

Breaking a Process Into Steps (Decomposition)

Grade Level: 1+ (Easy)

Focus Standard: K-1.CT.4- identify a problem or task and discuss ways to break it into multiple smaller steps.

Part 1: Introduction (Optional)

Materials: none

Time Needed: 15-30 minutes

You, the teacher, are to become the kids' robot for the length of this activity. Announce this to the class, and tell them to instruct you on how to pick up a book from the floor. Do not respond to "general" statements such as "pick book up" or "bend down" (prompt them to tell you "how" to do such tasks). When done, ask the kids to repeat their instructions, step by step, to run through their entire "program" and to see you pick up the book.

Once finished, connect this to computers and other electronics they may be familiar with (ex: TV), and discuss how those electronics also need step-by-step instructions to do what they do. Ask the students for examples of electronic devices they know of and what they do, then ask the class to come up with ideas on what instructions are given to those devices.

Part 2: Coming Up With Instructions

Materials: Paper, pencils, whiteboard, dry-erase markers

Time Needed: 15-45 minutes

Split the students into groups of 4-5. Provide each group with a set of papers with the following printed on them: [\[LINK\]](#)

If the students can read well, pass out the attached worksheet; otherwise, read the instructions attached to them and go over what the words on each of the printed papers mean. When done, have a class discussion on the three questions at the end.

Note: If your students can't write their steps down, have them hold up the printed papers in the order that they want you to do each step. Remember to follow each step EXACTLY how it is given, whether or not you know what the intent is (ex: Drawing in mid-air if no "Place Marker on Board" instruction is given).

Part 3: Coming Up With More Specific Instructions

Materials: Paper, pencils, whiteboard, dry-erase markers

Time Needed: 15-45 minutes

Split the students into groups of 4-5 again (same groups as in part 2 works well). Provide each group again a set of papers with the following printed on them: [\[LINK\]](#)

If the students can read well, pass out the attached worksheet; otherwise, read the instructions attached to them and go over what the words on each of the printed papers mean. When done, have a class discussion on the questions at the end.

Note: If your students can't write their steps down, have them tell you out loud the steps they want you to do. Remember to follow each step EXACTLY how it is given, whether or not you know what the intent is (ex: Drawing in mid-air if no "Place Marker on Board" instruction is given).

Note 2: There are two copies of the "move diagonally" directions: one for students who have previously learned about degrees and can tell you how much to turn, and one for if they have not.

Names: _____

Coming Up With Instructions WORKSHEET

As a group, come up with instructions to teach your teacher and classmates how to draw a simple house using the directions on the papers given to you. You cannot make up instructions. Write your steps (in order!) below:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

When you are done, call the teacher over. They will follow your instructions exactly. If there are any problems with how the house turned out, try changing your instructions until it comes out the way you want.

1. Did the teacher draw your house the way you wanted it to look the first time? Why or why not?

2. What problems if any did you run into? Were there enough instructions on the papers given to you to be able to draw the house you wanted?

3. What other possible instructions would you want to use? Make a list on the back of this paper.

Names: _____

Coming Up With More Specific Instructions WORKSHEET

In the previous activity, you gave instructions on how to draw a house. But the instructions you had (“Move arm up”, “Move arm down”, etc) were not very specific. Your teacher had to guess HOW far up to move their arm, and maybe your house didn’t turn out the way you wanted it to.

Let’s fix that. This time you can tell your teacher exactly how to make each line. But this time, you’ll give instructions on how to draw the person living in that house.

Write your instructions for drawing _____ (give your person a name!) below:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

When you are done, call the teacher over. They will follow your instructions exactly. If there are any problems with how your person turned out, try changing your instructions until it comes out the way you want.

1. How did the more specific instructions change the way you gave instructions?

2. How would you tell your teacher how to reposition the marker? For example, if you drew a line and wanted to go back to where you started.

3. Pick something that you do every day and break it into steps that anyone can follow.

4. What did you learn?

5. What did you have trouble with?

6. What do you still have questions about?
