Heat Transfer

Three Types

By Paul Nance and Angela Challis

6th Grade
Science/Dance

Science Core
Strand 6.2 Energy affects Matter
Standard 6.2.3 Plan and carry out an investigation to determine the relationship between temperature, the amount of heat transferred, and the change of average particle motion in various types or amounts of matter. Emphasize recording and evaluating data, and communicating the results of the investigation. (PS3.A)

Dance Core
Standard 6.D.CR.2:
Use a variety of stimuli and solve multiple movement problems to develop unique choreographic content.
Standard 6.D.P.1:
Build partner and ensemble skills by demonstrating effective spatial relationships with diverse pathways, levels, and patterns in space.

Objective:
In a 60-minute class 6th grade students will explore heat transfer by creating movement sequences based on locomotor steps and speed.

Experiment One: Conduction Heat Transfer
Conduction heat transfer can only be done when a hot source is touching a cooler source.

Materials: Cardboard, Metal, Cloth, Styrofoam, Wood, Glass, and Plastic. Signs of materials, shapes and locomotor steps.

Music: Happy (Gru's Theme from Despicable Me 2) by Pharrell Williams

Science Activity: Put your hand on the objects in front of you. You will feel that they have different temperatures. Put them in order from cold to warm. Describe why they feel like different temperatures even though they all are the same temperature.

Dance Activity: Assign a locomotor step to each object. Decide on a shape that everyone will make. Practice the speed of each. Put the objects in order from cold to warm, line them up. Assign two or three students to each object, make the same shape, and transfer from one side of the gym to the other. Make sure one is faster then the other.

Experiment Two: Convection Heat Transfer
Convection heat transfer can only be done in liquids or gases. As hot liquids or gases rise, cold liquids or gases take the place of hot liquids or gases.

Materials: Clear plastic cups, Thermometers, Ice cold water, Blue food coloring, Room temperature water, Hot water, Red food coloring, Paper towels, and Small syringe. Scarves or noodles.

Music: Tutti-Frutti (Rock and Roll Guitar) by Little Richard.

Science Activity: Fill two transparent cups with room temperature water. In one cup, put blue ice water at the bottom with a syringe. Put red hot water at the top of the same cup with a syringe. Describe the results of what happened and tell why. In the other cup, put red hot water at the bottom with a syringe. Put ice water at the top of the same cup with a syringe. Describe the results of what happened and tell why.

Dance Activity: Have students find a partner. Assign colors to hot and cold scarf or noodle. Decide a dance step that everybody will do. Example: moonwalk, sprinkler, worm, shuffle, etc. When the music starts they will do their step, when the music stops the will make a shape. If they have the hot scarf, they will make a high shape, and cold scarf will make a low shape.

Experiment Three: Radiation Heat Transfer
Radiation heat transfer can go through any type of medium. This is why cars in the sun with the windows closed and homes with the windows closed get hot in the summer. The heat goes through the metal and windows of the car and the brick or wood of the house. This is also why you get sunburned in the sun and cook hotdogs and marshmallows over a campfire.

Materials: 4 thermometers, Tin can, Styrofoam cup, Plastic cup, Paper cup, and Lids for each cup.

Music: Tutti-Frutti (Rock and Roll Guitar) by Little Richard.

Science Activity: Fill up four cups made of different materials with hot water and put lids on them. With a small hole in the lid for a thermometer to fit through, put a thermometer in each cup. Take a reading every three minutes. Describe what is happening with the temperatures in each container. Tell how this experiment shows radiation heat transfer.

Dance Activity: Decide which cup lets heat out faster. Line up the cups in order of speed. Decide a dance step that everybody will do. Example: moonwalk, sprinkler, worm, shuffle, etc. Do the same step at different speeds depending on the cup material. Teacher calls out the material.