Remote Learning Packet

There is no need to submit this packet at the end of the week. Enjoy your summer break!

Week 9: May 25-29, 2020

Course: 9 Biology

Teacher(s): Mr. Malpiedi michael.malpiedi@greatheartsirving.org
Ms. Oostindie megan.oostindie@greatheartsirving.org

Monday, May 25

Happy Memorial Day! No School!

Tuesday, May 26 - Friday May 29

Science doesn't stop with the school year. We've included a list of things you can do all summer to keep wondering. Also, life is the opposite of stasis. What keeps things alive is perpetual activity. Stay alive. Keep doing things. Go out and observe the continual motion of the cosmos.

Please choose one of these things and do it. You are welcome to include siblings, parents, classmates. Try and complete each one of these by the end of the summer.

Germinate Something

Background: germ: mid-15c., "bud, sprout;" 1640s, "rudiment of a new organism in an existing one," from Middle French *germe* "germ (of egg); bud, seed, fruit; offering," from Latin *germen* (genitive *germinis*) "spring, offshoot; sprout, bud." Germination unlocks the potency of life in the seed before it bursts and begins growth. In some fragile plants like lavender, germination in a separate environment is necessary before plants can be planted.

Materials: Water, gallon or quart size plastic baggie, 2 paper towels, water, seeds, and sunlight.

Method:

1. Thoroughly wet both paper towels so they are soaked but not dripping.
2. Arrange the paper towels one on top of the other and place them inside the baggie.
3. Place your seeds between the paper towels, and close the bag.
4. Place the bag near a window that gets lots of light - preferably one that faces south.
5. Check to ensure your seeds are moist every day. Add water as needed.
6. Once your plant has sprouted into a seedling, plant it in the dirt and watch it take off.

Conclusion: How long did germination take? How does it change day to day? How is a germinated seed different from a plant? How is it similar? Where is all that green matter coming from?

Additional study (optional): Research ideal growing times/conditions for your seeds and start a garden!

Plant Something

Background: You can't actually "grow" anything, but you *can* learn enough to cooperate with and foster the intrinsic property of growth of various plants.

Method:

1. Plant something: your seedling, a flower, seeds, etc. in a few inches of dark, damp earth. If not, pick a plant that's already growing and "adopt" it.
2. Water it gently every day, except on rainy days.
3. Use your lab skills to record observations on a regular basis. Observe as many of the 10 categories as you can *every time*. Take a note of plant height, color, number of leaves, new developments, wiltiness, etc.
4. Synthesize your findings in a chart.
5. Graph the change over time of a particular property. Time is your x-axis.

Conclusion: Most things grow so slowly, we can't recognize the change from day to day! IT's the work of the curious scientist to track those minor changes and then learn from them. By tracking how water, sun, temperature, and soil composition affects plant growth, we can learn about the nature of plant species.

Additional Study (Optional): Email Mr. Althage and ask him about grafting.

Watch Planet Earth and Planet Earth II on Netflix (Optional)

Background: Until you go to remote corners of the earth on your *own* research grant, take advantage of the beautiful work the Discovery Channel people have done. The Planet Earth series is what we call a species study, which focuses on particular species one at a time. What have you learned about ecosystems that you see here?

Method:

1. Gain access to the Planet Earth series (Netflix, local library, the cabinet).
2. Put your other devices in another room.
3. Make some popcorn.
4. Grab your notebook and something to write with.
5. Watch an episode, eat popcorn, and take notes on what amazes you.

Conclusion: How are species related? What are the driving forces of nature? Does nature as a whole work toward an end? Can we learn what that end is?

Additional Study (Optional): Practice your David Attenborough impression.

Species Survey

Background: The art of observation can reveal much that isn't registered by a passing eye. Taking the time to investigate what's *really* in front of us almost always renders worthy results. This particular activity is used by scientists the world over to make investigations and draw conclusions about the world around us. Species surveys provide essential ecological insights.

Method:

1. Construct a one-meter square with yardsticks, PVC, etc.
2. Place it on a random patch of natural ground (no concrete, please!)

3. Guess how many different species of living thing you might find within that square. Write it down.
4. Count and describe *every single* species of living thing you find within that square.
5. Write down your findings.

Conclusion: How did your results differ from your guess? Why? What do your results tell you about this parcel of land, this region, this county, this state, this biome? Did you find any very strange species? Did you find two very similar species that were hard to tell apart? How did you tell them apart? Did you find insects, arachnids, birds or mammals among the plants? Does the number you found seem reasonable? Why?

Go Birding

Background: Birding can become a lifelong hobby! Birding is different than birdwatching. Birding is more scientific and in-depth. Most birders out there have formation in the sciences, and love finding rare or unusual species wherever possible. There are also rich birding communities in most towns invested in finding and tracking species of birds all over the world. In Texas, bird species are usually registered by county.

Method:

1. Purchase or check out a bird guide (Sibley is good) from the library, or find a pdf online.
2. Go to a park or avian reserve area (around dawn or dusk are more active times).
3. Listen and watch for birds.
4. Make a note of which birds you hear and see.
5. ebird.com is a very cool way to see what's out there, and keep track of your own progress!

Conclusion: How many birds did you find? Which ones? How did you spot them? Which was your favorite to spot? Why? Where are you going next?

Cardio Study

Background: Human biology is not only available via textbook. Every activity you do is biological in some way, and thus can offer insight into human bio generally! It is particularly evident in the cardiovascular system.

Method:

1. Make a cardio plan of running, biking, swimming, jumping jacks, going up stairs, burpees, etc three times per week.
2. Follow your plan! If it's too hard or too easy, adjust.
3. Use your watch (or fitbit or grandfather clock) to track your heart rate in beats per minute.
4. Measure your heart rate before, during, and after exercise every day (remember that lab?).
5. Make a graph of your measurements over the course of 4 weeks or more this summer.

Conclusion:

Regular cardiovascular exercise has been proven to improve the efficiency of your entire cardiovascular system, meaning your body can do more with less exertion. This means that over time, with regular exercise, your resting heart rate can actually decrease while still supplying your cells with sufficient oxygen. Also, you will probably notice your recovery times decrease. The best athletes can have resting heart rates below 40 bpm!