



Lesson Plan

Exploring Parts and Wholes (K-2)

Estimated Time: 1 class period.

Central Benchmarks

1A Systems (K-2#1)

Most things are made of parts.

1A Systems (K-2#3)

When parts are put together, they can do things that they couldn't do by themselves.

Objective

At the end of this lesson students will be able to make some interesting and accurate statements about how parts of something are related to the whole thing.

Advance Preparation

Arrange to take the students on a short field trip in the neighborhood of the school. Be sure any necessary permission forms are completed, and identify parents and guardians who will accompany the group.

List of Materials

For each group:

A simple, large wheeled toy, such as a dump truck (toys should be identical)

A wheel that can be used to demonstrate that wheels are made of parts

For the class:

Chart, chalkboard, or blank transparency

Drawing paper

Crayons and markers

Masking tape

TRANSPARENCY: Parts of a Toy

Motivation

Organize the class into groups of three or four. Place before each group one of the identical wheeled toys. Have each group identify and list as many parts of the toy as they can. Tell students that if they do not know the name of a part they should make up a name. Ask groups to report their findings. List 10 to 15 parts on a chart, the chalkboard, or a transparency.

Now assign one part to each pair of students, or ask them to select the part they find most interesting. (Display the TRANSPARENCY: Parts of a Toy.) Ask the students to answer three questions about their parts:

- What does this part help the toy do?
- If this part were removed, would the toy still work?
- Is this part made of even smaller parts?

Have the whole class discuss what they have found. Help students classify the parts as essential or nonessential, justifying each categorization. When students say that a particular part is nonessential, counter with the question of whether the toy can really do its job without that part.

Show the separate wheel and ask: *What can it do by itself?* Accept answers. Point out that the wheel is not very useful by itself. However, when it is combined with other parts, it can do many things. State explicitly: *So we see that when parts are put together they can do things that they couldn't do by themselves.*

Development

1. Parts and wholes in the classroom.

Organize the class into new pairs. Say: *Each pair search the classroom to find something made of parts. Stand next to the item you have identified and name the item for the whole class. Show another pair one part of the whole item that you have selected.*

Now work in the same pairs to find an item in the room that is NOT made of parts. Show these items to the whole class. (Items not made of parts will probably be more difficult to find than items that are made of parts.)

Ask: Are there more things in the classroom that are made of parts or more things that are not made of parts? Please give evidence for your answer.

2. Parts and wholes in the natural world.

If necessary, review the meaning of *manufactured* with the students. Comment: *Most of the things in our classroom are manufactured. Can you give me examples of such items?* To verify understanding, ask also for examples in the classroom of things that are not manufactured. (Possible responses: plants, fish, water, etc.)

Ask: Where could we go to find more things that are NOT manufactured? (outdoors)

Ask: If we went outdoors and looked at things that are NOT manufactured, do you think we would also find that most of those things are made of parts? Accept answers.

Ask: How could we find out? (Lead students to conclude that to find out the answer to this question we must go outdoors and look around.)

Have students work in groups to plan the expedition to find nonmanufactured parts and wholes in the outdoor world. Students should plan, for example, where they will go, how long the trip should take, and how they will record their findings. Be sure students plan to identify items both made of parts and not made of parts. Make a decision for the class about the area to be investigated and the time to be spent in the investigation. Allow student groups to plan and use their own means of recording data.

Have students carry out the investigation in the same groups in which they made their plans.

Have students return to the classroom. Ask: *Did we find that more outdoor, nonmanufactured items are made of parts or are not made of parts?* Have students justify their responses.

Have each student draw a picture of one item observed outdoors that consisted of parts. Suggest that students find ways to make the parts on their drawings clear to others. (Among possible ideas: outlining with a dark color, labeling a part.)

Post the drawings. Ask each student: *Can you identify one part of the whole thing pictured in the drawing? What would happen to the whole thing if that part were removed?*

In many cases students will not know the function of the part or what would happen if it were removed. Do not tell them, but allow students to formulate questions and, where possible, design investigations to answer their questions. (You may wish to have students conduct some of these investigations at a later time.)

Raise the question of how the whole item would be affected if the parts were arranged differently. Be specific, asking, for example: *What if this part [point to it] were here [point], instead of where it is? Could the whole thing still do its job?*

If we repeated our investigation tomorrow, would we still find the same parts and wholes?

What tools might help you see even smaller parts of the things you chose? [Hand lenses, microscopes.] We will use these tools for observing parts of whole things in later lessons.

3. Evaluation of investigative procedures.

Have students meet in new groups of four to discuss the methods they used for recording data during their investigation. Have them evaluate these methods.

Summary

Have several students summarize what was done today. Give time for them to share their comments and questions, things they liked or didn't like in doing the lesson, etc.

Evaluation

Have students complete journal entries in which they list three general statements about wholes and parts based on today's experiences. Review the meaning of the word *general* by giving or asking several students to give examples of general and specific statements.

Also have students enter in their journals one thing they learned about useful procedures for recording data and one thing they learned about sharing information effectively through drawings.

Ask students also to record any new words they heard today, what they think the words mean, and why they think the words have those meanings.

Extensions

Base further instruction on the level of student understanding, as shown in the journal statements, that most things are made of parts (11A Systems [K-2] #1) and that, when parts are put together, they can do things that they couldn't do by themselves (11A Systems [K-2] #3).

Following are some activities that might follow this lesson:

- Looking for parts using hand lenses.
- Identifying parts and their functions in such items as oranges, seed pods, and isopods.
- Identifying all the parts and wholes you observe while eating your lunch.
- Restructuring block or Lego toy structures for new purposes.
- Pointing out differences in the parts of manufactured things and the parts of natural things.
- Investigating parts to see whether they can be separated clearly and distinctly from the rest of the whole or whether they merge gradually with the whole so that they cannot be separated clearly and distinctly.
- Allowing students to take apart some manufactured items, such as a bicycle bell, a telephone, or a clock. (First inspect the items to be sure they can be handled safely.)