**Reading-Based Discussion Questions:**

1. **What is biodiversity and why is it important? Think back to the readings. How does biodiversity help ecosystems and humans?**
    a. **Suggested topics to discuss:**
    - Biodiversity is a measure of the variety of different species, genes, or ecosystem types of a certain area/region (or even the entire globe).
    - It is important because higher biodiversity helps both ecosystems and populations be more resilient.
    - Additionally, organisms rely on one another so when biodiversity is decreased, often relationships start to fall apart and the ecosystem can spiral out of control.
    - Organisms can have unique qualities that are only found in that one species and so if you lose that species you lose that trait and potentially lose all services associated with that particular form of diversity (including resistance to diseases, keeping predators in check, etc.)
    - Broadly, biodiversity is important to humans because it affects the air we breathe, the food we eat and how clean our drinking water is. It is the source of the variety of products we use that come from the earth (including food and medicine). Biodiversity also helps control disease and can make us happy just by providing us with natural beauty.

2. **How do changes in environmental conditions (such as a change toward a different climate, introduction of different types of species and introduction of pollution) lead to changes in the number of individuals of different species, the types of species that can survive and/or the loss of entire species?**
    a. **Suggested topics to discuss:**
    - Every species has specific needs and cannot survive when their needs are not met, so when the environment changes, it can cause species to get pushed out (leave) or go extinct.
    - When an environment changes, species with low genetic diversity are more likely to be negatively affected because they cannot adapt as quickly.
    - The changes can sometimes be good for certain species as well and then those species can grow to larger populations than they previously had.
3. **What is the difference between extinction and biodiversity loss? How are they interrelated?**
    a. **Suggested topics to discuss:**
    - Extinction is the loss of an entire species.

- Biodiversity loss is specifically the loss of the diversity of life which is often caused by extinction but can also be caused by displacement of species or a changes to a certain ecosystem.
- They are interconnected because if you are losing a large number of species like we are now, you are also losing the variety/diversity that having more species provides.

4. **What are some major threats to biodiversity today? Where do these threats come from?**
    a. **Suggested topics to discuss:**
- Habitat loss, invasive species, pollution, human population growth, over consumption, climate change, unsustainable harvesting, global trade, etc.
- Habitat loss comes from development, agriculture, logging, destructive fishing, etc.
- Pollution comes from industry, driving cars, agriculture, lights, plastic, littering, etc.
- Climate change is caused by increasing CO2 in the atmosphere. CO2 comes from car exhaust and other sources and is also released when trees are cut down and ice caps melt because trees and ice caps store carbon dioxide.

5. **What are some ways that we can each work to protect biodiversity on a personal day-to-day level? What about on a large-scale or systemic level, for instance as a community or as a country?**
    a. **Suggested topics to discuss:**
- We can buy sustainable products. We can recycle to reduce consumption. We can limit our use of plastics. We can drive less to pollute less. We can change our diet.
- You can learn more about the species in your area and help teach others ways to help protect them.
- You can help clean-up rivers, restore habitat by planting trees or remove invasive species.
- On a larger scale, we can add more value to the species we are losing by highlighting their importance and the importance of the different kinds of networks that exist between different species.
- We can put new laws in place to protect species from extinction and to avoid introducing invasive species. We can call for a ban of single-use plastic and unsustainable fishing and/or logging.

6. **What are some types of relationships that exist between different species within an ecosystem? Why is understanding these relationships between species important? How do these relationships play a role in ecosystem stability?**
    a. **Suggested topics to discuss:**
    - Many ecosystems function the way that they do because of the relationships within them. For example, predator-prey relationships help keep different populations in-check so that one type of species doesn't take-over and end up over-using the resources it needs (which would essentially cause the ecosystem to collapse).
    - Another example: pollinators are necessary for the creation of fertile seeds, and herbivores can be important for spreading those seeds. So, those relationships help maintain the plant communities that other species also rely on.
    - It is important for us to understand these relationships because that allows us to more fully understand how our actions affect the entire ecosystem. Hunting out all of the predators for example can have a cascading effect that leads herbivores to eat too large of a proportion of the plant community, which can lead to erosion, etc. So, understanding the relationship between that predator and its prey can help us understand the unintended consequences of our own actions (eliminating wolves for example).
    - Stability of an ecosystem can be associated with the stability of relationships. If power dynamics change (too many predators for example), this can affect the entire ecosystem.

7. **What kind of relationships might exist in the ecosystems that we inhabit (in our cities)? Do you think that the Salt Lake valley has a lot of biodiversity? Why or why not?**
    a. **Suggested topics to discuss:**
    - Humans are often predators in city ecosystems (we hit things with our cars, we use pesticides, we eliminate rodents from our houses and gardens, etc). In this way we have a relationship with various prey.
    - Some animals benefit from city landscapes, such as pigeons and raccoons. Lots of scavengers have learned to rely on trash cans as a food sources so they thrive in cities. In this way, they come to rely on humans for food.
    - Space is limited in cities (especially green space or tree space, etc.) so there is a lot of competition between herbivores and bird species.

- Plants are often cut down or moved by humans which changes the soil as well, etc. and this affects the herbivore populations as well as the worms and other decomposers due to their relationships with plants.
- The greater Salt Lake area has more biodiversity than some more urbanized cities. We have different elevations so that can provide different habitats. We are very close to Forest Service land as well (which protects a lot of species and habitat) so biodiversity can spill over from the canyons and foothills.
- Some of the biodiversity in the city/valley is curated and therefore non-native.
- Insect biodiversity is often lower in cities than in non-human-dominated areas. Predator biodiversity is often lower in urban areas as well.

8. **How can science help us protect biodiversity?**
    a. **Suggested topics to discuss:**

- Science is a process of making observations, discovering a problem, and searching for information about how to help solve that problem or how to understand the causes of the problem.
- With biodiversity specifically, science allows us to understand the way that different species survive which can help us understand how best to help them.
- Science can also help us uncover relationships which allows us to see the ways that harm to one species can harm another or how helping one species can help another.