

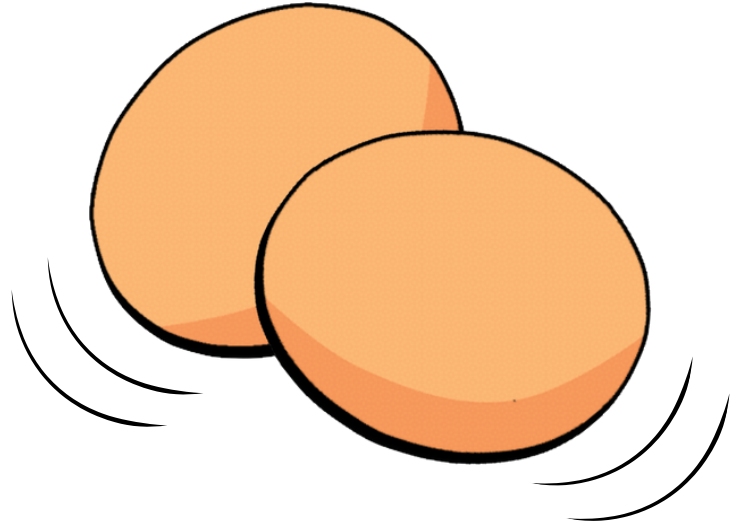
STEAM in the Classroom

SCIENCE-TECHNOLOGY-ENGINEERING-AGRICULTURE-ART-MATH

BREATHING INSIDE THE EGG

For this activity you will need:

- Large bowl or pot
- Water
- Blue food color
- Liquid dishwasher detergent
- Teaspoon
- Three eggs
- Tongs or large spoon
- Cup
- Plate or paper towel



Introduction:

How does an unborn chick breathe inside its shell? In order to live, the chick must get air somehow! Directly inside the shell there are two membranes to protect the embryo. Between the two membranes is a small air cell that's filled with oxygen. This is what the developing chick uses to breathe! But how does the egg release the carbon dioxide the chick breathes out? If you take a close look at a chicken egg, you will see tiny holes all over the shell called pores. This is how fresh oxygen replenishes the air cell and carbon dioxide can escape! In this activity, we'll look at how those pores work in order for the developing chick to breathe! Check out the parts of the egg diagram on the last page to see what each component of the egg is called!

activity adapted from:

<https://www.sciencebuddies.org/stem-activities/how-does-a-chick-breathe-inside-its-shell>



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Directions:

- Pour one and one half cups of water into a large pot or bowl.
- Add one quarter teaspoon of liquid dish detergent and one quarter teaspoon of blue food color. Mix well.
- Carefully put the three eggs in the pot with the water, dish detergent and blue food color.
- Make sure that the eggs are submerged in the liquid. If part of the egg is above the surface of the water, mix together liquid dish detergent and blue food color with more water in the same proportions as you did before. Add this to the pot/bowl until the eggs are submerged.
- Set a timer for one hour or make a note of the time.
- After the eggs have soaked in the liquid for at least one hour, carefully lift one of them out of the liquid using the tongs or large spoon. How does the egg look?
- Crack the raw egg into a cup, being careful not to damage or crush the shell much.
- Set the empty eggshell on a plate or paper towel.
- Carefully inspect the inside of the shell. What do you see?
- Crack open the other two eggs in the same way. Look all around the inside of their shells, too. What do you see? Do all of the insides of the shells look the same? Are there noticeable differences?

Results:

When chicken eggs are laid, they are warmer than the air outside, so as they cool the membranes slightly shrink. When this happens the two membranes pull apart, leaving behind the small air cell that fills with oxygen. As the chick grows, the chick uses up this oxygen and replaces the cell with carbon dioxide. The tiny pores throughout the shell is what allows the carbon dioxide to release and the oxygen to refill the air cell. This is why the dye appears as small dots inside the shell, often in clusters.



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Parts of the Egg

