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ABSTRACT

This exercise, designed for use by upper elementary and high school students, introduces the concepts of model and system. By examining a physical model, such as a top, the student learns the concepts of model and system which can later be applied to the study of social systems. A large system of interrelated parts is examined and the system and sub-systems analyzed. Emphasis is upon the concept formation of interdependence. Understanding of the two concepts is viewed as a prerequisite to the study of world politics in which there exists an interdependence among all nations. Objectives, a list of needed materials, and procedures are briefly stated. Sixteen questions for examination of the model are included to help students define the two concepts; analyze advantages and disadvantages for studying systems; represent a system pictorially, orally, or in writing; and recognize essential and non-essential parts and sub-systems. (Author/SJM)

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UNDERSTANDING THE CONCEPTS OF SYSTEM AND MODEL*
--Prerequisites to the Study of World Politics--

An important perspective on world affairs is an awareness of the interdependence of all nations and the constraints on each due to this interdependence. One helpful way to examine these constraints and this interdependence is to treat the world as one huge system of interrelated parts and to analyze that system and its many sub-systems through the use of models. This exercise will not attempt to explain the many systems of the world (e.g., political, physical and economic); rather, it will introduce the concepts of model and system in order to permit the use of these ideas wherever appropriate to the study of social systems. This exercise should be useful for students in upper elementary school through high school. If you think your students already understand model and system without this exercise, a quiz of this sort (described in the procedure below) would verify it for you.

Objectives: Given a simple toy model and a series of leading questions about it, students will be able to deduce a definition of the concepts, system, and model; list advantages and disadvantages for studying systems through the use of models; represent a system pictorially, orally or in writing; recognize essential and non-essential parts and sub-systems of a system.

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Materials: A toy model (e.g., car, boat, airplane) for each five or six students in the class. A toy for each student is all right and can be obtained by asking students to bring their own. 25¢ models are perfectly adequate.

A question sheet for each student (see attached).

Procedure: Distribute the toys, however procured, so that students divide into groups no larger than six to examine the models.

Distribute a copy of the questions about the model to each student.

Read the first two or three questions to the class, requesting that students answer each in writing on their sheets. Then let them work ahead on their own, discussing the questions with each other. Help individuals as needed. You may want to handle some of the more difficult questions as a class but each student should eventually write his own answers to the questions. When

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* This exercise is adapted by the Diablo Valley Education Project (50 Vashell Way, Suite 300; Orinda, California 94563) from draft materials of the World Law Fund (11 West 42nd Street; New York, New York 10036).

you get to the definition question, get as many different ones as the group will suggest. Then try to work toward agreement on one with which all feel comfortable.

To determine how well the lesson is understood you might give a quiz at a later time asking questions such as the following:

1. Define model and system.
2. Describe in writing some system on which you depend every day.
3. Describe a system in which you are one of the parts. (Use either pictures or words or both.) What function do you perform in the system?
4. Draw a diagram or picture of the essential parts of our school system.

   Some non-essential parts.

QUESTIONS FOR EXAMINATION OF THE MODEL

1. What is the real thing represented by your toy model?

2. Name several parts of the real thing represented by the model?

3. Name some parts of the real thing not represented by your model?

4. What function is performed when the parts work properly in relation to each other?

5. Are there any parts not represented in the model which would be required for the model to carry out its chief function?

6. On the basis of your answers to the previous two questions, state:
   What you know about the real thing from examining the model.

   What you could not learn about the real thing from examining the model.

7. Look once again at the individual parts of the model. Are all of those parts absolutely necessary to carry out the function which is the purpose of the real thing? List those which are essential and those which are not.

Essential Parts	Non-essential Parts

[over]

What do you think would happen if you took away some of the non-essential parts?

What would happen if you took away some of the essential parts?

8. How might you use this model to determine how well the real thing performs the function for which it was designed?

9. The real thing represented by your model is a system. On the basis of your examination of the model, how would you define "system"?

10. The toy itself is a model of a system. How does a model differ from the system it represents? Define "model."

11. Does the real thing represented by your model have any systems within the system? If it does, identify some of those sub-systems and their functions and determine which parts, if any, of those sub-systems are represented by the model.

12. If you wanted to learn about the entire workings of the real thing, short of having the object itself, what would you want besides this model, and what would you do to learn about the real thing?

13. If you did not have a physical model, in what other ways might you explain a system?

[over]

14. Give an example of a system in which many people performing different functions are important parts of the system.

15. Try to draw a picture (a model) of the system you described in Question 14.

16. List some advantages and disadvantages of each approach to learning about systems in the chart below:

	Learning About Systems from Models	Learning About Systems from Real Things
Advantages		
Disadvantages		