

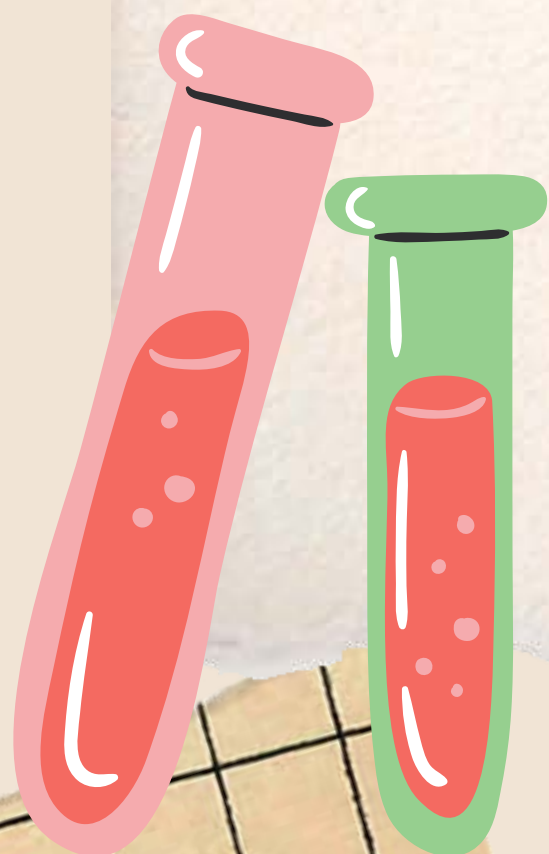
EPISTEME 9 SUBMISSION NO 7

INTEGRATION OF STEAM IN CHEMISTRY CLASSROOM

TOPICS:

GAS LAWS

STRUCTURE OF ATOM



DR. PUNEETA MALHOTRA

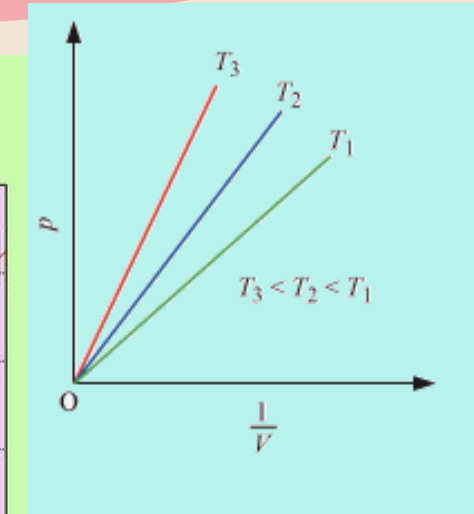
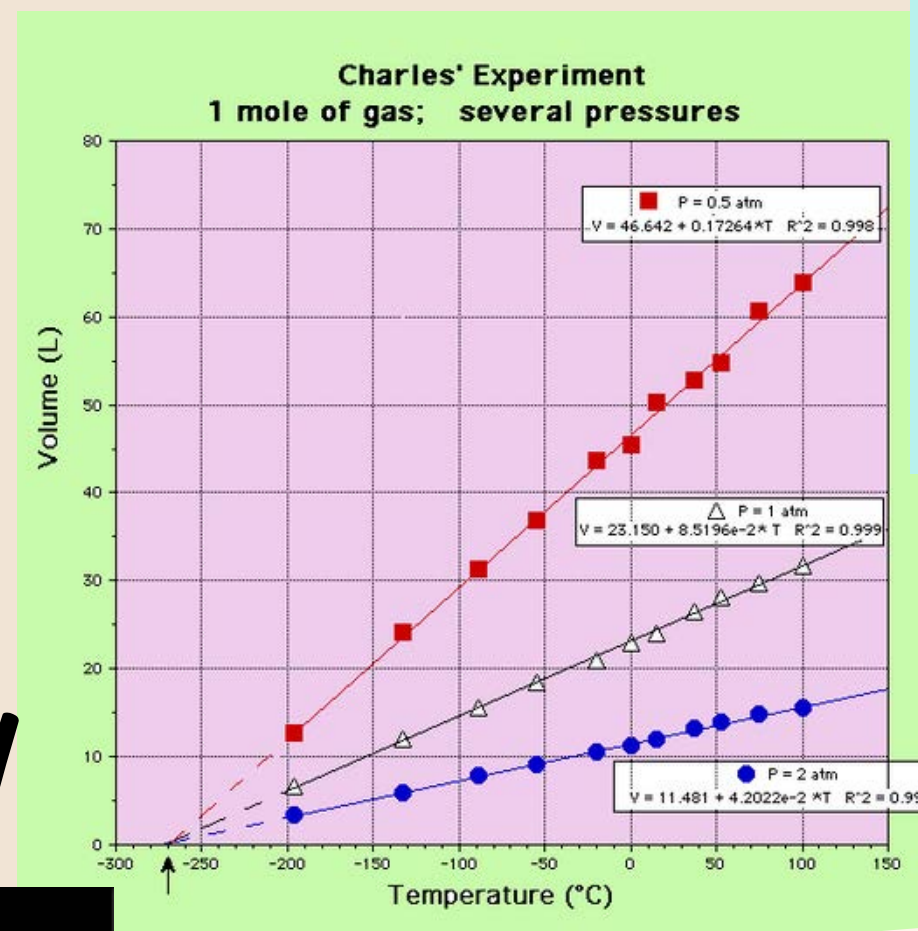
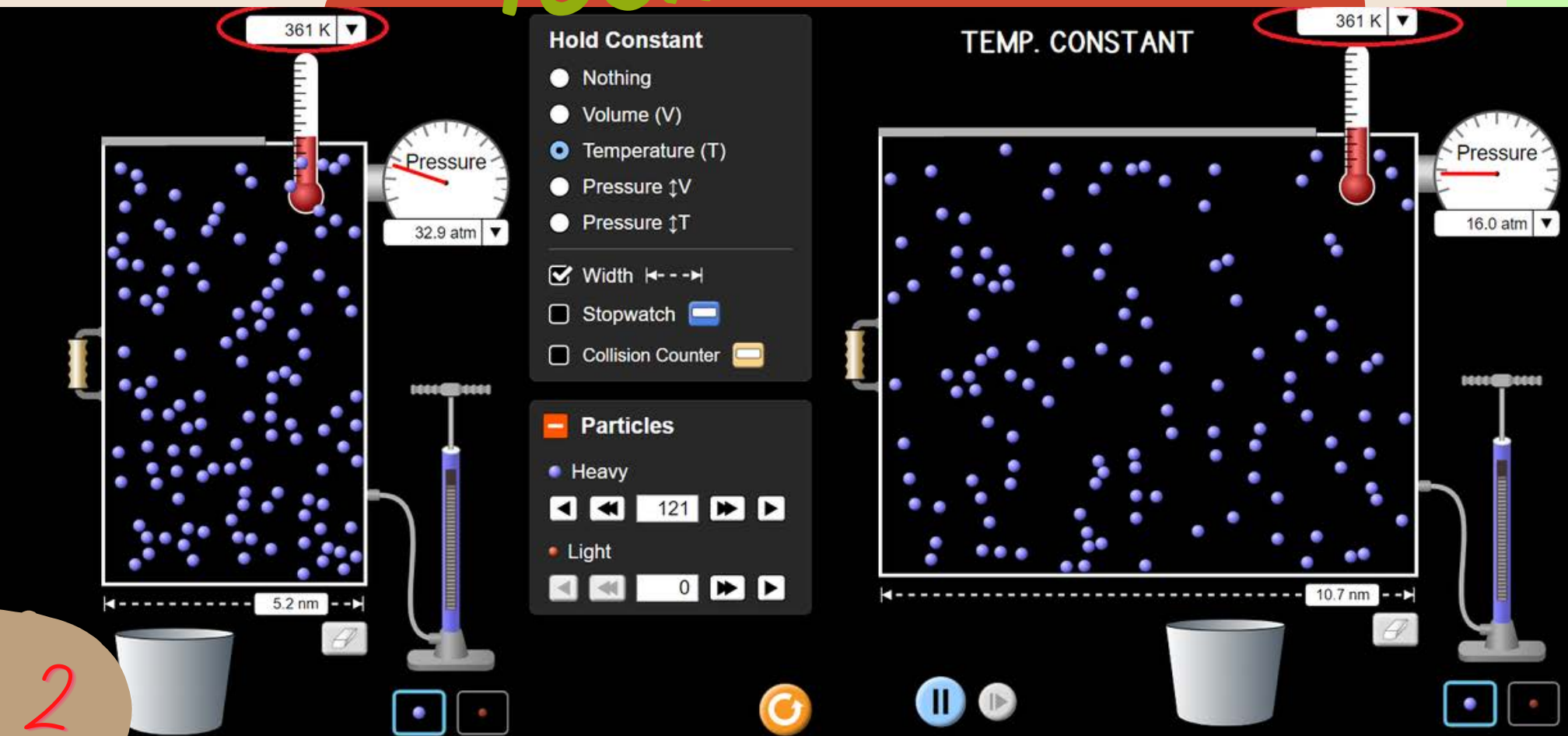
**SOCIETY FOR THE ADVANCEMENT OF EDUCATION,
DELHI, INDIA**

TEACHING GAS LAWS USING STEAM

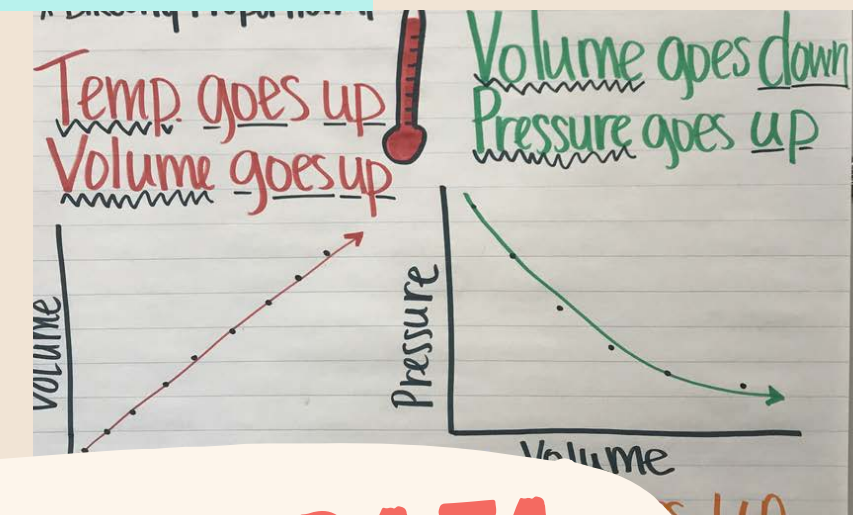
SIMULATIONS

Using online platforms like PhET to collect data for experiments which are not possible in school lab.

TECHNOLOGY



MATHS



INTERPRETING DATA

Analysis of data collected using simulations, graphical representation of data and arriving at the gas laws.

LAB WORK



PLAYGROUND AS LAB



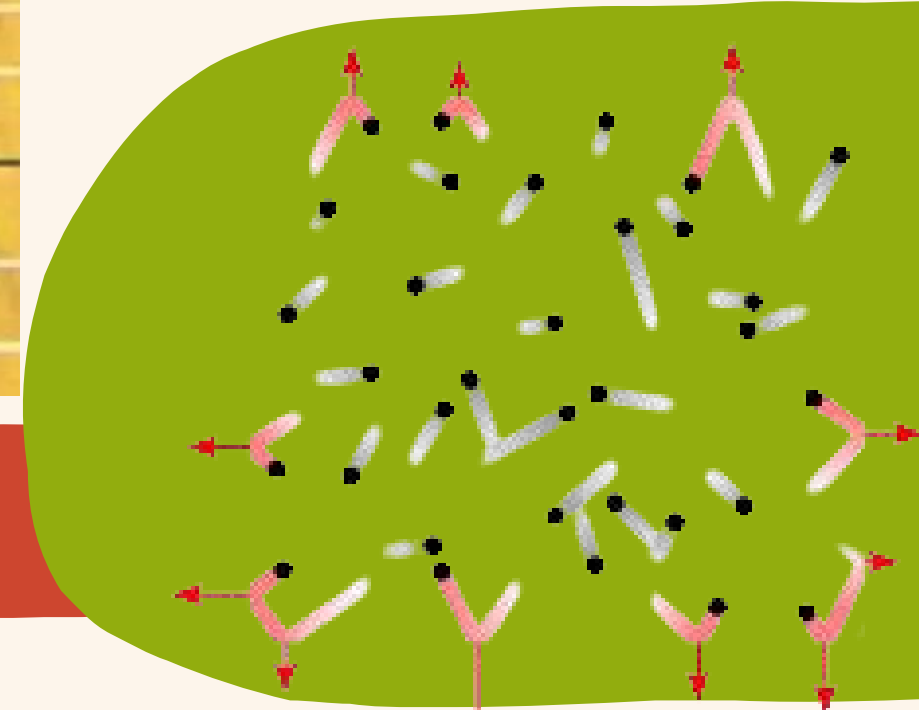
Apply gas laws and stoichiometry to design an air bag in the lab.



ENGINEERING



ARTS



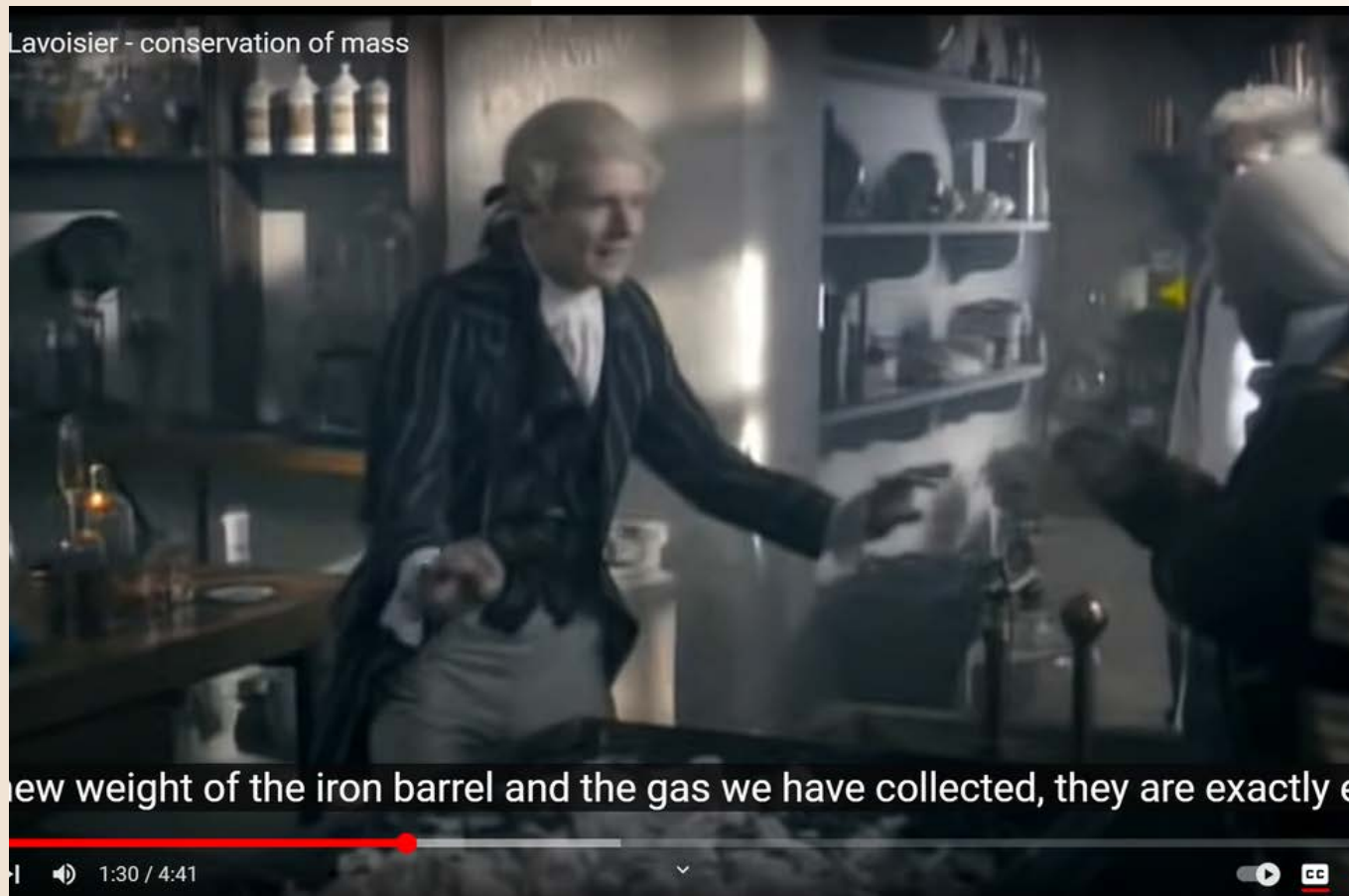
"Fit into the circle" game in the playground to arrive at Kinetic Gas Theory

STUDY OF BEHAVIOUR OF GASES (SCIENCE) USING SIMULATIONS (TECHNOLOGY) TO CREATE AN AIRBAG REPLICA (ENGINEERING) USING MATHEMATICAL CALCULATIONS (MATH). MUSIC AND DANCE WAS INTEGRATED TO UNDERSTAND COLLISIONS BETWEEN PARTICLES.

TEACHING STRUCTURE OF ATOM USING STEAM

HISTORY AND PHILOSOPHY OF SCIENCE

ARTS



Historical reconstruction of events that led to present day understanding of structure of atom.

Engaging students in philosophical debates

Ok. What is the colour of carbon atom?

black.

colour of oxygen atom?

colourless, as oxygen is colourless.

and carbondioxide molecule?

it is colourless

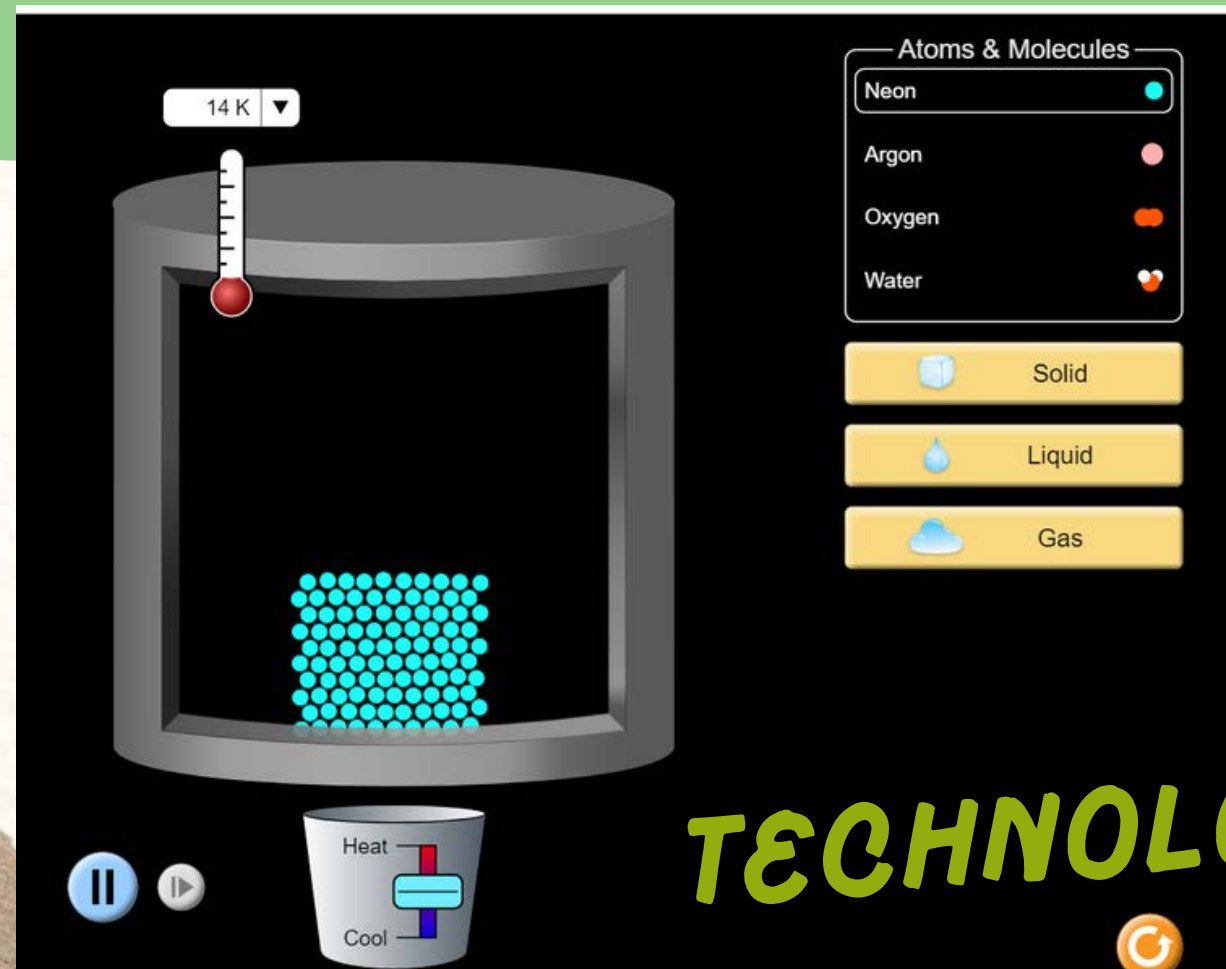
Why?

as carbon di oxide is colourless.

but carbon atom is black , so how can one black carbon atom and two colourless oxygen atoms give a colourless carbon di oxide molecule?

SIMULATIONS

Use of technology to visualize what happens at atomic/ molecular level.



PLAYGROUND AS LAB



Energy levels: Bohr Atom

n=∞	0.00eV
n=5	-0.54eV
n=4	-0.85eV
n=3	-1.51eV
n=2	-3.40eV
n=1	-13.6eV



Understanding energy levels through games

MATH & ARTS

THE TEACHING-LEARNING PROCESS INVOLVED HISTORY AND PHILOSOPHY OF SCIENCE, SCIENCE, MATHEMATICS AND THE LONG-JUMP GAME.

CONCLUSION

The lesson planning was very time-consuming but the two examples show that an integrated approach is possible even while teaching chemistry at the senior school level.

EDUCATIONAL IMPLICATIONS

1. Extend STEAM to other concepts/ content in Chemistry
2. Understand the process of science through HPS approach

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