WEEKDAY WONDERS

Content developed by the Tennessee Aquarium Education Department

TENNESSEE AQUARIUM

STEM Around Us: Day 5

We are surrounded by science, technology, engineering, and mathematics (STEM) every day. We do not always realize the extent that they play a role in our lives, but no matter your career or hobbies, STEM is involved. The more young scientists understand about STEM, the better their critical thinking, their passion, and their interest. This week, your young scientist will have opportunities to explore the connections between STEM and the world, beginning with bird wings and flight.

These curated activities are listed in a suggested sequence but may be done in the order that works best for you and your young scientists. Learn more about this series in the Introduction to Weekday Wonders.

Question of the Day

How can I build a machine to move objects?

Daily Nature Journal

Have your young scientist go out and complete a daily nature journal entry. Encourage your scientist to look and listen for sights and sounds s/he has not noticed before. If you need additional guidance about what your young scientist should put into a daily entry, see the Guide to Nature Journaling.

Simple Machines

Share with your young scientist that simple machines are tools to help make it easier to do work. They are called simple machines because they have no or few moving parts. There are different kinds of simple machines that your scientist will get a chance to explore in this activity.

Print the cards on page XX for your young scientist and cut them apart. If you do not have access to a printer, write the text of the cards on slips of paper and show your young scientist the pictures.

Have your young scientist read the cards or read them to him or her. Then have your young scientist match the descriptions to the pictures. Ask him or her to explain how each picture shows the characteristics of the machine. Then ask your scientist to think of examples of each kind of simple machine. If your scientist struggles, you can prompt him or her with some of the following.

Lever	**Wheel**	**Pulley**
Hammer	Bicycle wheel	Elevator
Seesaw	Ferris wheel	Raise and lower blinds
Handle to flush toilet	Rolling pin	Flagpole
Inclined Plane	**Wedge**	**Screw**
Slide	Doorstop	Bottle lid
Dump truck	Chisel	Lightbulb
Ladder	Teeth	Swivel chair

How Simple Machines Help Humans

Have your young scientist go on a walk around the area to look for simple machines. If you are able to go to a playground, take your scientist there, as they have many simple machines. For example, seesaws are levers, slides are inclined planes, and a flag on a flagpole is a pulley.

For each simple machine your scientist finds, have him or her share how it is making some sort of work easier. For example, a seesaw makes it much easier to lift the weight of another person.

Rube Goldberg Machines

Your scientist has been examining simple machines. Now, s/he is going to have a chance to make a complex machine. Share with your young scientist that they will design a Rube Goldberg machine. These machines are designed to do a simple task, but in an overly complicated and indirect way. This video will show your young scientists examples.

Once your scientist has an understanding of what a Rube Goldberg machine is, have him or her watch this video, by the band OK, Go. Ask your scientist to identify as many simple machines as s/he can while watching the videos and write the machine and how it was used in the video in his or her journal.

Tell your scientist that he or she should pick a task from the following list.

- Ring a bell.
- Move a small ball into a container.
- Move three small balls into the container (without resetting the machine.)
- Open or close a door.
- Water a plant.
- Put toothpaste on a toothbrush.

Tell your scientist that Rube Goldberg was a person who drew comics. He did not build his machines, but rather drew them in comics. Have your scientist consider what you have around the house that s/he might use to design a machine to do the task. He or she should then draw the design.

Build a Rube Goldberg Machine

Once your scientist has had a chance to design a Rube Goldberg machine, it is time to try building it. Have your scientist use the plans from the previous activity to put together a machine made up of simple machines that will accomplish the task s/he chose. Tell him or her that it may take time to make sure that each part is working the way s/he expected. S/he may need to experiment with longer or shorter levers, different slopes for an inclined plane, or heavier or lighter weights for a pulley.

Once your scientist has built the machine, have him or her test it out. If it does not work properly, he or she should revise the plan and try to make some changes. This activity can last as long as it holds your scientist's interest.

Simple Machines Card Set

Lever A lever is a bar that moves on a turning point. The bar could be straight or curved. Levers help to do the work of moving objects. They help to push, pull, or lift more easily.	**Inclined Plane** A plane is a flat surface. An inclined plane means that one end of the surface is raised higher than the other. This type of machine is sometimes called a ramp. It helps to move objects up and down more easily.
Wheel A wheel is a machine that makes it easier to move objects over distances. A wheel is round and is fastened to an axle so that the wheel can roll.	**Wedge** Wedges are a type of inclined plane. It is thicker at one end than another. A wedge makes it easier to cut or split two objects, tighten or hold back an object, or scrape an object.
Pulley Pulleys are simple machines that have a rope that moves over a wheel or a stable point. They make it easier to lift heavy objects to move them up and down.	**Screw** A screw is a special kind of inclined plane that wraps around a pole. They make it easier to raise and lower objects or to hold objects together.

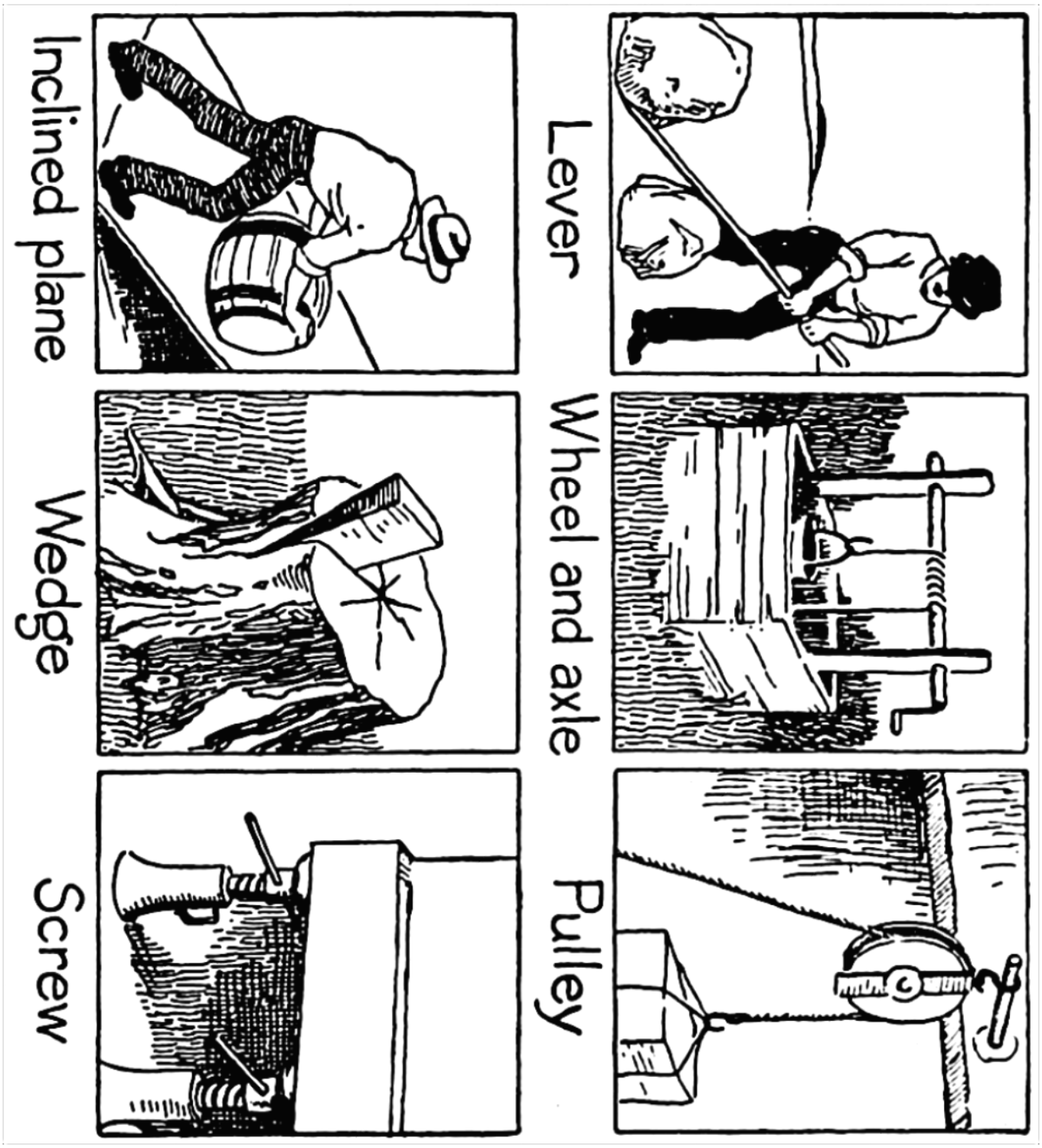

Photo Credit: Foster, Ellsworth D., ed; Hughes, James L. (James Laughlin) / Public domain