



SAND & SOIL

1000 Hours Outside Official Curriculum for home educators, nature schools, and anyone who wants to learn fascinating things!



ADD THE
WONDER

NATURE
CURRICULUM

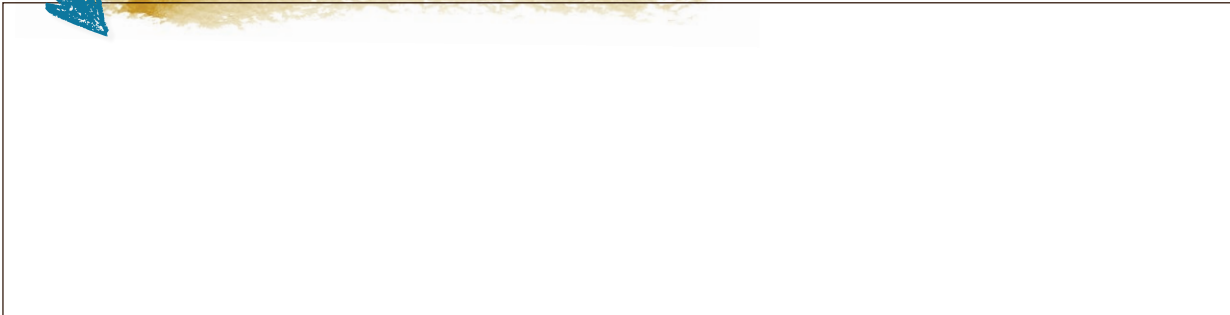
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Quicksand! The feared pit of sinking sand that the adventure movies and books portray as the number one danger in the jungle! Should we fear it? Probably not. Death due to quicksand is extremely rare. Today we will learn about what quicksand is, where it is, and how to escape it.

WHAT IS QUICKSAND?

Quicksand is simply agitated sand that looks solid but is so saturated with trapped water that it can no longer support any weight. It becomes liquefied soil! Two ways that sand can become agitated enough to form quicksand is through earthquakes pushing up groundwater and upward water flow from natural springs along riverbanks, on beaches at low tide, and in alluvial fan bases—where the mountain stream reaches the base.

Find the definition of an alluvial fan.
Note the shape and sketch it.



There is a similar feature called a river delta. What is the main difference between an alluvial fan and a river delta?



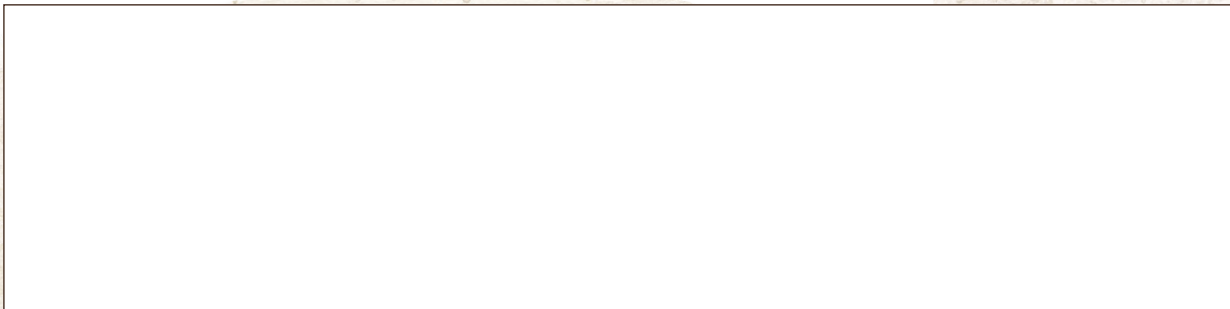
WHERE CAN YOU FIND QUICKSAND?

Quicksand can be found anywhere that there is sand and rising water. This reduces the friction of sand particles, making the sand behave like a liquid. The perfect places to find quicksand are along riverbanks, marshes, and near the coast.

HOW DO YOU ESCAPE QUICKSAND?

If you step into quicksand, don't panic! Because humans have a lower density than quicksand, you can only sink to your waist. The trick is to move your body slowly. If you move your feet slowly and lean back, more water will move into the area which will eventually allow your feet to float to the surface. Pulling you out will only cause pain since the force of quicksand is so great! The danger with quicksand happens when you are in an area with low tide and the tide starts rising. This could result in drowning.

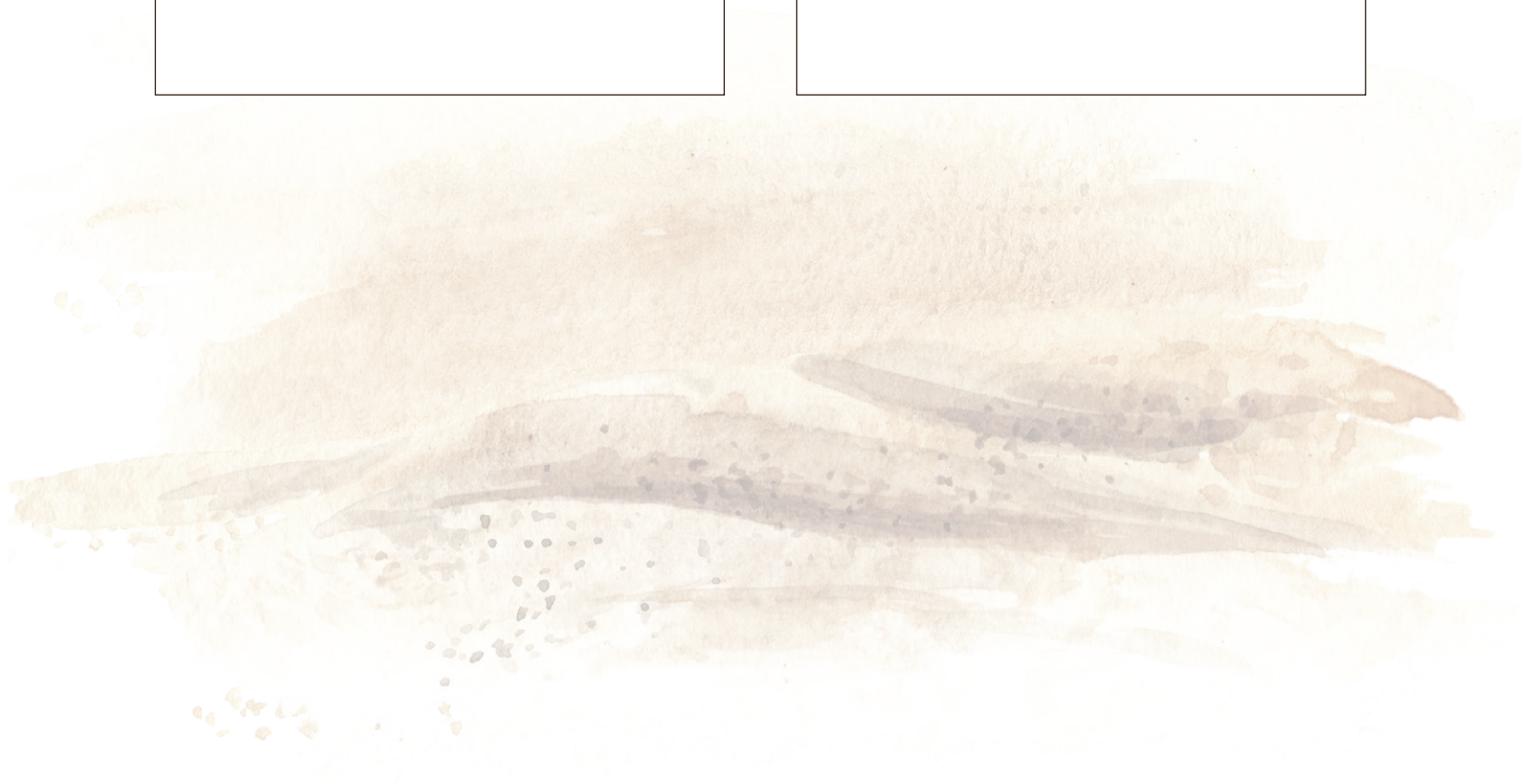
Before we make our own quicksand, let's learn about viscosity. Look up the definition and write it here:



Sir Isaac Newton explains that viscosity changes when heat is applied. Honey has a high viscosity at room temperature, but a low viscosity when heated. What about other kitchen items? Test out how heat will affect kitchen items such as syrup, ketchup, molasses, oil, water, milk, etc.:

MORE VISCOUS

LESS VISCOUS



HOMEMADE QUICKSAND

Let's make some "quicksand" using cornstarch and water!

QUICKSAND RECIPE

Mix together 1 cup of water with 1.5-2 cups of cornstarch. Food coloring is optional.

You can make as much as you want—some people have even filled a kiddie pool so they can experience walking on it!

As you add more cornstarch, the "quicksand" becomes more viscous.

Quicksand and the homemade quicksand are different from the kitchen items we tested out. Quicksand is a non-Newtonian fluid, which means that heat doesn't change their viscosity! What changes the viscosity of a non-Newtonian fluid is a force applied.

Play around with your quicksand. What happens when you slap your hand against it creating a force? What happens if you put little plastic animals or other small objects in it? Create a force by trying to pull your sinking animals out. What happens?

RECORD YOUR OBSERVATIONS HERE



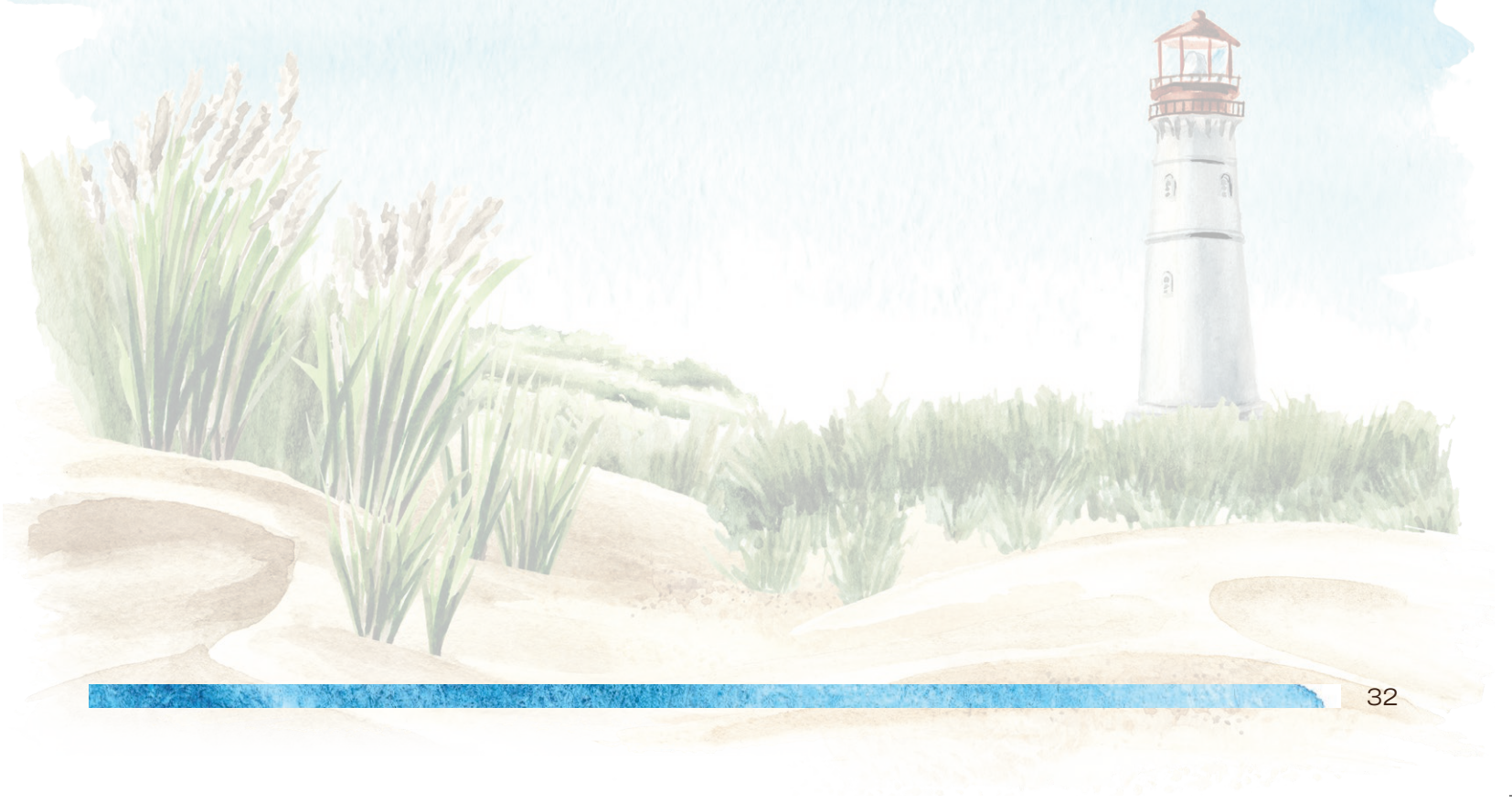
SIR ISAAC NEWTON

We just talked about Sir Isaac Newton and how he explained viscosity. Look up some pictures of Sir Isaac Newton. He lived from 1643 to 1727. Newton was a brilliant mind. He was a mathematician and physicist and developed the laws of motion as well as other principles of physics.

NEWTON FUN FACTS:

- his mother wanted him to be a farmer
- he discovered gravity
- his father died shortly before he was born
- he was born quite premature and was sickly
- he was in college during the bubonic plague
- he believed white light was composed of 7 colors
- he became a math professor at Cambridge University at the age of 27
- he never got married

Newton did much of his work when he was in isolation to avoid the bubonic plague. When the plague entered the city of London in England, Newton retreated to his family residence away from the city. It was during this quiet retreat that Newton developed calculus, his study of white light, and his laws of motion.



NEWTON'S LAWS OF MOTION

Look up Newton's 3 laws of motion and write them in your own words or draw them. Have you ever heard of these laws of motion?

