How Does a Pinwheel Use Power?

Purpose:

- To become familiar with a new activity from the curriculum.
- To become competent in completing an engineering-based lesson.
- To identify ways content can be embedded in lessons.

Time:

45 minutes

Materials:

Internet connection, computer, LCD projector, scissors, straight pins, pencils with erasers, pinwheel pattern from Appendix A or B

Trainer Notes:

STEP 1: Context

Explain to participants that they will complete investigations using the engineering design process, learn about the process itself, and redesign a "product." This is the first of three workshop segments that will scaffold and help them become competent in leading this curriculum based on engineering design principles.

STEP 2: Activity

Let's get going! You will have an opportunity to create a pinwheel, a form of a turbine. You will have 30 minutes to complete the activity "How Does a Pinwheel Use Wind Power?" on pages 14 – 15 in the Youth Guide. Please work with someone who you have not yet worked with. Materials are located_____***(tell participants where materials are located)***.

As participants are doing the activity, the facilitator should move around the room and check in with groups to identify progress and challenges they are having. The activity can take about 30 minutes but if the majority of participants are done early or need extra time, the length of time spent on the activity can be adjusted. Notify participants when they have 5 minutes left. This cue will help them wrap up the activity.

STEP 3: Discussion

Have participants walk around and see what each group did. Have each group share a little about their process. As groups are sharing, choose some of the following questions.

- When the wind blows straight into the front of the pinwheel, it turns. What happens when the wind blows into the back of the pinwheel or if it blows into the sides? Try both sides and see what happens.
- What adjustments can you make in the design to make your pinwheel turn better?
- How does the pinwheel use the power of the wind?
- The pinwheel and your boat both use wind power. How are they similar? How are they different?[3]

STEP 4: Video Clip and Discussion

Great! Thanks for sharing. I want to show you a brief video clip of pinwheels. It may help to ignite your thinking about your pinwheel and what you might do to make it better. **(http://projects.4-hcurriculum.org/curriculum/wind/)**

- What did you see in this video that was similar to what you learned when you were creating your own pinwheel?
- What is one thing you saw here that you might want to try?
- How can you help infuse content into the lessons you lead with youth?

STEP 5: Transition

Explain that through this process participants just completed a portion of the engineering design process. Tell participants that they will now spend some time working through the engineering design process and reflect on the pieces they've completed. When done explaining, they will have an opportunity to complete the process by redesigning their pinwheel.

3 Sebestick, J. *The Power of the Wind* Youth Guide. University of Illinois, 2008, p. 15.