

## Champion Trees & GPS

## Teacher's Guide

**Subject:** Integrated Science (Life; Earth-Space)

**Topic:** Measuring Tree Growth and Orienteering Skills

**Summary:** Students will use compass and GPS units to navigate to selected trees in Wakulla Springs State Park and take three selected measurements used by the Division of Forestry Program on identifying Champion Trees.

After completing the field lab, students will be able to:

**Objective(s):**

1. Navigate using GPS units and compasses
2. Use selected forestry equipment
3. Use and understand the Champion Tree Nomination Form

**Ecosystem(s):** Hammocks; Pinelands

### Equipment:

- Clinometer (optional)
- Calculator
- Compass
- Biltmore/Cruiser Stick (optional)
- DBH Tape (optional)
- GPS
- Tree Caliper (optional)
- Tape Measure
- Tangent Height Gauge

### Background:

- **Vocabulary:** Champion Tree; diameter; radius; circumference; crown
- **Reference Material:** How to Measure a Champion Tree  
<http://www.dfr.state.nc.us/urban/pdf/Howtomeasureachampiontree.pdf>  
 Equations:  $C = \pi \times d$ ; Tangent Height Gauge  
 The total point value, according to American Forests, is calculated as follows:  
*Total Points = Circumference in inches + Height in feet + 1/4 of Average Crown Spread in feet*
- **Equipment Training:** GPS, clinometer, cruiser stick, and DBH tape

### Procedure (Engage; Explore; Explain)

1. Students assemble at the field between the bathrooms and the picnic area.
2. Start by asking the students, "How do you determine if one tree is bigger than another?" Briefly introduce the process of growth and development that is common to all living things and explore various ways we measure our own growth. Introduce the common measures of tree growth (circumference, height, and crown spread).
3. In groups of 3, students will use the GPS and navigate to pre-selected area (playground, volleyball field, or sign)
4. From the pre-selected area, students will locate a specific point marked with an "X" and follow a specific compass bearing to the first tree. Students should count the number of paces to the tree and record that number.
5. Once you have located your tree, complete the Champion Tree measurements on your data sheet (you can calculate the total points for the tree at the end of the activity).
6. Use your GPS to navigate to the next pre-selected area and repeat steps 3-5.
7. Examine your results for each of the three trees.
8. Answer the discussion questions as a group

### Sunshine State Standards:

**Science:** SC.D.1.3.4; SC.G.1.3.4, 5; SC.G.2.3.2, 3, 4; SC.H.1.3.7; SC.H.2.3.1

**Language Arts:** LA.A.1.3.3; LA.B.2.3.1; LA.C.1.3.1 **Mathematics:** MA.A.1.3.1; MA.A.3.3.3; MA.B.1.3.1, 2; MA.B.3.3.1

# Champion Trees & GPS

# Student Data Sheet

## General Information

|                   |  |            |  |
|-------------------|--|------------|--|
| Full Name:        |  | Date:      |  |
| School (teacher): |  | Time:      |  |
| Latitude:         |  | Longitude: |  |

## Field Observations/Measurements/Data

|   | Tree 1<br>GPS point: Playground<br>Bearing: 41.5°<br>Paces: ____ Initials: ____ |                     | Tree 2<br>GPS point: Volleyball<br>Bearing: 90°<br>Paces: ____ Initials: ____ |                     | Tree 3<br>GPS point: Sign<br>Bearing: 232°<br>Paces: ____ Initials: ____ |                     |
|---|---|---------------------|---|---------------------|--|---------------------|
|   | Measure-<br>ment  | Points              | Measure-<br>ment  | Points              | Measure-<br>ment   | Points              |
| Crown Spread – maximum diameter:  | Feet  |                     | Feet  |                     | Feet   |                     |
| Crown Spread – minimum diameter:  | Feet  |                     | Feet  |                     | Feet   |                     |
| Crown Spread Subtotal (maximum + minimum diameter)  |   |                     |   |                     |  |                     |
| <b>Average Crown Spread:</b> (crown spread subtotal divided by two)                         | Feet  |                     | Feet  |                     | Feet   |                     |
| <b>Point Conversion</b> (divide average crown spread by 4 and round to nearest whole point) |   | <b>Points</b>       |   | <b>Points</b>       |  | <b>Points</b>       |
| <b>Circumference</b> (to the nearest inch)  | Inches  | <b>Points</b>       | Inches  | <b>Points</b>       | Inches   | <b>Points</b>       |
| <b>Height</b> ( to the nearest foot)  | Feet  | <b>Points</b>       | Feet  | <b>Points</b>       | Feet   | <b>Points</b>       |
| Total Points  |   | <b>Total Points</b> |   | <b>Total Points</b> |  | <b>Total Points</b> |
| Height above average ground level that the Circumference was measured:                      | Feet  |                     | Feet  |                     | Feet   |                     |

## Champion Trees & GPS

## Assessment

1. Did the tallest tree also have the highest number of total points?

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2. Using the equation  $C = \pi \times d$ , calculate the diameter of the largest tree that you measured (use 3.14 for  $\pi$ )? Show your work below.

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3. In a dense and crowded forest, which of the three factors (circumference, crown spread, or height) is most likely to be negatively affected or constrained? Why?

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4. Why might a Champion tree in the mountains be smaller than a Champion tree in Florida?

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5. Name two positive and two negative impacts that people have on the survival of Champion trees?

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### Portfolio Journal Prompt

The oldest tree in the world is a bristlecone pine in California named Methuselah and is about 5,000 years old. Before you begin writing, think about three of the oldest people you know. Keeping in mind these people, try to imagine how the tree might feel if it could take on human characteristics.

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# Reference Chart

Circumference of a circle:

$$C = \pi d$$

Area of a circle:

$$A = \pi r^2$$

