project zero THINKING ROUTINES

Parts, Purposes, Complexities (For Exploring Complexity)

A routine for looking closely at systems.

Choose an object or system and use the following prompts.

- What are its **parts**?
  - What are its pieces or components?
- What are its **purposes**?
  - What are the purposes of each of these parts?
- What are its **complexities**?
  - How is it complicated in its parts and purposes, the relationship between the two, or in?

PURPOSE

What kind of thinking does this routine encourage?
The routine helps students slow down and make careful, detailed observations by encouraging them to look beyond the obvious features of an object or system. The routine stimulates curiosity, raises questions, and surfaces areas for further inquiry. The routine is one of three PZ Thinking Routines that begins with the naming of parts. Naming parts is an important way of exploring complexity because it reveals how objects and systems have numerous interacting components.

APPLICATION

When and where can I use it?
The routine can be used to explore virtually any object or system. It works particularly well with things that students can directly observe or diagram. If you use the routine with an object or system from the natural world, as opposed to a human-designed object or system, you may want to substitute the word 'function' for 'purpose. This is because humanmade objects and systems are made with intentional purposes in mind, whereas in the natural world, form and function co-evolve without requiring explicit intentionality.

How much background knowledge do students need in order to use this routine? If the topic is an object that is physically or visible, students may not need a lot of background knowledge. However, if students are working with a system that extends beyond what they can observe at the moment—like democracy or recycling—it may be helpful for students to have some background knowledge, or to give them an opportunity to reflect on their experiences interacting with that particular system.

LAUNCH

What are some tips for starting and using this routine?

Should the routine be used all at once, or step-by-step? The three elements of this routine can be introduced all at once, but it is often helpful to begin by taking extra time with the parts step, in order to give students plenty of time to make detailed observations. (If an object is physically present, students can be encouraged to draw its parts, as a way of looking closely.) Once students have taken time with the parts step, the next two steps—purposes and complexities— often flow together naturally.

How can students' thinking be made visible while using this routine? The routine provides an opportunity to make students' thinking visible through creating lists, maps, and drawings of the parts, purposes, complexities of various objects and systems. Often students discover linkages between the three steps of the routines and their diagrams can including lots of connecting lines and annotations—and even look messy at times. This is generally a good thing, as it is an indication that students are discovering the genuine messiness of complexity.

Can this routine be used with very young students? Yes, though generally for students in preK-4 you may want to lead the discussion and make one collective chart or diagram. Also, you may consider swapping out the word complexities for more accessible terms, such as *puzzles* or *questions*.

FACILITATION

This activity is recommended for the following learner age ranges:

- Preschool
  - 15-30 minutes
  - Heavily facilitated by peer/teacher/caregiver
- Elementary School
  - 15-30 minutes
  - Lightly facilitated by peer/teacher/caregiver
- Middle School
  - 15-30 minutes
  - Lightly facilitated by peer/teacher/caregiver
- High School
  - 15-30 minutes
  - Lightly facilitated by peer/teacher/caregiver

This thinking routine was developed as part of thePZ Connect project at Project Zero at the Harvard Graduate School of Education. Explore the full PZ Thinking Routine Toolbox at *pz.harvard.edu/thinking-routines*.