead wood found on the forest floor will be damp unless the climate is very dry. Instead search for dead-standing wood, or wood caught up in other tree branches and so suspended off the ground.
   c. Cut a section of wood about a foot long and three fingers wide. There should be as few knots as possible; knots are too hard.
   d. Carve the wood down so that it resembles a small plank. You could start by splitting a round baton of wood in half and then carve the round side flat. A small hatchet is great for this.
   e. Hearth boards should be about 15-16mm thick. The width should be at least twice the thickness of the drill (about 4cm).

3. The Drill (picture B)
   a. For the drill try to find shoots of wood that are already about the right thickness
   b. Strip the bark off. Then carve one end pointed and the other end into a blunt point as shown. Your drill should be perfectly straight and about 6 or 7 seven inches long.
   c. The bottom of the drill is carved to a blunt point so that there
is a lot of surface area to cause as much friction as possible; whereas the top end ideally
needs to be as friction free as possible.
d. Drills should be about 2cm thick (do this by eye).
e. Note: The wider the drill the less full rotations it will make for each stroke of the bow. It is
also harder to apply as much downward pressure with a wide drill.
4. The bow (picture C)
a. The bow should be rigid and pretty much as thick as a broom handle. A bow
about 85cm long is a good length. A slightly bent shape is nice, although this
doesn't have to be much at all.
b. There are various natural materials from which you could make the string. A
good choice is something that is very hard wearing, such as nylon cord.
c. You can tie the ends of the cord to the bow in many different ways. Some
suggestions are: (pictures D and E)
5. Bearing block (picture F)
a. The bearing block should be as friction free as you can make it,
some tough hard wood is best like yew, elder, holly, and oak.
b. A small section of wood is all that is needed. Carve a depression
in the center using the tip of a knife. This small depression will
hold the pointed end of the drill in place.
c. You should make the bearing block comfortable to hold. Carve
off any sharp corners etc.
6. Tinder (picture G)
a. A lot of tinder takes preparation. Buffing it between your hands
will break the fibers down and produce fine fluffy tinder. Keep
your tinder somewhere dry, in a pocket for example. If it's damp,
keeping it against the warmth of your body will help to dry it.
7. Before you start drilling, you need to make a slight depression in the
hearth board where the base of your drill will initially sit. Make the
depression with the tip of your knife.
8. Now take up position and begin to bow until you have burnt a nice circle
the width of the drill.
9. Now before you proceed you will need to cut out a notch into the center
of this circle. The notch should be 1/8th of the circle. Mark it out first by
scouring with a knife as shown. (picture H)
10. You have now completed making your Bow Drill kit. Please refer back to
Cadettes Step 3 for instructions on how to start your fire.