Ergonomics

Your mission depends on people and their physical well-being. You rely on staff and volunteers lifting, sorting, and administering your program. They rely on you to create a work environment that protects their comfort and health. **This resource is designed to help you protect the people delivering your mission from strains or stresses that could impact their short or long-term well-being.**

Through this module, you will learn how to:

- Explain why ergonomics is a priority for your organization.
- Name key ergonomic principles and how they relate to the work of your organization.
- Describe important ergonomic considerations related to lifting, standing, and sitting.
- Demonstrate several ways to avoid back injuries, one of the leading Worker's Compensation claims.

Washington Food Coalition

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Overview

There are five main topics for you to know about ergonomics.

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At the end of the guide, you'll find helpful resources:

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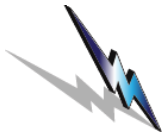
This course is accompanied by a series of **short videos**, also available from nonprofitsafetyhero.com.



We recommend that you print this document and have a pen or pencil handy. We've provided exercises where you can reflect on your situation and make plans. The first one is below.

Let's check in with what you already know about ergonomics.
Write down your answers to these questions.

- ❑ What is ergonomics?

- ❑ Why does it matter to your organization?

- ❑ What are some ergonomic-related issues that someone would spot in your organization?

1. What ergonomics is and why it matters

The word “ergonomics” comes from “ergon,” which means work, and “nomos,” which means laws. It is essentially the study of how to create optimal work environments so people can function safely and efficiently. Think of it as *fitting the job to the worker*. Within a food program, our goal is to reduce strains on your body and increase productivity.

There are many benefits to a focus on ergonomics. They include:

Higher productivity. People get more done in the same amount of time.

Reduce injury risk. People stay safe and healthy.

Lower costs. People don’t miss work because of injury, and they file fewer Workers' Compensation Claims.

Improved staff and volunteer engagement. People are more comfortable, so they are more eager to work.

We talked in the “Safety Leadership” module about building a strong safety culture. Investing in good ergonomics practices is a critical step in demonstrating a safety-first way of achieving your mission.

Imagine that you are tasked with making the case for an investment in ergonomic to your board of directors. You want to make sure they see the value of the time you are spending in training new staff and the cost of buying equipment to help lift heavy boxes. What will you say to them in your short presentation at the next board meeting?

[If you need some talking points, look at the benefits listed above.]

2. Ergonomic principles

Before we get specific about ergonomic topics, there are some principles that can help you to see and address ergonomic risk factors . These principles are general guidelines that we elaborate on in later sections. Our goal is for you to develop an "ergonomic eye" to spot potential problems in your workspace.

The principles fall into four main categories: general conditions, body position, exertion, and repetition.

General Conditions

- ☐ **Move, exercise and stretch**. Whatever your work entails, it is important to move and stretch at regular intervals.
- ☐ **Maintain a comfortable environment.** A comfortable environment entails proper lighting, space to work, a safe working temperature, and fresh air.

Body Position

- ☐ **Work in neutral postures**. These are postures where the body is aligned and balanced. Neutral postures minimize stress applied to muscles, tendons, nerves, and bones. (https://ergo-plus.com/fundamental-ergonomic-principles/)
- ☐ **Work at proper height**. Your "power zone" falls close to your body at the height where you would shake someone's hand. We talk more about the power zone on page 11.
- ☐ **Minimize pressure points.** Contact stress happens from continuous contact or rubbing that inhibits blood, nerve function, or movement of tendon and muscles.

Exertion

- ☐ **Reduce excessive force.** Excessive force is one of ergonomics biggest risk factors. It can be both a factor of one-time heavy load and too heavy load over time. Examples are: lifting, carrying, pushing, pulling, gripping, and pinching.

Repetition

- ❑ **Reduce excessive motions**. A repetitive motion results when someone repeats a similar motion every 30 seconds or less. These motions don't provide a long enough pause between movements for the body to rest and recover. For example, repeated tying a bag of rice or labeling boxes can be an excessive motion.

Washington State Department of Labor & Industries provides a "Simple Solutions" set of resources and checklist. (See Resources on page 18 for the link.) The items on the checklist are below. Draw a line from the item on the left to the principle that it addresses on the right. We've given you an example.

Simple Solutions	Ergonomics principle
Store off the floor	Move, exercise, and stretch
Push, don't pull	Maintain a comfortable environment
Keep it close	Work in neutral positions
Hands below head	Work at proper height
Grip, don't pinch	Minimize pressure points
Keep wrists straight	Reduce excessive force
Roll it	Reduce excessive motions
Work at waist height	
Keep a level head	
Change it up	
Match work height to task	

Think about the most physically challenging task in your workspace. Find one principle that relates to that task. What would you need to do to follow the principle? What would be hard in doing that? What could you do to reduce or remove that barrier? How could you involve employees and volunteers in following the principle?

3. Body position

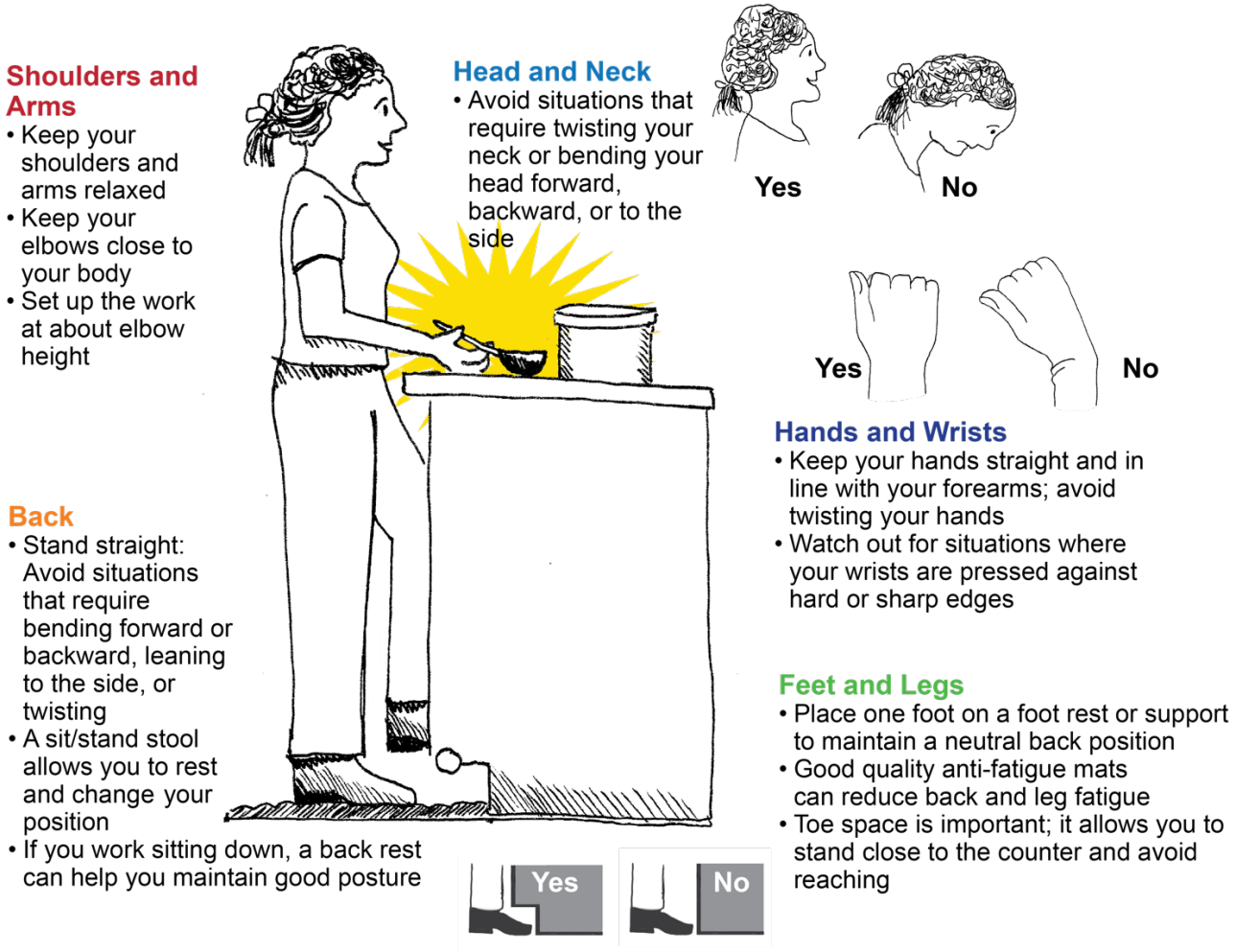
You work in a busy food bank. You spend a lot of time on your feet bundling bulk items into smaller packages. You then sit at a desk processing data and ordering supplies. You are willing to do what you need to do to get the job done, but your back hurts at the end of most days.

You know from our ergonomic principles that our bodies are the safest and most efficient when they are in a neutral position. We've seen how the "power zone" is our most preferred space in which to work. Let's build on that to find out how to stand or sit in optimal body positions.

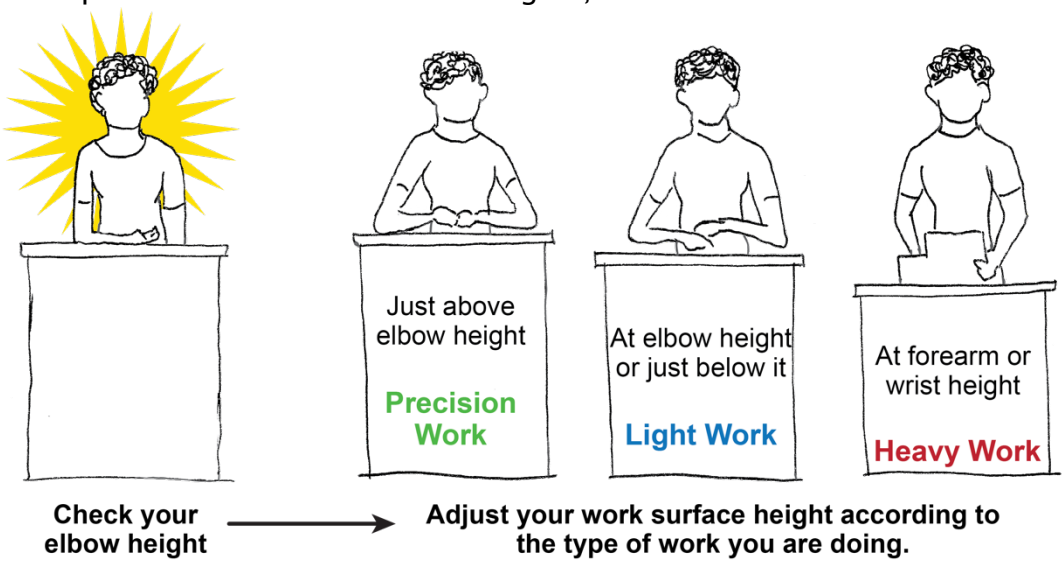
There are five aspects of our body position to consider:

- Head facing forward
- Shoulders relaxed
- Lower back supported
- Wrists flat and straight
- Feet supported

The following image shows what to pay attention to when you are working while standing.



Different tasks require different work surface heights, as shown below.



4 tips to address work surface height issues
1. Use small work platforms to raise shorter workers
2. Raise or lower work tables
3. Place work items on small stands
4. Use height adjustable workstations, etc.

7 solutions for standing
1. Provide opportunities to sit
2. Wear comfortable shoes
3. Provide footrests
4. Provide adequate toe space (at least 4 inches) at the bottom of workstations. Toe space allows the person to stand closer to work surface.
5. Change positions regularly
6. Adjust table height or provide platforms to adjust to shorter or taller workers
7. Use an anti-fatigue mat

These same principles apply to sitting:

Back
- Your back should be straight, not slumped or slouched
- A lumbar cushion can provide extra support

Chair
- Use a chair with a back rest and arm rests
- Adjust the chair height to maintain correct arm height
- Elbow, hip, and knee angles should be between 90 and 120 degrees

Arms
- Relax your shoulders
- Keep your forearms parallel to the floor
- Make sure your wrists are straight

Legs and Feet
- Your thighs should be parallel to the floor
- Your feet should rest flat on the floor, with toes facing forward
- Use a foot rest to adjust the height, if necessary

Monitor
- Adjust the distance and height: the top should be at eye level and slightly tilted

10 solutions for sitting
1. Raise the chair or add cushions to get the arms to a near 90 degree angle
2. Add a foot support
3. Remember to protect your eyes:
4. Eyes should be at least 18 inches from the monitor.
5. The top of screen should be at eye level. Screens should be slightly lower if wearing multifocal lenses.
6. Reduce glare by using window shades or changing the angle of the screen.
7. Use photochromic (tinted) lenses.
8. Adjust font size and screen brightness within your computer settings.
9. Give your eyes a break every 20 minutes.
10. Reduce mouse use as much as possible

Look around you. Find someone either sitting or standing while performing a task. Answer these questions about their body position:

Body part	**Characterization. Is it:**	
Head	Forward?	❑ Y ❑ N
Shoulders	Relaxed?	❑ Y ❑ N
Lower back	Supported?	❑ Y ❑ N
Wrists	Straight?	❑ Y ❑ N
Feet	Supported?	❑ Y ❑ N

What corrections can you make to address any problems you find?

Repeat this activity as many times as you need to. Your goal is to identify opportunities to offer training and tools that would help. You may need to invest in equipment such as anti-fatigue mats or systems to adjust table/chair heights. Many food banks find creative free solutions, too.

4. Lifting & exertion

Your food distributor just dropped off four pallets of bulk pasta. You need to unload 35 pound cases of tomato sauce and move them 30 feet to your distribution space. How can you do these tasks without strains and pain?

Lifting and physical exertion in general is a regular part of working in a warehouse environment. Boxes come in from distributors, and they need to be stored and used in service of your mission. You can take some simple steps to avoid strains and stress to your body.

There are four main ideas to understand as you think about lifting and exertion:

- Weight limits
- Power zone
- Twisting or other awkward postures
- Pinching and gripping

We will cover them one by one with opportunities for you to pause and reflect on the practice of your organization.

A. Weight limits

How much you can safely lift is determined by several factors, such as the item's weight, the conditions in which you are picking up that weight, and how long you are carrying heavy weights. Ergonomists have developed a formula to help people determine their weight limits. Luckily, there are several lifting calculator apps available, and Washington Labor & Industries has a link to one on their website (see page 18 for several lifting calculator links.)

The L&I Lifting Calculator suggests safe lifting limits under ideal conditions. It specifically asks four questions:

- What is the beginning position of the lift?
- How many lifts per minute will you be lifting?
- How many hours will you be doing this lifting?
- How much twisting must you do in this lifting?

Here's an example, based on the illustration on the right:

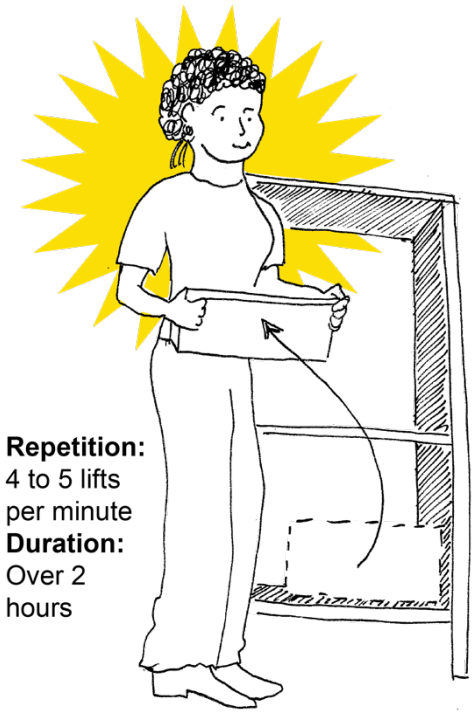
If you were lifting **four items per minute**...
...from the floor **in front of your toes**...
...for **over two hours**...
...and the lifting involves **MORE than a 45 degree twist**:

You could safely lift **12 pounds**.

If the lifting involves **LESS than a 45 degree twist**:

You could safely lift **15 pounds**

If you speed up the work, the same task at ten items per minute **drops the safe weight to 5 or 6 pounds**.



Repetition: 4 to 5 lifts per minute
Duration: Over 2 hours

Examples of heavy lifts	
70 pounds	Once a day
55 pounds	10 times a day
25 pounds	25 times a day, above head
10 pounds	Two hours a day, twice per minute

Our goal is to avoid heavy lifts. Sometimes you can't avoid it—you have to lift something heavy. Here are some ideas to help.

3 alternatives to heavy lifts

1. Open boxes to remove items individually.
2. Store boxes on shelves at the same height as a cart, so you can slide them onto it.
3. Look for situations where the same box is lifted more than once, to see if some of the lifting or moving can be eliminated.

9 general lifting tips

1. Put the heaviest items at waist level
2. Deliver materials to the point of use
3. Use equipment for heavy loads: cart, hand truck, powered pallet jack, etc.
4. Break down a large load
5. Use a step stool to reach items on high shelves
6. Ensure that the floor area is level and free of debris
7. Push or roll instead of lifting and pulling
8. Provide handholds on boxes
9. Avoid irregular or bulky loads

7 Steps for Lifting a Heavy Load

1. Clear your path
2. Check its weight before you lift. Make sure it is safe to lift.
3. Move the item (by sliding it) as close to your body as you can.
4. Keep your back straight. Use your leg muscles to do the lifting.
5. If the lifting involves placing the item to the side of its current position, turn your body as a unit (no twisting).
6. Get help if the load is too heavy.
7. If lifting many items, use the Lifting Calculator to determine your maximum lifting duration before changing tasks.

Name one lifting activity that regularly occurs in your space:

For this lifting activity, answer the four "Calculator" questions:

What is the beginning position of the lift?	
How many lifts per minute will you be lifting?	
How many hours will you be doing this lifting?	
How much twisting must you do in this lifting?	

Use the Lifting Calculator App to determine the safe lifting weight for this activity. Compare the actual weight of the item typically lifted.

If the safe lifting weight is less than the actual weight, what can you do to make the situation safer?

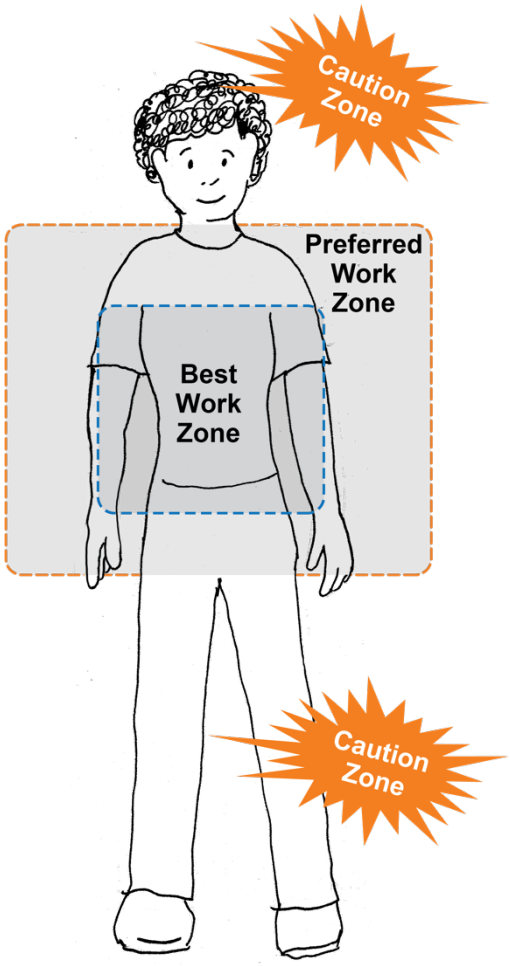
It is important to practice proper lifting technique to build muscle memory on what to do when faced with a load. **Let's pretend that your pen (or some other handy item) is a 10 pound box of pasta**. Follow the directions below. As you pick up your pretend box of pasta, verbalize out loud what you are doing to follow the lifting steps above. Name the principle that you are following.

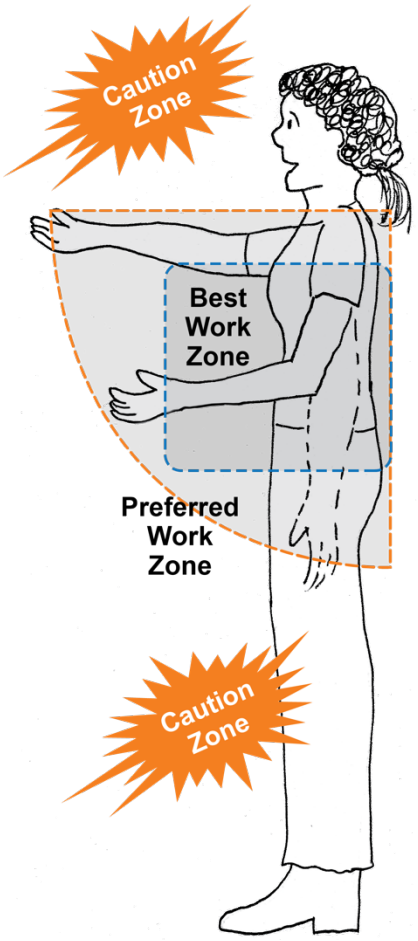
1. Drop the pen to the ground at your feet. Pick it up using proper lifting technique.
2. Drop the pen to your side. Pick it up and place it on a surface behind you.
3. Put the pen on a shelf above your head. Retrieve the pen as if it were 10 pounds.

Reflect: What did you experience that you could apply to a food bank task?

B. Power zone

An important principle in ergonomics is holding the body in a neutral position. That means that your **best work zone** is the box between your chest and waist. In lifting, your **preferred work zone** is the space you can reach if you lift your bended arm. It is the box from your neck to your waist.





On the following page, we've provided an activity to help you understand work zones and how to adjust your practices to use your best and preferred work zones.

Stand upright. Draw an imaginary box in front of you that represents your BEST WORK ZONE. Now draw an imaginary box that represents your PREFERRED WORK ZONE. Move your arms around your preferred work zone to build muscle memory around what that space is.

Now place your hands in the CAUTION WORK ZONE. That might be the space above your shoulders, at your knees, or behind you. Tune into how your body feels when your hands are in these positions. You can pick up something near you and hold it in these positions to reinforce the feeling when you are lifting something potentially heavy.

Make a list of work practices that you (and others) should follow to keep your work primary in your best or preferred work zones. We've started the first rule for you:

If a box is on a shelf above my head, I will…	…take items out of the box while it is on the high shelf to make the box lighter. Then I will take it off the shelf.
If…	
If…	
If…	

C. Twisting or other awkward postures

Unfortunately, most heavy items are not stored directly in front of our hands. We have to twist, bend, or otherwise move our bodies into awkward positions to move them. An awkward position might include those CAUTION ZONES we just mentioned: hands above the head, neck or back bent more than 30 degrees, kneeling, or squatting.

5 Solutions to Address Twisting and Awkward Positions
1. Limit overhead storage to infrequently used items.
2. Give yourself extra space to take steps to change direction as opposed to twisting at your waist.
3. When loading cars, use the rear of the vehicle where you're less likely to twist.
4. Use an EZ Retriever (essentially a hook on a pole) to pull items closer to you.
5. Pay attention to your center of gravity as you move items. You want to keep your center of gravity over your feet.

Name a task that involves twisting or an awkward position. We list some awkward positions above. Describe one way that you could reduce or remove the need to twist or hold that position. Describe the system or reminder you will implement to help you and/or other remember to implement that task in this new way.

D. Pinching and Gripping

Imagine you need to pick up a box without handles. You pinch the sides and lift using the strength of your fingers. That puts a lot of strain on these sensitive muscles. These same muscles are involved in forceful gripping of a hand tool.

Just like with lifting, weights matter. Here are two examples of tasks that are stressful to the hand.

- Pinching a two pound ream of paper
- Gripping a heavy object (like a gallon jug of milk)

Tasks resembling these should be avoided or limited to a maximum of two hours per day.

You also need to be careful about wrist bending. Bending your wrist reduces your strength and makes injury more likely when you are gripping or pinching.

7 solutions to address pinching and gripping
1. Use boxes and totes with handles.
2. Find ways to lift from underneath. This may include asking for help
3. Use hand trucks, carts, or other tools to carry loads
4. Use power tools instead of hand tools
5. Use lighter tools
6. Grip with the whole hand, not just the fingers. Grip with both hands keeping wrists straight.
7. Use larger diameter handle tools when a high grip force is needed and smaller diameter handle tools when more control is needed.

Name a task that involves pinching or gripping. Describe one way that you could reduce or remove the need to pinch or grip. Describe the system or reminder you will implement to help you and/or other remember to implement that task in this new way.

5. Repetitive motion

You see around you many colleagues involved in repetitive tasks. People are turning bulk boxes of rice and beans into smaller bags sized to feed a family. Administrative colleagues are typing emails and invoices for hours on end. Volunteers are entering data. You are worried that these repetitive tasks are going to take a toll on their hands.

A lot of tasks require the regular repeating of the same motion. A repetitive motion is one that repeats at least every 30 seconds. Many repetitive tasks involve your fingers, wrist, and hands. Tasks like scooping and bundling rice, stamping labels on products, or entering data can cause swelling, numbness, pain, muscle weakness, and joint problems.

6 solutions for repetitive motions
1. Eliminate unnecessary motions 2. Automate the task 3. Enlarge the job, like giving people different tasks within one work experience 4. Use power tools instead of hand tools 5. Spread repetitive work throughout the day 6. Change hands or movements frequently

Identify one repetitive motion that is part of a typical task in your organization. Describe the task in slow motion, naming the aspects of it that might cause strain on a body part.

List specific ways that you can reduce or remove the problem for people who do this task.

Describe how you will implement these ideas in your current workflow.

At the beginning of this guide, we asked a few questions. Let's return to them to give you a chance to reflect on what you learned through this module.

- ❑ What is ergonomics?

- ❑ Why does it matter to your organization?

- ❑ What are some ergonomic-related issues that someone would spot in your organization? *What specific things will you do to make sure you and others follow good ergonomic principles?*

Congratulations! You are now an Ergonomics Safety Superhero!

Ergonomic checklist

Use this checklist to identify potential ergonomic risks. If you answer YES to any of these questions, the task should be reviewed further.

	YES	NO	NOTES
BODY POSITION *Consider routine tasks in answering these questions.*			
Is the person's back bent or twisted while lifting or holding heavy items?			
Are objects lifted out of or put into cramped spaces?			
Do tasks involve leaning, bending forward, kneeling or squatting?			
Do tasks involve working with the wrists in a bent or twisted position?			
Are tasks done with the hands below the waist or above the shoulders?			
Are tasks done behind or to the sides of the body?			
Does the job require standing for most of the shift without anti-fatigue mats?			
Do employees work with their arms or hands in the same position for long periods of time without changing positions or resting?			
EXERTION			
Are items lifted while bending over, reaching above shoulder height, or twisting?			
Is lifting done with one hand?			
Are items lifted without the assistance of a mechanical device?			
Does lifting involve pinching to hold the object?			
Are dollies, pallet jacks, or other carts difficult to get started or keep moving?			
Are dollies, pallet jacks, or other carts overloaded?			
Is there debris (such as broken pallets) or uneven surfaces (such as cracks in the floor) that could catch the wheels while pushing?			
Is pulling rather than pushing routinely used to move an object?			
Are objects carried manually for a long distance?			
REPETITION			
Do repetitive motions last for hours without a break?			
Does the job require repeated finger force?			

Resources

Washington Labor & Industries and others offer a wide range of resources related to ergonomics.

Videos	• Dr. Ergo (14 minutes) NAPO videos (awareness-raising cartoon videos with no words) • Safety pays • Prevention • Lighten the load
Tip Sheets	The following tip sheets are available on the L&I website: • Simple solutions • Quick Tips for Lifting • Setting up a safe and health workspace for teleworking
Tools	• Ergonomic Ideas Bank
Calculators	• Lifting Calculator App (Oregon) • Lifting Calculator (a more detailed option) • Push/Pull/Carry Calculator
Checklists	• L&I Caution Zone Checklist • L&I Hazard Zone Checklist