

# Working Models (All Divisions)

**Students are encouraged to explore ANY scientific area of interest.**

## Scale models

This is a scaled representation of an **existing** device/invention. You are asked to make a **WORKING** model that simulates the operation of, and the scientific principles behind, an existing technology. You should choose a model which clearly illustrates a scientific principle. For example, you could construct a scale model of an operating small scale radio telescope demonstrating the process of receiving radio waves.

## Information models

Information models are **WORKING** models that either demonstrate a scientific principle or concept, or simulate a scientific technique. These models are intended to educate people about the concept being illustrated. For example, if you wanted to show how electrons flow through a wire you couldn't use electrons (because they are too small) but would use something large enough to see to represent the electrons.

**Note that Information and Scale Models is a separate section to Inventions. See page 16 for information about the Inventions section.**

✓ *Tick that you have satisfied each of the guidelines and criteria below.*

### Entry guidelines and criteria

- ☐ Your model must be a **WORKING** model.
- ☐ Your model must be no larger than 0.5m x 0.5m x 0.5m, and weigh no more than 15 kg unless special permission is granted by the Science Talent Search Section Coordinator.
- ☐ Your model must be safe to operate in a crowded area. All models must have appropriate safety features; e.g. boilers must have correctly operating safety valves. Dangerous chemicals must not be used, and rocket models will not be judged. Projects that involve cruelty to animals will not be judged.
- ☐ Your model must be original (volcanoes will score poorly!!). Models made from kits without original input do not score well.
- ☐ The best Scale models will clearly and accurately illustrate only one or two scientific concepts. These should be the major concepts in the operation of the model.
- ☐ Information models should show original, creative and innovative presentation.
- ☐ Your Model is well constructed.
- ☐ You have shown resourcefulness in the parts you have chosen to use, including consideration of properties of the materials.
- ☐ Your Model is easy to use and has operating instructions.
- ☐ **The scientific principle used is clearly understood and demonstrated.**
- ☐ Due to new safety standards, STS recommends students use their own battery pack for power.

### Written report

You must include with your Model a written report that includes the following:

- ☐ **Introduction** – What the model represents and ideas behind it. Identify your model either as a scale model or an information model.

- ☐ **Design brief** – describes how you went about building and testing, problems you encountered and how they were solved, and the science principles used and applied to the design. **Draw and label diagrams of your prototype designs**, including relevant explanations.
  - Scale model: you must address how appropriate your model is in the explanation of the science concept being demonstrated. Also include how accurate your scale model is and note where exceptions were made to the size ratio.
  - Information model: you should show original, innovative and creative design in the implementation of the scientific principle(s) being demonstrated.
  - List any safety considerations in your design. Attach **Risk Assessment Form**, see sample on page 23.
- ☐ **Instructions** – Operating instructions of your model.
- ☐ **Discussion** – Discuss the scientific principles involved and how they apply to the Model. What are the limitations of your design and/or suggest how you would make further improvements.
- ☐ **Acknowledgements and References** – Make sure you include a list of people who gave you help/advice and outline the ways they helped you. Also list other sources of information used (refer to page 23).
- ☐ Include or attach a photo(s) of your Model in your report.
- ☐ Your report should be no more than 1000 words in length, (log books and appendices are not included in word count) on A4 paper and presented in a paper manila folder (not plastic) with a copy of the completed Face Sheet firmly attached to the front.
- ☐ **Keep a full electronic copy of your work**, including scans of your log book etc. See pg 23 for naming your file.

### Judging Day

Students will be expected to give an oral presentation that demonstrates to the judges how the Model works and discuss the following aspects:

- ☐ ➤ The accuracy of the scale model and its appropriateness in demonstrating the scientific principles and/or concepts
- or** ➤ How your Information Model is original and creative in demonstrating a scientific principle and/or concept.
- ☐ Your understanding of the **scientific principles** used in the design and its application.
- ☐ What materials and their properties have you used in your model. Would you use anything else to construct your model if you could do it again?

**Judges will look for evidence of depth of research into the science behind your Model.**

### JUDGING DAY FOR MODELS

**Saturday 8 August 2020**

Methodist Ladies' College,

Fitzwilliam Street Entrance, KEW

**Country entrants are encouraged** to bring their model along to Judging Day to discuss their entry with Judges. Country entrants may submit their projects electronically. This includes your report, log book, risk assessment and a video.

**All guidelines should be followed to avoid being disadvantaged during judging.**