ConcepTest 22.2a Field and Force I
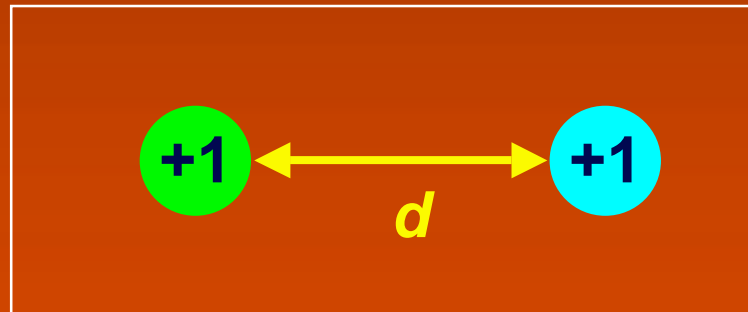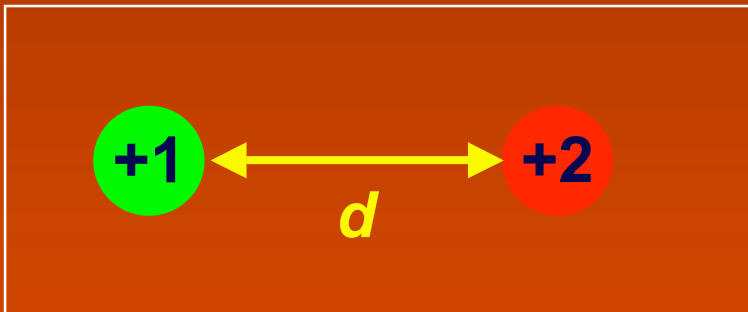
Between the **red** and the **blue** charge, which of them experiences the greater *electric field* due to the **green** charge?

1) **+1**

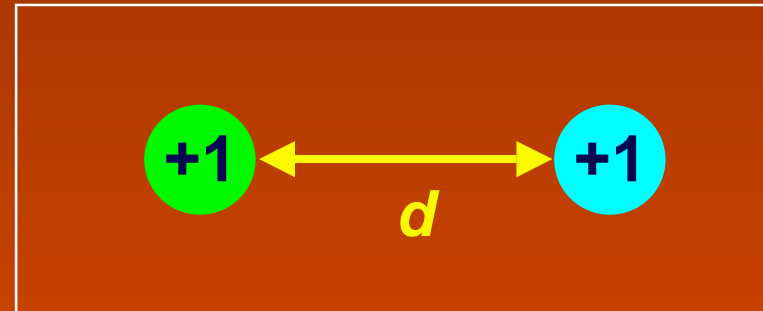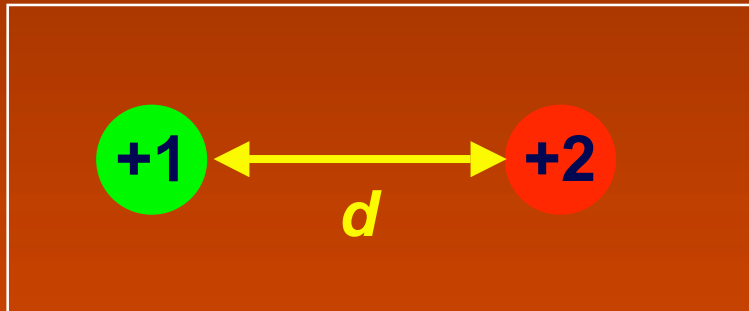2) **+2**

3) the same for both

ConcepTest 22.2a Field and Force I

Between the red and the blue charge, which of them experiences the greater *electric field* due to the green charge?

1) +1

2) +2

3) the same for both

+1 ←——*d*——→ +2

+1 ←——*d*——→ +1

Both charges feel the **same electric field** due to the green charge because they are at the **same point in space**!

$$E = k \frac{Q}{r^2}$$

ConcepTest 22.4 Find the Charges

Two charges are fixed along the *x*-axis. They produce an electric field *E* directed along the negative *y*-axis at the indicated point. Which of the following is true?

1) charges are equal and positive

2) charges are equal and negative

3) charges are equal and opposite

4) charges are equal, but sign is undetermined

5) charges cannot be equal

ConcepTest 22.4 Find the Charges

Two charges are fixed along the *x*-axis. They produce an electric field **E** directed along the negative *y*-axis at the indicated point. Which of the following is true?

1) charges are equal and positive

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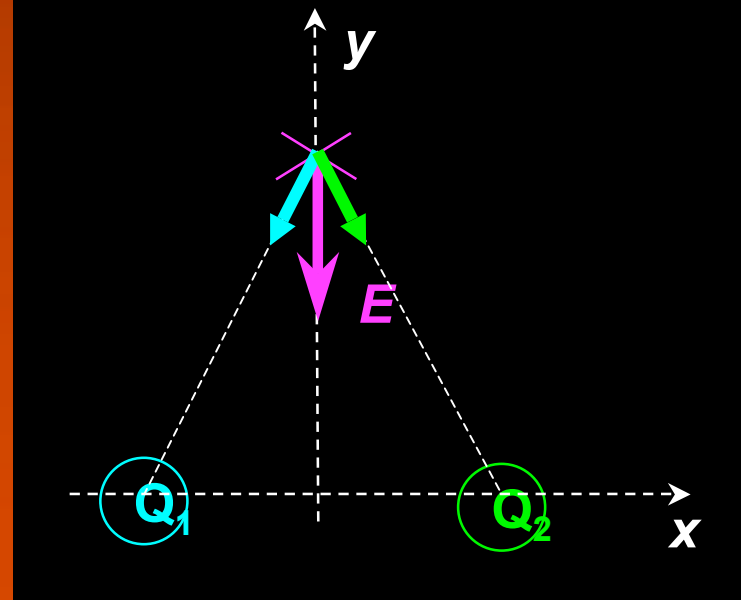4) charges are equal, but sign is undetermined
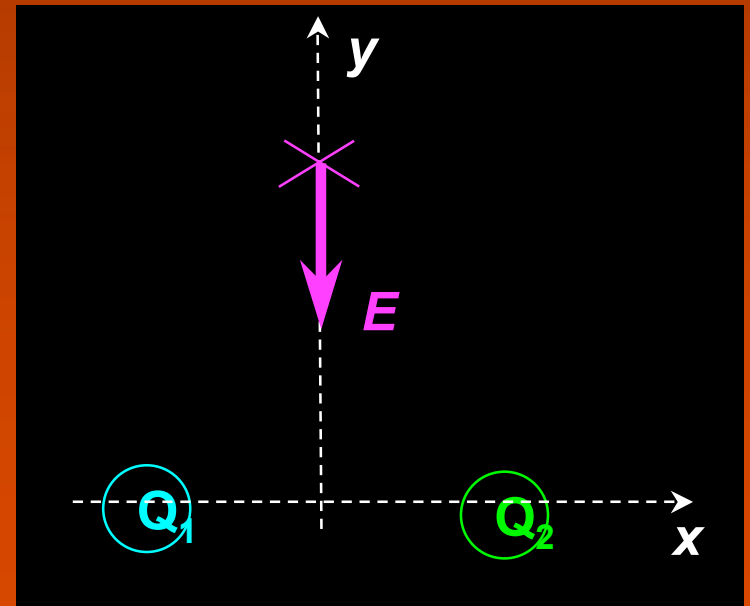
5) charges cannot be equal

The way to get the resultant PINK vector is to use the GREEN and BLUE vectors. These **E** vectors correspond to equal charges (because the lengths are equal) that are both negative (because their directions are toward the charges).

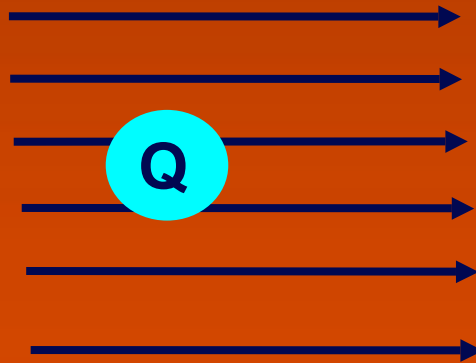**Follow-up:** How would you get the **E** field to point toward the right?

ConcepTest 22.5   Uniform Electric Field

In a uniform electric field in empty space, a 4 C charge is placed and it feels an electrical force of 12 N. If this charge is removed and a 6 C charge is placed at that point instead, what force will it feel?

1) 12 N

2)   8 N

3) 24 N

4) no force

5) 18 N

ConcepTest 22.5 Uniform Electric Field

In a uniform electric field in empty space, a 4 C charge is placed and it feels an electrical force of 12 N. If this charge is removed and a 6 C charge is placed at that point instead, what force will it feel?
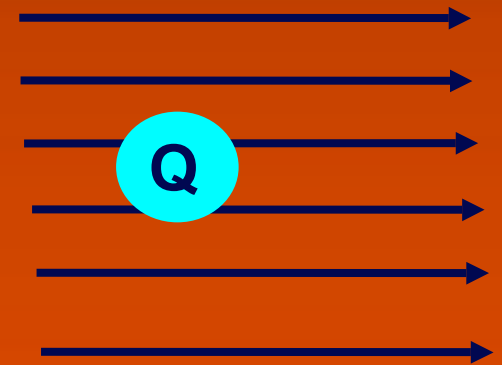
1) 12 N

2)   8 N

3) 24 N

4) no force

5) 18 N

Since the 4 C charge feels a force, there must be an electric field present, with magnitude:

$$E = F / q = 12 N / 4 C = 3 N/C$$

Once the 4 C charge is replaced with a 6 C charge, this new charge will feel a force of:

$$F = q E = (6 C)(3 N/C) = 18 N$$

Q

Follow-up: What if the charge is placed at a *different position* in the field?