**Mission STEMCAP Pollution**

**Guided Reading Questions**

**“Utah Faces Unique Air Quality Challenges”**

1. **What happens to Utah’s Wasatch Front during the winter? How does this effect Utah residents?**

During the winter, the valley is prone to temperature inversions, where high pressure systems act like a lid over cold air for days to several weeks. Pollutions gets trapped in the stagnant, cold air, greatly reducing air quality and posing health risks to the area’s residents.

1. **What is “urban air quality” and how is it measured? How does Utah compare to the rest of the United States for its urban air quality?**

Urban air quality measures the average number of days in a year which the state’s Air Quality Index was above what the Environmental Protection Agency deems a “healthy threshold.” Utah is ranked second to last (ahead of Delaware) for its urban air quality.

1. **How much has Utah reduced air emissions during the past 15 years?**

38 percent.

1. **What did University of Utah chemical engineering professor Kerry Kelly do to understand more about Utah’s pollution sources? What did she find?**

She analyzed filters that capture particulate matter to see exactly where pollution is coming from. She found that wood burning is far more significant than the state originally thought.

1. **What did Kelly discover about neighborhood-scale pollution?**

During inversions, air quality is significantly better higher up in the valley, such as Park City, which is typically comprised of higher-income homes, compared to the air quality lower in the valley.

1. **In Utah, what form of pollution accounts for approximately half of the state’s air quality problem?**

Mobile emissions (cars, planes, motorcycles).

1. **According to Kelly, what has been the biggest source of Utah’s air quality improvement so far?**

Cleaner vehicles replacing older vehicles that cause more pollution.

**“A Voyage to Research Plastic Pollution”**

1. **What are ocean gyres and how are they interacting with plastic?**

Gyres are currents in the ocean. They are collecting waste “like a giant plughole.” Much of the plastic is breaking down in minuscule pieces in the gyres.

1. **What are some problems surrounding the micro plastics found in the ocean? How are humans affected by these?**

They are really hard to clean up and their small size means that they could end up in the food chain.

A study found that adults eat about 50,000 micro plastics each year.

1. **What are endocrine disruptors? Where are they coming from and why are they so dangerous?**

Chemicals that mimic hormones and stop important messages from moving around our bodies.

These endocrine disruptors are coming from the micro plastics we eat each year. They can be a big problem for female reproductive health and can potentially be passed on to children.

1. **What is the Indonesian Throughflow?**

A current through which 90% of all plastic found in the sea is driven.

1. **How is the eXXpedition voyage building a more complete picture of plastic in the ecosystem?**

They carry out research on both sea and land. They use surface trawling, sampling from the layer just below the surface, and sediment sampling. Samples will be used by the University of Plymouth to map how marine plastics end up in the gyres they are visiting.

**“Lights Out, Please!”**

1. **How do birds navigate how do modern cities affect their navigation?**

Birds use the moon and stars to navigate and lights in cities confuse them.

1. **How many birds die each year from running into windows?**

100 million

**“Energy Production”**

1. **What generates most electricity?**

Electricity is generated by machines that run on steam realized from burning things like oil, gas, and coal.

1. **What does renewable energy mean?**

This means that its source is not consumed when we use the energy.

1. **Why is solar power better for the earth than oil, gas, or coal?**

It does not release toxic chemicals into the air