Live Class Model of the States of Matter

Summary

This is a model where the students act as molecules to show the arrangement of particles in the 3 states of matter. An extension is done to show the motion of the particles relative to the state, and how temperature also affects motion and arrangement. This activity can be done by having class discussion and drawings on the board or using the more detailed student sheet.

Main Core Tie

SEEd - Grade 6

Strand 6.2: ENERGY AFFECTS MATTER Standard 6.2.2

Time Frame

2 class periods of 45 minutes each

Group Size

Small Groups

Materials

Live Class Model Worksheet

Instructional Procedures

Begin by asking the students which state of matter takes up the most space & which has particles closest together.

Have students get into small groups (2-4) and discuss how they could use the classroom to show the 3 states of matter. Give them about 5-10 min. to come up with ideas and have a few share with the class.

Explain to the class that they will be making a model where the walls are the container, and the students represent the particles in that container. 10-15 min

Solid

Ask how the "student particles" could represent real particles and take up as little space as possible. Take some ideas, and end up having them squeeze together touching shoulders.

Gas

Ask how the "student particles" could represent real gas molecules and take up as much space as possible. Take ideas, and end up having them spread out as far as possible so no one is touching.

Liquid

Ask how the "student molecules could represent real liquid molecules & be close but not too close. Take ideas, and end up having them spread out, but need to be within arms reach of other "student particles".

If using student sheet, have them draw what the room looked like in the box & write observations. You could also use the board to make drawings & discuss the questions as a class. 10 min.

Extension to 3 a & b: 30 min (students would do this all day if you let them, especially if you let them take turns being in charge) 15-20 min. is needed for students to fill out paperwork.

Analogies to compare the motion of particles. Ex.: Compare gas molecules to hyperactive 2 yr olds running around crazy and all over the place. Solids = really old people. They sit in their chairs, don't go very far, they lift their hands to change the channel. Liquids= Them(7th graders).

Move around casually. They can write their analogy on the student sheet.
Same set up as the earlier model. Have them re-show the arrangements of the states they learned previously.
Now have them act like gases. They can't stop being a gas until directed by you, and all student molecules are behaving like a gas. (they are excited to do this part, but it is surprising how quickly they get tired of being a very active gas)*****You might want to have them be silent molecules, they think that a lot of movement is also a lot of noise*********
Now have them act like liquids, casually walking around.
Finally, have them act like a solid, standing in one spot, moving their heads, eyes, arms, etc. (sometimes I have them go back to their seats).
Go back and forth between the states, by calling out what state you want them in.

Discussion Break: Fill in diagrams and discuss questions and ways to mend the model to be more accurate. (You may want to remind them that previously solids were close enough to be touching shoulders, and liquids were within arms reach) Possible corrections: solids will not take up the whole room, but "student molecules: are only in 1/2 of the room, or need to be touching shoulders. In this case, they will end up making several "solid clumps"

To reinforce motion at different temperatures, instead of calling out what state they are in, say that they are warming up or cooling down. Students generally recognize that melting causes solids to liquids, but when doing the model they can see that amount of space taken up or "volume" is different. If students are following closeness rules, this helps students have to make the connection on what state they are in & how the volume changes.

Assessment Plan

Participation……4
Completion of Student sheet, if being used…….4

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

Utah LessonPlans