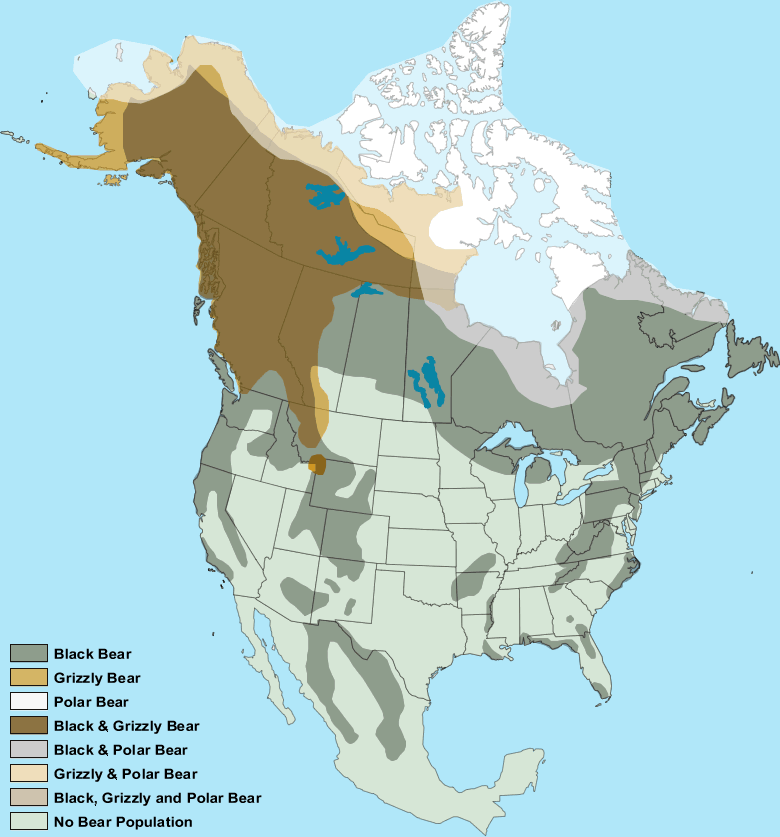
Vocab:

* Population – A single species that lives in a defined area
* Population Dynamics – The study of a changing populations
* Sampling – Using a small section of the population to gain greater understanding about the whole
* Population Density – How tightly packed a population is in the area
* Dispersion – How a population is spread out in a given area
* Uniform Dispersion – A population is evenly spread out over an area
* Clumped Dispersion – A population is grouped together, often around resources, in their given area
* Random Dispersion – A population is randomly spread out over their given area

**Introduction To Populations**

1. A population is a group of the same species that live in a specific area.

Use the map the United States to circle and define a population.



This population is the black bear population in Florida.

* *Key Note – There are multiple areas on this map that have many different species of bear. Students must identify a single species within any area that they identify.*

1. Use the space below to discuss with group members to come up with two ways that populations can grow over time.

The two main ways that populations can grow are through birth and immigration.

Use the space below to discuss with group member to come up with two ways that populations can decrease over time.

The two main ways that populations can decrease over time are through death and emigration

The study of how populations change is called **population dynamics**. To truly understand population dynamics, come up with a mathematical equation that represents how populations can change over time.

Original Population + ((Birth + Immigration) – (Death + Emigration)) = New Population

Or

(Birth + Immigration) – (Death + Emigration) = Population Change

* *Key note – The students may come up with other equations. Make sure you help guide them to the correct principals.*

1. Populations can be spread out over an area in diverse ways. There are three major ways that populations can be spread out over an area.

|  |  |  |
| --- | --- | --- |
| Random | Uniform | Clumped |
| http://www.uwyo.edu/dbmcd/popecol/Fig6.3Dispersion.jpg | http://www.uwyo.edu/dbmcd/popecol/Fig6.3Dispersion.jpg | http://www.uwyo.edu/dbmcd/popecol/Fig6.3Dispersion.jpg |
| Random dispersion means that there is no pattern to how organisms are spread over the area | Uniform dispersion means that there is an even spacing over the area that the animal is spread | Clumped dispersion means that there are areas of tightly packed animals around resources |

Now we are going to utilize the classroom around us to see how the types of dispersion are used in your classroom. Use the space below to draw a basic map of your classroom.

* *Key note – This section of the lesson will be individualized based on the size and shape of your classroom. You may have to pre measure the size and shape of your individual classroom.*

Length of Classroom: \_\_\_\_\_\_\_\_\_\_\_\_\_\_meters Width of Classroom: \_\_\_\_\_\_\_\_\_\_\_\_\_\_meters

Total Square Meters: The length of the classroom x the width of the classroom

1. How many people are in the classroom?

* *Key note – this will be individualized based on the dynamics of the class.*

1. The best way to understand dispersion is to understand the **population density**. The population density is the number of organisms in an specific area. What is the overall population density of the classroom?

The population density is the number of students divided by the square footage of the classroom.

* *Key note – this will be individualized based on the dynamics of the class.*

1. What type of dispersion do students commonly display in the classroom?

* *Key note – this will be individualized based on the dynamics of the class.*

1. What type of dispersion do students display during lab periods?

* *Key note – this will be individualized based on the dynamics of the class.*

1. **Sampling** is the practice of counting a smaller section of the population and applying it to the larger population. It is a useful way to understand a changing and dynamic population. While it may not the perfect way to understand a population, it is the only way to understand how to understand a dynamic population.

Work with your group members to come up with a method of sampling that would be appropriate for sampling the number of people in your school that have access to a pool. Use your method of sampling on the class to estimate the number of people in your school that have access to a pool.

Total number of students in the school: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Estimated number of students with access to a pool: \_\_\_\_\_\_\_\_\_\_\_\_\_

Methods of sampling can vary. As long as the students have a good system in place to come up with a sample, guide them in the right direction.

* *Key note – this will be individualized based on the dynamics of the class*

1. There are multiple different methods of sampling. Each can be used based on the population that is going to be studied.

**Random sampling** is the process of taking samples from a population at random. This is often used when a population that is too large to accurately study the population. This method of sampling will be used in the activity below.

Take one of the bags in front of the class and follow the steps below to use random sampling to understand the sentence in the bag

1. Find a bag with a sample set of information in the population.
2. Record a guess as to what sentence is on the series of cards.

* Key Note – This could be any sentence. They have no information at this time.

1. Select one index card with a sentence that will have a bit of information. Record that information on the data table below.

|  |  |
| --- | --- |
| **Sample Number** | **Information on the Card** |
| Sample #1 | Use the provided PDF of sample sentences, or create your own on index cards! |

1. Place to the sample to the side and repeat step 3 three more times. Each time record the information on the data table below.

|  |  |
| --- | --- |
| **Sample Number** | **Information on the Card** |
| Sample #2 | Use the provided PDF of sample sentences, or create your own on index cards! |
| Sample #3 | Use the provided PDF of sample sentences, or create your own on index cards! |
| Sample #4 | Use the provided PDF of sample sentences, or create your own on index cards! |

1. Now try to estimate the entire sentence that is written on your cards. Record your estimation below

The students should come up with an answer that is closer to the actual sentence than their initial guess.

1. You may now check your sample and find out what information is being represented by your population. Record the correct sentence below.

Students should record their complete sentence here.

**Tag and release sampling** is the process of taking samples from a population randomly and measuring the sample. However, once you are done with that sample you release the sample back into the population. This is often a good method when you are working with living members of a population. Based on the method of sampling, an organism can be caught and recorded again later in the study.

1. Find a new bag with a sample set of information in the population.
2. Record a guess as to what sentence is on the series of cards.

* Key Note – This could be any sentence. They have no information at this time.

1. Select one index card with a sentence that will have a bit of information. Record that information on the data table below.

|  |  |
| --- | --- |
| **Sample Number** | **Information on the Card** |
| Sample #1 | Use the provided PDF of sample sentences, or create your own on index cards! |

1. Place to the sample to the side and repeat step 3 three more times. Each time record the information on the data table below.

|  |  |
| --- | --- |
| **Sample Number** | **Information on the Card** |
| Sample #2 | Use the provided PDF of sample sentences, or create your own on index cards! |
| Sample #3 | Use the provided PDF of sample sentences, or create your own on index cards! |
| Sample #4 | Use the provided PDF of sample sentences, or create your own on index cards! |

1. Now try to estimate the entire sentence that is written on your cards. Record your estimation below

The students should come up with an answer that is closer to the actual sentence than their initial guess.

1. You may now check your sample and find out what information is being represented by your population. Record the correct sentence below.

Students should record their complete sentence here.

**Systemic sampling** is the process of identifying samples from a population systematically and measuring the sample. A good example of this would be to sample every twenth tree in a forest.

1. Find a new bag with a sample set of information in the population.
2. Record a guess as to what sentence is on the series of cards.

* Key Note – This could be any sentence. They have no information at this time.

1. Take out all the index cards and place them so the words are face down. **Do not** look at the information on the cards! Arrange the cards by their sequence.
2. Take every even card and turn it over. Record each card’s information in the data table below.

|  |  |
| --- | --- |
| **Sample Number** | **Information of the Card** |
| Sample #1 | Use the provided PDF of sample sentences, or create your own on index cards! |
| Sample #2 | Use the provided PDF of sample sentences, or create your own on index cards! |
| Sample #3 | Use the provided PDF of sample sentences, or create your own on index cards! |
| Sample #4 (if needed) | Use the provided PDF of sample sentences, or create your own on index cards! |
| Sample #5 (if needed) | Use the provided PDF of sample sentences, or create your own on index cards! |
| Sample #6 (if needed) | Use the provided PDF of sample sentences, or create your own on index cards! |
| Sample #7 (if needed) | Use the provided PDF of sample sentences, or create your own on index cards! |
| Sample #8 (if needed) | Use the provided PDF of sample sentences, or create your own on index cards! |

1. Now try to estimate the entire sentence that is written on your cards. Record your estimation below

The students should come up with an answer that is closer to the actual sentence than their initial guess.

1. You may now check your sample and find out what information is being represented by your population. Record the correct sentence below.

Students should record their complete sentence here.

Let’s take a moment to understand the lab that we just did. With your group, record the answers to the questions below.

1. Each type of sampling asked you to assess the information from your sample before actually providing it (step 2). Each type of sampling also asked you to assess the information from your sample after acquiring information (step 5). After reflecting back on these steps, were your assessments more accurate after sampling? Why or why not?
2. Were your assessments after the samples correct? Why were they not perfectly correct in each case?
3. Which method of sampling seemed to work best for this activity? Why might it have worked for this activity?
4. Give an example for each type of sampling in the real world. Why might your hypothetical situation be good for that type of sampling?