



# **Florida Master Naturalist Program (FMNP) Uplands Module Project**

**For  
Lyonia Environmental Center (LEC)**



**By  
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# Understanding Plant Adaptations

The sand pine (*pinus clausa*) is a **conifer**, a plant that has covered seeds. Sand pine seeds are produced in cones. A sand pine cone is **serotinous**, which means that heat is required for the cone to release its seeds. You can observe how a sand pine cone is dependent upon heat for its reproduction by doing the following activity.

**Objective:** Model the adaptation of the sand pine cone for an understanding of how this producer is able to use fire as a means to aid in its reproductive cycle and survival.

**Materials:** opened sand pine cone  
zip-top plastic 7"x8" bag  
50ml graduated cylinder  
water



## Procedure:

1. Examine an opened sand pine cone. What are you able to tell from the appearance of the pine cone?
2. Place the opened pine cone into the zip-top bag. Add 10ml of water and seal the zip-top bag. Set the bag aside for an hour. Predict what will happen.

3. After an hour, **observe** the appearance of the pine cone. How has it changed?

Remove the pine cone from the bag and set it aside for an hour. After an hour, **observe** the appearance of the pine cone again.

## Draw Conclusions

1. What adaptation of a sand pine cone did you observe?

2. **Inquiry Skill** How does this help demonstrate how a sand pine is able to survive certain natural events?

## Instructor Notes

**Annos:** 1. The serotinous adaptation that opens the cone when it is dried out.; 2. The sand pine is adapted to protect and release its seeds when conditions best favor their survival. This adaptation also allows sand pine seeds to survive the danger of fire.

## Extending the Learning

A variation to the activity is to have already placed a cone into a zip-top bag the day before. Observe the cone and make inferences. *Ask what stage of the reproductive cycle the closed pine cone is in?* Remove the pine cone from the bag and observe it. Then leave the pine cone out of the bag and set it aside until tomorrow. *Predict how being without the moisture of the bag and outside might affect the pine cone?*

If you have access to a small oven, or access to a microwave repeat the variation of the activity. Again, observe the closed pine cone. Next, place the closed pine cone inside the oven. *What do you think warming the closed pine cone might do?* **Caution: Pine cones are flammable.** Slowly warm the pine cone and make observations. Once the pine cone begins to open, remove the pine cone from the oven. Compare their drawings and the appearance of the pine cone. *How did warming the pine cone model actual natural events that take place?*