

## Just for Fun – Word Search

Find the words hidden below reading forward, backward, up, down, and diagonally.

ANGLE	MAGNET
ATTRACT	MARS
BATTERY	REPEL
CIRCUMFERENCE	RESISTOR
COMPASS	ROTATION
CURRENT	SEMICONDUCTOR
DATA	SOLAR
DIRECTION	VOLTAGE

R	W	S	B	T	G	Y	M	K	Z	D	B	L	U	Y
R	D	M	I	U	K	W	X	C	I	K	B	W	S	C
N	J	A	V	A	J	P	F	R	R	X	L	J	E	O
C	I	R	C	U	M	F	E	R	E	N	C	E	M	M
M	N	S	Z	W	I	C	A	M	L	O	T	T	I	P
L	Y	O	R	O	T	S	I	S	E	R	N	E	C	A
K	G	J	I	I	K	L	D	C	F	E	B	L	O	S
X	E	B	O	T	E	N	U	A	I	V	L	G	N	S
D	T	N	A	P	A	R	X	B	T	F	B	N	D	Q
J	A	E	E	T	R	T	M	U	P	A	M	A	U	V
T	R	R	N	E	T	A	O	A	T	T	R	A	C	T
C	T	G	N	G	Y	E	K	R	P	R	C	T	T	C
O	S	T	N	S	A	E	R	E	G	A	T	L	O	V
B	F	F	S	E	T	M	G	Y	S	O	L	A	R	D
P	P	L	P	Q	L	F	P	O	B	M	X	B	A	V

What do planets like to read?

Answer: comet books

## LEGO Engineering with Vernier: Electricity & Magnetism on Mars

### Engineering Notebook

#### Curiosity Rover on Mars Gale Crater

>> Navigation: In 2012, NASA sent the Curiosity rover to Mars to search for past life embedded in the rocky plains. The rover established an operations' base in Yellowknife Bay, a clay-rich lakebed in the center of Gale Crater chosen for its abundance of magnetite.

>> System Status: Critical

Two NASA astronauts have been stranded on Mars while attempting a routine mission to service the rover. A sudden storm has covered their solar panels in dust and most of their backup batteries have run down.

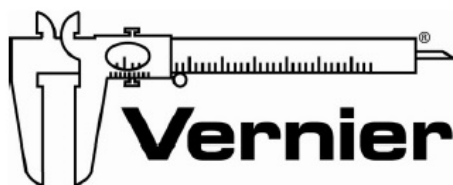
>> Mission Task: Build a robot to retrieve the stranded astronauts, replace the dead batteries with fresh ones, remove the dust from the solar panels, and find the magnetic rocks scattered near the base station.

Mission Specialist #1: \_\_\_\_\_

Mission Specialist #2: \_\_\_\_\_

## Martian Challenge

Describe your strategy for solving this challenge: \_\_\_\_\_

[illegible]

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Where would an astronaut park his space ship?

Answer: a parking meteor

3. How do seasons affect the power of a solar cell? \_\_\_\_

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4. How does geographic location affect the power of a solar cell? \_\_\_\_\_

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What did the solar cells say to their cloudy boss?

Answer: We need rays.

### Just for Fun – Sudoku

5			6	7			9	2
		6	9	5		7	8	
	7	8			4			6
	9			8	5	3		1
8			4		2			9
1		2	3				7	
3			8			1	6	
4		1		6	9	2		
	6			2	3			8

### Exploring Mars

Name 3 facts about Mars:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Why should we explore Mars? \_\_\_\_\_

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What is a spaceman's favorite chocolate?

Answer: a Mars bar

### Aerospace Engineering

Describe the duties of an aerospace engineer: \_\_\_\_\_

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What do you call a loony spaceman?

Answer: an astronaut

## Solar Cells

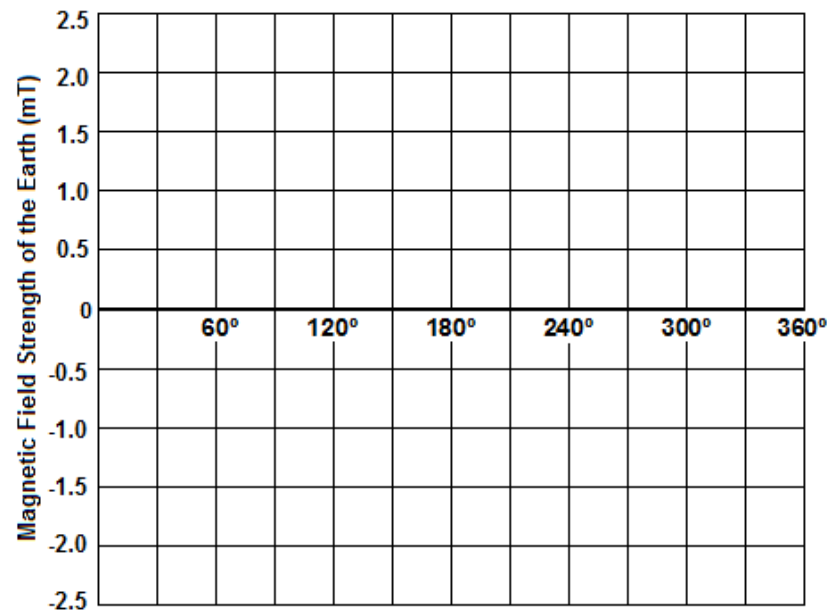
1. Solar panels have one red wire and one black wire.
- Why? \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

2. How does angle affect the power of a solar cell? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

10. Sketch the graph of the magnetic field strength around the Earth. Label the peaks and valleys.



11. These types of graphs are called \_\_\_\_\_

12. What conclusion can you draw about the Earth's magnetic field and compasses? \_\_\_\_\_

Where is it always 90 degrees, but never hot?  
Answer: The North and South Poles.

Data Log #1: Magnetic Scavenger Hunt	
Objects that are attracted	Objects that are not attracted

8. What conclusion can you draw about magnets? \_\_\_\_\_

\_\_\_\_\_

9. Draw a disc magnet and label its poles. Record the sensor readings for the top and bottom faces of the disc.

What did one magnet say to the other magnet on Valentine's Day?

Answer: I'm attracted to you.

## Batteries

1. Draw a battery and label its terminals.

2. What is electric potential? \_\_\_\_\_

\_\_\_\_\_

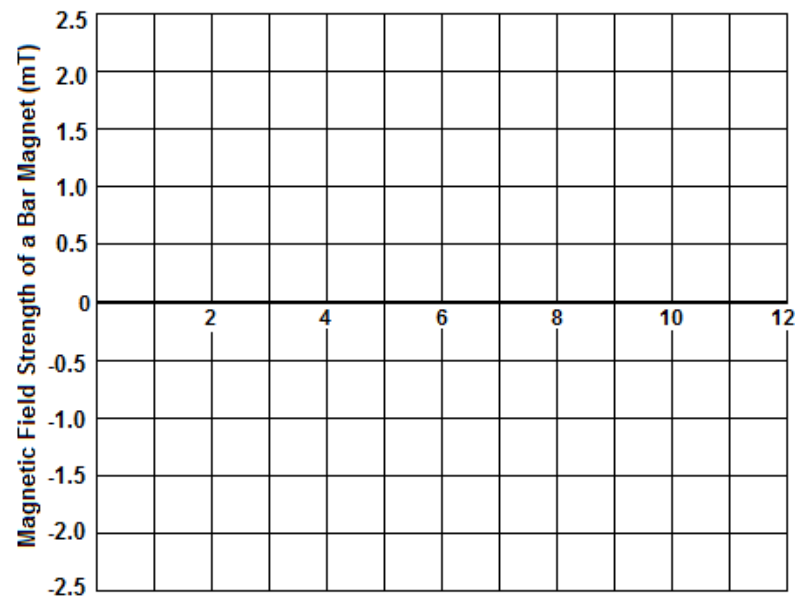
Data Log #2: Battery Size			
Battery type	Predicted potential	Measured potential	Voltage printed on battery
AAA	1.5 V	V	V
AA	V	V	V
C	V	V	V
D	V	V	V

3. What conclusion can you draw about battery size? \_\_\_\_

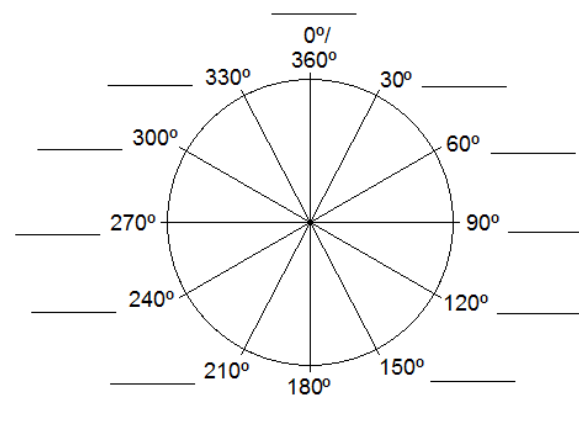
\_\_\_\_\_

\_\_\_\_\_

8. Plot your magnetic field strength measurements on the graph below. Draw a smooth line through the points and label the peaks and valley.



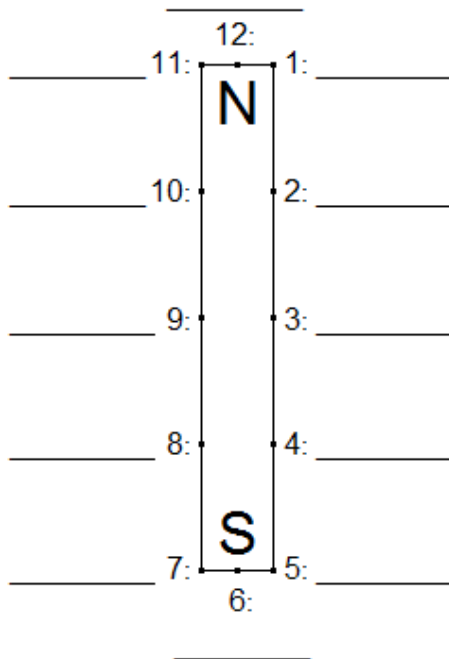
9. Measure the magnetic field strength around the classroom.



5. Sketch the pattern made by iron filings placed over a north pole and a south pole.



6. The length of the magnetic field between a paper clip and my magnet is \_\_\_\_\_
7. Measure the magnetic field strength around a single bar magnet.



Data Log #3: Stacked Batteries		
Battery Type: _____		
Number of batteries	Predicted potential	Measured potential
1	1.5 V	V
2	V	V
3	V	V
4	V	V

4. When I stack batteries together \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
5. If I stack 10 batteries together, the electric potential would be \_\_\_\_\_

Data Log #4: Battery Status		
Battery size: _____		
Battery name	Measured potential	Status
alpha	V	
beta	V	
gamma	V	
delta	V	

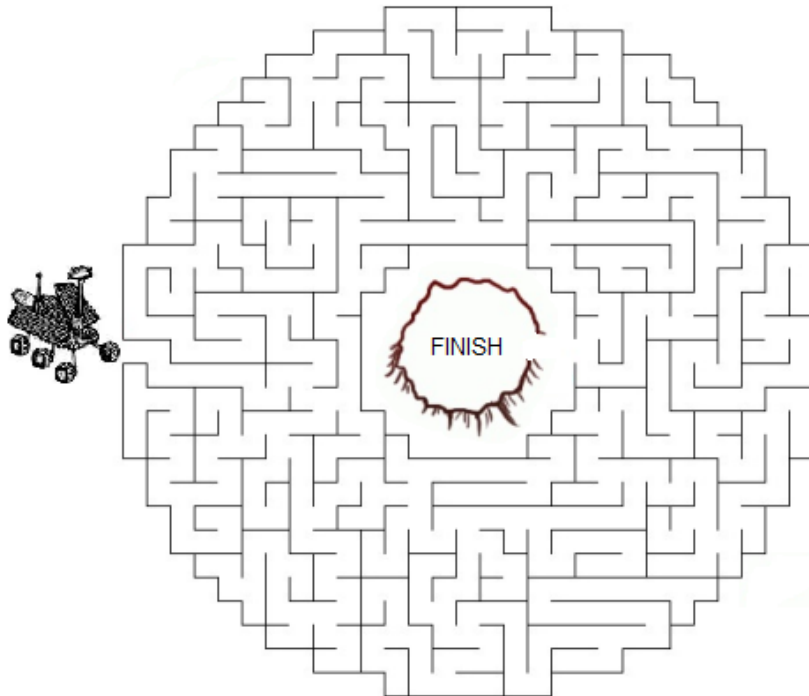
6. The minimum voltage for a “good” battery is \_\_\_\_\_

Why was the battery always in trouble?

Answer: Because it didn't know how to conduct itself properly.

### Just for Fun – Maze

Help Curiosity find the path to Gale Crater.



### Compasses

1. Draw a compass and label the four cardinal and four intercardinal directions.

2. When I place a compass near a magnet \_\_\_\_\_

3. Sketch the pattern made by iron filings placed over a bar magnet.



4. Sketch the pattern made by iron filings placed over two north poles.

