

Student Resource page

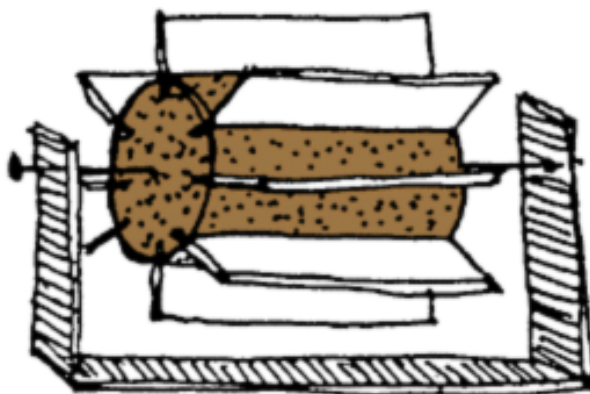
Explore: Hands On Activity - Build a turbine

Objective: Design a turbine turn that will turn the fastest using the least amount of energy.

Power stations use turbines to convert kinetic energy into mechanical energy. In this lab you will build a model turbine. Then you will change the design to see if you can improve the performance of the turbine.

Materials:

- > Cardboard tube (e.g., as used for aluminum wrap or clear wrap)
- > Cardboard for holder and fins
- > Cork
- > Craft knife
- > Household fan (3 speed)
- > Large pins
- > Marker pen
- > Tape
- > Timer



Procedures:

1. Use the picture below as a guide to how to build your turbine.
2. Push a pin in the ends of the cork to act as axles.
3. Make a U-shaped cardboard holder for it.
4. Use the craft knife to cut slits into the cork.
5. Cut pieces of card to act as fins for the turbine.
6. Place the card the slits made in the cork.
7. Color one of the fins with the marker pen.
8. Place the cork into the holder.
9. Tape the holder to a table or similar surface.
10. Use the fan on the slowest speed setting to create wind to blow at your turbine.

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11. Use the timer to count how many times the colored fin makes a complete turn in one minute. (This is the revolutions per minute, or RPM of your turbine.) Record your data in the worksheet.
12. Repeat steps 9 and 10 using the two additional speeds of the fan.
13. Using a new cork, repeat steps 4 through 11. This time use a different design for the fins. (Hint: You can change the angle of the fins, or their shape, or both.)

Analysis:

1. How fast in RPMs did your turbine spin with the first design on the slowest fan speed?
2. How fast in RPMs did your turbine spin with the first design on the fastest fan speed?
3. What is the difference in your turbine RPMs between the slowest and fastest fan speeds with the first design?
4. How fast in RPMs did your turbine spin with the second design on the slowest fan speed?
5. How fast in RPMs did your turbine spin with the second design on the fastest fan speed?
6. What is the difference in your turbine RPMs between the slowest and fastest fan speeds with the second design?
7. Was your second design an improvement on the first? Explain.
8. In what ways could you improve further on your design?
9. You used wind to turn the turbine. What other ways could you use to turn the turbine?
10. How would you generate electricity with your turbine?

Data Collection Student Worksheet

RPMs of turbine designs at different fan speeds

| | Fan Speed | | |
|----------|-----------|--------|---------|
| | Slowest | Medium | Fastest |
| Design 1 | | | |
| Design 2 | | | |

Draw and label a picture of each fan design. Include a title and scale for each drawing. Label all the parts and materials.