

# Exploring Air and Heat with Pumpkins

*A lesson from the New Jersey Agricultural Society*

*Learning Through Gardening Program*

Overview: Don't miss the opportunity for your older elementary students to enjoy a Jack O'Lantern in the classroom. Combine the making of the Jack O'Lantern with an exploration of how heat and air move.

Grades: 3-5

Objective: The student will be able to:

- Explain that fire needs oxygen to stay lit and that hot air rises.

Materials:

one pumpkin

knife

short candle

candle holder or modeling clay

bowl for seeds

large spoon

matches



Preparation:

Cut the pumpkin lid and ask the students to scoop out the seeds. The lid must fit on very tightly. If it doesn't, use clay to fill up the gaps. Secure the candle in the bottom of the pumpkin using a candle holder or piece of clay. *Do not carve a Jack O'Lantern face yet!*

Procedure:

For each question and answer below, follow this procedure:

1. Ask the question.
2. Have students think of their own answers.
3. Ask students to discuss their answers with a partner or in small groups.
4. Call on several students to share ideas. Do not tell them if they are correct.
5. Do the activity to find out the answer.

## Questions and Answers

Q1. *If I light the candle and put the lid back on, what do you think will happen?*

A1. The candle goes out.

Q2. *Why did the candle go out?*

A2. Fire needs oxygen to burn. When you put the lid on, the fire cannot get oxygen.

Q3. *Would the candle stay lit if I carve eyes in my pumpkin and replace the lid?*

A3. No. The candle burns briefly and then goes out.

Q4. *Why did the candle go out?*

A4. Since the lid is on, the used air cannot flow up and out of the pumpkin. Therefore, fresh air cannot flow in to feed the flame.

Q5. *If I remove the lid, will the candle stay lit?*

Q5. No. If the candle is short, it will still go out. The warm air rises and pulls in fresh air, but the flame is still in a pocket of stale air.

Q6. *If I carve a nose and mouth and don't put the lid back on, will the candle stay lit?*

A6. Yes.

Q7. *Why does the candle stay lit now?*

A7. Warm air rises. As the stale air rises, it pulls fresh air in through the eyes, nose, and mouth. The candle continues to burn as long as it is getting air.

Q8. *Will the candle continue to burn if I put the lid back on?*

A8. Yes. Even with the lid on, warm air will rise through the eye holes and pull in fresh air through the mouth. Students can observe this air flow if the candle is smoking a little.

## Evaluation:

Students write about their pumpkin observations and the flow of warm air in their science journals.