

How to use Diapers on A Plane Worldschooling Lesson Guides and Worksheets

Our Worldschooling Lesson Guides are free to use and intended to be a resource for parents to engage with their children. Combined with the accompanying blog post, which shares our family story of experiencing the related topic firsthand, these guides will help your family pinpoint ideas to focus on during your learning sessions.

Whether you are on a journey to the subject quite literally, or whether you are studying at home, the intention is to use these guides to initiate the discovery process. These lesson guides are not intended to be handed off to your kids for self directed learning. While we love checking out books from the library, reading and discovering new things, worldschooling is about seeking hands on opportunities.

As a family we abide by the philosophy of Socrates Questioning, a method of teaching and learning which Socrates practiced by asking questions of his students instead of lecturing. This method allowed them to discover the answers by asking more questions and examining ideas. Ultimately through enough questions we will be lead to the answer. These lesson guides don't have all the answers. They are a starting point. Together, with your student you can begin the questioning process and seek out the answers together.

We could include dates and statistics, but that's not what students remember. Regardless of the type of learner you happen to be, everyone responds to learning that stimulates the senses and challenges the learner. Worldschooling at its core stirs the energy of the mind to stimulate a passion for the topic.

The provided worksheet plays off the lesson guide as a comprehension tool. A way to access if the way you are presenting the information and the questions that are asked are being received.

Of course, use this the way you see fit! Use these as they fit your family best; these are just our ideas and how they work best for us.

Puerto Rico: Ecology

Bioluminescent Bay Worldscooling Lesson Guide

Q 1) What is a Bioluminescent Bay?

- A) A Bioluminescent Bay is a body of water that has a perfect ecosystem that enables aquatic organisms that produce light to thrive. Some bioluminescent creatures that abound in the world are fireflies, glow worms, and jellyfish. In a bioluminescent bay, these creatures are so abundant that the water turns to light when it is disturbed.

Q 2) What are the creatures that make the bay sparkle with light?

- A) In a Bioluminescent Bay the creatures that create light are called dinoflagellates. They are a type of algae that possess features of both plants and animals. These creatures are microscopic and measure no bigger than 1/500th of an inch. To the naked eye, they can only be seen when they light up and appear as a fluorescent blue green pin prick.

Q 3) Why do dinoflagellates light up?

- A) The classification of a dinoflagellate is algae, and so they are both predators and prey and they are also parasitic. They protect themselves a number of ways. The most spectacular is by using their bioluminescence to light up and cause a shock to their predators. Any disturbance to their environment will cause the dinoflagellates to light up; rain, wind, a cresting wave, a splash of an oar, a hand in the water. etc. Another way they protect themselves is that if they are consumed, they become like vampires and suck the energy out of the organism that ate them!

Q 4) What do dinoflagellates prey on? Who are their predators? How are they parasitic?

- A) Dinoflagellates are predators to certain types of protozoa, but to say a dinoflagellate is a predator is a bit of a misnomer. They do not hunt or kill other animals, but they do prevent the host animal from living by releasing a toxin if eaten. Through evolution many fish have learned not to eat the algae however also through the process of evolution many fish are now immune to the toxins. Animals that are predators to the dinoflagellates include frogs, insects, shrimp, and snails. Dinoflagellates are heterotrophic and take energy from other organisms thus making them parasitic.

Q 5) How do dinoflagellates recharge?

- A) Bioluminescence only happens at night, on a circadian clock. Each algae can light up seven times in one minute and then they go back to the bottom of the bay to be recharged by the sun the next morning.

Q 6) Where are Bioluminescent Bays located around the world?

A) Puerto Rico has three Bioluminescent Bays, but you can also find bioluminescence in many states in the continental US and around the world including Jamaica, Vietnam, Australia, New Zealand, Hong Kong, Japan and more. They can survive in both warm and cold climates, but are most commonly found in freshwater. They can even live in snow and ice! In fact, every body of water has bioluminescent creatures, but not every body of water has the perfect balance of vitamins and organisms to allow the creatures to be seen. Mosquito Bay on the island of Vieques, in Puerto Rico holds the Guinness world record for having the highest concentration of dinoflagellates and is consequently the brightest bay in the world.

Q 7) What type of diet do dinoflagellates require?

A) Mangrove trees provide the perfect diet for the dinoflagellates because they are high in protein. One leaf of a mangrove tree possesses more protein than a 6 oz steak! Mosquito Bay is surrounded by mangrove trees. The leaves fall into the water and are broken down through a biological cycle that includes highly concentrated amounts of Vitamin B-12, salt and a whole host of nutrient dense vitamins. As the leaves decompose, the microscopic organisms feed on them and this diet creates the bioluminescent plankton in the water.

Q 8) Are dinoflagellates helpful?

A) Dinoflagellates are quite complex organisms, that constitute a vital link in aquatic ecosystems. Depending upon the context, they can either be strongly beneficial or detrimental to human uses of these environments. When toxic, clearly they are detrimental, but can be highly productive when accomplishing photosynthesis and behaving as predators to bioaccumulation.