

# Global Precipitation Measurement Mission

## The Global Precipitation Measurement Mission

### Teacher Guide

#### Lesson Overview:

This activity was developed to teach students about the Global Precipitation Measurement Mission. In this one-hour long activity, students will watch a short video summarizing the purpose of the mission, learn about the parts of the satellite and their functions, and build an edible model of the satellite.

#### Learning Objectives:

- Describe the purpose of the GPM Mission
- Name at least four parts of the GPM satellite and describe their functions

#### National Standards:

##### *Core Idea ETS2.A Interdependence of Science, Engineering, and Technology*

- Engineering advances have led to important discoveries in virtually every field of science. These discoveries have in turn increased the need for more sophisticated technologies to solve even more complex science problems. Scientific development has led to the development of entire industries and engineered systems.

##### *Core Idea PS4.C Information Technologies and Instrumentation*

- Understanding waves and their interactions with matter has been used to design technologies and instruments that greatly extend the range of phenomena that can be investigated by science (e.g., telescopes, microscopes) and have many useful applications in the world.

#### Background Information:

In 2014, NASA will launch the Global Precipitation Measurement (GPM) satellite to collect precipitation data. Water is fundamental to life on Earth. Knowing where and how much rain or snow falls globally is vital to understanding how weather and climate impact both our environment and Earth's water and energy cycles, including effects on agriculture, fresh water availability, and responses to natural disasters. Since rainfall and snowfall vary greatly from place to place, satellites can provide more uniform observations of rain and snow around the globe than ground instruments, especially in areas where surface measurements are difficult.

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## Materials:

Copies of [“GPM” student capture sheets](#) including GPM reading  
Food for edible model (suggestions are: pretzel sticks, graham crackers, marshmallows, frosting, skittles)  
Knives for spreading frosting  
Napkins, paper towels or paper plates to build model on

## Engage:

Show students the short video “Our Wet Wide World” (4:06) which is linked in the [“GPM” PowerPoint](#). (Slide 2) Ask them to answer the questions on their capture sheets. Tell them they will learn more about the GPM satellite today.

## Explore/Explain

Ask the students to read the background information (found at the end of the student capture sheet) about GPM. Or, read it as a class or in groups. (Slide 3) Then, complete the following tasks:

Part 1: Parts of the Satellite and their Functions: (Slide 4)

Ask students to find a partner. They will work with their partner to label the parts of the satellite. They can check their answers with the teacher’s key (Slide 5), then complete the matching section to match the part of the satellite with its function. (Slide 6) The reading should provide some information to help them. Share answers as a class, and make sure students have the correct answers. (Slide 7) The answer key is found in the [PowerPoint](#).

Part 2: Build an Edible Model: (Slide 8)

Show students the options of food ingredients you have. Ask them to use their labeled diagram to create a model of the satellite using the food items. Be sure to check for any food allergies before deciding which materials to use. Put the models on display on the desks and let the students do a gallery walk to see what others have created. Once they have shared their work let them eat it! (A suggested edible model is shown in the teacher notes section.)

## Evaluate:

Ask the students to write a short letter to a younger student to share what they’ve learned about GPM. (Slide 9)

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## Elaborate/Extend:

- Show students the GPM Launch Animation Video (2:03) (Slide 10) that shows how scientists plan to get the satellite into orbit.  
<http://pmm.nasa.gov/education/videos/gpm-launch-animation>
- Learn more about the science behind GPM at <http://pmm.nasa.gov/GPM>.
- Create an anime or superhero character for GPM. GPM had a challenge recently and selected two main Anime characters to use in their upcoming Anime comic books. Students can make their own GPM characters or write a story that involve the two GPM Anime characters. <http://pmm.nasa.gov/education/anime>
- Ask students to choose another satellite to research. A list of current missions can be found at <http://www.nasa.gov/content/earth-missions-list/>

## Teacher Notes:

Here is one way to make an edible model using graham crackers, frosting, pretzel sticks, and marshmallows:



## Additional Resources:

- Helpful information, background, and resources about the GPM mission and Precipitation Education <http://pmm.nasa.gov/education/>  
<http://pmm.nasa.gov/GPM>
- GPM's predecessor is TRMM – Tropical Rainfall Measuring Mission  
<http://pmm.nasa.gov/TRMM>
- Information about using edible models in science classes  
<http://www.teachervision.fen.com/science/activity/5634.html>
- Information about microwaves and how they are used to measure precipitation  
<http://science.hq.nasa.gov/kids/imagers/ems/micro.html>  
and [http://missionscience.nasa.gov/ems/06\\_microwaves.html](http://missionscience.nasa.gov/ems/06_microwaves.html)