

Living Systems

INVESTIGATIONS GUIDE



Full Option Science System
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Investigation 1 - Systems

PART 1: Everyday Systems

NGSS Standards:

5-PS3-1

5-LS2-1

5-ESS2-1

2 sessions

Student Notebooks:

You are expected to keep a **neat and organized** science notebook. Your notebook will be **graded** as we go through the investigations. You will need your notebook to record observations, focus questions, ideas, and vocabulary.



- Make sure your name is on the front of your notebook.
- Number the **first ten pages** (#1 - #10) in the lower corner of the pages.
- On the first page, write **“Table of Contents”**.
- The first three pages will be saved for the Table of Contents.
- We will begin today’s notes on page 4.

Introduction:

This is a **system** that has been designed for efficient transportation of clothes and other personal items while traveling.



- *What do we call this system?*
- Based on this example, (turn & talk),
What is a system?
- *What are the elements or parts that make up this system?*

	<p><i>This symbol means that any time a new, bold vocabulary word is presented, we:</i></p> <ol style="list-style-type: none"><i>1. Listen to the teacher say the word.</i><i>2. We repeat the word aloud.</i><i>3. We write the word and definition into our notebook.</i>
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A **system** is any collection of interacting parts that work together to make a whole or produce or perform a function.

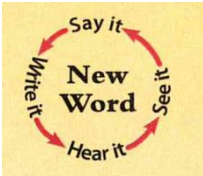
*This symbol means that we write down a FOCUS QUESTION into our notebooks.
The focus question is the learning objective.*



FOCUS

How can you identify a system?

Write this question on the top of page 4 in your notebook.



The word system has an important meaning in science. A system is any collection of **interacting** parts that work together to make a whole or produce or perform a function.

Brainstorm: What are the “interacting parts” that make the suitcase perform its function of transporting people’s goods?





- Handles for rolling or lifting
- Main storage compartment
- Pockets for holding items
- Zipper for closing
- Wheels for rolling
- Luggage tag for identification
- Straps for holding items in place
- Manufacturer's logo

Did you think of any other interacting parts?

Discuss: Now think of a more complex system with interacting parts, how about a **railroad!**

A railroad is a transportation system. Railroad systems transport people and heavy products.

Turn & Talk: List some of the interacting parts of a railroad system.

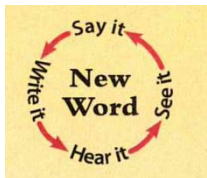


- *Locomotive or engine*
- *Train cars*
- *Tracks*
- *Engineer or conductor*
- *Cargo or load*
- *Control center*



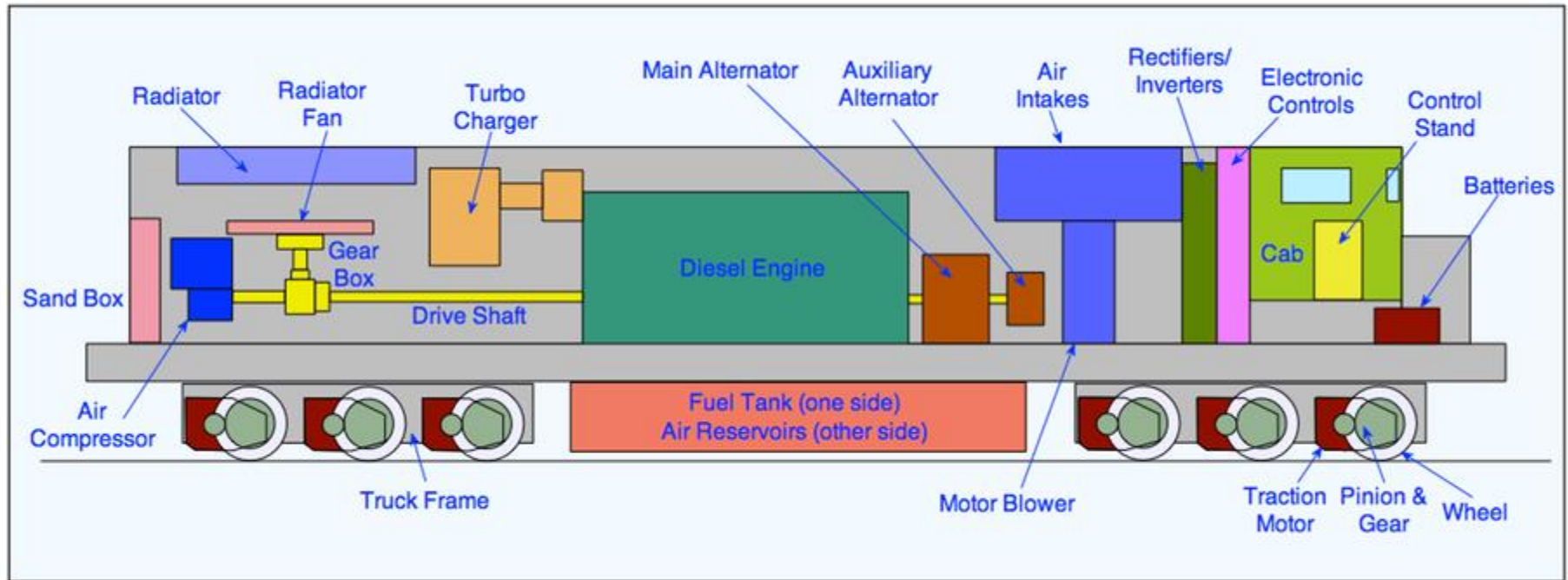
Some of the parts of the system are themselves systems. For instance, a locomotive that pulls the train is itself a complex system, including engines, generators, electric motors, wheels, lights, whistles, and controls (just to name a few!)

When a system is part of a larger system, the system inside the larger system is called a **subsystem**.



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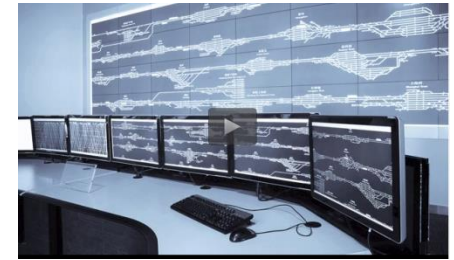
The locomotive is just ONE subsystem of a railroad.



The rails are another subsystem of a railroad.



= metal rails, wood planks, nails, gravel, etc.



Important:

The **sum of all the parts** = a railroad system. If any of the subsystems breaks down, the railroad system cannot accomplish its tasks of transporting people and goods.

Some systems are **COMPLEX** (lots of subsystems)
others are **SIMPLE** (few if any subsystems)

Review What We Have Learned:



- A **system** is any collection of interacting parts that work together to make a whole or produce or perform a function.
- When a system is part of a larger system, the system inside the larger system is called a **subsystem**.
- You can identify a system by looking for **interacting** parts.
- If any of the subsystems breaks down, the overall system cannot accomplish its tasks and function.
- Some systems are **COMPLEX** (lots of subsystems) .
- Some systems are **SIMPLE** (few if any subsystems).

Small Group Task:

Pick one of the systems shown below. Tell us what the system is and share with the class the parts of the system, how the parts interact, and if the system has subsystems.



Share Out:

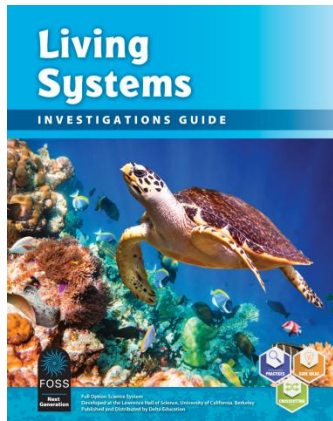
What is the system?

What are some of the parts of the system?

How do the parts interact?

Does the system have subsystems?





How can you identify a system?

Partner-Read “**Introduction to Systems**” - page 3 & 4.

Answer the focus question above in your notebook.

Notebooks will be graded.



A **system** is any collection of interacting parts that work together to make a whole or produce or perform a function.

Interact - when parts of a system work together to perform a function.

When a system is part of a larger system, the system inside the larger system is called a **subsystem**.