Our Ideas About Remote Sensing

Which mission should we send to Mars? What instruments does a spacecraft need for it?

What is Mars made of?

What mountains and other features does Mars have?

How big is Mars?

Is there water on Mars?

Where could we land a rover on Mars?

Resolution—the amount of detail in an image

Physical Properties—the shape and texture of a surface

Composition—what a surface is made of

Criteria—things a successful design needs to do

Constraints—limits on a design

Scientist—Scientists ask questions, test things out, make observations and measurements, and gather evidence to answer the questions.

Engineer—Engineers design things to solve problems.

Technology—Any object, system, or process designed by people to solve a problem

How can we gather information about Mars from far away?

How can we **use a system to** redirect light to gather data from a distance?

Technologies that redirect light to gather data: mirrors, telescopes, cameras

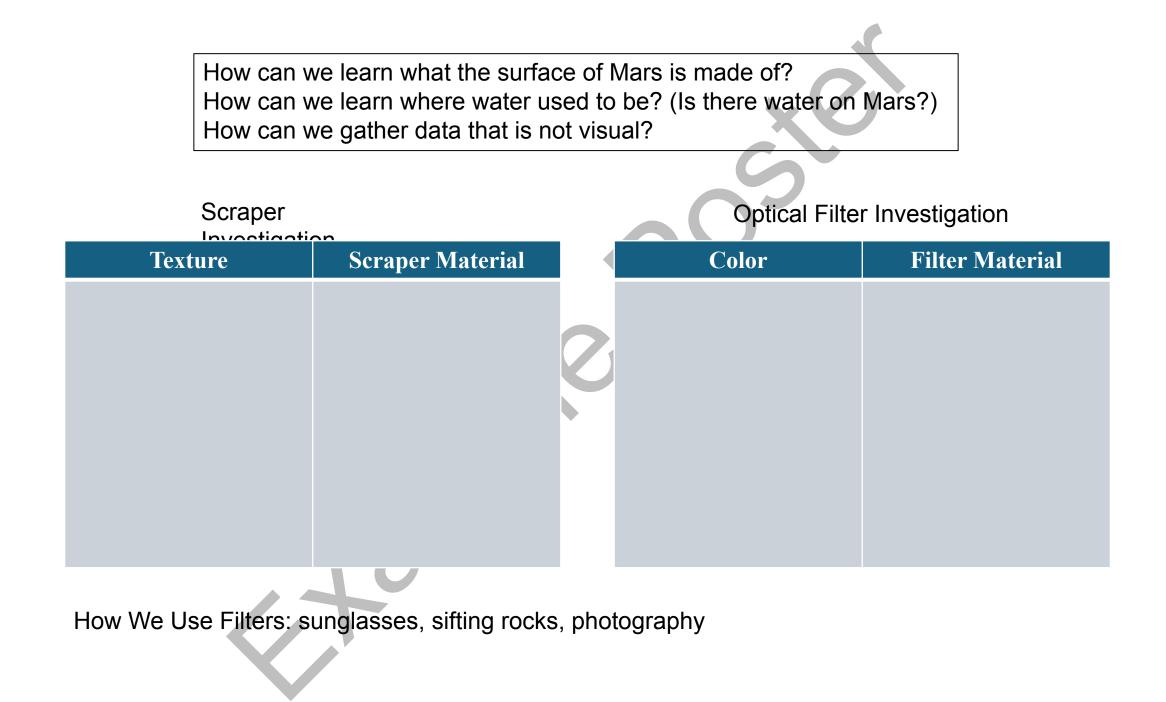Needs to work around **obstacles**—things that might be in the way

Needs to be a **system**—a group of parts that work together

Needs to be **portable**—easy to move around

Uses for mirrors

- Rearview mirrors in cars
- Mirrors on road curves
- Tools at the dentist

Remote Sensing—gathering information from far away

How can we learn what the surface of Mars is made of?
How can we learn where water used to be? (Is there water on Mars?)
How can we gather data that is not visual?

Scraper
Investigation

Optical Filter Investigation

Texture	Scraper Material		Color	Filter Material

How We Use Filters: sunglasses, sifting rocks, photography

How can we figure out where to land a rover?
How can we learn about the physical properties of the surface?
(What does Mars look like?)

LiDAR—Light Detection and Ranging
Bird's-Eye View—How a bird would see a landscape when flying over it
Topography—the shape of land in an area
Topographic Map—a representation of the shape of land in an area

Uses of Topography
- Finding a place to play soccer
- Deciding where to camp
- Using a range finder when fishing

How can we create remote sensing devices to gather different types of data from a distance?

How can we improve our remote sensing devices?

Adjust positioning of technologies
Make the device smaller

How can we share information about our remote sensing device design with others?