# PROJECT : PLANT EXPERIMENTAL DESIGN

**i) PURPOSE:** To determine whether added nutrients speed up seed germination.
**HYPOTHESES: "**The plants with the nutrients will grow better."

**ii) EQUIPMENT:**
**1.** 10 pinto beans
**2.** 1 500 ml jar
**3.** distilled water
**4.** 1 refrigerator
**5.** liquid plant fertilizer (5-10-5)
**6.** 1 4 litre plastic milk jug
**7.** 1 marking pen
**8.** masking tape
**9.** paper towels
**10.** paper towels
**11.** 2 straight sided drinking glasses
**12.** 2 sheets of black construction paper
**13.** 1 stapler

**iii) METHOD:**
**1.** Put the beans in the jar and cover them with distilled water.

**2.** Place the jar of beans into the refrigerator, and let them soak overnight.

**3.** Prepare 4 litres of the liquid plant fertilizer by following the instructions on the package. Use the distilled water to mix the fertilizer in the milk jug.

**4.** With the marking pen, write "Nutrients" on a piece of masking tape and tape this label to the jug of liquid fertilizer.

**5.** Prepare two separate containers of beans as follows:
**a**. Fold one paper towel and line the inside of a glass with it.
**b**. Put together several paper towels and stuff them into the glasses hold the paper lining against the glass. **c.** Place five beans between the glass and the paper towel lining, evenly spacing the beans around the perimeter of the glass.

**6.** Use the marking pen and tape the label one glass "Water" and to the second glass "Nutrients".

**7.** Moisten the paper towel in each glass with either distilled water or plant fertilizer as indicated. Keep the paper towels in the glasses moist, but not dripping wet, during the entire experiment.

**8.** Cover the outside of each glass with one sheet of black construction paper. Fold and staple the top and sides of the paper.

**9.** Each day, until the bean grows , remove the paper covering from each glass and observe the contents.

**10.** Collect the results and make a conclusion.

**iv)** The **Independent Variable** is the liquid plant fertilizer for the germination.
The **Dependent Variable** is the speed the seeds will grow.

**v) Variables to be controlled**
**a)** The amount of distilled water in each jug.
**b)** Even spacing the beans around the glass.

**c)** Same moisture contained in the paper towels.
**d)** Where the glasses are placed, whether in sun or shade.