



POO = ENERGY

- ◆ Grade Level: 4th-5th
- ◆ Time: 25 min

Students will watch *The Story of Poo* and take a closer look at what should go down the toilet and what shouldn't. They will have the opportunity to dive deeper into some of the impacts our sewer system has on our local environment.

OBJECTIVES

Through this video and activity students will:

1. Develop a basic understanding of San Francisco's sewer system
2. Connect to the impact we have on our city's infrastructure

MATERIALS

- ◆ Technology to show the 5-minute *The Story of Poo* video to class
- ◆ One *Poo=Energy Worksheet* per student

BACKGROUND FOR EDUCATORS

The Story of Poo answers the question of what happens after we flush the toilet in San Francisco. We meet a young inquisitive San Francisco student who leads us through the ins and outs of our city's sewer system and treatment facilities. Together we learn where our poo goes, how it is treated and where energy is captured along the way.

This concise and engaging video supports students' learning about how engineering helps keep our local environment healthy.

EDUCATOR PREP

1. Have access to a computer and a way to show the video to your class.
<https://www.calacademy.org/educators/the-story-of-poo>
2. Print one worksheet per student.

INTRODUCTION

- ◆ Introduce the video to the class. Then, ask the following questions and allow for share outs or partner talk:
 - ◆ *Does anyone know what happens after you flush the toilet?*
 - ◆ *Where does it go?*
- ◆ Watch the video all the way through.





CHECK FOR UNDERSTANDING:

- ◆ Hand out the *Poo=Energy Worksheet*, one per student.
- ◆ Rewatch the video and have the class closely consider the stages of wastewater processing highlighted on the worksheet and their impact on the environment. The clean water from the treatment plant flows to the Pacific Ocean.

(Tip: stop video to allow for immediate discussion and note taking after each stage)

- ◆ Encourage students to collaborate throughout the discussion and to make notes onto the worksheet in the spaces provided.
 1. Only the 3Ps in the sewer system
 - a. What are the 3Ps? (*poop, pee and paper*)
 - b. Why is it important to remove trash from the sewer system? (*clean water gets sent to the San Francisco Bay where plants and animals live; clean water keeps the Bay healthy*)
 2. Gas is captured in the digester and used for power
 - a. How does the digester make energy? (*the bacteria release gas that is captured and recycled to make energy that is used to power the treatment facility*)
 3. Poo is made into biosolids
 - a. How is poo turned into biosolids? (*after leaving the digester the poo is dried out*)
 - b. Why are biosolids important? (*biosolids are rich and have lots of nutrients*)
 4. Biosolids are used by local farms
 - a. Why do farms use biosolids? (*biosolids are a good source of nutrients for soil*)

WRAP-UP

Bring students back together. Have students discuss:

Where along the poo's journey do we see energy? (*in the digester and in biosolids*)

How does our sewer system help minimize the impact on our local environment? (*keeping our city clean; sanitation; capturing methane; using biosolids at local farms*)

EXTENSIONS

- ◆ Renewable Energy Powered by Poop
<https://www.calacademy.org/educators/renewable-energy-powered-by-poop>
- ◆ Build a digester with this lesson from Teach Engineering!
https://www.teachengineering.org/activities/view/usf_biorecycling_lesson01_activity1





NEXT GENERATION SCIENCE STANDARDS

Disciplinary Core Ideas

4-ESS3-2: Earth and Human Activity

- ◆ Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment

Cross-Cutting Concepts

Cause and Effect

- ◆ Cause and effect relationships are routinely identified and used to explain change.

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Big Idea 3 (3-5)

- ◆ Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways.

