Reading 1.1 – Interactions in Ecosystems

Imagine the life a bird. From the moment it is first hatched from its egg to the end of its life the bird interacts with the world around it. Think about all the different things that the bird interacts with during its lifetime.

Question #1: List one example of where 1) birds would interact with another bird, 2) birds would interact with another other animal, and 3) birds would interact with a plant.

1) _____

2) _____

3) _____

Question #2: What are three examples of interactions that you might observe birds having with non-living objects in the environment?

1) _____

2) _____

3) _____

You are going to study some of the interactions between some organisms and all the living creatures and non-living objects around them. The living creatures that interact in a shared physical environment are referred to as an **ecosystem**. **Ecosystems** vary in size. They can be as small as a puddle or as large as the Earth itself.

When scientists study interactions of many objects and organisms in an environment, they often notice that the interactions they are studying result in difficult to predict outcomes. Systems that generate such outcomes difficult to predict outcomes are referred to as **complex systems.**

In order to study and understand complex systems, scientists often create computer **models** of the system to test what would happen in various situations. Such models are representations of the real world system that often include simplified representations of the real individuals and simplified representations of their interactions.

The model you created in class of an ecosystem was represented with people moving cards that were attached to each other with yarn. That model allowed you to understand some of the complex outcomes that might emerge in a real-world ecosystem. Scientists create computer models to for similar reasons, to understand some of outcomes that emerge in real-world system. If you wanted to create you own computer model (or computer simulation) of an ecosystem you would need to select type of objects that you wanted to represent within the ecosystem. And you would have to choose the important interactions between the objects you wanted to include in the model as well.

Question #3: What are some of the objects you would want to represent in a computer model of an ecosystem?

_____

_____

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Question #4: What are some of the interactions between the objects in an ecosystem that you would want to represent in the model?

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One important type of interaction that occurs between organisms is for food. Food provides energy to do things (all actions require energy) and the matter needed for growth and repair. All organisms need food in order to survive.

Plants make their own food, in part, by absorbing light energy from the sun. Plants use this energy to make food molecules through chemical reactions of molecules from the air and water. Animals, on the other hand, get their food molecules from other organisms when they eat them.

All organisms can survive for short amounts of time without making or eating food by using the food they stored in their body structures. Eventually, though, these sources of stored food energy will run out. At that point, any organism that does not get additional energy will not survive. The survival of any individual, therefore, is very dependent on it getting enough energy and matter from food.

The computer model of the ecosystem you will be studying next time in class will include only the interactions between these objects and organisms:

- The ground
- 1 type of plant
- 1 type of bug
- 1 type of bird

The plants in the model of the ecosystem will grow at a constant rate in the ground. This growth simulates what happens when plants have sunlight, water from the ground, and carbon dioxide available from the air– they can create and store up food more and more food to build more and more new cells to grow bigger and bigger as time goes by.

In a model of an ecosystem with only these objects, think about how you would model the source of food for the rest living creatures?

Question #5a: What do you think bugs should get their food from? _____

Question #5b: What do you think birds should get their food from? _____

In the computer model you will be using, bugs will only be able to get their food from eating grass and birds will only be able to get their food from eating bugs. This is a simplified food chain for the grass, bugs, and birds. In a real world ecosystem, bugs and birds might have other sources of food.

In class you learned that the driving question of this unit of study is "How do Populations Change?" and you began your study of ecosystems and interactions by modeling a food web.

Question #6: What are some of your own questions you now have about "How do Populations Change?"