

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>

Weather and Gardening

Detailed Teaching Material

March 12, 2018

Introduction

The material provided in this document is intended to provide the user with the material necessary to conduct workshops about weather and gardening, as was conducted for a group of twelve high school students (level 3 and 4) in Longido, Tanzania. Several images and informational content was adapted from the CAWST (Centre for Affordable and Water Sanitation Technology) WASH (Water, Sanitation, and Hygiene) handbook.

Intended Audience

- Upper level high school students

Learning Objectives

By the end of this workshop participants will gain a better understanding of the following:

- What weather is and how you can measure it,
- The different types of weather and seasons around the world,
- Why weather is important,
- Resources plants need to grow,
- How to start a garden,
- Materials needed to garden,
- Measures needed to protect a garden.

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>

Required Resources

Presentation:

- This detailed workshop material,
- The PowerPoint presentation,
- Overhead projector and board to project presentation,
- Optional demonstration material such as soil, planting containers, seeds, water, gardening tools.

Activity:

- If location permits, an optional demonstration or discussion regarding gardening practices could be performed as part of this workshop. If available resources may include:
 - A gardener,
 - Gardening tools,
 - Seeds,
 - Soil,
 - Plant containers.

Details

This workshop consists of 18 slides of educational material about weather and gardening. The presentation starts with an introduction to climate and weather patterns experienced in Canada and Tanzania. Weather data collected from these two different locations is then explained using graphs and temperature curves. Short videos of different rain event intensities are then used to discuss the experience of the students with regards to rain and weather events. A discussion of the importance of weather leads into the topic of gardening. The gardening section of this workshop outlines the basic requirements for plant growth and a general procedure for planting and starting a garden.

An optional activity can take place at the end of the workshop where participants can observe gardening practices and try planting seeds.

Below are the details of the workshop material. This includes content to be delivered for each slide of the PowerPoint presentation as well as questions that can be asked to encourage student engagement, check for their understanding of the content, and to learn what the students know on the subject.

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>

Weather and Gardening

Part 1: Weather



*Note: If possible, change the slide to be about yourself and where you are from, as well as where you are conducting the presentation.

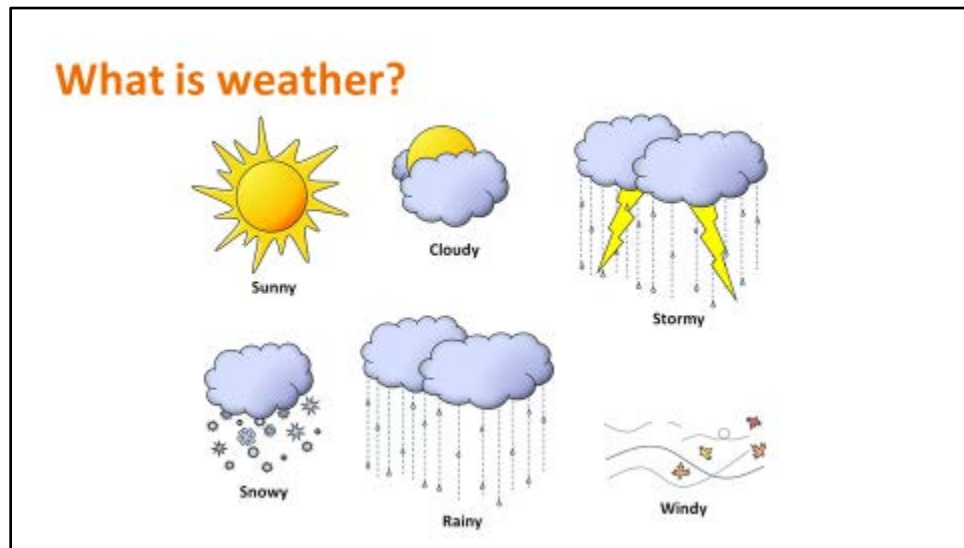
Content:

- a. Introduce yourselves.
- b. Tell the students where you are from.

Questions you can ask:

- Is anyone else from a different place too?
 - Students can share and discuss where they are from and connect that information with further discussion about climate in those areas.

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>



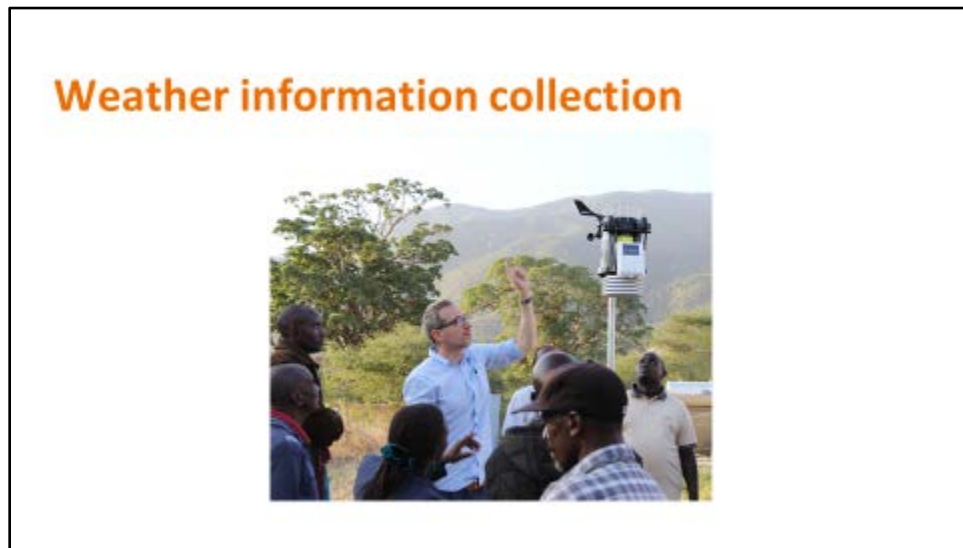
Content:

- Different types of weather include sun, clouds, wind, rain, storms, and snow.
- Most of these weather types are experienced around the world. Snow is one that people may be unfamiliar with. It is like rain except very cold and doesn't disappear when it touches the ground.
- The different weather types are experienced to different degrees depending on where you are. Some regions get a lot of rain, some get very little. The same can be said for wind and sun.

Questions you can ask:

- What types of weather do you experience most here?
 - Students should discuss weather in different areas and connect differences with where people come from.
- In which type of weather do you experience the greatest changes throughout the year?
 - Students should discuss seasonal changes as an introduction to future slides regarding seasonal changes

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>



Content:

- a. Measuring what type of weather happens is a way that you can show people the type of weather you experience.
- b. Weather can be collected through many different machines, including thermometers, rain gauges, and anemometers.
 - Thermometers measure temperature,
 - Rain gauges measure the amount of rain that falls over a period of time,
 - Anemometers measure the speed of the wind.
- c. Some measuring devices show you the current information, others (like the one in the picture) can store the information in a computer so that the information can be sent to other people.

Questions you can ask:

- How do you think we can measure weather? (b., c.)
- What kind of weather can we measure? (Recall weather types from first slide)
- What do you think we can use weather information for?
 - Students should discuss data use in predicting weather, for use in planning, designing, and decision making.
- Do you know of anyone who measures the weather? What do they measure?
 - Students should discuss local methods of weather measuring, like collecting rain water, and their link to more technical measurement methods.

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>

Seasons in Canada and Tanzania



*Note: If possible, replace with images of where you're from.

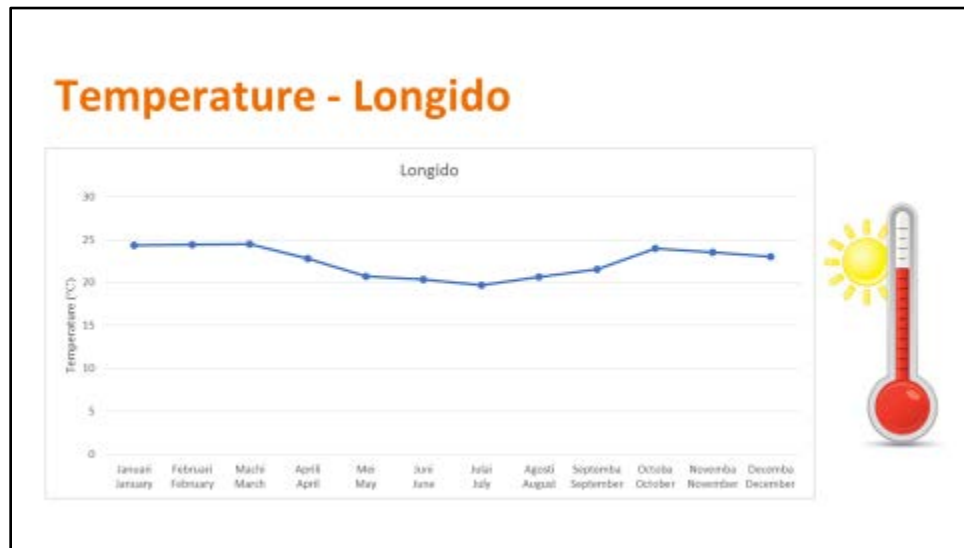
Content:

- When similar weather happens in a short amount of time it is called a season.
- In Canada there are four seasons: Fall, Winter, Spring, and Summer
- In Tanzania there are wet and dry seasons.
- The wet season is similar to the Canadian spring season, while the dry season is similar to a Canadian summer. Canadian fall is when the plants are getting ready for cold temperatures and lose their leaves. Winter is when it gets really cold and snow falls.
- The seasons in different areas of the world are very different and change depending on the time of year.

Questions you can ask:

- What are the seasons like in Longido?
 - Discuss difference in seasons in different home towns and in comparison to different countries.
- Are Longido seasons clearly separate or do you sometimes get rain in the dry seasons?
 - Students should discuss how the seasons are described and what they have experienced in those seasons.
- Are any of you from somewhere where the seasons are different than here?
 - More discussion to gather information regarding local weather context.

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>



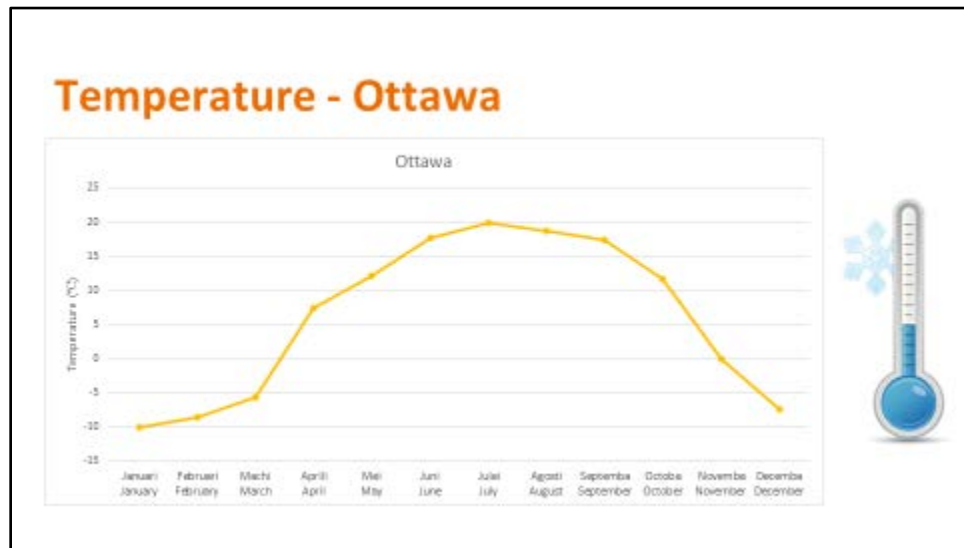
Content:

- This graph shows the temperature experienced in Longido, Tanzania from January to December in the year 2017.
- Temperatures in Longido are highest in the months of October through March.
- During the colder months of the year the temperatures is only a few degrees cooler than the warmest times of the year, ranging from 20°C to 25°C.

Questions you can ask:

- What time of year do you experience the warmest days? (b.)
- What time of year to you experience the coldest days? (c.)
- Do you do different activities when it's warmer out? When it's colder?
 - Discussion on the impacts weather can have on activities.

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>



*Note: If possible, replace with information about where you're from.

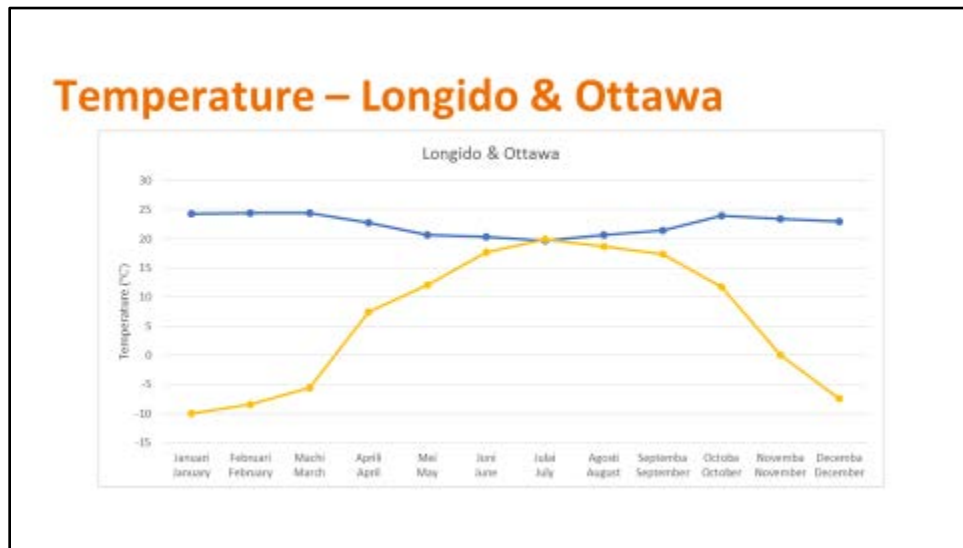
Content:

- This graph shows the temperature experienced in Ottawa, Canada from January to December in the year 2017
- Temperatures in Ottawa are warmest in July and coldest in January.
- The temperatures changes a lot from month to month as Ottawa experiences four distinct seasons.

Questions you can ask:

- What time of year does Ottawa experience the coldest days? (b.)

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>



Content:

- With all of the information together you can see how much Longido and Ottawa are different.
- The two places are most similar in July when Ottawa has its warmest weather and Longido has its coldest.
- In January is the biggest difference since Ottawa is experiencing the winter season.

Questions you can ask:

- Which location experiences more cold days? (Ottawa)
- How would the weather in Ottawa change your behaviour and activities?
 - Continue discussion on impacts weather can have on activities.

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>



*To play the videos, click on the images in the slide. If that does not work, links to the videos can be found in the presentation notes.

Content:

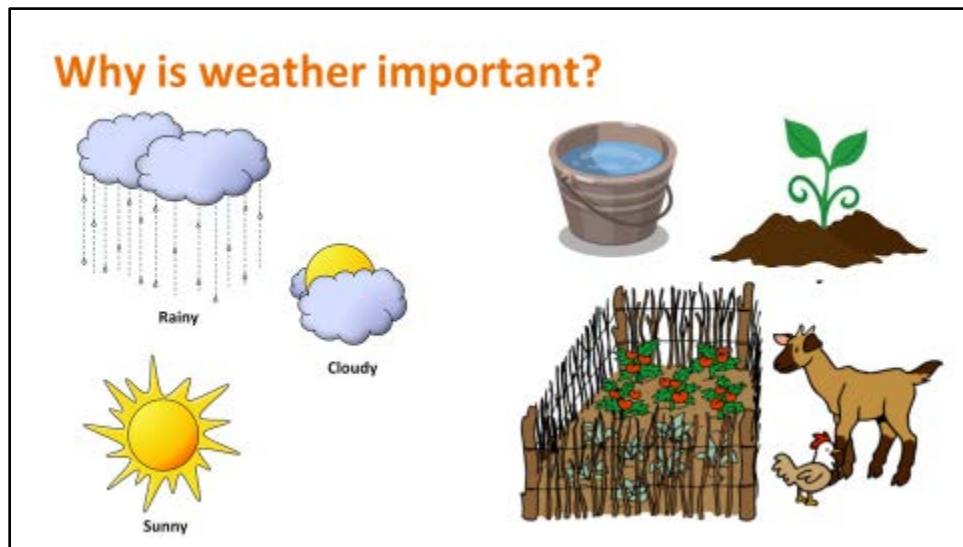
- These two videos show different levels of rain:
 - The first video shows light rain which means that the raindrops fall less often. It is usually quieter than heavy rain.
 - The second video shows heavy rain which means the raindrops are falling more often and faster than the light rain.

Questions you can ask:

The following questions are used to gather information regarding Longido rain and weather experiences. Local knowledge of past experiences and discussion on weather changes is encouraged. This discussion should allow the students to gain a better understanding of the variations in rain and start thinking about how it can impact them.

- Do you experience any other types of rain here?
- What type of rain do you get the most?
- Do you usually get small amounts of rain or large amounts?
- Do you notice that it usually rains at certain times of day?
- Does the type of rain change what your daily activities are?
- Do you try to collect the rainwater?

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>



Content:

- a. Now that we know how different parts of the world experience weather, and how different parts of weather are measured, we can discuss why weather is important
- b. Weather affects the day to day lives of everyone and influences the activities that a person does, like going to school, work, or performing activities at home.
- c. Rain is particularly important as it is the major source of water for many people, plants, and animals.
- d. Weather is also important to animals and plant life, it affects their health and growth throughout their lives.

Questions you can ask:

- What kind of activities rely on the weather? (b, with open discussion for further ideas)
- How does weather affect you? What do you do when it rains? What do you do when it is very hot or very cold?
 - Discuss different perspectives on weather and its effects. Make connections to personal opinions on weather
- How does weather affect plants and animals? (d)

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>

Part 2: Gardening



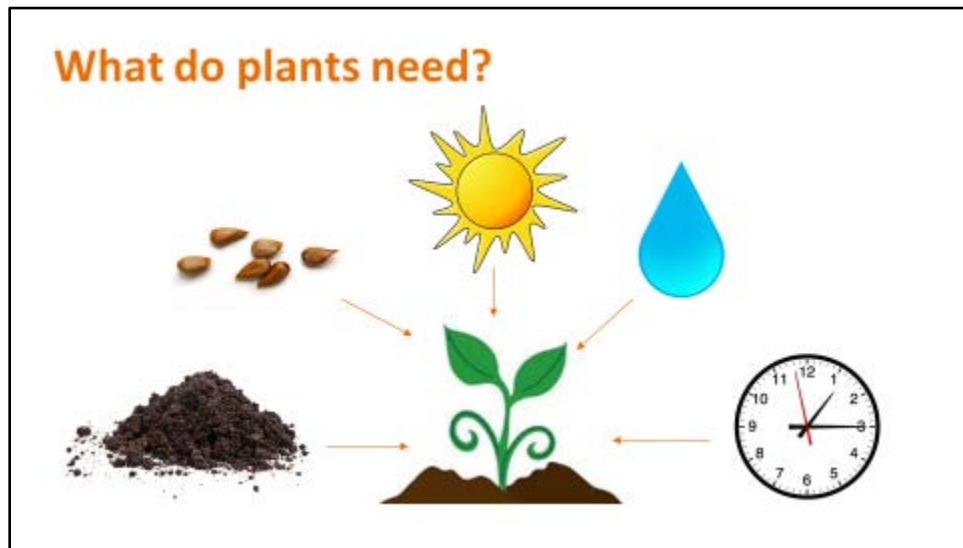
Content:

- a. Gardening relies on weather to be successful. The right conditions need to be present in order for plants and vegetables to grow.
- b. Since plants are not able to move to find the things they need to survive they must rely on the conditions they grow in.

Questions you can ask:

- Do you know anyone who grows their own food? What do they farm?
 - Open ended; connect the need for water and good conditions for both plants and livestock agriculture. Discuss different plants and animals that are farmed in the area and in people's home towns.

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>



Content:

- a. Plants start as seeds and need the right soil, sun, water, temperature, and time to grow successfully.
- b. Plants need soil to provide a home for them to grow. The plants also use the soil to collect water and nutrients using their roots. The nutrients in the soil, like potassium, nitrogen, and phosphorus help a plant grow and create more roots, stems, leaves, flower, and fruit.
- c. Plants use the sun to create food for themselves. The leaves in a plant use the energy from the sun, with the water and nutrients that the roots collect, and turn it all into food. This is called photosynthesis.
- d. Plants need the right temperatures to grow so that they do not get too hot, or too cold. The time of year that has the best amounts of water, sun, and temperatures is called the growing season

Questions you can ask:

- What do plants need to grow? (a)
- Where do plants get water and nutrients? (b)
- What do plants use to make food? (b, c)
- What time of year is best to start growing a plant and why? (c)

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>



Content:

- a. In order to successfully grow plants the right knowledge is needed in order to make decisions that will benefit the plant. An experienced gardener or farmer is important to show you how to best provide for your plants.
- b. Making a garden is easier if you have tools to help you.
- c. These tools include
 - Wheelbarrows,
 - Buckets,
 - Shovels,
 - Pots,
 - Soil,
 - Containers.

Questions you can ask:

- How can you learn how to take care of plants? (a)
 - Discuss who in community would be ideal to engage in a gardening program, and how this person would help participants grow plants.
- What kind of tools would you use in making a garden? (c)

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>



Content:

- a. Building a garden involves several steps.
- b. The first step involves finding a suitable home to plant your seeds in. Soil that can be easily watered, and has enough nutrients in it is ideal for starting a plant. Containers like reused water bottles or plastic wrap will help keep water near your plant so that it does not dry out too quickly.
- c. To start your plant you must fill up a container with soil.
- d. Once your container is ready you can bury a seed in it to start your plant.
- e. Different types of seeds need to be buried at different depths in the soil to help them grow better.
- f. When a plant emerges from its seed it is called germination.
- g. Each type of plant needs a specific amount of time, heat, and water to germinate.
- h. Talking to a gardener about the seeds you are planting, and what they need to germinate, will help your garden grow better.

Questions you can ask:

- What materials are needed for a garden? (c, d, g)
 - Discuss where participants would get materials for growing plants.
- How would you make sure your plant does not dry out too quickly? (b)
- What type of seed would you plant?
 - Discuss different available plants in the area and which participants would want to grow.

*The majority content of this workshop was adapted from the CAWST WASH handbook.
Please refer to their website for the original files and more resources for teaching:
<https://resources.cawst.org/>*

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>



Content:

- a. Once your seeds are planted it is time to take care of your garden.
- b. Checking on your plants regularly and giving them what they need (water and nutrients) will help your garden grow.
- c. If you have started a plant in a container there may come a time when the container is too small for your plant.
- d. At this time you can put your plant in a new home by moving it into a bigger space that gets both sun and shade, this is called transplanting.
- e. It is important to keep regularly checking and taking care of your plants after they have been moved.

Questions you can ask:

- What do plants need to grow?
 - Review from pervious slide: soil, sun, water, time, and temperature.
- When your plant needs to be transplanted where would you put it?
 - Discuss ideas for garden locations near where participants live.
- How would you make sure your plants grow in their new location? (d)

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>

How to protect your garden



Content:

- a. Providing water, sunlight, and nutrients to plants is sometimes not enough to make a garden successful.
- b. Not enough water, or heat, or sun can make your plants die.
- c. Too much water, or heat, or sun can make your plants die too.
- d. Other things can harm your garden as well. Goats and other animals love to eat plants and your garden is an easy target
- e. How can we stop these things from hurting our gardens? Putting up fences, taking good care of the garden, and checking on it every day can help your garden be successful.

Questions you can ask:

- What do you need to protect your plants from? (b, c, d)
- How would you protect your plants? (e)

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>

Could you build a garden?



Content:

- Now you know how to make a garden. (Review concepts from presentation)

Questions you can ask:

Have a group discussion regarding plant needs, material needs, engaging experts, garden threats, and ideas for starting gardens at home.

- How would you start a garden?
- Who would you start a garden with?
- Where would you start a garden?
- How would you make sure the garden is taken care of?

The majority content of this workshop was adapted from the CAWST WASH handbook. Please refer to their website for the original files and more resources for teaching: <https://resources.cawst.org/>

Part 3: Activity

Preparation:

- If you know a gardener, contact them and arrange for them to set up a gardening activity. If not, an activity can be conducted as described in the presentation.
- Assemble any gardening materials you have available for the demonstration.

Content:

- This activity will allow students to learn how to plant seeds and take care of a garden.
- The activity will also allow students to become familiar with gardening tools and resources needed.

Volunteers:

- A few volunteers can help to demonstrate the planting activities.

Procedures:

- Any tools available should be named and their purpose in gardening explained.
- The students should be shown how to plant a seed as outlined in the presentation.
- The students may also be shown how to move a plant from its container to a larger spot in the ground.
- This would be a good time to review main gardening lessons such as:
 - What do plants need to keep growing bigger? (page 13)
 - What do you need to protect your plants from? How? (page 17)