

PHYZ SPRINGBOARD: FIELDS



CONCEPT CONSTRUCTION

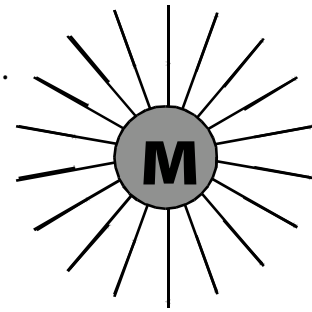
1. Does the Earth have an influence on things around it? (For example, does the behavior of a dropped pen depend on the presence of the Earth?) ___ Yes ___ No.
2. a. What is the name of this influence? "Gravity" (this is an ambiguous term, but will work in this case)
b. What does the Earth have that allows it to have this influence? Mass
c. What do other objects have that allow them to be influenced by the Earth? Mass
d. How far does the Earth's influence extend? To "infinity."
3. Suppose an elephant and a peanut find themselves suspended near the surface of the Earth.
 - a. Which has a greater gravitational force acting on it? ___ Elephant ___ Peanut ___ Same for both.
 - b. Which would undergo a greater acceleration if dropped? Same for both
 - c. What is the ratio that defines the value of this quantity? Gravitational Force / Mass
 - d. What is another name for this ratio? Gravitational Field
(which happens to be equal to "gravitational acceleration")
 - e. What is the symbol for this quantity and what are the units of measure for it?
"g" measured in newtons per kilogram: N/kg

AND NOW FOR SOMETHING COMPLETELY DIFFERENT

1. Does a charged Van de Graaff generator dome have an influence on things around it?
___ Yes ___ No.
2. a. What is the name of this influence? "Electricity"
b. What does the dome have that allows it to have this influence? Charge
c. What do other objects have that allow them to be influenced by the dome? Charge
(neutral objects can be influenced when they become POLARIZED)
d. How far does the dome's influence extend? Infinity (assuming no shielding is involved)
3. Suppose a small charge and a large charge find themselves suspended near the dome.
 - a. Which has a greater electric force acting on it? Large charge
 - b. What ratio is the same for both charges? Electric Force / Charge
 - c. What is the name for this ratio? ELECTRIC FIELD
 - d. What is the symbol for this quantity and what are the units of measure for it?
"E" measured in newtons per coulomb: N/C

DRAW THEM

1. The Earth's gravitational field can be represented graphically as shown.



a. What might the lines represent? What is indicated by the direction of the arrows?

Lines of force--showing the path that would be taken by a small mass.

b. What happens to the density of the lines as you go farther and farther from the Earth?

Line density gets lower--lines spread farther apart.

c. What does the field line density indicate about the Earth's actual gravitational field?

The STRENGTH of the field.

2. a. Using a scheme like the one above, how could the electric field around a charged object be represented?

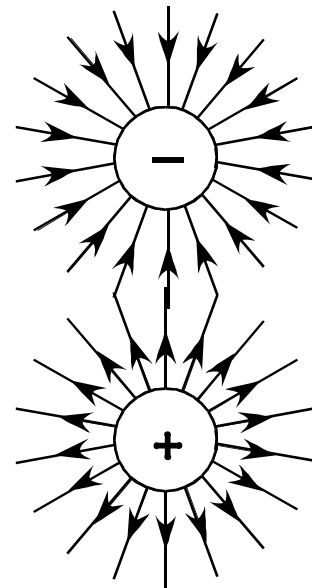
(See diagram)

b. What about an oppositely charged object?

Same kind of diagram but with arrows reversed.

c. Which way should the arrows go?

*The arbitrary convention is as follows: Away from +, toward -.
The direction a small positive charge would move.*



d. What happens to the strength of the electric field as you move farther away from the charge?

Field gets weaker (lines spread farther apart).

e. How would you draw the electric field between two oppositely charged plates?

(See diagram)

