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Title: What is the best angle to place your solar panel to get the most power from the sun?

Subject: Science

Grade levels: 6-12

Group Structures: small groups

Lesson Length: 50 min

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Objective: Students will measure the voltage using multimeters as well as observing how fast the fan motor spins at different angles in the sunlight.

Materials:

- Solar panel
- Alligator Clips
- Sunlight or bright lamp
- Fan motor

Directions:

1. Go outside and make several observations using your solar cell and fan motor. Older groups of students may wish to use a multimeter to get a specific reading. You will explore **2** different variables:

VARIABLE 1: DIRECTION

Direction (**North, South, East, and West**) affects the speed of the fan motor. Use your phone or teacher's compass (provided) to figure out direction.

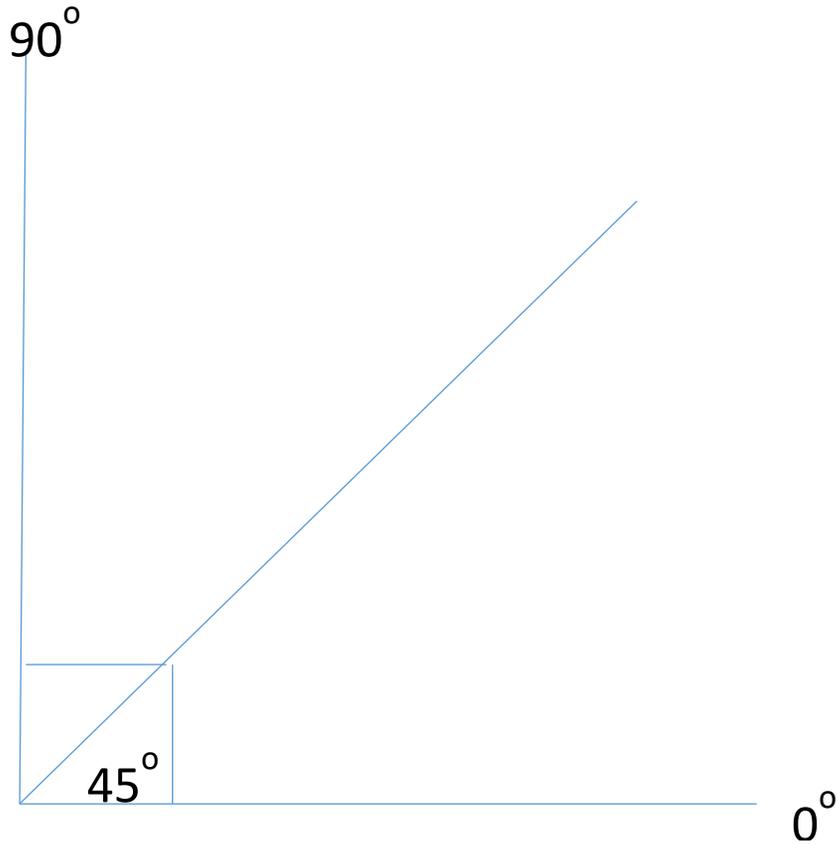
VARIABLE 2: TILT

Tilting your panel in relationship to the sun affects the speed of the fan motor. Use the image on the back to help you with the different angles (**0 ° , 45 ° , 90 °**)

2. Fill out the data table on the back of this sheet, then answer the following questions:

QUESTIONS:

- a. Was there a difference in the speed of the fan based on the direction?
- b. How did tilting the panel affect the fan performance?
- c. What do you think would be the best direction and angle to place a panel on your home?
- d. Why is that the best angle? Could that change? If so how could it change?
- e. How would you design your solar panels to get the most power on average across the day and year? (Draw a picture)



Data Table:

Fill in the table for each direction (North, South, East, West) at the different angles. You may also choose a direction of your choice or additional angles if time permits. Fan speeds will be reported as a speed from 1 to 5, 1 being the slowest and 5 being the fastest.

| | 0°  | 45°  | 90°  | Additional angles (35°) |
|-------------------------------------|---|--|--|----------------------------|
| North | | | | |
| South | | | | |
| East | | | | |
| West | | | | |
| Additional direction (Southwest) | | | | |
| | | | | |