

## Mysterious Mixture Fact Sheet

The **mysterious mixture** appears to be made up of one gray substance. When we use a magnet we can separate the mixture into two materials. One is a black iron powder that is attracted to the magnet and the other is a white powdery substance, sand, which you may have seen at the beach!

### COOL FACTS

- When you shake up the *Mysterious Mixture*, it appears gray. Why is that? The individual particles inside the window are too small for your eyes to see individually. So, your eyes “blend” the black and white particles together making you see gray.
- A single grain of sand or iron is very small, too small for you to see with your eyes and is referred to as “microscale.” Objects this small can be seen more easily with a microscope.
- Even though you cannot see objects on the microscale, small objects make a difference. An example is bacteria in our bodies that we cannot see. An important part of your health is to maintain healthy bacteria inside of you. There are a large number of bacteria that are critical to the proper digestion of food which live in your intestines.

Replace the box above with a picture. Write a two or three line caption for picture.

### FAQ's

**Q:** What are some things I can see with microscope?

**A:** There are many things that you can see with a microscope which are too small to be seen with your eyes alone. If you have access to a microscope, you can see bacteria which live in yogurt.

**Q:** What is the “mysterious mixture” made of?

**A:** The white powder is silica (very fine sand) and the black powder is iron filings.

**Q:** How is the “mysterious mixture” separated?

**A:** Iron (the black powder) has a special property called *ferromagnetism* that makes it attracted to the magnet in your hand. Silica (the white powder) is not attracted a magnet (like most things!) so the two can be separated.

**Q:** What are the grain sizes of the powders?

**A:** Both the iron and the silica powders are about 60 micrometers ( $\mu\text{m}$ ) - the same as the average diameter of a human hair. (60  $\mu\text{m}$ )

**Q:** Why is the background green?

**A:** No reason. The background is colored only to make it easier to see both of the powders.

**RELEVANCE TO OUR LIVES:** On a smaller scale things can behave differently and are very important. Bacteria in our bodies help us to digest our food even though we cannot see them. Also, these small things collectively can exhibit larger properties too. A single grain of sand cannot be seen with our eyes but at the beach, we easily see the sand.

### RESOURCES:

Size Scales Relevant to Cells:

<http://www.uic.edu/classes/phys/phys461/phys450/MARKO/N003.html>

Nanotechnology Introduction: <http://nanotech-now.com/introduction.htm>

Physiology of Vision and Perception:

<http://www.brad.ac.uk/acad/lifesci/optometry/resources/modules/stage1/pvp1>