We're not talking about your bed...

we mean your.... bed. Your garden bed!

Whether you are going to have a garden at your school or not, you can use this lesson to improve your knowledge of agriculture.

Can a garden be placed anywhere?

How do people create new gardens?

How is wind, water and sun important to the garden location?

How is soil tested?

Gardens don’t just happen. They have to be created and prepared.

Early settlers to our area, just as in other areas, had to cut down trees to make clearings for gardens. Eventually the area was made larger and larger so that entire fields could be planted.

People all around the world have had to do this. Many people still depend on their own gardens and fields to provide much of the food for themselves and their livestock.

Today most new vegetable gardens or flower gardens are created in spaces that have already been cleared of trees.

What is the number one reason why trees are removed from garden areas?
If you were starting a new garden, you would consider the following factors before you put a shovel into the ground:

<table>
<thead>
<tr>
<th>Soil Texture?</th>
<th>Water source nearby?</th>
<th>Sun or Shade?</th>
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<td>Air flow or wind?</td>
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<td>Accessible location?</td>
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<td>Insects or Diseases?</td>
<td>Hilly or flat?</td>
<td>Soil Drainage?</td>
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Pick one of the factors above and explain why you think it might be important to consider before you create a garden:

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Soil Texture - From what you have learned about soil, you should know that some soil has more clay in it and some has more sand. The best soil for gardens is LOAM. It is a mix of CLAY, SAND and SILT. It drains well. Later we'll talk about how you can determine your soil's texture.

Water source nearby - Plants generally need watering when they are young, and will continue to need water if there is little or no rain. Do you have a water source nearby? The early settlers were happy to have a creek nearby, even though they had to haul water in buckets. Most of us like to use a hose for water now!

Sun or Shade - vegetable plants need sun. Flower plants are different. Some can tolerate shade. Vegetables all need at least 6 hours a day but prefer more! Is your garden site going to receive at least 6 to 8 hours of sunshine a day or will trees or buildings shade it?

Air flow or wind - air flow around a garden is one of the best ways to avoid having problems with diseases like fungus. But, is your bed going to be in a windy spot? Wind will dry out the soil quickly and a strong wind might damage your plants.
ACCESSIBLE location - if your garden is hard to get to or far away no one will want to check on it. Gardens change quickly during the growing season. You will want to see how the plants are doing, if they need water and if you have insect or animal damage or if a disease has appeared. Do you have students or visitors with IMPAIRED MOBILITY to consider?

Insects or Diseases - most gardens will have insect visitors. Most of them are good, some of them will do damage. Do you have insect problems in the area of your garden? Some diseases like fungus, virus and bacteria often stay in the soil. Although diseases are quite choosy about what plants they will attack, don’t start a new garden where you know you’ve had problems before.

Hilly or Flat - besides being hard to work with, a hilly site can become a problem site when there is a lot of rain. Erosion can occur where there is no plant roots to hold soil in place.

Soil DRAINAGE - even if your soil texture is good, you may still have soil that doesn’t dry out well because the site does not have good drainage. It is pretty uncommon to have a completely flat site, but keep drainage in mind.
If you do not have to build a new garden site because you are using an EXISTING bed, you should still keep those factors in mind. The best part is that you have much less work to do!

If you have an existing garden, you should still examine the site. If you are not having a garden this school year, we hope you can practice these skills somewhere on school grounds or while visiting a farm or plant nursery.

How Many Hours of Sunshine?
Here are two ways to collect data on sunshine. Your teacher will decide what is best for your class. Your goal is to find out if your garden gets enough sunshine each day for vegetable plants to grow. Because you are not in school 10 hours, you will have to ESTIMATE.

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Pick one day or a week to track the amount of sunshine on your garden plot. The best way is to have students from your class take turns checking the garden site every hour for one full school day. Pick a sunny day. Fill in each hour of sun with yellow and any time the plot is shaded by trees or a building, use gray. (Track shade caused by buildings or trees only, not cloudy days.)

You can also use this chart to track a week’s worth of sunshine and compare how many sunny hours you had and how many cloudy hours.

What is your estimate? How many hours of sunshine does your garden plot get in one day?

____________________________
Is your garden site too windy? It is always good to have air movement in a garden. Air movement helps plant leaves dry off and so they are less likely to develop fungal diseases. But too much wind can be a problem too.

Think of some ways you can DETERMINE air movement. You have probably all had a pinwheel at some time. The faster the wind, the faster it spins, right? We can’t see wind, but we can see the movement it creates. When you walk around to a different side of your school building do you ever feel a difference in the wind speed? Trees and buildings block wind, just as they can block the sunlight. An open field is always going to have more wind than a yard that is protected by buildings, isn’t it?

Try to gather information about wind on four occasions. Be aware of what is moving and use this chart to estimate the wind speed. If your garden never has any wind in it, it may be too well protected! Remember, soft air movement is helpful to plants.

| Nothing moves? | “calm” | wind speed 0-3 mph |
| Feel wind on your face? | “light breeze” | wind speed 4-7 mph |
| Flags and leaves moving? | “gentle breeze” | wind speed 8-12 mph |
| Papers and small branches move | “breezy” | wind speed 13-25 mph |
| Large branches move | “strong breeze” | wind speed 26-31 |

Wind Data collected:

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<th>#1</th>
<th>Date:</th>
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Your data brings you to the conclusion that the garden site is:
Next we will examine the soil texture, soil pH and how well the site drains.

Let’s review the PROPERTIES of soil. Soil is made up of air, water, minerals and organic matter. Minerals come from parent material, the rock that was worn down over time by erosion to create stones and pebbles we find in soil.

Soil particle size is what makes a soil sand, silt, or clay. The largest particles are sand. You can feel sand because it is gritty. The next smaller size is silt and the smallest particles make up clay. These three sizes of particles make soil act very differently. If you pour water into a container of sand, the sand and water separates easily. You could easily drain water out. However, if you pour water into a container of clay, you will end up with sticky, smooth handful of soil. It takes a long time to dry out and when it does it becomes very hard.

Are you ready to get your hands dirty? The best place to examine your soil is outside in the garden. Your teacher will place a large spoonful of soil on the palm of your hand. Have a partner drip water onto the soil until the soil starts to stick to your hands. Mix it in your hands until it seems you can form it into the shape of a ball.

Now, here’s the test:

Does the soil remain in a ball shape when you squeeze it?

Yes_______ No_______

If no, and it crumbles, you have sandy soil

If you answered yes, continue:
Try to roll the ball of soil into the shape of a snake by rolling it between your hands. Can you make a short ‘soil snake’ that doesn’t break?

Yes_______ No_______

If no, you have loamy soil

If you answered yes, continue to roll the ‘snake’ in your hand. Do you feel any grit?

Yes_______ No_______

If no, you have silty-clay soil
The longer you can roll your snake, the more clay you have in your soil.

What is the best soil? Just like Goldilocks tried out three breakfasts, and three beds when she visited the three bears' house, you will want to have soil that is “just right.”

“Water runs right through this soil and dries out quickly.”

“Water drains away nicely and this soil is not sticky or dry. This soil is... just right!”

“Water sits in this soil and makes a sticky mess. When this soil dries it is very hard and dry.”

What kind of soil do you think you have in your garden site?
Test Yourself!

1. Name one factor you should consider when selecting a site for a garden:

__________________________________________________________________________

2. How many hours of sunshine should your vegetable garden receive?

_______________

3. Your garden site often has a 'strong breeze' (26-31 mph wind). How will this affect the plants in your garden?

__________________________________________________________________________

4. A couple spoonfuls of your garden soil can be squeezed and rolled into a very thin 'soil snake' and is not gritty but very sticky. What kind of soil is it?

   a. sandy soil
   b. loam soil
   c. clay soil

5. So many people visited your garden site last year that there is a well-worn path through the garden. The path makes a good place to plant vegetables.

      ______true             ______false
Vocabulary:

accessible - easy to get to

acidic - being tart or sour due to, having a lot of hydrogen ions

alkaline - not sour, having few hydrogen ions

atoms - the smallest part of any thing; atoms make up molecules

clay - the smallest of the soil particles; when wet it is sticky and when dry it is very hard

compaction, compacted - something that is closely packed together and dense

determine - to decide to act on something based on information you have

drainage - the movement of water or other liquid away from its source

estimate - to make a best guess based on information you have

existing - something that is there and has been; not newly formed

hydrogen - the most abundant of all the gases in the universe and is part of the water molecule

impaired mobility - being unable to walk or move easily from one area to another

ions - an atom or group of atoms (molecules) that have become unbalanced

loam - soil that is made up of sand, silt and clay and organic matter

molecules - the smallest particles that anything can be divided into without changing its chemistry (molecules are made up of atoms)

oxygen - an element that is found in the atmosphere and also as part of the water molecule
properties - characteristics or traits of something

sand - the largest sized soil particles, anything bigger would be a piece of stone

silt - a type of soil particle sized between the smallest (clay) and the largest (sand)

For Teachers and Parents:

Materials required: These lessons contain activities that can be done by classrooms with a garden or classrooms who are interested in some very simple hands-on activities outside the classroom. Materials vary for each activity:

- Estimating amount of sunshine on a particular site: no materials needed
- Estimating wind speed at a particular site: no materials needed
- Soil texture activity: water and soil samples (amount of soil is variable depending on the number of students handling soil. Each test requires a large spoonful of soil)
- Estimating compaction of garden site: no materials needed
- Testing pH: perfectly safe activity needing soil samples, distilled water, and a pH test kit. These kits are found in most hardware, home improvement and gardening stores.
- Testing soil drainage: shovel, water bucket and water, yardstick and elbow grease
- Estimating site accessibility: no materials needed

For the most part, these materials are free or easily obtained. Purchases include distilled water and a pH test kit which usually sells for under $10.00.

Additional resources: The best resource for this lesson would be an adult volunteer who is familiar with gardening. Contact your local Cooperative Extension or inquire at a nursery/garden shop.
Instructions to help students with pages 5, 6, 7 and 8:

Pg 5 You may use this chart in two ways. We suggest your class tracks the amount of sunshine on a specific site (garden or school yard) specifically to see how buildings and trees may cast shade on the site. Choose one sunny day and determine how you will have students check the site hourly. The second use may be done by tracking a week’s worth of weather. By filling in the hourly blocks, they will have a visual representation of the sunny days or cloudy days on the site.

Pg 6 This activity lets you choose four occasions to have students physically check wind on a specific school site. For example, this can be four different days in the same week. Discuss with students how wind may gust and be different from moment to moment. How will they choose wind speed on such a day? Encourage students to make a good case for the wind speed they’ve chosen. Students will then have to consider all four days’ worth of data before making a final conclusion. Is the site generally receiving a breeze or rarely? Do they feel they have enough information to make the conclusion?

Pg 7 Hands-on activities are great teaching tools. What’s better than to get dirty hands, too? Choose how many students will work with soil in their hands. It is best to work with partners or small groups, as water will be added to the soil in hand by the drop. Students who are handling the soil will have to work with it toward the goal of creating a damp ball of soil. Following the questions, a partner (non muddy) student will check the yes or no and each group will determine what kind of soil they have. If you have multiple soils, from various areas, it is a good idea to give a soil type to at least two teams to see if they come up with the same results.

Pg 8 Unfortunately, the soil which makes the best soil snake is not the best for gardens. Discuss with students the term ‘clay’ and its relationship to the creation of pots and bricks.
Test Yourself!

1. Name one factor you should consider when selecting a site for a garden: clay or sandy or loam soil? not close to water, too much shade? too windy? too hilly, no drainage?

2. How many hours of sunshine should your vegetable garden receive?
   __________
   6 at the very least; 8-10 is best

3. Your garden site often has a 'strong breeze' (26-31 mph wind). How will this affect the plants in your garden?
   This may be too much wind for young plants, plus the soil will dry out quickly
   ______true     ______false

4. A couple spoonfuls of your garden soil can be squeezed and rolled into a very thin 'soil snake' and is not gritty but very sticky. What kind of soil is it?
   a. sandy soil
   b. loam soil
   c. clay soil  clay soil is not the best for vegetables.

5. So many people visited your garden site last year that there is a well-worn path through the garden. The path makes a good place to plant vegetables.
   ______true     ______false
   X (no, soil will be compacted)