

# Molecular Modeling

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## Category Requirements – 30%

### **Model – 30%**

Further broken down into:

**Creativity of design/materials – 10%**

**Degree of interactivity -- 10%**

**Durability – 5%**

**Overall presentation – 5%**

Create a model that demonstrates the interaction of two or more molecules of relevance to biotechnology or biomedicine (enzyme/substrate, DNA and binding protein, etc.). The molecules may either represent a widely accepted model of interaction or may model a hypothetical relationship. For example, you may design a hypothetical molecule ('drug') to interact with a drug target. In that case, the target needs to be clearly indicated and described.

- Must be a 3-D physical model.
- Must be durable and freestanding.
- Maximum size consistent with Expo Guidelines for displayed work.
- Store-bought molecule kits cannot be the sole basis for the model, unless used in a novel way.

## Science Content – 20%

### **Science Background Paper (5-10 pages)– 20%**

- Overview of the importance of models in research
- Brief summary of technology behind determining structures and models
- The relation of your model's structure to its function
- The overall biological system that your model is part of (the big picture)
- Any other relevant background on the molecules.

Your paper should demonstrate a mastery of relevant scientific ideas by accurately explaining difficult concepts in terms a layperson could understand. The work should provide an appropriate combination of explanations, examples, and details that are specific, clear, and relevant to the topic. The content of your work should reflect critical thinking about the topic.

## Use of Resources and General Written Requirements – 20%

### **Effort in Use of Resources– 10%**

Include 1-2 typed pages describing the resource(s) you put the most effort into using. More weight is given in judging to those students who put more effort into locating and using available resources. A good use of resources may include working with an advisor or mentor, making arrangements to tour a company, interviewing an adult in your field, or other sources. What did you learn? How did this resource help you? An interview with an adult in the field carries far more weight than a Google search.

If a qualified adult (i.e your Expo Advisor or Mentor, someone you interviewed or a tour guide at site visit) significantly helped you with your project, please include:

- a) The person's name, title and contact information.
- b) Dates you emailed, talked on the phone or met.
- c) Your thoughtful reflections on the experience of working with that person.

### **Paper Format – 5%**

Provide a typed Cover Sheet including name, title, category, teacher, grade level, school, and date. Papers should be typed/word processed on white letter-sized paper, with one-inch margins. Use an easily readable font such as Times Roman or Arial, 10-12 point, double-spaced. If included, illustrations must be neat and applicable, with a title and a source. Number your pages and label section headings. Consistently follow the rules of Standard English for usage, spelling, capitalization, and punctuation.

### **Annotated bibliography in standard MLA or APA format – 5%**

Use a minimum of 5 sources (3 must be non-internet sources). Journals published in hard copy as well as online can count as non-internet sources. For each source, provide one reason why you believe the source is credible and describe how it was used in your project.

## Creativity – 10%

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The most successful projects have been ones that have invited audience interaction or have presented a challenging concept in a new and engaging way. Show your ability to creatively approach or solve a problem, or present evidence of your understanding in ways that are novel or unique. Your project should reflect your special insights and abilities.

## Poster/Interview at Expo Event – 20%

### **Poster – 10%**

- Provide a key that allows viewer to understand important features of the model.
- Describe how to interact with your model (if applicable)
- Highlight important information from your science background paper. Focus on the relation of your model's structure to its function as well as the overall biological system that your model is part of.
- Put your project title at the center of the display
- Include the same information that is on your cover sheet (Name, etc.)
- Make sure your writing is large enough to be read from 3 feet away.
- Use visual aids that relate to the topic and make the viewer want to learn more about it.

Posters should convey important information about your project in a visually appealing manner. Displays and models must be freestanding and have the following maximum dimensions: 3 feet width, 2.5 feet depth, and 4 feet height (from table).

### **Interview – 10%**

***Judges will be looking at your effectiveness in communicating your project to them, and your understanding of your topic.***

Your judge will want an overview of your project - practice giving a short (2-3-minute) 'walk-through' of your project that explains it in straightforward terms. You will receive written feedback from your judge regarding the strengths of your project, and how you could make it even better in the future.

*The following are samples of the types of additional questions a judge might ask you: Why were you interested in this topic? What did you learn from doing your project? What was the most enjoyable/difficult aspect of doing this project? What else would you like to find out about this topic?*

What you need to submit for the Expo Prejudging  
Due April 18, 2008

- Cover Sheet – please indicate anticipated AV or electrical needs**
- Photograph or detailed sketch of your model (in JPEG format for the electronic submission)**
- Science Background Paper**
- Bibliography + description of Effort in use of Resources**
- Any electrical or AV needs**
  
- Provide one hard copy and one electronic copy.*
- Please combine your files into a single Word PC File or PDF.*
  
- Label your file MM\_SchoolAbbreviation\_LastName  
Example = MM\_BA\_Smith (note that there are no spaces, only underscores, in the file name).  
Check with your teacher for school abbreviations.

What you need to bring to the Expo  
Due May 28, 2008

- Cover Sheet**
- Science Background Paper**
- Bibliography + description of Effort in use of Resources**
- Poster**
- Model**