Why Does A Poori Puff Up?
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Level 3

Aditi and Aarav love pooris.
Halwa- poori, kheer-poori and shreekhand– poori.
Yummy! Chhole-poori or aaloo-poori.
finger-licking good!

Pooris are tasty, whatever you may eat them with! The smell of pooris frying! Oh, so wonderful. The sight of pooris swimming in hot oil! One look at golden, crispy, hot, puffed pooris and Aditi and Aarav rush to get the roundest and the most puffed ones.

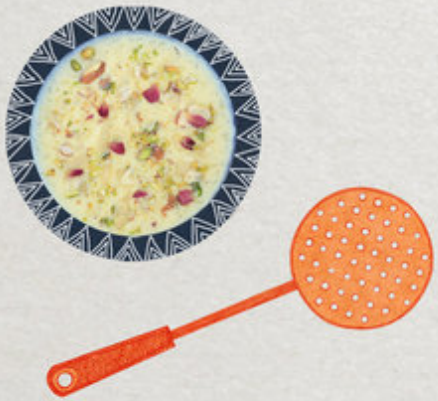
But how does the poori puff?

Is there air inside? Who fills the poori with air?

Aditi and Aarav blow air into balloons,to make them puff up. Pa uses a pump to fill air in the tyre of his bicycle.

But Ma doesn’t seem to use any of these methods to puff the poori. She just fries them and they puff. Amazing!

Aditi and Aarav decide to observe, ask questions and find answers the next time pooris are made at home.



Pa has put some whole-wheat flour in a big dish. He adds a little oil and some salt and starts mixing water into the flour.

How come the flour is absorbing the water readily?
Well, the reason is, something in the wheat flour is very thirsty! When you are thirsty what do you do? You drink water.

Gliadin and Glutenin are the two types of proteins in the wheat. Proteins and all other chemical substances are made up of tiny units called molecules. The molecules in these proteins are very thirsty.

As soon as water is put in the flour, these molecules drink it. Then they become big and fat. They expand. Naturally, they don’t have enough space to sit comfortably. So they touch and push each other. They actually stick to each other.

Sometimes, you hold each other’s hand and make a chain while playing. The whole chain then moves about. Similarly, these molecules stick together and form a network.

Pa has made dough out of the flour. He asks Ma to knead the dough some more. She smears some oil on her palm and starts kneading. You need strong hands to knead the dough. She says if the dough is not
kneaded the pooris won’t puff.

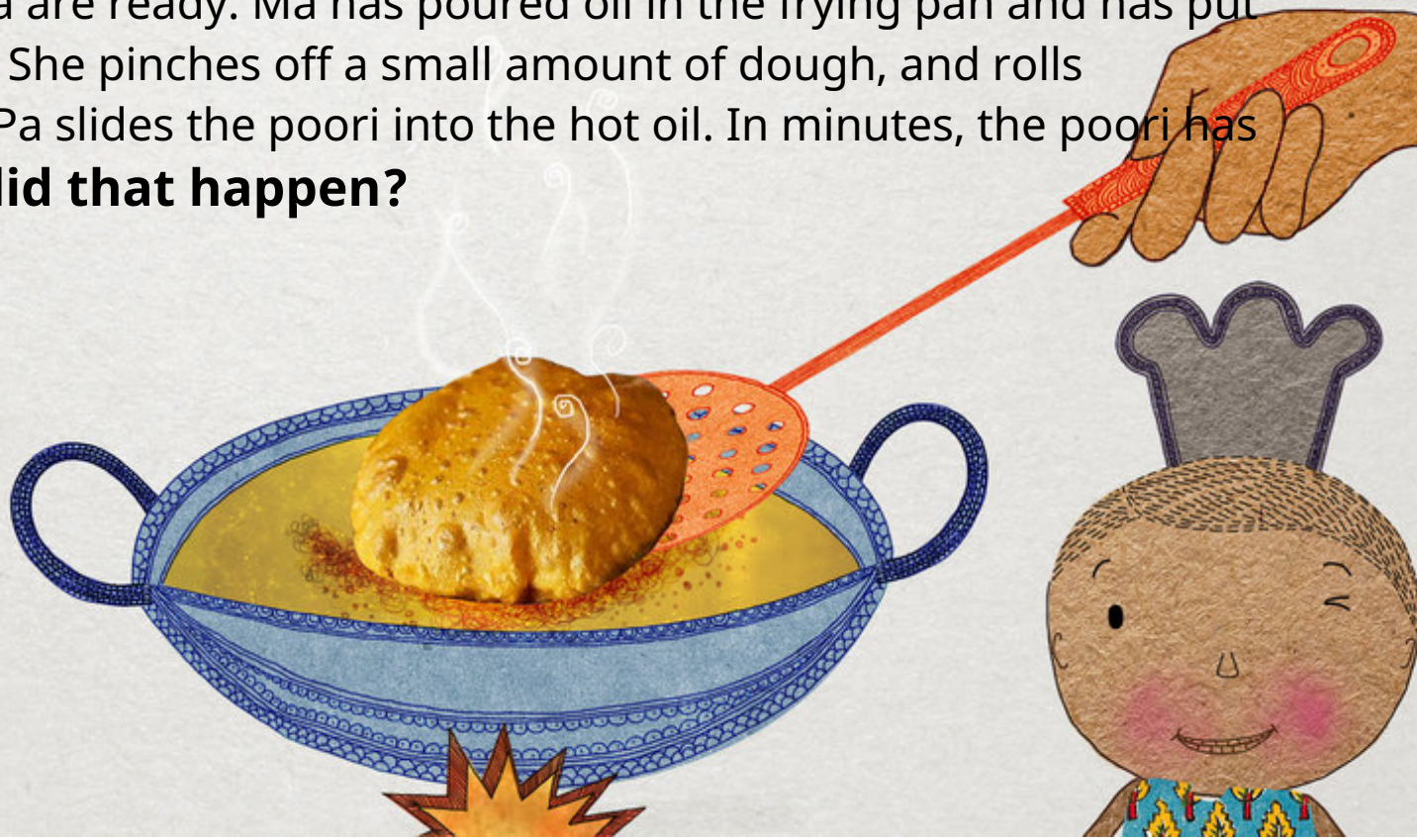
How are these two related?

Here is the secret.

When you knead the dough, the molecules that are stuck to each other, now start stretching. When this stretching is complete, a new protein is formed. It is called Gluten. Gluten is elastic like a rubber band and we can give any shape to that dough.

Ma has left the dough aside for some time. She is now preparing the kheer. Aditi and Aarav decide to come back when she starts rolling the pooris.

Now Ma and Pa are ready. Ma has poured oil in the frying pan and has put it on the stove. She pinches off a small amount of dough, and rolls it into a poori. Pa slides the poori into the hot oil. In minutes, the poori has puffed. **How did that happen?**



Here is what happens to the poori. The rolling is possible due to the Gluten in the dough. When the small piece of dough is rolled, a Gluten sheet is formed in the poori.

When the poori is put in the hot oil, its lower surface becomes very hot due to the oil.

Do you remember that water was used for making the dough? So, due to the high temperature, the water in the poori turns into steam. This steam is very powerful and it lifts up the sheet of Gluten. And that is why the poori puffs.

Pa now turns the poori so that the other surface also turns golden. He has taken the poori out of the pan and kept it in a dish.

Now with the help of a fork let us make a hole in a poori.
See the steam oozing out? So the puffed poori doesn’t contain air. It has steam in it, right?

Why are the pooris used for bhel-poori, aloo–dahi-poori not puffed?

There could be three reasons:
if the poori is rolled very thin the steam formed is not sufficient for the pressure to build up so that the poori can puff.

Sometimes after the pooris are rolled, thin holes are made in them with a fork so that while frying, whatever steam is created, it comes out of the holes and does not let the poori puff. Such flat pooris can be used for longer.

Also if pooris are fried at low temperatures, steam forms very slowly, pressure does not build up and the poori does not puff.

Now you know why some pooris puff up, and why some pooris don't!

Experiment to get gluten from wheat flour

Make dough using wheat flour and water. Use only adequate amount of water so that the dough would not be too hard or too soft.

Use the lower portion of the palm and knead the dough for few minutes. If necessary, little oil can be used so that the dough does not stick to your palm. Leave the dough covered for about ten minutes.

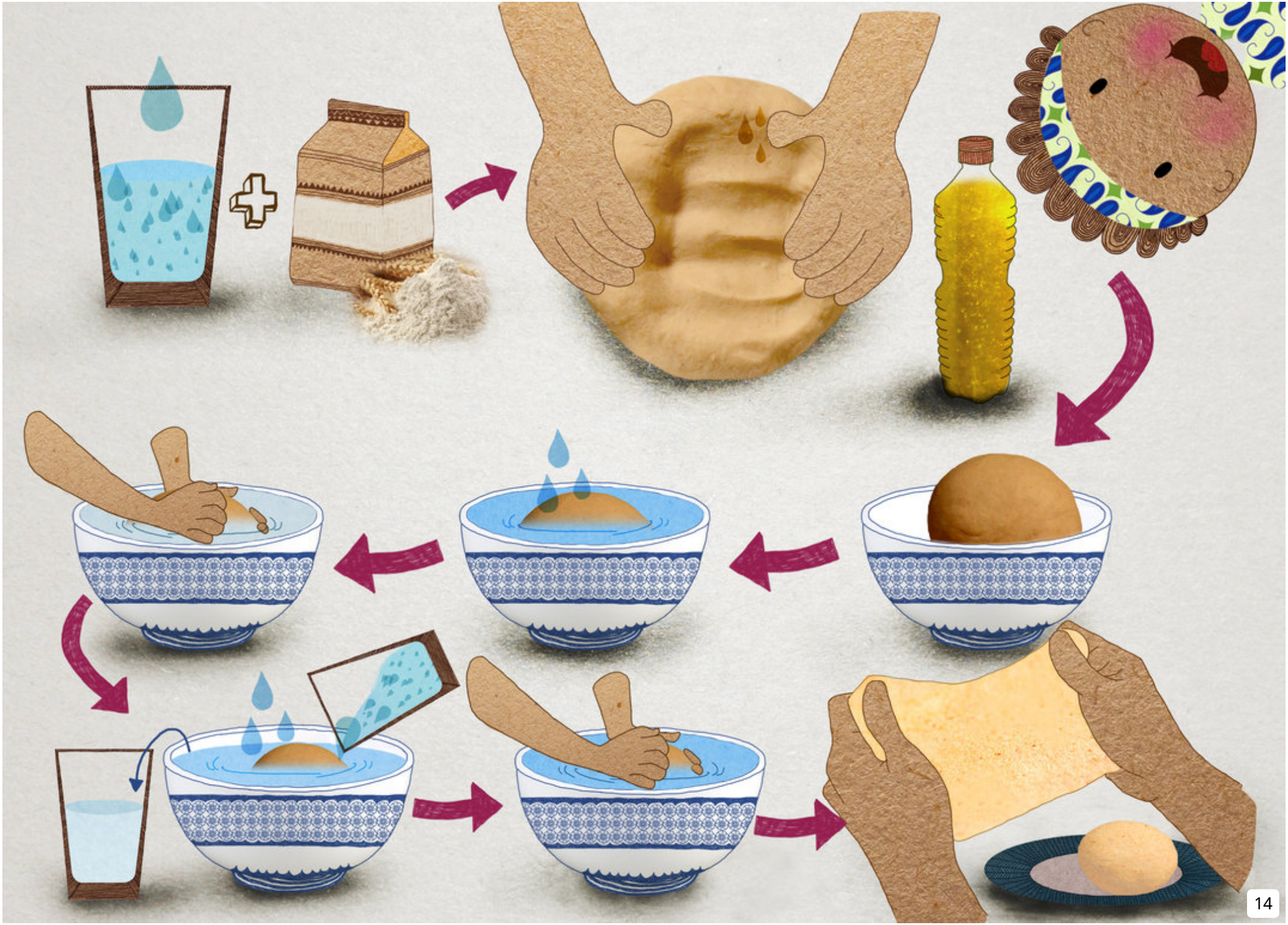
Now take a big bowl and put the dough in it after kneading it for few minutes again.

Pour water on the dough in the bowl so that it is completely immersed in water. Continue kneading the dough in water till the water becomes white. Throw the water out and put fresh water in the bowl.

Repeat the procedure till you observe that a small portion of the dough now remains which when kneaded water does not turn white.

This means all the starch from the dough is removed and only gluten has remained. This is because starch dissolves in water but gluten does not.

Take out the small portion of the dough which is gluten. You can stretch it like a rubber band. If you stretch it and leave it comes back to original state. This demonstrates the elasticity in it. You can spread it horizontally. This demonstrates the plasticity in it.



Poori facts from history

According to scientists, wild wheat originated first in middle east countries about 11,000 years ago.

According to the world's first encyclopedia 'Abhilashitarth chintamani' or Manasollas written in 12th century by King Someshwar, something similar to poori was made at that time but was called as pahalika. So poori is at least 800 years old.

Excavation done near Damaskas in Syria revealed wheat dated back 9000 years. Tools necessary for planting and harvesting wheat plants and also for grinding wheat were found at the same sight.

CAN YOU FIND OUT?

Can pooris be made from jowar, bajra or rice flour? Why?

Apart from pooris, what are the other things we make using wheat flour?

What happens if you put too much water in the flour?

What happens when you use other methods of cooking flour such as in a tandoor or on a tawa?

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The development of this book has been supported by Oracle Giving Initiative.

Why Does A Poori Puff Up?

(English)

Round, fat pooris are a treat in most Indian homes. Why do they puff? There is a whole lot of science behind this simple question.

This is a Level 3 book for children who are ready to read on their own.

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