## OSU_COE_horizontal_2C_O_over_B.epsLesson Description

Distinctions

Systems Thinking Skills

## Levels

Grades 6-8

## Content Areas

Systems Thinking

## Lesson Time

45 minutes

## Next Generation Science Standards

* SEP 2 – Developing and Using Models
* SEP 4 – Analyzing and Interpreting Data
* CC 2 – Cause and Effect

## Learning Objectives

Students will be able to:

* Define the systems thinking concept of making distinctions
* Make distinctions about basic physical things
* Sort data into a logic chart puzzle

## Materials

Lesson worksheet printouts

PowerPoint

This lesson introduces students to the systems thinking concept called distinctions. To make distinctions, students will define what things are and are not, and students will also be placing like-things together in the same categories. During this lesson, students will practice this skill by solving logic chart puzzles.

## Using This Lesson

This lesson was designed to be used in series with the Systems Thinking Skills series, however it can also be used as a standalone lesson.

There are three parts to this lesson: an initial activity to teach students how to use the logic chart puzzle, a brief lesson on how they already make distinctions in their daily lives and that logic chart puzzles are a great way to organize information when problem solving, and finally a second logic chart puzzle that students must set up and solve.

## Importance of This Lesson

We are often presented with more information than what our brains can process when we first receive it. By practicing sorting and organizing this data, students can better process what they know and come to learn the information is telling us more than what they originally thought.

This can lead for students to become more naturally curious and to think more deeply about their other course materials.

# Content Background

## Systems Thinking

What is systems thinking? Systems thinking is the method of thinking used to think about systems. It is based in four basic rules, described below with their accompanying co-implication:

* **Distinctions Rule:** Any idea or thing can be distinguished from the other ideas or things it is with (thing-other).
* **Systems Rule:**Any idea or thing can be split into parts or lumped into a whole (part-whole).
* **Relationships Rule:** Any idea or thing can relate to other things or ideas (action-reaction).
* **Perspectives Rule:** Any thing or idea can be the point or the view of a perspective (point-view).

These four rules (abbreviated to DSRP) are applied in parallel in systems thinking and can be found as the basis for practically all forms of thinking and methodologies related to systems.

Distinctions

# Materials List

* Put a detailed materials list here.
* Included any specifications of materials per group, for whole class, etc.
* Note materials that need to be printed for students

# Preparation Instructions

1. Provide step by step preparation instructions
2. This should include any logistics or technology necessary
3. Include diagrams, tables, figures as necessary

# Lesson Outline

## Introduction

The initial introduction should be kept very brief. The introduction should only be used to introduce logic chart puzzles, how to solve them, and a story to get them excited about solving the puzzles:

* A logic chart puzzle is a graph that helps you visually sort and organize information (e.g. clues/hints) to solve a problem
* Each person gets their own puzzle, but students may form groups of up to three
* 15-minute time limit
  + If students complete the puzzle before time is up, check their answers.
  + If they were correct, have them go around and assist other groups. Have them keep their puzzle face down on their desk to prevent them from simply showing the answers to other students
  + If they were not correct, provide one of the correct answers to help them get on track

## Mini Lesson on Distinctions

Use the PowerPoint that correlates to this lesson. (5 minutes)

* Using the worksheet, lead a brief discussion on questions 1-3:
  + What steps did you take to solve the logic chart puzzle? What challenges did you face?
  + How does using what you already know help you solve the logic chart puzzle? Did you initially think that you had enough information to solve the problem?
  + List three ways that logic chart puzzles are a helpful tool.
* Ask students to define a distinction. Allow for a minute of brainstorming in their groups and recording their answer on their worksheets. Then call on each group to share their answers.
* Define distinctions (definition provided in PowerPoint) (question 4)
* Demonstrate how students are making distinctions everyday (examples provided in PowerPoint)
* Ask students to provide examples of how they make distinctions in their daily lives. (Question 5)
* Ask students what step in solving logic chart puzzles they are making distinctions. (Question 6)

## Follow-up Activity

Provide students with a second logic puzzle chart, but this time the puzzle will be blank. The objective of this activity will be for students to create their own logic chart puzzle.

* Students work in the same groups of up to three
* 15-minute time limit
  + If students complete the puzzle before time is up, have them double check it can be solved, then have groups trade puzzles to see if they can solve them!
* Using the worksheets, lead a group discussion on questions 7-8:
  + What information would you need to make your own logic chart puzzle?
  + Compare and contrast how you make versus solve a logic chart puzzle. Give one example of each.

If time does not permit for the students to complete the puzzle, ask them to participate in the discussion based on what they think would happen.

## Discussion and Wrap-up

Concluding lecture and worksheet: ask students to share in their groups, fill out their worksheets, then share with the class the following questions. (5 minutes)

* Why were the logic puzzle charts helpful?
* Do you think something like this could be helpful with problem solving in the real world? Why?

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Distinctions

**Solving Logic Chart Puzzles**

1. What steps did you take to solve the logic chart puzzle?

2. How does using what you already know help you solve the logic chart puzzle? Did you initially think that you had enough information to solve the problem?

3. List three ways that logic chart puzzles are a helpful tool.

**Distinctions**

4. What does it mean to make distinctions?

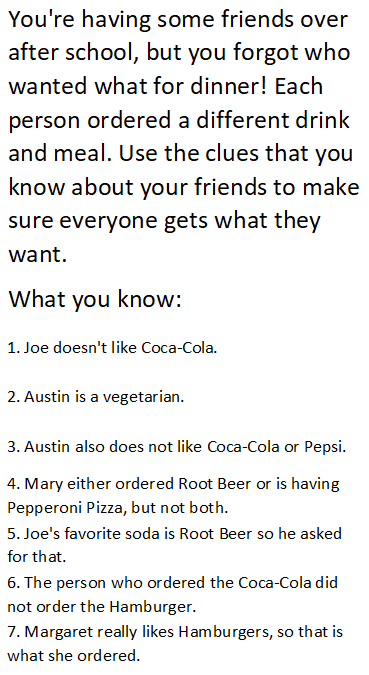
5. Describe 3 ways that you make distinctions every day.

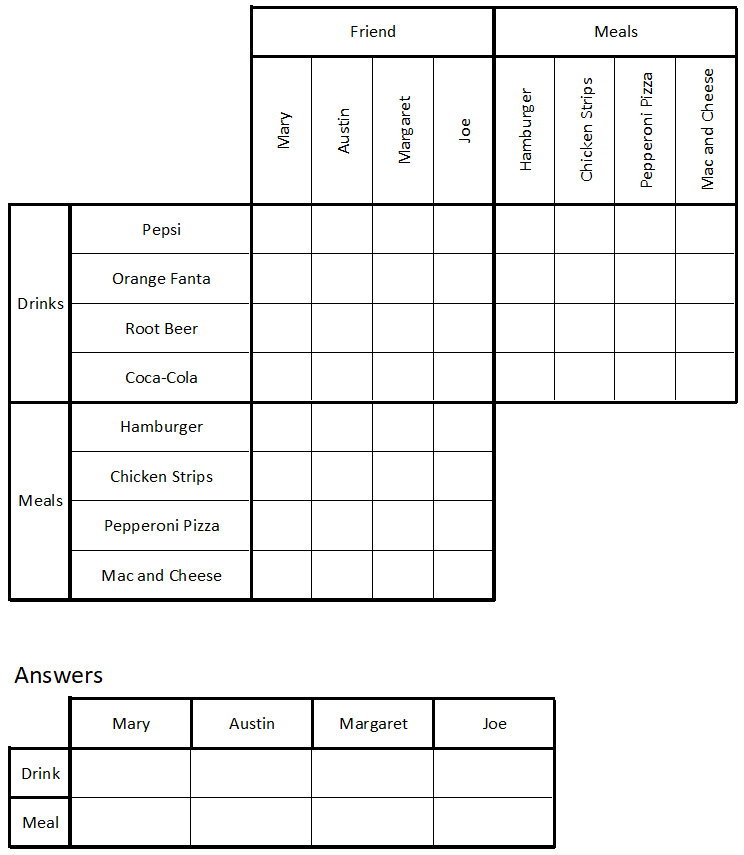
6. What step in solving logic chart puzzles are you making distinctions?

**Creating Your Own Logic Chart Puzzle**

7. What information would you need to make your own logic chart puzzle?

8. Compare and contrast how you make versus solve a logic chart puzzle. Give one example of each.





**Create Your Own!**

**Scenario:**

**What you know:**

