Instructions for a Simple Adapted Laser Pointer for Low Tech Augmentative Communication

A Low Cost, Simple to Make, Simple to Use Laser Pointer for Low Tech Communication

No Soldering, Drilling or Prior Experience Required
Can be Created in Roughly 15-20 Minutes

Laser Can Be Adapted So That a Person with a Significant Disability Can Independently Turn It On and Off

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Adapted Laser Designed by Margaret Cotts & Amy Román, SLP-CCC
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She has worked at the ALS Treatment and Research Center at UCSF since 2000. Prior to that, she worked at the Center for Accessible Technology, providing computer access services to people with physical disabilities.

Margaret is currently in the process of creating a website on low tech communication for People with ALS.

In addition, Margaret and Amy Román co-provide a two day workshop on AAC for People with ALS. The course is geared towards speech language pathologists and other AAC service providers. It is designed to cover the basics of providing AAC services to people with ALS.

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Margaret Cotts, August 2007
Disclaimers

The author of this document expressly disclaims any and all responsibility for any liability, loss, or risk, personal or otherwise, which may be or is incurred as a consequence, directly or indirectly, of the use and application of the contents of this document.

Medical Disclaimer:
Certain sections of this document deal with health related issues. Please note that this is not intended to supplant any in-person consultation or services with a speech language pathologist or AAC service provider. Always seek the advice of a trained health professional with any questions you may have regarding communication issues. Any information received from this document is not intended to diagnose, treat, or cure. This manual is for information purposes only. The information on this document is not intended to replace proper medical care.

Laser Safety- Making the Laser
Please carefully follow the instructions step by step. There are certain safety risks involved in making the laser pointer if the instructions are not followed exactly (i.e. if you leave the batteries in the battery holder, and touch an exposed wire, you could receive a small electric shock.) If you follow the instructions exactly, making the laser pointer should be safe.

Laser Safety- Using the Laser
There are certain safety risks involved in using a laser pointer. If a person stares directly into the beam of the laser for an extended period of time, the laser can burn the retina and cause blindness. Please carefully review the safety portion of this document.
1. Do not stare directly into the laser beam.
2. Do not laminate communication boards designed to be used with the laser pointer.
3. Do not view the laser beam through a microscope, or binoculars.
4. Do not point the laser pointer at mirrors, or other reflective surfaces. (It could bounce back into the eyes of the person using the laser pointer.)
5. Do not point the laser pointer into the face of a person or an animal.
6. Do not allow children to play with the laser pointer.

This laser pointer is designed to be used by cognitively intact adults. It was not designed to be used by children, or in classroom settings.
Disclaimers (continued)

Laser Pointer Assessment/ Appropriateness

A laser pointer based communication system may or may not be the most appropriate low tech system for an individual. There are a number of different types of low tech communication for people with different needs and physical abilities. If a person does not have the physical ability to use a laser pointer, there may be other low tech options that will work for them. Please contact your Speech Language Pathologist/Augmentative Communication Specialist for assistance in determining the most appropriate communication system.

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A. A LITTLE BIT OF BACKGROUND...

In 2000, I started working at the ALS Center at UCSF, helping to provide Augmentative Communication Services to people with ALS (Lou Gehrig’s disease).

One of my first clients was a Russianёмigré. He was a lovely gentleman with a dry sense of humor, and a generous heart. His ALS had progressed. He had lost the ability to speak, and had very little movement below his neck.

I made a laser pointer for him by sliding a rubber o-ring over the “on” button of a mini keychain laser pointer (see page 15). We attached the laser pointer to his glasses using double-sided Velcro. I also put together a large communication board, based on the WordPower© core vocabulary system, created by Nancy Inman, SLP. The board contained the alphabet, plus about 100 frequently used words. We personalized the communication board, and made sure the targets were big enough for him to easily hit with the laser pointer. I gave his wife a blank version of the board, and she created a Russian version, complete with a picture of a heart for “I love you”, and a paper “remote control” which allowed him to give directions on how to control the TV and cable. (He was the only one in the household who understood the intricacies necessary to make the TV and cable work together.)

Meanwhile, we performed extensive trials on different speech generating devices. We looked at different access methods, including head mice, Morse code and switch scanning. I showed him computerized systems which would allow him to input text in Cyrillic (Russian). He had some unique needs which made using a speech generating device more difficult. (We were not able to find a Russian speech synthesizer, and, at the time, his Russian primary paid caregiver was not literate.) But on the whole, the main issue was that he just wasn’t interested in using a computer, or a speech generating device.

I was extremely fond of this gentleman, and remember having many long conversations on all sorts of interesting topics- the Soviet Gulag system, Russian literature and cinema, his pride in his children’s accomplishments. All of these conversations were carried out with his laser pointer and communication board. Even though he could not speak a word, I can still clearly hear our conversations in my head.

This was early in my career. At the time, I felt guilty that he wasn’t using a speech generating device. I kept reintroducing the idea of using a communication device, but he wasn’t interested. He could physically perform scanning on a computer (scanning through the letters of the alphabet) by hitting a switch with his head but the laser pointer was much faster and simpler for him.

It began to dawn on me that of all my clients at the time, he was the one who seemed to be communicating the quickest, and most efficiently.
The situation made me think about the value of low tech and laser pointers. I was especially interested in the idea of low tech and physical access (how an individual physically accesses their communication system.)

There were, however, a number of practical problems with the first laser pointer. The laser with the o-ring was not ideal - It was difficult to turn on and off. You had to slide the o-ring just so or it wouldn’t work. Sometimes the batteries would burn out quickly, sometimes after only a few hours. It was hard to attach the laser pointer to the eyeglasses at the right angle. A colleague, Ray Grott, showed me how to create a laser with external batteries. The first adapted laser pointers took over an hour to make. I would purchase a conventional handheld laser pointer from Office Depot, remove the laser module, and solder it to a power source. It was easy to overheat and destroy the laser module while soldering.

Over the next few years, the laser pointer went through several incarnations. There was a version which plugged into the wall and ran on AC power. There were versions which were switch adapted, so that a person with a significant disability could independently turn it on and off.

As time went on, we located various components which made the laser pointer much easier to put together. The goal of this document is to pass along the instructions, so that other people will have a simple way to create this powerful low tech communication aide.
B. **What is Augmentative Communication?**

Augmentative Communication (also referred to as Augmentative Alternative Communication or AAC) refers to anything that serves to **augment** or act as an **alternative** to speech, for a person with a significant speech disability.

Examples of AAC:

1. Spelling by pointing to letters on a paper alphabet board
2. Using a voice amplifier (for a person with very weak speech)
3. Sign language or finger spelling
4. Gestures
5. Vocalizations
6. Using a Speech Generating Device (SGD) (a special talking computer)
7. Eye gaze
8. A system of intelligent guessing on the part of the communication partner (the person who is communicating with the AAC user).

**What is an Augmentative Communication System?**

There is often a misconception that the speech generating device is the AAC system. The speech generating device is only **one part** of a complete AAC system. The AAC system is everything that makes communication possible. It may include gestures, vocalizations, intelligent guessing, using a low tech system (such as a paper alphabet board), an accessible call button, computer access, a way to use the telephone, as well as the speech generating device.

C. **Why Use Low Tech?**

The laser pointer and communication board are one form of “low tech” (low technology) AAC. A “high tech” system is anything which is computerized, or uses a computer chip.

Below is a partial listing of some different reasons why people use low tech communication:

1. **Low Tech as a Backup to High Tech**
   A speech generating device is essentially a computer. There are times when a computer doesn’t work. It’s important to always have a backup communication system.

2. **Low Tech for Certain Locations / Situations**
   There are certain situations where it might not be feasible to use a speech generating device (for example, in the shower, in bed in the middle of the night, while in a car.)
   There are times when it is simpler and more efficient to use a low tech system.

   I once visited a client with ALS who lived out in the country. He was quadriplegic (had very little movement below his neck). It had been a long visit, and he was tired. His wife helped him into bed. I was saying my goodbyes when he suddenly yelped, gestured with his head, and gazed intently at the leg of his pajamas. By following the direction of his
gaze, and by scanning through a few letters of the alphabet, we were able to figure out that a bug had crawled up under the leg of his pajamas. We could have put him back into his power chair, set up his speech generating device, turned it on, and waited for it to boot up. However, it was much simpler to use a series of gestures, eye gaze, plus a little scanning to figure out was he was trying to say.

3. **Low Tech for Reasons of Ease/Simplicity**

Some people with ALS might use a low tech system at times because they find it easier or simpler than using a speech generating device. They might use their SGD with visitors, or out in the community, but may use a low tech system at times with family and caregivers. Some people with ALS may rely more on a low tech system towards the end of life.

4. **Low Tech for Physical Access Reasons**

For some people, using low tech may be physically easier and more efficient than using a high tech system. This can especially be true for head mounted laser pointer users.

**Head Operated Mice vs. Lasers**

There are special computer mice which are controlled via head movements. Examples of these include the Madentec Tracker Pro, and the Origin Head Mouse Extreme.

The question comes up: “If a person can use a head-mounted laser pointer, why not use a head operated mouse with a computer?”

The answer is that head mice and laser pointers work in very different ways. A head mouse requires very good head control, and a good range of motion. When using a head operated mouse, the cursor doesn’t always go exactly where you want it to go. The device must be constantly re-calibrated through head movements. (If you can’t reach a target on the right side of the computer screen, you have to look far left, and then back again.)

A laser works very differently. When a person uses a head mounted laser pointer, the laser is essentially a straight line attached to their head. There is no need to “calibrate” the laser via head movements- the laser dot goes exactly in the direction that the person’s head is pointed to. I have worked with numerous clients who had the physical ability to use a head mounted laser pointer, but could not use a head operated mouse.

These individuals could independently use a SGD, but only through a special system called “scanning”. With high tech scanning, a person will hit a special button called a switch. This activation will scan through a grid which contains the alphabet, or other items. When the person gets to the selection they want, they hit the switch again.
INDIRECT vs. DIRECT SELECTION

A few terms to explain

Physical Access:
Physical Access refers to how a person will physically access a communication device, or low tech system. (i.e. will they touch the item they want with their finger? Use a mouse on a computerized device? Point to items with their eyes? Scan through desired selections by hitting a switch?)

Direct Selection:
Direct selection means that the individual directly selects the item that they want. Examples of direct selection include:

- Touching an item on a speech generating device (SGD) with a finger
- Directly pointing to an item on a SGD using a mouse.
- Pointing to a letter on a paper alphabet board using a laser pointer.

With direct selection, there is no intermediary step- the person sees the item that they want, and they directly select it.

Indirect Selection:

Indirect selection implies that there are intermediary steps in the process. Scanning is an example of indirect selection.

With a scanning alphabet board, the alphabet is divided up into a grid. In a low tech scanning system, a partner will indicate the different rows of the grid, i.e. “Do you want a letter on the row 1? Row 2? Row 3?” The AAC user will indicate the desired row, and the partner will scan through the letters on the row. “Is it I? J? K? L?” The person with the speech disability will indicate when they get to the desired letter.

I have worked with some clients who could use direct selection if they used a low tech method (a laser pointer). However, these same clients could only use a speech generating device or computer via indirect selection (scanning).

Low Tech and Interdependence

They (some people with disabilities) declare that they prize not self-sufficiency but self-determination, not independence but interdependence, not functional separateness but personal connection, not physical autonomy but human community.

Paul K. Longmore, Disability Historian

All low tech systems (other than writing) require some degree of interdependence. It is not possible for someone to communicate using a laser pointer alone in a room. There
must be a partner available in order to receive the message, and to say each word and letter out loud as it is being pointed to.

For many people with ALS, being 100% independent around communication and message creation may not be the highest goal. At times, the highest goal may be communicating simply, efficiently, and quickly. For some people, this may mean using a speech generating device. For others, because of their needs and physical abilities, it may mean using a low tech system.

I have worked with some clients who spent most of the day using their speech generating device or computer. I have also had clients who used a laser pointer for most conversation, but would use a computerized scanning system in order to independently do email. A handful of clients used their low tech system in order to navigate a computer (they would spell out an email using their laser and board, and a caregiver would type what they wrote into the computer.) I have had other clients who primarily used a low tech system throughout the course of their disability. Each person gravitates towards a system which meet their current needs, abilities, and situation.

**Low Tech as a Part of a Complete Augmentative Communication System**

A Speech Generating Device (SGD) can be an extremely powerful tool. It can help enable a person without speech to have a voice. A SGD can allow a person with a significant disability to independently create and speak messages. SGD offer the ability to use pre-programmed phrases and rate enhancement. Having voice output can alter the listener’s perceptions of the AAC user. A SGD can allow the user to have a conversation on the telephone, with a non-literate person, and with a group of people. When a person uses a speech generating device, it can allow a communication partner or caregiver to multi-task, and to attend to other business while taking part in the conversation. A communication device can make it possible to communicate with remote partners via email and text messaging.

This manual is not suggesting that low tech is “better” than high tech, or vice versa. Rather, that low tech and high tech are both important components of a complete Augmentative Communication System. There is no one “best” communication system. Everyone with a speech disability has unique communication needs and preferences. These needs may change over the course of the day, and over the course of a disability.
D. **Why Use a Laser Pointer?**

A laser pointer can allow a person without speech and with very limited physical movement to directly point to letters, words and phrases on a communication board.

There are a number of different types of people, with varying physical abilities, who may benefit from using a laser pointer for low tech communication:

a. **HEAD MOUNTED LASER POINTER**

People who have limited ability to use their hands and arms, but who have control over their head movements may benefit from using a head mounted laser.

Example of a customizable simple core vocabulary communication board, designed to be used with a laser pointer. Can be printed out any size. We print them out in a 15” x 20”, and a 30” x 40” version.
D. Why Use a Laser Pointer? (continued)

Example of a large scale core vocabulary/needs board. This particular board was printed out at 35” x 50”, but it could be printed any size.

For a demonstration of people with ALS using head mounted laser pointers, please go to www.youtube.com/alscommunication.

c. HAND HELD LASER
   There are 2 main categories of people who might benefit from a handheld laser pointer:

   i. People with Some Limited Hand Function
   A hand held laser pointer may be useful for people who have enough hand function to point with a laser pointer, but not enough to move their hand over a 8 ½ x 11 sheet of paper.
ii. People with Neck Weakness
Some people may have the ability to point with their hand to letters and words on an 8 ½ x 11 sheet of paper. However, because of neck weakness, it may be fatiguing to lean over to actually look at the communication board in order to make selections. If this individual uses a hand held laser pointer, and a larger sized communication board, they can sit or recline in a comfortable position, and not have to lean over a board in order to communicate.

Using a hand-held laser pointer with a WordPower® low tech board.

d. PEOPLE WHO HAVE THE ABILITY TO MOVE SOME OTHER BODY PART
I once worked with a woman who had difficulty moving her head and her arms. Her best, most consistent movement was her right foot. She was able to communicate by laying in bed, with a laser pointer attached to her right big toe. She used her foot to point to letters and words on a wall mounted communication board.

e. PEOPLE WHO WOULD BENEFIT FROM USING A CORE VOCABULARY BOARD, BUT HAVE DIFFICULTY DUE TO VISUAL ISSUES OR LIMITED RANGE OF MOVEMENT.
There are low tech and high tech communication systems based on “core vocabulary”. In addition to containing letters of the alphabet, these boards are also comprised of frequently used words. Examples of core vocabulary systems include WordPower® by Nancy Inman, SLP-CCC and AlphaCore® by Amy Román, SLP-CCC.

WordPower® is made up of roughly 100 of the most used words in the English language. The words on the board make up roughly 50% of what we say in our day to day life. Words in WordPower® are categorized, color-coded and alphabetized to make them easy to locate. (For example, all verbs are green, and are grouped together. All pronouns are yellow and grouped together, etc.)
AlphaCore® is also a core vocabulary system. Commonly used words are organized in alphabetical order. There are 3 different versions of AlphaCore: Mini, Mid-size and Full size. (The full size contains more words than the Mini or Mid-size).

Both WordPower® and AlphaCore exist in low tech (paper) and a high tech (computerized) formats. If a person has the ability to use a core vocabulary board, it can be make communication faster and much more efficient. It can allow someone to put together a sentence word by word, rather than having to spell everything out letter by letter.

Some people may have difficulty using a core vocabulary board printed onto an 8 ½ x 11 sheet of paper for the following physical reasons:

**PHYSICAL**
The individual doesn’t have the ability or range of motion to physically point to small cells on a 8 ½ x 11 sheet of paper with their finger.

**VISUAL**
Because there are so many cells on a core vocabulary page, a person might not have the visual ability to see the smaller font required to fit so many words onto a single sheet of paper.
If a core vocabulary board is enlarged to poster size and used with a laser pointer, it can address these 2 particular physical access issues. (There are some people who may have difficulty using a core vocabulary system for other reasons, but using an enlarged system with a laser pointer can at least address some of the physical obstacles.)

E. Why Adapt the Laser Pointer?

When I first began providing Augmentative Communication services to people with ALS, I learned the follow method for adapting a commercial laser pointer.

1. I would take a small commercial laser pointer and remove the keychain.
2. I would slide a small rubber o-ring (purchased from a hardware store) over the red “on” button. The pressure of the o-ring would hold the red button down, turning the laser pointer on. Another option was to wrap a rubber band tightly around the “on” button, until the laser turned on.

3. I would then attach the laser pointer to a person’s glasses using double sided Velcro, or I would Velcro the laser to a baseball cap.

It quickly became apparent that there were major drawbacks to this method:

1. **DIFFICULT TO TURN ON AND OFF**
   The biggest problem with this laser/o-ring setup was that it was difficult to turn the laser on and off. You had to slide the o-ring just so, or the laser wouldn’t turn on.

2. **BATTERY LIFE**
   The battery life of the laser was sporadic. Sometimes the batteries would last a few days, sometimes a few hours. The laser didn’t use conventional batteries (like AA batteries) which could be purchased at any grocery store. Rather, it used special batteries which had to be purchased at a store like Radio Shack.

3. **BATTERY WEIGHT**
   When this laser was mounted onto a person’s glasses, the individual was carrying the weight of the laser module and the batteries and the laser casing on the bridge of their nose. After an extended period of time, it could become heavy and uncomfortable, especially for a person with a weak neck. (One client developed a pressure sore on his nose from the weight of the glasses and the laser pointer.)

4. **DIFFICULT & TIME CONSUMING TO PUT THE LASER ONTO EYE GLASSES**

5. **LASER SAFETY**
   The laser that we were using was a Class IIIa laser. A lower power Class II laser is much safer.

It became clear that we needed a laser solution which was light-weight, easy to turn on and off, and which had an external power source.
F. Why Adapt the Eyeglass Mount?

The laser module can be mounted onto a person’s head in a number of different ways.

a) It can be attached to the temple frame of a pair of glasses.

b) It can be attached with Velcro to a baseball cap, visor or terry cloth head band.

Whether a laser is mounted onto glasses or a baseball cap is largely a matter of the personal preference.

One of the downsides of mounting the laser onto a baseball cap is that if a person has the back of their head resting against a pillow or head support, as they move their head they can accidentally move the baseball cap, changing the position and angle of the laser.

We came up with the idea of using a bicyclist’s eye glass mirror in order to attach the laser to a person’s glasses

The Third Eye® Eye Glass Mirror is a little device that a bicyclist can clip onto their glasses in order to see cars and traffic behind them.

Using the Third Eye® Eye Glass Mirror as a laser module mount served two different purposes:

a) It made it easy to take the laser on and off of a pair of glasses.

b) The moveable arm made it easy to change the angle and position of the laser. (The arm of Third Eye® Eye Glass Mirror can be rotated up, down, left and right.)

The ability to change the angle and position of the laser was important because a person with ALS might change their position several times throughout the course of a day. If a person was in a tilting power chair, or a hospital bed, they might be more or less reclined at different times. This change in body position would change the angle of the laser pointer.

Let’s say, for example, that a person had a laser pointer permanently attached to their eye glasses with Velcro in a fixed position. If they wanted to spend some time tilted back in their power chair, the laser beam would be pointing up too high for communication.

If a person was using the Eye Glass Mirror mount, the caregiver could adjust the arm of the laser pointer downward, so that the person could use the communication board.

Using this Eye Glass Mirror mount could also help compensate if an individual had a weak neck. The angle of the laser could be adjusted to help compensate if the person was leaning their head to one side.
G. Laser Safety- PLEASE READ

In simplified terms, a laser is a device that creates and amplifies a narrow, intense beam of light.

Looking directly into a laser is like staring directly into the sun. However, staring into a laser is much more dangerous, since it is a brighter, more focused light. If a person stares directly into the laser beam for an extended period of time, it can burn the retina, and damage the eye. If a person intentionally stared into the laser beam for an extended period of time without moving, it could cause blindness.

Lasers are sorted into different “classes” depending on their health risk. For this project, we do not want to use anything more powerful than a Class II laser pointer.

Class II
A Class 2 laser is a visible laser with less than 1 mW (milliwatt) of power output. Momentary viewing is not considered hazardous (0.25 second or less). People tend to blink or look away, which protects the eye. Intentional extended viewing, however, is considered hazardous.

Class IIIa
A Class IIIa laser is a visible laser with less than 5 mW of power output. This is more powerful than we need for this application. A Class II laser is much safer than a Class IIIa laser.

SAFETY NOTES:

1. Do not intentionally point the laser pointer into your eye. Do not look directly into the laser light source.
2. Never shine a laser pointer directly into the face of a person, or an animal.
3. Do not allow children to play with the laser pointer. The laser pointer is not a toy.
4. Do not point the laser pointer at mirrors, or other reflective surfaces. (The reflected light can bounce back into the user’s eye.)
5. Do not laminate a communication board that will be used with a laser pointer. The light will reflect back into the face of the person wearing the laser.
6. Never view a laser pointer through an optical device such as binoculars or a microscope.
7. This laser is designed to be used by cognitively intact adults. This particular laser is not designed to be used by children, or in classroom settings.
H. Special Safety Considerations for Individuals in Hospitals or Skilled Nursing Settings
(or individuals with multiple caregivers)

1. POST A SHEET ON LASER SAFETY
   There are a lot of misconceptions about what is and isn’t safe. Some people are concerned that their eyes might be damaged by simply looking at the red dot on the communication board. Others think that looking at the laser pointer when it’s on (without the beam going into their eyes) might be harmful. Please see the appendix for a possible sample sheet to post in a hospital room. (I always post my name, email and phone number on the sheet, in case any nursing staff want to contact me with questions or concerns)

2. LABEL THE LASER AND COMMUNICATION BOARD
   Make sure the laser has the “Class II” label on it. Label the communication board with a statement like “Do not look directly into laser beam” and “Do not laminate this board”.

3. PROVIDE A SAFETY IN-SERVICE
   When providing a laser based communication system to an individual living in a nursing facility, it’s very important to discuss safety issues with the administration, and to provide an in-service to the nursing staff.

   An in-service on laser safety is important for two reasons:
   a. To protect the safety of the nursing staff, and to educate them about what is and isn’t safe. It is especially important to clear up any misconceptions about laser safety.
   b. To ensure that the augmented communicator will be allowed to use the laser. (I have heard of situations where an individual in a nursing facility was not allowed to use the laser, because the nursing staff had concerns about safety.)

   The in-service should cover the following:
   A. SET UP
      How to set up the laser pointer (i.e. how to turn the laser on and off, how to change the batteries, how to adjust the eyeglass mount so that it’s in the correct position, etc.)
   B. SAFETY
      Safety Issues with the laser (i.e. what is and what isn’t safe.)
   C. HOW TO USE THE COMMUNICATION SYSTEM
      Demonstrate how to actually use the communication system- (saying the letter /word out loud as it is pointed to, guessing if appropriate or desired, writing down what has been pointed to so far, providing verbal and written feedback.)
   D. MODELING AND PRACTICE
      Model how to set up and use the communication system. After demonstrating how to use the system, call on some of the staff to set up and use the system with the augmented communicator.
   E. QUESTIONS AND ANSWERS
      Allow for time for nursing staff to ask questions and express concerns.
I. POTENTIALLY UNSAFE COMMUNICATION SETUP:
In the top illustration, the communication partner is directly facing the laser pointer user. This is a potentially unsafe position—when the laser user looks at his communication partner, he could accidentally hit her in the eye with the laser beam.

SAFER COMMUNICATION SETUP
This is a much safer configuration, since both partners are looking in the same direction. There is much less likelihood that the communication partner could get hit in the eye with the laser beam. (This is also a better set up, because the communication partner can write down what has been pointed to, and the laser user can look at the notepad to see what he has written so far.)
## COMPONENTS

For Adapted Laser Pointer with On/Off Switch and External Batteries

<table>
<thead>
<tr>
<th>Laser Pointer Components</th>
<th>Available from</th>
<th>Part number</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class II Red Laser Module</strong> (note: we are specifically using a Class II laser for safety reasons).</td>
<td>Lasersale.com (888) 709-0777</td>
<td>VLM-650-03LPT</td>
<td>$13.00</td>
</tr>
<tr>
<td><strong>Radio Shack “AA” Enclosed Battery Holder w/ on/off switch</strong></td>
<td>Radio Shack RadioShack.com 800-843-7422</td>
<td>270-409</td>
<td>$1.89</td>
</tr>
<tr>
<td><strong>4 AA Batteries</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>24 gauge stranded speaker wire</strong></td>
<td>Radio Shack RadioShack.com 800-843-7422</td>
<td>278-1301</td>
<td>$3.99</td>
</tr>
<tr>
<td><strong>24 gauge stranded black zip cord.</strong></td>
<td>Jameco jamesco.com 800-831-4242</td>
<td>100280</td>
<td>$5.59</td>
</tr>
<tr>
<td><strong>Black Electrical Tape</strong></td>
<td>Radio Shack 64-2373</td>
<td>(20 ft)</td>
<td>$1.99</td>
</tr>
<tr>
<td><strong>OPTIONAL 3rd Eye Eye Glass Mirror</strong></td>
<td>bicycletriess.com 1-888-222-9887</td>
<td>Only for people who are going to be mounting the laser onto their glasses.</td>
<td>$11</td>
</tr>
</tbody>
</table>

**TOOLS NEEDED:** Wire Stripper, scissors, small Phillips head screwdriver.
## INSTRUCTIONS FOR ADAPTED LASER POINTER

### 1. PREPPING THE WIRE

#### 1A. CUTTING THE WIRE

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1.   | Cut a 4 to 5 foot length of 24-gauge **stranded** speaker wire or black zip cord.  

![Black zip cord](image1.png)  
![Speaker Wire](image2.png) |
| 2.   | Both speaker wire and zip cord are made up of two separate wires which are joined together lengthwise. One of the wires has a white stripe running down the length of it.  

Take a pair of scissors and cut a tiny slit at the end of the wire. We are partially separating the two joined wires. The slit should only be a few centimeters long. |
| 3.   | Grasp each of the wires separately with your fingers, and gently pull them apart by about **one inch**. |
| 4.   | The end of the wire will now look like a snake’s tongue. Repeat this process with the other end of the wire. |
### 1. PREPPING THE WIRE (cont.)

#### 1B. STRIPPING THE WIRE

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>We will be using a tool called a wire stripper. The wire stripper will allow us to “strip” the plastic coating off the end of the wire. A wire stripper is designed to strip different sizes (or “gauges”) of wire.</td>
</tr>
<tr>
<td></td>
<td>![Wire Stripper Image]</td>
</tr>
<tr>
<td>6.</td>
<td>For the first part of our project, we will be using the size “18” slot of our wire stripper.</td>
</tr>
<tr>
<td></td>
<td>![Wire Stripper Size Image]</td>
</tr>
<tr>
<td>7.</td>
<td>Insert one of the 1 inch wires into the 18 gauge slot on the wire stripper. Squeeze the handles of the wire stripper firmly together.</td>
</tr>
<tr>
<td></td>
<td>![Insert Wire Image]</td>
</tr>
<tr>
<td>8.</td>
<td>Hold the wire firmly with one hand, and squeeze the wire stripper shut. Pull the wire stripper away from the wire. (If you are holding the wire strippers with your right hand, pull hard to the right, or away from your body, whichever is easiest for you.)</td>
</tr>
<tr>
<td></td>
<td>![Pull Wire Image]</td>
</tr>
</tbody>
</table>
### 1. PREPPING THE WIRE (cont.)

9. A one inch long piece of plastic tubing should “strip” right off of the wire, leaving a number of thin, copper colored threads exposed.

   If you accidentally cut off a few of the threads, don’t worry, as long as the bulk of the copper colored threads remain.

   If you accidentally cut off a lot of threads, it’s possible that you accidentally used the smaller 20 size gauge slot on the wire stripper. If this happens, cut off the “snakes tongue” and repeat steps 2 through 7.

### 1C. TWISTING THE WIRE

10. Take the stripped copper wires between your thumb and forefinger, and twist, twist, twist the wire in a clock-wise fashion.

    It’s very important not to have any stray threads of wire sticking out. (Later, when we create the laser pointer, if stray threads of wire are touching each other, it could keep the laser pointer from working.)

### REPEAT THE PROCESS WITH THE OTHER END OF THE WIRE

11. Repeat the process of twisting the copper wires. All 4 ends of our wire should be neatly twisted.
## 2. PREPPING THE LASER MODULE AND BATTERY ENCLOSURE

### 2A. PREPPING THE LASER MODULE

1. Insert about one inch of the red wire from the laser module into the **20** gauge slot of your wire stripper. (We are going to strip off about one inch of wire.)

   **IMPORTANT**
   Do not grasp the silver laser module itself when you are stripping the wires.

   The red and black wires are soldered onto a small chip inside the laser module. It is a fairly delicate connection. If you hold onto the laser module, and pull hard on the wire, you could yank the wire right off of the laser module.

   ![](image)

   Here, the red wire is wrapped around the laser-maker’s finger. This is one way to help keep tension off of the connection to the laser module.

2. It’s important to pinch the red wire tightly between your fingers. (You can pinch it between your thumb and forefinger, if that’s easiest for you.)

   This will help protect the connection where the wire is soldered onto to the laser module.

3. Squeeze the wire stripper tightly shut. Pull the wire strippers away from the hand holding the laser. About an inch of red plastic should strip off.

4. After the red plastic has been stripped off, there should be about an inch of thin, exposed silver wires. Twist these threads in a clockwise motion between your thumb and forefinger, so that no stray silver threads are sticking out.

   Repeat steps 1-4 with the **black** wire from the laser module.
2. PREPPING THE LASER MODULE AND BATTERY ENCLOSURE (cont.)

2B. PREPPING THE BATTERY ENCLOSURE

5. Strip off about an inch of the plastic covering from the red and black wires coming out of the battery enclosure.

   Again, it’s important to pinch the wire very tightly, in between the battery holder and the wire stripper. Do not hold onto the actual battery holder while stripping the wire. (You could pull the wire right off of the box.)

6. Twist the exposed silver threads in between your thumb and forefinger in a clockwise fashion, so that no exposed silver threads sticking out.

7. There is a small screw holding the battery box shut. Use the Phillips screwdriver to remove this screw, and place it aside.
3. TESTING THE LASER MODULE & BATTERY ENCLOSURE

3A. TEMPORARILY JOIN THE LASER MODULE & BATTERY ENCLOSURE

1. Before we put together our laser pointer, we want to make sure that the laser module and the battery enclosure actually work.

   **Turn the on/off switch on the battery holder into the “off” position.**

   Take the black wire from the laser pointer, and bend it into a cursive “l” shape. Loop the black wire from the battery enclosure through it (see photo.)

2. Note: This is a very temporary connection.

3. Place a strip of black electrical tape over the wire, where the laser pointer is joined to the battery box. Tape the wire down to your table top.

   This will serve two purposes-

   a. It will temporarily join the two wires, and keep them from disconnecting.
   b. It will keep us from accidentally touching the exposed wires while the batteries are in the box (which could give a mild electrical shock).
3. TESTING THE LASER MODULE & BATTERY ENCLOSURE (cont.)

4. Repeat the process and join the red wire from the laser pointer with the red wire from the battery enclosure. Put a piece of electrical tape over the bare, exposed wires.

   (Basically, we are joining the red wire to the red wire, and the black wire to the black wire.)

Inserting the Batteries & Testing

5. Insert the 4 AA batteries.

   Turn the on/off switch on the battery holder to the “on” position.

   The laser pointer should turn on. Woo-hoo!

6. **IMPORTANT SAFETY NOTE:**
   
   a. **Turn the battery enclosure OFF.**
      (I.e. put the on/off switch into the “off” position.)
   
   b. **REMOVE the batteries.**
      We don’t want to touch the exposed wires when the battery enclosure is in the “on” position, with the batteries inside. It could lead to a mild electric shock.

7. a. Remove the strips of tape.
   
   b. Disassemble the connection between the laser module and the battery enclosure. (Disconnect the laser module from the battery holder)

   **DO NOT LEAVE THE BATTERIES IN THE BATTERY HOLDER!**
### 4A. ATTACHING THE LASER MODULE

**1.** Take the red wire coming out of the laser pointer. Cross the exposed silver wire portion of this wire with the exposed copper wire from black & white zip cord (the one with the white stripe on it.)

2. Twist the copper colored wire (from the zip cord) and the silver colored wire (from the laser pointer) around *each other*, on the vertical axis.

3. Here is a close up image of the two wires being twisted together.

   **Note:** Do not twist all the way up to the top. Leave about ¾ of an inch of each wire untwisted.
4. ATTACHING THE LASER MODULE TO THE WIRE (cont.)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>Take the copper colored wire, and wrap it around <em>itself</em> one or two times. Take the silver wire, and wrap it around <em>itself</em> one or two times. You want to wrap the exposed wire on top of exposed wire. (i.e. don’t wrap the exposed wire around the plastic part of the wire.)</td>
</tr>
<tr>
<td></td>
<td><img src="image1" alt="Image of wire wrapping" /></td>
</tr>
<tr>
<td>5.</td>
<td>Place both wires parallel to each other, so that they can be twisted together.</td>
</tr>
<tr>
<td></td>
<td><img src="image2" alt="Image of twisted wires" /></td>
</tr>
<tr>
<td>6.</td>
<td>Wrap the copper wire and the silver wire around each other.</td>
</tr>
<tr>
<td></td>
<td><img src="image3" alt="Image of wrapped wires" /></td>
</tr>
<tr>
<td>7.</td>
<td>If there is any exposed length of wire left, repeat step 4 (wrap the copper and the silver wires around themselves) until you have formed a tight knot. What we basically want to do is join the two wires tightly together. It doesn’t matter how you get there, as long as the two wires are joined tightly together. We are performing the equivalent of tying a “child’s knot” (twisting the wires together one way, and then another way). If we only twisted the wires together in one direction (i.e. we only performed step 3) and we pulled hard, the two wires would come apart.</td>
</tr>
<tr>
<td></td>
<td><img src="image4" alt="Image of final wrapped wires" /></td>
</tr>
</tbody>
</table>
### 4. ATTACHING THE LASER MODULE TO THE WIRE (cont.)

#### 4B. TAping the Connection

<table>
<thead>
<tr>
<th>Step</th>
<th>Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td>Cut a one inch piece of black electrical tape. Place the knot on top of the sticky part of the tape, as shown in the picture.</td>
</tr>
<tr>
<td>9.</td>
<td>Wrap the black electrical tape tightly around the knot/connection, so that no stray wires are showing.</td>
</tr>
</tbody>
</table>
| 10.  | Repeat this process with the black wire coming out of the laser pointer:  
Join the black wire from the laser pointer with the solid black wire from the zip cord (or the solid copper colored speaker wire). When you are finished joining the wires, wrap the knot/connection with black electrical tape. |
| 11.  | Cut a piece of electrical tape about 3 inches long. Lay the two taped connections onto this new piece of tape. (Notice how the tape is placed on a diagonal.) |
| 12.  | Wrap the new piece of tape around the two connections. |
## 5A. REINFORCING THE LASER MODULE

1. We want to protect the connection where the red and black wires are soldered onto the laser module. (We don’t want these wires getting yanked on.)

   Take the red and black wires, and fold them into a “U” shape, and lay the “U” shape on top of the laser. (See photo)

2. Take a strip of black tape, about 4 inches long, and use it to tape the “U” shaped wires onto the laser.

3. Note how the tape is being applied at a slight diagonal. That way, as we wrap, we will be able to cover the whole distance.

4. If needed, cut another strip of black tape, and continue to wrap, so that the red and black wires are no longer visible.
### 6. ATTACHING THE BATTERY ENCLOSURE TO THE WIRE

#### 6A. ATTACHING THE BATTERY ENCLOSURE

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cross the exposed wire from the red wire from the battery holder with the exposed striped black zip cord wire (the one which has the white stripe on it.)</td>
</tr>
</tbody>
</table>
| 2. | Twist the copper colored wire (from the zip cord) and the silver colored wire (from the battery holder) around **each other**, on the vertical axis.  
   Note: Do not twist all the way up to the top. Leave about \( \frac{3}{4} \) of an inch of each wire untwisted. |
| 3. | Take the copper colored wire, and wrap it **around itself** one or two times. Repeat this process with the silver wire.  
   You want to wrap exposed wire on top of the exposed wire. (i.e. don’t wrap the exposed wire around the plastic part of the wire.) |
| 4. | If there is any exposed length of wire left, repeat step 3 (wrap the copper and the silver wire around each other) until you have formed a tight knot. |
### 6. ATTACHING THE BATTERY ENCLOSURE TO THE WIRE (cont.)

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>Cut a one inch strip of electrical tape, and lay the knot we have created on top of it.</td>
</tr>
<tr>
<td>6.</td>
<td>Wrap the tape tightly around the connection, so that no stray wires are showing.</td>
</tr>
<tr>
<td>7.</td>
<td>Repeat the process with the black wire from the battery holder, and the solid black wire from the zip cord.</td>
</tr>
<tr>
<td>8.</td>
<td>Cut a piece of electrical tape about 3 inches long. Wrap it around the two connections, so that they are joined together.</td>
</tr>
</tbody>
</table>
### 7. REINFORCING THE BATTERY ENCLOSURE

#### 7A. REINFORCING THE BATTERY ENCLOSURE

1. Take the red and black wires coming out of the battery holder, and fold them into a “U” shape on top of the battery box.

2. Cut several strips of tape, and use them to neatly tape the wires onto the battery box.

3. Flip the battery box over. Cut off any stray bits of tape which are overhanging.

4. Repeat this process, until the wire is completely taped down.
   (Note: we do **not** want to tape the box shut. We just want to tape the wire down onto the box.)
### 7. REINFORCING THE BATTERY ENCLOSURE (cont.)

#### 7B. INSERTING THE BATTERIES

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
</table>
| 5.   | **BE SURE THE BATTERY BOX IS IN THE “OFF” POSITION**  
      | Insert 4 AA batteries. |
| 6.   | Place the cover onto the battery box. If desired, screw the battery enclosure shut. (The battery box should come with a tiny screw).  
      | (For some people, it’s better to throw the screw away, and simply wrap a rubber band around the battery box in order to keep it closed. That way, when the batteries need replacing, the caregiver doesn’t have to go hunting around for a mini-screwdriver to open the box.)  
      | Put the switch on the battery box into the “on” position. The laser should turn on. |
| 7.   | The laser pointer will come with an adhesive safety warning. Peel off the backing and put the warning on the battery holder. |
### 8. OPTIONAL INSTRUCTIONS: ATTACHING THE EYEGlass MOUNT

#### 8a. ATTACHING THE LASER TO THE EYEGlass MOUNT

**NOTE:** This step is only for people who are controlling the laser via head movements.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong></td>
<td>Hold the arm of the eye glass holder (with mirror), and gently pop the mirror off.</td>
</tr>
<tr>
<td><strong>2.</strong></td>
<td>Lay the laser pointer directly on the top of the long “arm”. (So, when the individual is wearing the laser, the actual laser should be on top of the arm. This is important, because it will allow the individual to wear the laser on either the right or left side of their glasses. Some people need to switch sides every so often.)</td>
</tr>
<tr>
<td><strong>3.</strong></td>
<td>Cut a strip of tape about 4 inches long. Place the tape at the top of the laser module, at a diagonal.</td>
</tr>
<tr>
<td><strong>4.</strong></td>
<td>Wrap the tape around the laser pointer, firmly joining the laser to the “arm”.</td>
</tr>
</tbody>
</table>
8. ATTACHING THE EYEGlass MOUNT (cont.)

8B. ATTACHING THE LASER TO A PAIR OF EYEGlasses

5. Before getting started, notice the three pronged “legs” of the mount. At the bottom of each leg is a little “foot”. Notice how the “foot” in the middle points in one direction, and the other two feet point in the opposite direction. These “feet” will help the laser pointer stay attached to the eyeglasses.

6. The laser pointer can be attached to either the left or right side of a person’s glasses. It’s a matter of personal preference.

   If you are attaching the laser pointer to the left hand side of the glasses:
   a. Place leg #1 on the inside of the frame (closer to the individual)
   b. Place leg #2 on the outside of the frame (away from the individual)
   c. Then, put leg #3 on the inside of the frame (closer to the individual) (see photo below).

7. Here is a close-up of the laser mount attached to the left side temple (earpiece) of a pair glasses.

   Notice how “legs” 1 & 3 are on one side of the temple and the center leg, 2, is on the opposite side.

   (Notice how the feet are positioned, so that they are “clutching” onto the eye glass frame.)

8. If a person doesn’t wear glasses, it’s possible to use the frames from a pair of inexpensive sunglasses (just pop the lenses out.)

   (Note: when removing lenses from a pair of sunglasses, they always pop out away from the eye.)
9. ADAPTING THE LASER POINTER FOR HAND-HELD USE (Optional)

**NOTE:** This step is only for people who are going to be holding the laser in their hand.

1. For this adaptation, you can use a piece of plumbing pipe insulation (the grey tube in the photo.) Plumbing pipe insulation is available at any hardware store. You could also use cylindrical foam tubing (available in different diameters) from Sammons Preston. [www.sammonspreston.com](http://www.sammonspreston.com)

2. There are two different ways to adapt the foam tubing. I usually try both methods with an individual, to see which works best for them.

   **Method One:**
   Using a pair of scissors, or a box cutter, cut the length of tubing so that it is a little bit wider than the individual’s hand.

   Using a ball point pen, poke a hole through the piece of tubing. (The pipe insulation has a seam running down the length of it. Avoid putting the hole through the seam.)

3. Insert the laser module in the hole created by the ball point pen.

   If desired, the loose wire can be taped to the foam tubing using paper tape.

3. With this set-up, the individual holds the tube length-wise, with the laser module sticking out from in between their fingers. It may be helpful to place a small pillow, or folded washrag under the individual’s wrist, in order to help stabilize their hand.

   Optional: Enclose the foam tube in a cotton tube sock, with a small hole cut out for the laser pointer. (This can help wick the moisture away if a person’s hands sweat. It is also washable.)
9. ADAPTING THE LASER POINTER FOR HAND-HELD USE (Continued)

<table>
<thead>
<tr>
<th></th>
<th>METHOD TWO:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>If using the plumbing tubing, open it up along its pre-cut seam.</td>
</tr>
<tr>
<td>2.</td>
<td>Insert the laser in the middle of the tube.</td>
</tr>
<tr>
<td>3.</td>
<td>Fold the foam tubing on top of itself. Secure with a rubber band.</td>
</tr>
</tbody>
</table>
### 10. SWITCH ADAPTING THE LASER POINTER (Optional)

**NOTE:** This is an *optional* step for individuals who want to be able to independently turn the laser pointer on and off by themselves.

This is a battery interrupter, (also known as a battery device adapter). This is a simple way to switch adapt any small battery operated device. Available through Ablenet. [www.ablenetinc.com](http://www.ablenetinc.com) (do a search on the word “battery”.)

Item no. 1-BDAAA (for AA batteries)  $12.00

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Simultaneously insert a battery, and the copper disk of the battery interrupter into the battery holder. The copper disk should be wedged in-between the ‘negative’ side of the battery, and one of the silver springs on the battery holder.</td>
</tr>
<tr>
<td>2.</td>
<td>Here is a close up of the inserted battery interrupter. The copper disk of the battery interrupter is represented by the blue line. Note how the copper disk is placed in between the negative side of the battery (the side with the minus sign), and the silver coil on the battery holder.</td>
</tr>
</tbody>
</table>
### 10. SWITCH ADAPTING THE LASER POINTER (cont.)

3. Hold the door to the battery enclosure with one hand. Use the tip of the wire stripper to clamp onto a small section at the corner of the battery door. (The corner you clamp on should correspond to the side where the battery interrupter wire will come out)

   Waggle your wire stripper in an up-and-down motion. A tiny piece of that battery door corner should come off easily.

4. We have now a small chunk missing out of the door to our battery holder.

5. **PUT BATTERY HOLDER SWITCH INTO THE “OFF” POSITION.**

   Insert the rest of the AA batteries.

   Close the door of the battery holder. The wire tail of the battery interrupter should fit through the little opening we have created.
### 10. SWITCH ADAPTING THE LASER POINTER (cont.)

6. Plug an ability switch into the jack on the battery interrupter. (In the photo, we have plugged in a specs switch, but there are a number of different types of switches which might be appropriate for an individual, based on their physical abilities).

   Put the switch on the battery holder into the “on” position.

7. Press down on the switch. The laser should turn on.

   NOTE: There are a number of different kinds of switches and mounting systems for switches. If it is not clear which switch is appropriate, it may be helpful to work with an assistive technology specialist. A local Assistive Technology Specialist can be located through the RESNA website. (RESNA is the Rehabilitation Engineering and Assistive Technology Association of North America).  [www.resna.org](http://www.resna.org)

8. We are going to need another piece of equipment to make this setup work.

   Ablenet sells a device called a switch latch.  
   [www.ablenetinc.com](http://www.ablenetinc.com) Item no. 1-SSLAT $75.00

   a. Plug the switch into the switch latch box.
   b. Plug the male jack on the switch latch box into the female receptacle/jack coming out of our laser box.
   c. Set the Switch Latch box into “latch” mode.
   d. Turn on the “on” switch on our battery holder box.

   Now, when we hit our switch one time, the switch will turn on. When we hit the switch a second time, it will turn off.

   Keep in mind that switch adapting the laser pointer is optional.
## 11. DIMMING THE LASER POINTER (Optional)

Some communication partners have stated that it was irritating to look at a very bright dot of light. This is a simple way to dim and soften the light source.

<table>
<thead>
<tr>
<th>Cut a small hole in a pair of women’s stockings.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Cut hole in hosiery" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Place the cut piece of hosiery over the head of the laser pointer. Tape a piece of electrical tape around it, to secure it to the laser.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image2.jpg" alt="Hosiery over laser pointer" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>You may want to double or even triple the layers of hosiery. Experiment with one or more layers of fabric, to see what works best for you.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3.jpg" alt="Multiple layers of hosiery" /></td>
</tr>
</tbody>
</table>
LASER SAFETY NOTES:

1. Do not intentionally point the laser beam into your eye.
2. Do not look directly into the laser light source.
3. Do not shine a laser pointer directly into the face of a person, or an animal.
4. Do not allow children to play with the laser pointer. The laser pointer is not a toy.
5. Do not point the laser pointer at mirrors, or other reflective surfaces. (The reflected light can bounce back into the user’s eye.)
6. Do not laminate a communication board that will be used with a laser pointer. The light can reflect back into the face of the person wearing the laser.

WHAT IS SAFE:

Note: We are using a very low power laser (Class II).

1. It is safe to look at the red dot on the communication board.
2. It is safe to look at the person, while the laser pointer is on (as long as the laser beam itself isn’t directly hitting you in the eye for an extended period of time.)
3. If the laser passes across your eye for a moment, it is safe.

Please feel free to contact me if you have any questions or concerns.

I can be reached via email at ________________
I can be reached by phone at ________________

Sincerely,
SAMPLE INSTRUCTIONS FOR SETTING UP COMMUNICATION BOARD WITH LASER

1. Ms. Smith must be sitting up in order to use laser pointer.

2. Place the eye glasses onto Ms. Smith. Make sure the frames of the glasses are over her ears.

3. Turn on the laser pointer. Look at the communication board – when Ms. Smith is looking straight ahead, in a comfortable position, the red dot should be roughly in the middle of the board.

4. Ask Ms. Smith if the laser pointer is in a good position.

5. If the laser is not in a good position, adjust the laser (up/down, left or right). Ask again if laser is in a good position. Adjust again until the laser is in a good position.

6. Stand to the side of Ms. Smith (so you are both facing the same direction- towards the communication board)

7. When Ms. Smith is done communicating, ask her if she would like the glasses off. Turn off the laser when it is not in use.
SAMPLE INSTRUCTIONS FOR USING COMMUNICATION BOARD WITH LASER

1. Set up Ms. Smith with laser pointer.
   (Please see laser set up instructions)
2. Ms. Smith will point to a letter or word. Say the letter or work out loud.
3. It helps to write down what Ms. Smith is spelling. (It helps if you write it down in a location where Ms. Smith can see what you have written.)
4. It helps to occasionally give Ms. Smith verbal feedback of what she has pointed to so far... (For example, “So far I have “I need to see the...”)
5. If you think you know the word Ms. Smith is spelling, it’s OK to guess. If you are correct, Ms. Smith will move onto the next word. If you are not correct, Ms. Smith will shake her head “no”. (You will see the red laser dot go side to side.)
6. When Ms. Smith is done, ask her if she would like the glasses off. Turn off the laser when it is not in use.
POSI TIONING WHILE USING THE LASER POINTER

Do not face the person using the laser pointer.

Stand to the side of the person, and look at the communication board together. (This is safer, because there is less chance of the laser pointer hitting you in the eye.)
Resources

ALS
The ALS Association  www.alsa.org

The Muscular Dystrophy Association  www.mda.org

Videos
www.youtube.com/alscommunication
Videos by Margaret Cotts of people with ALS communicating via laser pointer.

http://www.als-communication.dk/
A site by Birger Bergmann Jeppesen, a Danish man with ALS. Features videos of people with ALS using Assistive Technology and Augmentative Communication

Professional Services

American Speech-Language-Hearing Association (ASHA)  
www.asha.org  To find a local Speech Language Pathologist in your area- www.asha.org/findpro

RESNA- Rehabilitation Engineering and Assistive Technology Society of North America  
www.resna.org  (Click on ATP/ATS/RET link, to find a local Assistive Technology Specialist in your area).

Laser Safety

http://www.laserinstitute.org/  (for detailed information on laser safety)
Click on Laser Safety Podcast.

Resources for Switches

www.tashinc.com  TASH  (Tash offers an excellent CD with information on different kinds of switches.)
www.infogrip.com  Infogrip
ENDNOTES

i  WordPower®  www.inmaninnovations.com


iii CLASS II LASER MODULE
The laser that we want to purchase from LaserSale is the VLM-650-03LPT (a class II laser). The VLM-650-03LPM looks identical, but it is a class IIIa laser. We want to stick with the Class II laser for safety reasons.

If the Class II laser is out of stock at Lasersale, a company called CalPac Lasers also sells a Class II laser module for $29.00. (Note: It’s a little larger and heavier than the VLM-650-03LPT)
Cal Pac Lasers: Item number: CP-TIM-201-1D-650
Calpaclasers.com  800-975-1575

iv BATTERY ENCLOSURE
We are using the AA sized battery enclosure so that later on, if we desire, we can switch adapt it using a battery interrupter. If it’s not important to a person to be able to independently turn the laser on and off, you can use a AAA sized battery enclosure instead- it works the same, and is smaller and lighter. www.radioshack.com

v ZIPCORD VS. SPEAKER WIRE
Either zip cord or speaker wire will work fine for this project. If you are going to be making a number of laser pointers, it’s worthwhile to invest in the black zip cord. (It’s much easier to see the white stripe on the black wire.)

vi LENGTH OF WIRE
The length of the wire is a matter of personal preference. If a person wants to store the battery holder of the laser module on a tray at the back of a power wheelchair, the wire should be longer. If a person is going to hold the battery enclosure on their lap, or mount it onto the back of a wheelchair head rest, the wire can be shorter.