Investigation 1: Systems

Part 1: Everyday Systems
This **system** has been designed for efficient transportation of clothes and other personal items while traveling.

What would you call a system like this?

What is a system?
Investigation 1, Part 1

Science Notebook Setup

IG pg. 93, Step 2
Focus Question

How can you identify a system?
A **system** is any collection of **interacting** parts that work together to make a whole or perform a function.

What are the interacting parts that make up this suitcase and perform the function of efficient transportation of personal goods?

-
Investigation 1, Part 1

A Railroad System

A railroad is a transportation system. Railroad systems transport people as well as heavy products going to market.

Work with your group to list the important parts of a railroad system.

•
Subsystems

A system inside a larger system is a **subsystem**.

The locomotive that pulls the train is a complex system itself.

What are other subsystems found in a railroad transportation system?

•
Investigation 1, Part 1

System Analysis

What are some other systems we can analyze?
•

In your group, analyze one of the systems.

Time

IG pg. 95–96, Step 7
Investigation 1, Part 1

System Summary

Systems can be simple or complex.

**simple systems**

**a complex system**

Complex systems usually have a number of complex subsystems.

*IG pg. 96, Step 9*
Focus Question

How can you identify a system?

Discuss the question with your group and then write a response in your notebook.

Use your notes from the reading to support your ideas.
How can you identify a system?

Pair up with a partner to

- share your answer to the focus question;
- discuss your understanding of system.
Investigation 1, Part 1

Living Systems

Developed at

THE LAWRENCE HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

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Investigation 1: Systems

Part 1: Everyday Systems

IWB Click the Overview Button to open the Overview.
IWB Click the Complete Teacher Notes Button to open the complete Teacher Notes.
IWB Click the FOSS logo to access FOSSweb.
This **system** has been designed for efficient transportation of clothes and other personal items while traveling.

What would you call a system like this?

What is a system?

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**Investigation 1, Part 1**

**Systems**

Living Systems, IG pg 93, Step 1

Show students the piece of luggage you brought in.

Introduce the idea of a system.

**IWB** You can use the *Pen Tool* to record students' responses.

The definition for *system* will be introduced in Step 4.
Living Systems, IG pg 93, Step 2

Introduce and set up the science notebook. Follow the instructions in Step 2 or your own method.

**NOTE:** See the Science Notebooks chapter for more information on how to use science notebooks as a resource.

**IWB** Use the Pen Tool to show students how to set up their science notebooks.
Investigation 1, Part 1

Focus Question

How can you identify a system?

Living Systems, IG pg 93, Step 3
Ask students to write the focus question in their notebooks.

IG pg. 93, Step 3
A **system** is any collection of interacting parts that work together to make a whole or perform a function.

What are the interacting parts of a suitcase and perform the transportation of personal belongings?

- **Living Systems, IG pg 93–94, Step 4**
  
  Continue to define a system.

  Record students' responses. Start with the first bullet and add as students contribute. Students should identify some of the elements listed in Step 4.

  Ask students to suggest missing parts or to identify items on the list that do not contribute to the intent of the system (to secure and transport personal goods efficiently).

  - **IWB** You can use the *Pen Tool* to record students' responses.
    - **New Word** Introduce *system*.

    - **system**: a collection of interacting parts that work together to make a whole or perform a function
    - **New Word** Introduce *interact*.

    - **interact**: to act upon one another

  Add all new words to the word wall.
A railroad is a transportation system. Railroad systems transport people as well as heavy products going to market.

Work with your group to list the important parts of a railroad system.

- Time

Living Systems, IG pg 94–95, Step 5

Turn the discussion to railroads.

Give groups 4 to 5 minutes to list the parts of a railroad system.

**IWB** Use the Pen Tool to write when you want students to finish the activity.

When students are ready, have one group read its list. Call on a student from another group to suggest one addition to the first group’s list. Continue the process, giving each group an opportunity to add to or revise the class list.

**IWB** You can use the Pen Tool to record students’ responses.
A system inside a larger system is called a **subsystem**.

The locomotive that pulls the train is a complex system itself.
System Analysis

What are some other systems we can analyze?

In your group, analyze one of the systems.

Living Systems, IG pg 95–96, Step 7

Have students work in their groups to analyze another system. Write your own list on the slide (see Step 7 for a set of possibilities). Give groups about 4 to 5 minutes to work.

IWB You can use the Pen Tool to list the systems and assign them to groups.

IWB Use the Pen Tool to write when you want students to finish the activity.

IG pg. 95–96, Step 7
Review vocabulary.

**IWB** You can use the *Pen Tool* to write class definitions beside the words or use this slide as a resource/reminder.

**IWB** Click each word to reveal its definition at the top of the page.

These words should find a permanent place on a word wall in your classroom so that they are always accessible to students.
Investigation 1, Part 1

System Summary

Systems can be simple or complex.

simple systems

a complex system

Complex systems usually have a number of

Living Systems, IG pg 96, Step 9

Summarize systems with students. Tell them that systems can be simple or very complex.

Complex systems usually have lots of complex subsystems. During the rest of the module, students will look at other systems.

IG pg. 96, Step 9
Living Systems, IG pg 97–98, Steps 10–11

Give students a few minutes to look at and discuss the cover of Science Resources. Then have them examine and discuss the table of contents. They should also locate the glossary and index.

Turn to page 3, "Introduction to Systems," in Science Resources. Have students preview and read the article as described in Steps 10–11. If you choose to do the concept definition map with students, you can create a new slide or draw the chart on chart paper.

For reading strategies to support English learners and below-grade-level readers, see the Science-Centered Language Development chapter in Teacher Resources.
Focus Question

How can you identify a system?

Discuss the question with your group and then write a response in your notebook.

Use your notes from the reading to support your ideas.

Living Systems, IG pg 98, Steps 12–13
Ask students to answer the focus question in their notebooks.
Assess progress using the "What to Look For" in Step 13.
How can you identify a system?

Pair up with a partner to
- share your answer to the focus question:
  - how can you identify a system?
- discuss your understanding of systems.
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