

Sun Prints, T-Shirts and Team Building

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Abstract: Making T-shirts is an effective way to create group identity. Making T-shirts while learning some content is an even better way to do so. Cyanotype or Sunprinting has often been used to determine surface area, estimate solar exposure and preserve leaf shapes in the field without damaging the source plant. This technique can also be applied to fabric via saturation with traditional cyanotype chemical or through the use of sun paints. Combining sunpaint or sunprint images of plants from nature walks or from eradication of exotic species is an excellent way for students to become engaged in the activity or to remember what they have learned. Participants in this workshop will need to bring a white or very light colored washed cotton T-shirt. We will learn the sunprinting technique and then use our hurry up and wait time to discuss other ways to effectively use class time while simultaneously facilitating better group interactions.

Introduction

Each year, ABLÉ participants receive a bag and a T-shirt with the host's ABLÉ logo blazoned across it. They identify each other in airports and crossing campuses by these symbols of their common interest. Likewise, social interactions on fieldtrips before and after the workshops provide opportunities for ABLÉ members to get acquainted with one another. Before the first workshop even begins, ABLÉ participants attend a friendly mixer where they get a chance to renew old friendships and begin new ones. As a result of these personal interactions, ABLÉ participants become comfortable with one another and new acquaintances become effective lab partners and collaborators. Thus the ABLÉ conference itself is a team-building exercise. These same principles apply to students arbitrarily gathered together in active learning environments.

Team building generally gathers individuals together and requires them to work together to accomplish a goal or task; essentially what we want to happen in the laboratory. But effective team-building creates the circumstances where individuals can learn to trust one another, to learn individual strengths and to learn to work together. Helping students adopt the skills and behaviors necessary for collaborative learning is an essential but frequently neglected part of active learning.

The team-based approach is two-fold by helping students learn the required course material, as well as practicing life skills necessary after graduation. Knabb (2000) employs the team-based approach in her biology course to help students learn how to work effectively in a group to solve a posed problem. The researcher believes that learning this skill will better prepare graduates to enter

the work force. The team-based approach will facilitate group interactions, communication, and other skills necessary throughout the course of life: academically, professionally, and personally.

The sunpainting activity described here creates an opportunity for students to work together in an informal setting. This helps create the bonds that allow students to work together effectively. Furthermore, the T-shirt can be worn by students on future field trips or class activities building a common group identity.

Sunprinting works best with plant material. This activity follows a

service project for the removal of invasive species from a local nature center. The removed plants become the source material for creating the T-shirts.

Target Audience: This activity is suitable for students of all ages. It fits best into field biology or botany courses.

Objectives: Students participating in this activity will create a T-shirt that aids in the identification of plant species, leaf shapes or invasive plant species. The experience will assist in team-building. The T-shirts can be worn on field trips to enhance group identity.



Instructor Notes

Call a local park or nature center to coordinate a time and place for students to assist with removal of invasive species. Plan at least an hour for the service project part of the activity. You will need at least an hour for the fabric painting. Two hours would be better. Be sure to have a place to work inside if the weather is bad. Be sure to have a plan to take additional time for shirts to dry if necessary.

- Have each student label their shirt with a sharpie.
- Fabric paint will stain fabric. That means that clothing will stain. Be sure to let students know ahead of time that they should wear old clothes or provide lab coats or other protective covering for them while working with the paint.
- Spilled paint will stain concrete too. Try not to work directly in front of your building where some one will be offended by drips, splashes and spills. Some seepage is unavoidable.

- In general follow the directions for the fabric paint you purchase. The Pebeo sunpaints provide excellent instructions for the entire process. Other fabric paints will not have instructions for using them in this fashion.
- Fabrics should be washed to remove any sizing. You should not use fabric softener. Students will occasionally bring new unwashed shirts to paint. In that case simply rinse the new shirts in plenty of tap water. Since the fabric needs to be damp to start with this is not a problem.
- Fabric paint must be diluted before using. This is an important step but the ratios are not at all critical. The more paint to water the stronger the colors. Less paint relative to water will yield lighter colors. Make the decision based upon cost. Usually 2 parts water to one part paint is a good ratio.
- While this process is called sun painting it is not a chemical reaction that requires sunlight. It is an evaporative process. Sunlight speeds up the process by speeding up the evaporation. When you place a waterproof object on the wet surface it prevents or slows evaporation over that specific area. Evaporation taking place around the edges of the object causes the water to wick out from under the object. As the water moves, it carries the paint with it. The paint is drawn out from under the object leaving the covered area close to the original unpainted color. You can set this up inside and let the projects dry overnight and it will work just as well as if you set it up outside.
- You need to be careful about allowing students to collect plant material. Be aware of toxic plants such as poison ivy. Be aware of students with allergies. Set boundaries for collecting materials or provide the plant material yourself. You do not want to create conditions where students decimate flowerbeds or pick threatened or endangered species. Collecting material works best in conjunction with removal of invasive species such as buckthorn and garlic mustard or as part of a leaf walk. Flowers work very well but again you want to provide them yourself or be very clear about how and when to collect.
- Fabric paint will soak through to the back side of a T-shirt if there is no plastic between the layers. It gives a muted version of the front of the shirt. For most occasions this is acceptable. Some people will prefer to have the back of the shirt left plain. Allow them to carefully insert a plastic garbage bag inside the shirt. Remembering that any section of fabric not protected will get painted.
- Carefully smooth the damp fabric or shirt out onto a piece of plastic garbage bag slightly larger than the size of the shirt. The fabric needs to stay wet but not soaking wet until all of the paint has been applied and the plant material is in place. Use spray bottles to keep the fabric moist and to move the paint around on the surface.
- Apply paint. It is usually best to limit students to two colors or three related colors. Mixing colors can get muddy and ugly. Paint can be dripped, splashed or painted onto the fabric. Spraying with water will cause it to diffuse and blend. Remember that it is the upper third of the T-shirt that will show the most when being worn. Students tend to focus on the belly and the bottom and neglect the area between the sleeves and around the neck.
- It is usually best to paint the shirt in the spot where it will stay to dry. An out of the way sidewalk or patch of parking lot is good. Lab benches or other tables will work inside. If that is not practical then carefully carry the fabric on it's plastic to the drying location.

- Quickly before the paint starts to dry arrange the plant material and other objects onto the shirt. Leaves are best placed with the ribs and veins up so that you get the greatest contact with the fabric. Since this is a very random process the more material you place on the shirt the more likely you are to get good results.
- Paper and wooden object do not work well as they tend to draw the moisture out of the fabric causing the paint to move toward the center of the object rather than the edges.
- Students can cut designs out of freezer paper or aluminum foil in addition to the leaves. They can write their names or group identifier in this manner. Confetti and foam cutouts also provide particularly good results. While these are not natural materials it is a good idea to provide a few choices to insure that everyone gets some results.
- Have small rocks or other weights available to place over leaves and to hold down the edges of the plastic. Usually you can find gravel near the sidewalk or parking lot where you set the shirts to dry. Just be sure that the students replace it when they are finished.
- Allow the fabric to dry. The time will vary depending upon how wet the fabric is and the atmospheric conditions. On a hot dry day the shirts can dry in 30 minutes. A breeze accelerates the process but makes it harder for the object to remain in position.
- Carefully remove the leaves and other materials from the fabric and check out your design. Be sure to tell your students that this process is very unpredictable. Many variables can affect the results. Make sure that they understand that the results are random and will seldom turn out exactly as they predict. Each one is unique.
- Have a clear plan for collecting any foam cutouts, confetti, or glass marbles. These materials should not be left to blow around the environment. Rocks should be replaced from wherever they were borrowed.
- The fabric paint needs to be heat set. Follow the directions from the manufacturer. Typically ironing with a hot iron will accomplish the task. Test it first or use an old iron to make sure you don't leave any residue on your iron. Heat set paints will last for many years and many washings.

Materials

- Cotton fabric squares or light colored cotton T-shirts
- Fabric paint: Pebeo Setacolor Soleil Fabric <http://www.pebeo.com/us/index.htm> paints can be purchased at Michaels or from numerous on-line sources. Many fabric paints will work. Dimensional fabric paint such as that produced by Tulip and available in most craft stores will make the fabric stiff. Fabric paints labeled soft will not.
- Containers for mixing paint with water
- Brushes for painting fabric
- Spray bottles for keeping fabric moist
- Plastic sheets, garbage bags or other plastic bags to cover the work surface, protect the fabric from the ground and separate the layers of the T-shirt for one-sided prints
- Plant material (as discussed below)
- (Optional) confetti, aluminum foil, freezer paper, old transparency sheets, foam cut-outs
- Small rocks or glass 'marbles' to weight the fabric and leaves down on windy days
- Electric clothing iron

Resources

- Klutz books has also produced a sunpaint kit that can be purchased through various on-line book outlets: http://www.klutz.com/??source=gaw01&kw=klutz+books& s_ksid=CghJ58Z0fQQKCgcD
- http://www.dharmatrading.com/info/sun_paint.html A commercial site that has good descriptions and pictures of how to use the setacolor paints.
- <http://www.pburch.net/dyeing/fabricpaints.shtml> A good discussion of fabric paints, how they work and some other techniques to try. (The sunpaint section describes the evaporation process.)

Student Instructions

To Sun Paint

- **Wet natural fiber fabric**
- **Paint with diluted paint**
- **Place objects (not paper or wood) onto fabric**
- **Allow to dry in the sun (Can be dried inside.)**
- **Remove objects and heat set.**

References

Knabb, M. T. 2000. Discovering Teamwork. American Biology Teacher, 62(3):211-213.

About the Authors

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