APPENDIX-II

SCIENCE COGNITIVE PREFERENCE INVENTORY (SCPI)

Directions: In this inventory, we are NOT testing you on your ability. We DO want to find out about some of the things you like in science. Each item in this booklet begins with some information about science. An item is followed by four statements that all contain correct information. You are asked to indicate your preference for each of these statements.

The statements have to be ranked 1 or 4 as follows :

1...for the statement that you like best, or that is most interesting to you.

4...for the statement you like least, or that is least interesting to you.

For each statement, mark your ranking in one of the circles for that response number on your answer sheet. (You will not use circle 5). Each response has its own number on the answer sheet.

Example: On a Friday night many things could be done.

(5) I could go to a movie.
(6) I would go out and dance.
(7) I could watch a wrestling match.
(8) I could sit around and talk.

Sample Answer Sheet :

(5) ✓ 0 0 0 0 (6) 0 0 0 ✓ 0 (7) 0 0 0 0 0
(8) 0 0 0 0 0

The person who filled out this sheet preferred going to a movie (5), and the least preferred statement was going out and dance (6).

Important: 1. Read the items and statements carefully, read all four statements before recording your ranking on the answer sheet. 2.Preferences of people are different, there is no best way of answering this inventory, give your personal preference.

1. A function of the stem of a plant is to bear leaves and flowers and later fruits.

   (1) Fibers used in cloth are made of stems of certain plants.
   (2) The maximum height of a plant depends on the shape and the amount of wood in the stem.
   (3) Some stems are soft, others are woody.
   (4) How do old trees with hollow trunks remain alive?

2. Recently increased interest has been expressed about electricity as a main source of energy.

   (5) The loss of electric energy in electric transport cables depends on the length, thickness, material, and the current in the cable.
   (6) Electricity generated by flowing water is called hydro electric energy.
   (7) Thomas Edison developed many practical uses of electricity such as the light bulb.
   (8) Many scientists are searching for devices that will convert solar energy into electric energy in a more efficient way than current devices do.

3. All substances have characteristic physical properties (hardness, shininess, colour, boiling point, etc.) and chemical properties, reactions with other substances, etc.

   (9) The chemical composition of a material determines the physical properties to a great extent.
   (10) Steel contains iron and carbon.
   (11) In winter, we put antifreeze into the car radiator to prevent the water from freezing by decreasing the freezing point.
   (12) We could investigate the relationship between the boiling points of sodium and chlorine and the boiling points of their compounds such as sodium chloride.

4. Unequal heating of the land and the ocean by the sun's rays produces different wind conditions at different times of the day.

   (13) These conditions are known as land breezes and sea breezes.
   (14) Cool air replaces warm air creating local winds in the process.
   (15) What wind conditions would you expect during cloudy days?
   (16) Fishermen travel by sail away from the land during the morning and toward the land in the evening.

5. The unit for measurement of heat or energy is the calorie.

(17) A calorie is the amount of heat needed to raise the temperature of one gram of water by 1°C.
(18) The heat energy absorbed by a substance will increase the motion of its molecules.
(19) The calorie value of foods is an important consideration in determining balanced diets.
(20) We might get some clues about the structure of substances by knowing how much heat is required to melt different substances.

6. Anything in the environment which tends to prevent maximum activity of an organism is called a "limiting factor".

(21) Water, temperature and light are examples of possible limiting factors.
(22) Too little or too much of a particular factor may cause a stress which limits population growth.
(23) Knowing about limiting factors may help us in the control of certain diseases and pests.
(24) We can devise an ecological study to examine how living organisms may be limiting factors in the development of other organisms.

7. The evaporation of water by plants is called "transpiration".

(25) The amount of water evaporating from a single corn plant during its growth season indicates the amount of irrigation water needed by a corn field.
(26) In order to maintain enough water for some plants to survive, it is important to reduce the rate of transpiration.
(27) A corn plant needs about 50 litteres of water during its growth.
(28) We might devise an experiment to see whether a decrease in the transpiration rate is possible without decreasing the growth and other processes of a plant.

8. Plants may reproduce or propagate in a number of different ways.

(29) Two ways that plants reproduce are through seeds and through bulbs.
(30) We could try to find out if new plants grown from seeds are different from those propagated from cuttings.
(31) Most plants can propagate in nature without the help of man.
(32) Propagation with cuttings or bulbs is often a more convenient or efficient way for man to produce new plants than through the use of seeds.

9. The average weather of an area over a long period of time is called the climate of the area.

   (33) Large bodies of water have a moderating effect on the climates of nearby areas.
   (34) The year 1977 had exceptionally low temperatures in the winter and high temperatures in the summer.
   (35) From tree rings one can tell whether years were dry or rainy a long time ago.
   (36) Is the amount of rainfall on coastal plains greater or less than that on high mountains?

10. Air is a mixture of several different gases.

   (37) I wonder if the air over the ocean would be different from that over a forest.
   (38) Air mainly contains oxygen, nitrogen and carbon dioxide.
   (39) Air pollution controllers do special tests to determine the quantities of each gas that is present in the air.
   (40) Cities that are surrounded by mountains usually have severe pollution problems since the polluted air does not move away.

11. Soil is one of the most important components in the relationship between living things and the physical environment.

   (41) The more packed the soil is, the more slowly the water can pass through it, and the more water evaporates.
   (42) How different are the composition and texture of soil from one area to another?
   (43) Top soil is a complex mixture of sand, minerals from decomposed rocks, and decayed vegetable matter.
   (44) A farmer usually cannot grow many different kinds of crops in the same soil.

12. The water that is "pushed away" when an object is placed under water is called displaced water.

   (45) A good way to measure the volume of an object with an irregular shape is to measure the volume of water displaced when it is placed under water.
   (46) The volume of one gram of water is one cubic centimetre (1cm3).
   (47) The volume of the displaced water equals the volume of the sub-merged object.
   (48) I wonder if it is possible to measure the volume of objects with irregular shapes other than by the method of displaced water.

13. The atomic model of matter considers the world to be made of small particles called atoms. Atoms are built from protons, neutrons and electrons.

    (49) The atomic model has guided scientists and industry to many discoveries.
    (50) Physicists are searching for particles that are possibly more fundamental than protons, neutrons, and electrons.
    (51) Over one hundred different atoms have been identified.
    (52) The number of protons/electrons in an atom determines how this atom will behave (chemically) whenit comes close to other atoms.

14. Changing the temperature of a liquid may cause it to change to either a solid or a gas.

    (53) The final temperature of a shower can be predicted if the temperatures of both the hot and the cold water are known before mixing.
    (54) What other things happen to a substance besides an increase in temperature when it is heated?
    (55) At temperatures below 0°C most substances are solids.
    (56) The amount of heat energy present in a substance determines whether it is a solid, liquid or a gas.

15. Solid substances can be changed to form liquids and liquids can be changed to form gases.

    (57) The freezing, malting, boiling and condensing temperatures are always the same for pure substances (given a constant pressure).
    (58) By determining the boiling and freezing points it is possible to decide whether a substance is pure or impure.
    (59) The freezing point of salty water is lower than the freezing point of pure water.
    (60) I wander if any solid substances can be changed to gas without first forming a liquid.

16. In the process of photosynthesis, carbohydrates (food) and oxygen are produced ~~for~~ from carbon dioxide and water.

    (61) Photosynthesis is the process which links the sun and solar energy to the needs of man: food and oxygen.
    (62) During photosynthesis solar energy (light) is being converted into chemical energy (food that plants provide) and oxygen.
    (63) We might ask ourselves whether all the cells of green plants carry out photosynthesis.
    (64) Corn is an example of a plant that conducts photosynthesis.

17. Rocks may contain fossils of organisms which lived millions of years ago.

    (65) Today heavy emphasis is placed on research for fossils fuels (oil and coal).
    (66) If the remains of a plant or animal escape destruction for a long period of time, the remains are said to be a fossil.
    (67) Perhaps there are more fossils of water organisms than of land organisms because in water dead organisms are more easily covered by sediments than on land.
    (68) The order and depth of fossils in a rock layer indicates the age and sequence of evolution of various organisms.

18. Heredity (genetics) is a topic in biology.

    (69) Genetics is used extensively in the breeding of horses.
    (70) Plants with blue eyes are likely to have children with blue eyes.
    (71) Organisms (people, animals,plants) have many features in common with their parents.
    (72) I wonder whether girls inherit more traits from their mother than from their father.

19. If a pea plant is put into a closed box and the light is allowed to enter the box through a small opening, the plant will grow toward the light.

    (73) The tendency for plants to grow toward sunlight is called phototrapism.
    (74) Plants react not only to light but also to other factors such as touch or gravity.
    (75) Plants grow toward the light because the side of the stem facing the light gx grows more slowly than the side away from the light.
    (76) Potted house plants should be turned regularly so they will grow straight.

20. Scientists have observed that in cities where the drinking water contains traces of fluorine, tooth damage is less severe than in similar cities where the water contains no fluorine.

    (77) The human body always contains some fluorine.
    (78) Fluorine may be added artifically to the drinking water or to toothpastes k in order to prevent tooth decay.
    (79) Is it possible that addition of fluorine in water is dangerous to human health?
    (80) Fluorine in drinking water decreases the damaging effect of acids produced by bacteria on the teeth.