Teaching with i-Tree Exercise

Team Name: _____

Advisors: make an account at https://plt.org

Go to the Shop icon at the top of the Project Learning Tree page, narrow your search to "secondary", and click on the *Teaching with i-Tree* resource at the bottom of the page (This resource is FREE).

Once "purchased", go to Account Home on plt.org website

Find the "My Materials" tab in the left hand column of your Account Home page.

In "My Materials", your *Teaching with i-Tree* resource should be available for download. This document contains three activities for your benefit. We will primarily focus on **Activity 1, Part A** and **Activity 2.** The other activities are optional and great for practice for the state competition.

** This resource is correlated to the Next Generation Science Standards for Middle and High School, as well as the Common Core English Language Arts Standards. See how in the preface of the *i-Tree* document.

Activity 1, part A delves into the benefits that trees provide, both in products and the ecosystem services. It also begins the discussion on calculating a dollar value for these benefits. Products can easily have a monetary value attached to them, but how do we do this for things like watershed protection, carbon sequestration, or biodiversity? Follow the instructions and guiding questions in the document with your teams.

Activity 2 is all about calculating Tree Value. Your team will inventory the trees around your school. We suggest printing an aerial map of your school and surrounding area before venturing outside.

- Locate 10 trees in your school's vicinity
  - A minimum of 10 trees should be collected from your school's area. If you don't have trees immediately near the school, look to the boulevards, green spaces, or adjacent lots. If you select trees on a private homeowner's residence, be sure to ask permission before measuring.
- Mark each tree on your map with a dot and a number; later we will color those dots according to their species
- Distribute the student page for Activity 2, titled "Tree Value Worksheet".
  - For each tree in their selected area, assign a number and collect information on:
    - Tree species
    - Condition
    - Exposure to Sunlight
    - Diameter at Breast Height
      - This is the diameter of the tree at 4.5' above the ground. In your document, there are a few videos on how to best take this measurement. Watch if you or your team have questions!

- Can use a measuring tape, diameter tape if on hand, Biltmore stick, or simply measuring a string (plus the math!)

- Once your trees have all been identified with their species and assigned a number on the worksheet, color-code each tree on your aerial map to correspond to the type of tree they are and write the number next to the dot on the map. Make a legend to show what each color means. (This can easily be done in Microsoft Paint or another fancier program)

- Once data in the field is collected, use the design.itreetools.org program to measure benefits
  - Enter your school's address in the search bar
  - Draw school structure in step 1
  - Place trees using step 2
    - Be sure to include accurate info on tree species, DBH, and condition
  - Click model crown growth to see your trees' growth potential
    - Take note of the current placement of trees
      - Will their crown growth interfere with each other (aka were they planted too closely)?
      - Is there placement optimal for energy savings (aka do we have trees in the green zones around the building)?
      - Where are there opportunities for planting (Activity 3)?
  - Estimate benefits of your trees in step 3
    - Set years to 20
    - ***Save your project before calculating***
      - NOTE: this program can get a little laggy. Be patient with it!
  - You should receive some graphs with data supporting the ecosystem benefits and dollar value associated with them, for all trees and for each individual tree (you can select which in the yellow drop down menu at the top).

- Go to the Project Tab at the top of the webpage and click on "View Report". Save this document to turn in with the other pages.
  - For each individual tree, complete the Tree Value Worksheet with data on "Dollar Value per year" and "Ecosystem Services"
  - For all trees, complete the questions on the next page.

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- Lastly, go to the Project Tab again and click “Return to Setup” to finish Question #5. If you have already clicked out of the program, you can click the Project Tab on the main page of the website and select “Load” to repopulate your project data.
- Screenshot the map for your “All Trees-Energy tab-Current Year 2024” page to show the trees added in Question #5 on the answer sheet. This can also be done by clicking on the Project tab at the top, and selecting the “Print” option.

- Once completed, attach all documents listed below and email to beth.hill@ndsu.edu. Only one packet is suggested per team.

  - ☐ Benefits Estimate Report (from original scenario, prior to adding new trees)
  - ☐ Color-code tree dot map
  - ☐ Tree Value Worksheet
  - ☐ “All Trees-Energy-Current Year” screenshot of map

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Please follow all directions.

1. For all trees in your selected area, what is the dollar value of the benefits that these trees will provide in the current year (2024)?

2. For all trees in your selected area, what is the dollar value of the benefits that these trees will provide in 2044?

3. If all trees are cared for, what dollar value will their overall benefits provide over the next 20 years?

4. In 2024, all trees in your selected area will conserve how many Kilowatt-hours of electricity?

5. Strategically placed trees can increase home energy efficiency. In summer, trees shading east and west walls generally keep buildings cooler. In winter, allowing the sun to strike the southern side of a building can warm interior spaces.

   In your project area, place two trees (species of your choice, DBH of 2, Excellent condition, full sun) that you think would help improve the energy efficiency of your building. Run* the Step 3 Estimate Benefits calculation again and note how much of an increase of Kilowatt-hours of electricity you conserve.

   * To best do this, click the project tab at the top of the webpage. Click “load” and upload your saved file from the previous exercise. Add trees, then run the Step 3 Estimate Benefits again.

6. Explain why you selected the trees you did in Question 5.