

Pine Cone Science



Why do pine cones open and close?

Have you ever noticed that sometimes pine cones are open and sometimes they're closed? Why do pine cones do this? Is there a reason for it? Follow this simple experiment to investigate this unique phenomenon of pine cones.



Materials

- (3+) Pine cones
- (2) Bowls
- (1) Plate
- Paper towels
- (2) Kitchen tongs
- Hot water
- Cold water
- Permanent marker



Instructions

1. Gather at least 3 or more pine cones from one tree.
2. Place your bowls and plate on a flat, water resistant surface like a table or kitchen counter. Place a few paper towels on your plate to absorb liquid.
3. Use your marker to label your pine cones A, B, and C (one letter per pine cone).

Botanist Tip: Label the underside of the scales near the bottom of the pine cone.





4. Fill one bowl 3/4 full with hot water and the other bowl 3/4 full with cold water.

5. Place pine cone A into the cold water and pine cone B into the hot water. You may need to use the kitchen tongs to hold the pine cones under the water. Set pine cone C on the plate.

6. Observe the pine cones in the water.

7. When your pine cones have closed, remove them from the water, and place them on the plate.

8. Observe the pine cones as they dry.

9. Repeat the experiment as many times as you like. Try using pine cones from another tree and note any differences.



Extra Credit Science for Advanced Botanists

Use a measuring tape to measure the length and circumference of each pine cone before and after putting them into the water, and then again when they are dry. Use the Observation Data sheet below to help you record your observations from the experiment. Don't forget to record the times you put the pine cones into the water and take them out again.





Observation Data Worksheet

	Pine Cone A	Pine Cone B	Pine Cone C
Dry Length			
Dry Circumference			
Time Pine Cones Placed in Water			
Cold/Hot Water Length			
Cold/Hot Circumference			
Time Pine Cones Out of Water			
Final Length			
Final Circumference			
Time Pine Cones Reopened			



Observation Questions

What happened when you placed the pine cones in the bowls of water?

Did the pine cone in the hot or cold water close fastest? Why do you think this is?

How long did it take the pine cones to close?

Why do you think the pine cones floated in the water?

What happened to the pine cones as they dried?

About how long did it take for the pine cones to reopen?

Are there any other observations you made?

What did you learn about pinecones from this experiment?

Extra Credit Science for Advanced Botanists: How were your first measurements different from your final measurements? Why do you think this happened?



Background Information for Caregivers

How does a pine cone know when to open or close its scales? When the weather is cold and wet, pine cones close their scales to protect their seeds from freezing temperatures and hungry animals. The inner layers of a pine cone expand like a sponge, causing the scales to close. When the weather is warm, dry, and right for growing, pine cones open their scales to release their seeds. The inner layers of the pine cone shrink, causing the scales to open.



Fun Fact

Some pine trees have cones that are **serotinous**, meaning they are tightly closed and sealed with wax. Serotinous pine cones only open when a fire melts the waxy coating. Did you pick up a serotinous cone?



References

<https://parentingchaos.com/why-do-pine-cones-open-and-close/>

<https://www.scientificamerican.com/article/unlocking-the-secrets-of-the-pinecone/>