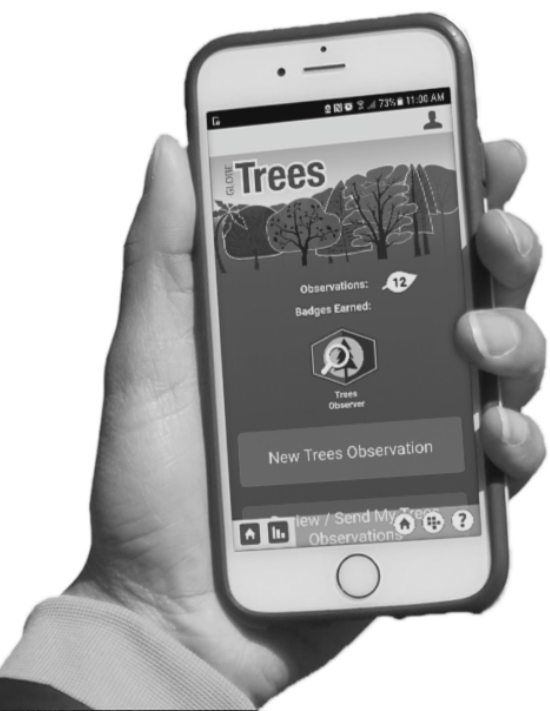
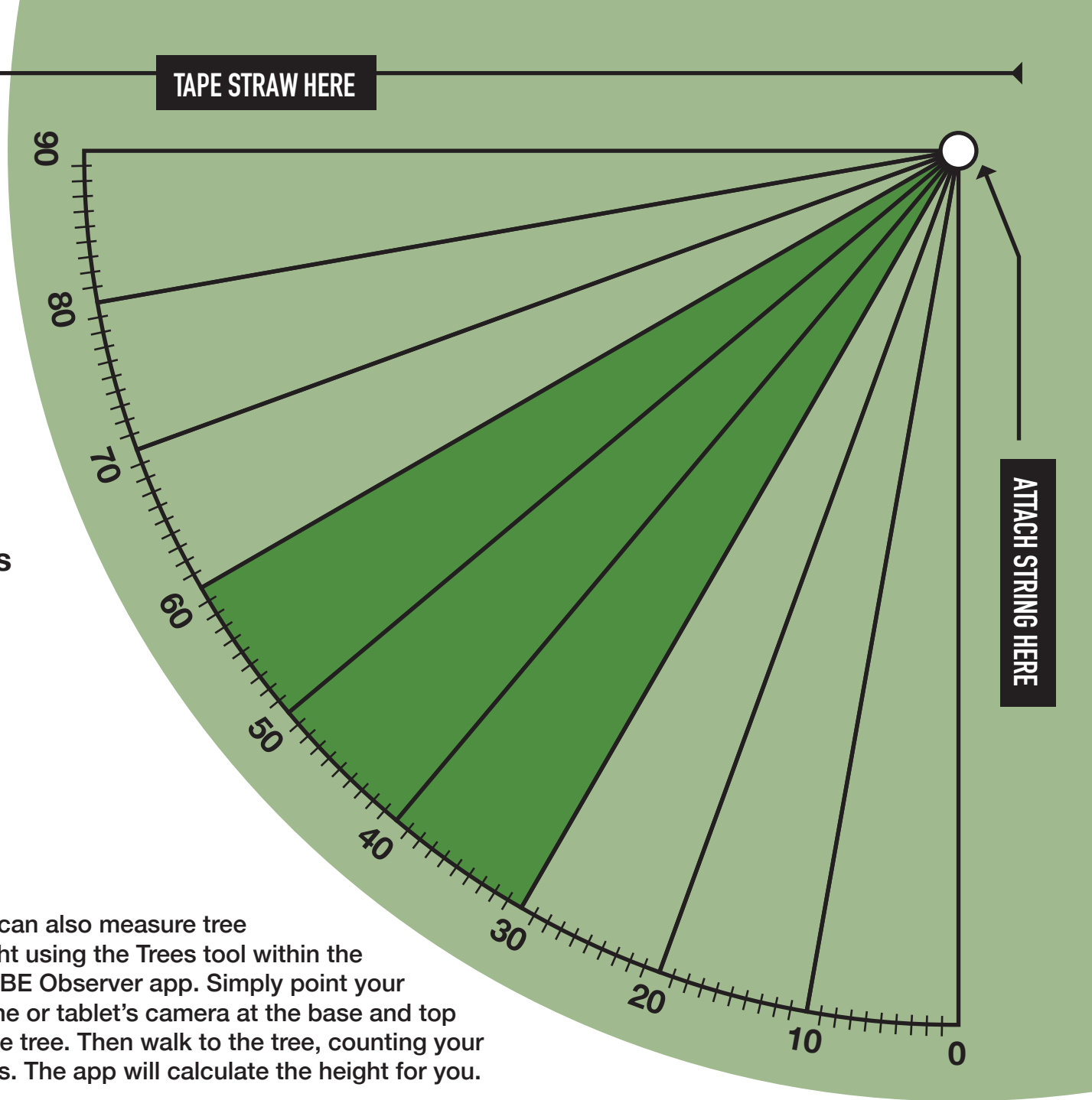


GLOBE **Trees**

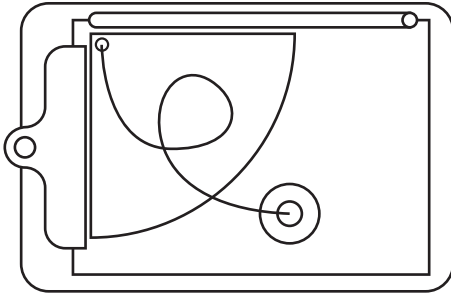
Measuring tree height is just one way that scientists study the health of forests and ecosystems around the world. Give it a try using this paper clinometer.



You can also measure tree height using the Trees tool within the GLOBE Observer app. Simply point your phone or tablet's camera at the base and top of the tree. Then walk to the tree, counting your steps. The app will calculate the height for you.



Constructing the Clinometer



1. Pull a knotted string through the circle in the upper right corner of the clinometer.
2. Attach a weight (like a paper clip or washer) to the bottom of the string.
3. Tape your straw to the top of the page.
4. Clip to a clipboard or hold against a hard surface like a book or piece of cardboard.

Using the Clinometer

1. Find a tree on level ground that is at least 3m tall. Stand where you can clearly see the base and the top.
2. Look at the top of the tree through the drinking straw.
3. Use the clinometer to measure the angle at which you are looking at the tree. It helps to have a friend tell you where the string crosses the arc.
4. Walk to the base of the tree, counting your steps.

$$\begin{array}{c} \text{Your Height} \\ \boxed{} \text{ cm} \end{array} \times 0.413 = \begin{array}{c} \text{Step Length} \\ \boxed{} \text{ cm} \end{array}$$

$$\begin{array}{c} \text{Your Height} \\ \boxed{} \text{ cm} \end{array} - 10 = \begin{array}{c} \text{Eye Height} \\ \boxed{} \text{ cm} \end{array}$$

$$\begin{array}{c} \text{Step Length} \\ \boxed{} \text{ cm} \end{array} \times \begin{array}{c} \text{\# of Steps} \\ \boxed{} \end{array} = \begin{array}{c} \text{Distance from Tree} \\ \boxed{} \text{ cm} \end{array}$$



$$\begin{array}{c} \text{Distance from Tree} \\ \boxed{} \text{ cm} \end{array} \times \tan \begin{array}{c} \text{Clinometer Angle} \\ \boxed{} \end{array} + \begin{array}{c} \text{Eye Height} \\ \boxed{} \text{ cm} \end{array} = \begin{array}{c} \text{Tree Height} \\ \boxed{} \text{ cm} \end{array}$$

$$\begin{array}{c} \text{Tree Height} \\ \boxed{} \text{ cm} \end{array} \div 10 = \begin{array}{c} \text{Tree Height} \\ \boxed{} \text{ m} \end{array}$$