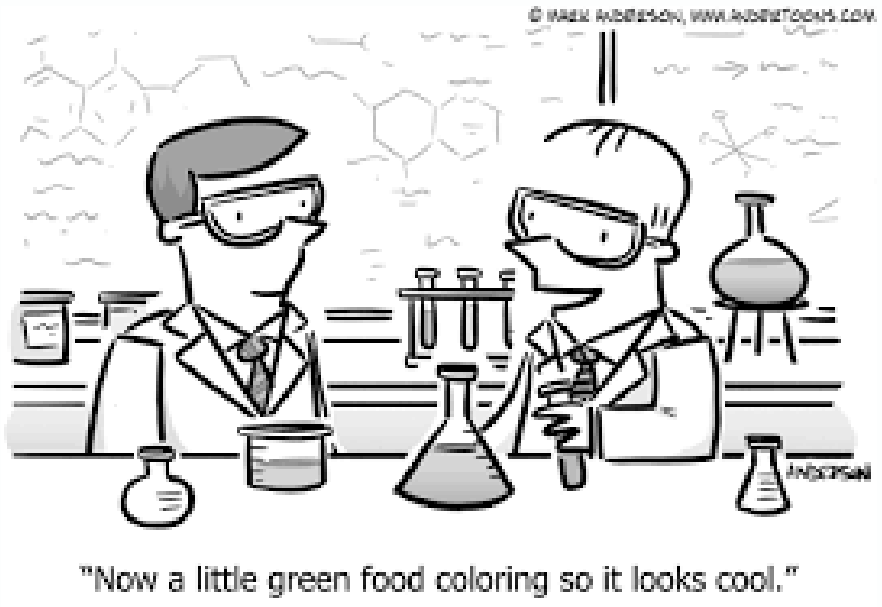
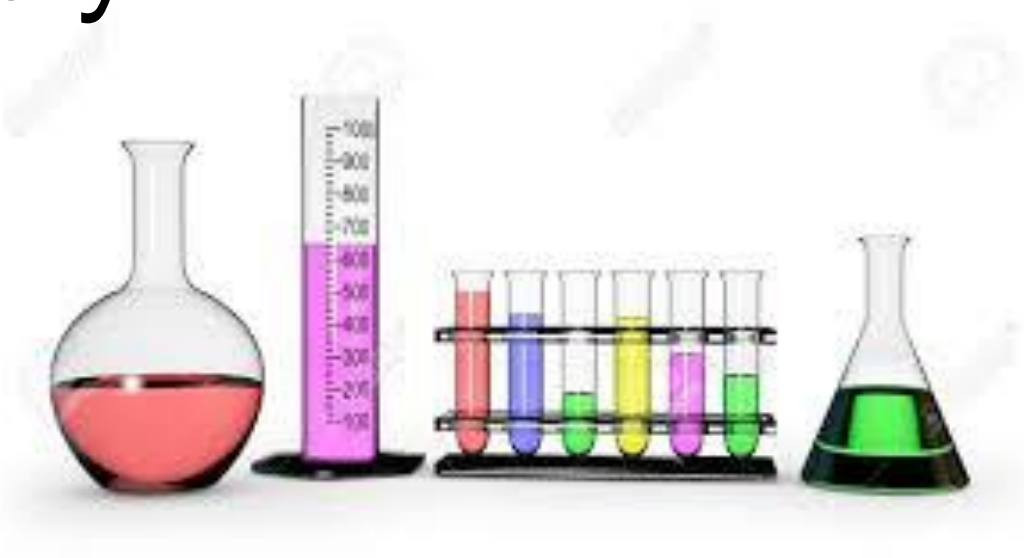
AP/IB Sciences In MCPS

AP Chemistry

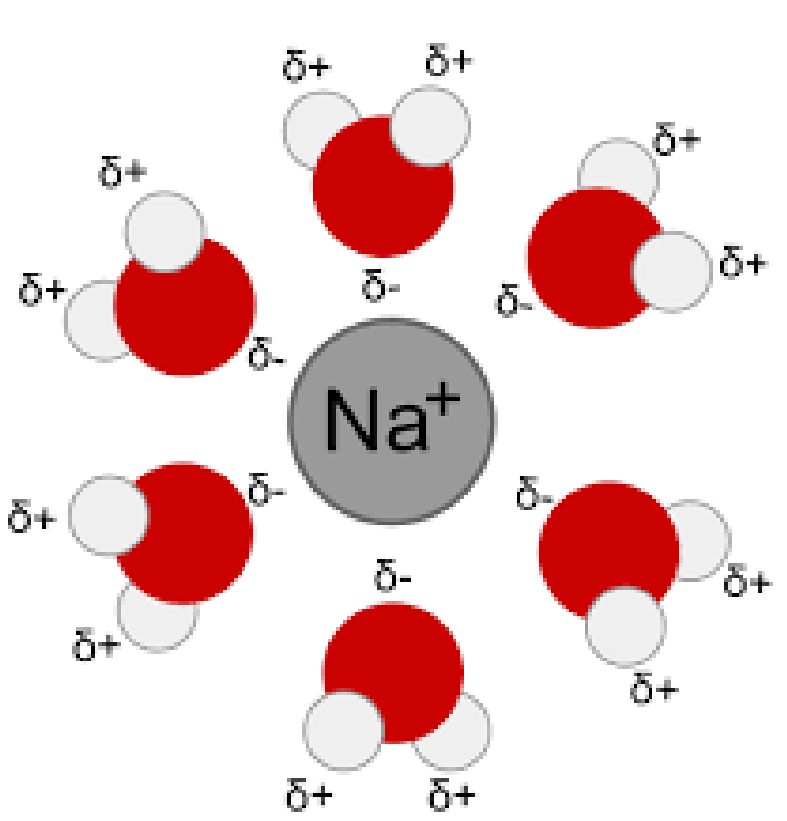




May 8th
Wootton High School

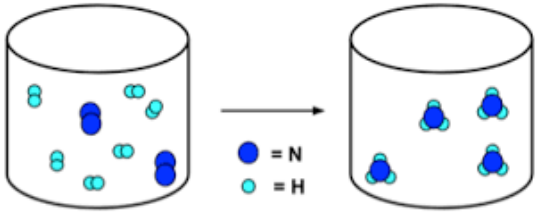
Learning Engagements:

- Overview of the AP chemistry course
  - Current Big Ideas
  - Unit Outline for 2019-2020
    - New College Board CEDs
- Science Practices
  - Recommended Labs and Lab Notebooks
- External Assessments



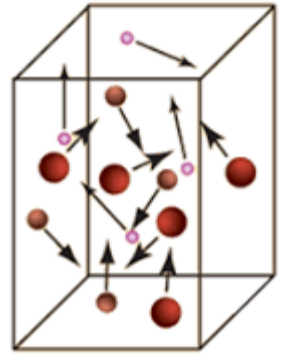
Overview of the AP Chemistry Course

Big Idea 1



The chemical elements are fundamental building materials of matter, and all matter can be understood in terms of arrangements of atoms. These atoms retain their identity in chemical reactions.

Big Idea 2

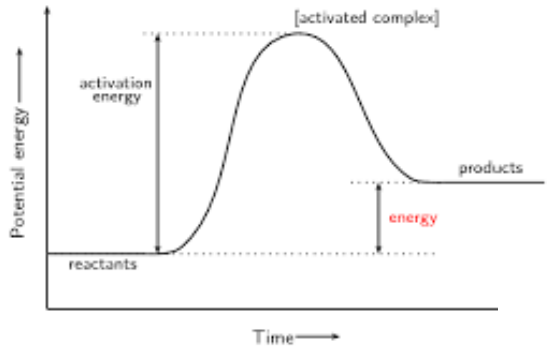


Chemical and physical properties of materials can be explained by the structure and the arrangement of atoms, ions, or molecules and the forces between them.

Big Idea 3

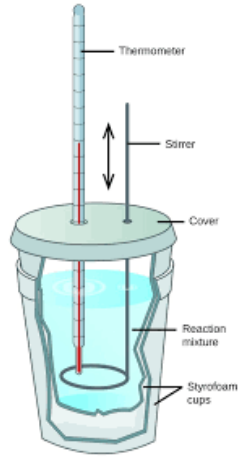
Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.

Overview of the AP Chemistry Course



Big Idea 4

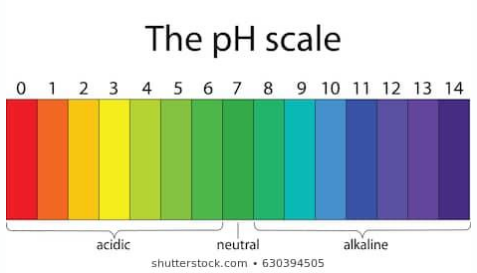
Rates of chemical reactions are determined by details of the molecular collisions.



Big Idea 5

The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter.

Big Idea 6



Any bond or intermolecular attraction that can be formed can be broken. These two processes are in a dynamic competition sensitive to initial conditions and external perturbations.

New Unit Organization for 2019-2020

1. Atomic Structure and Properties
2. Molecular and Ionic Compound Structures and Properties
3. Intermolecular Force and Properties
4. Chemical Reactions
5. Kinetics
6. Thermodynamics
7. Equilibrium
8. Acids and Bases
9. Applications of Thermodynamics

New to College Board AP 2019:

- Content has NOT changed for AP Chemistry
- Most AP Courses will have new CEDs (Course and Exam Descriptions)
  - For AP Chemistry, that includes the new unit organization
  - This will include updated pacing guides and percent weights for each topic on the exam
- Students will register in the fall for an AP exam, they will have access to test bank, progress check, unit guides, and more provided by College Board

Overview of AP Science Practices

Science Practice 1

The student can use representations and models to communicate scientific phenomena and solve scientific problems.

Science Practice 2

The student can use mathematics appropriately.

Science Practice 3

The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP Course.

Science Practice 4

Student can plan and implement data collection strategies in relation to a particular scientific question.

Overview of AP Science Practices

Science Practice 5

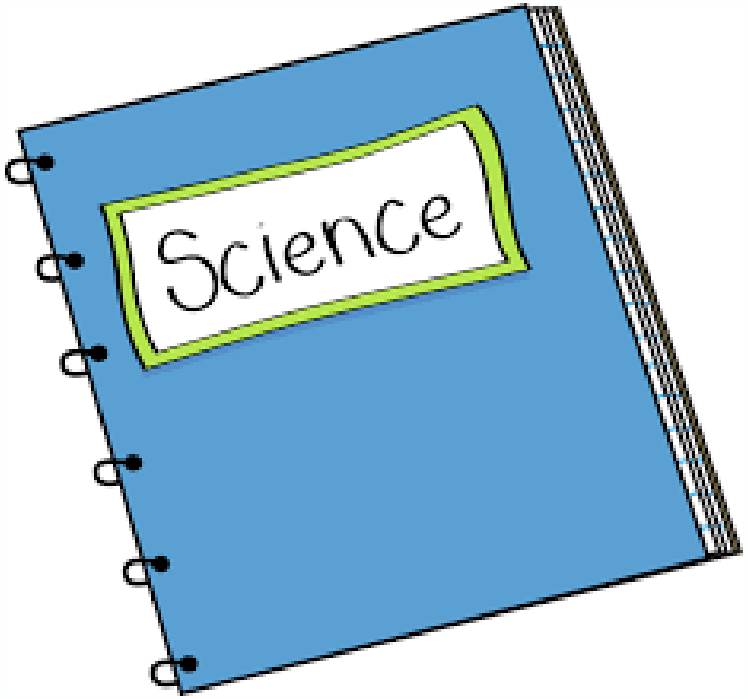
The student can perform data analysis and evaluation of evidence.

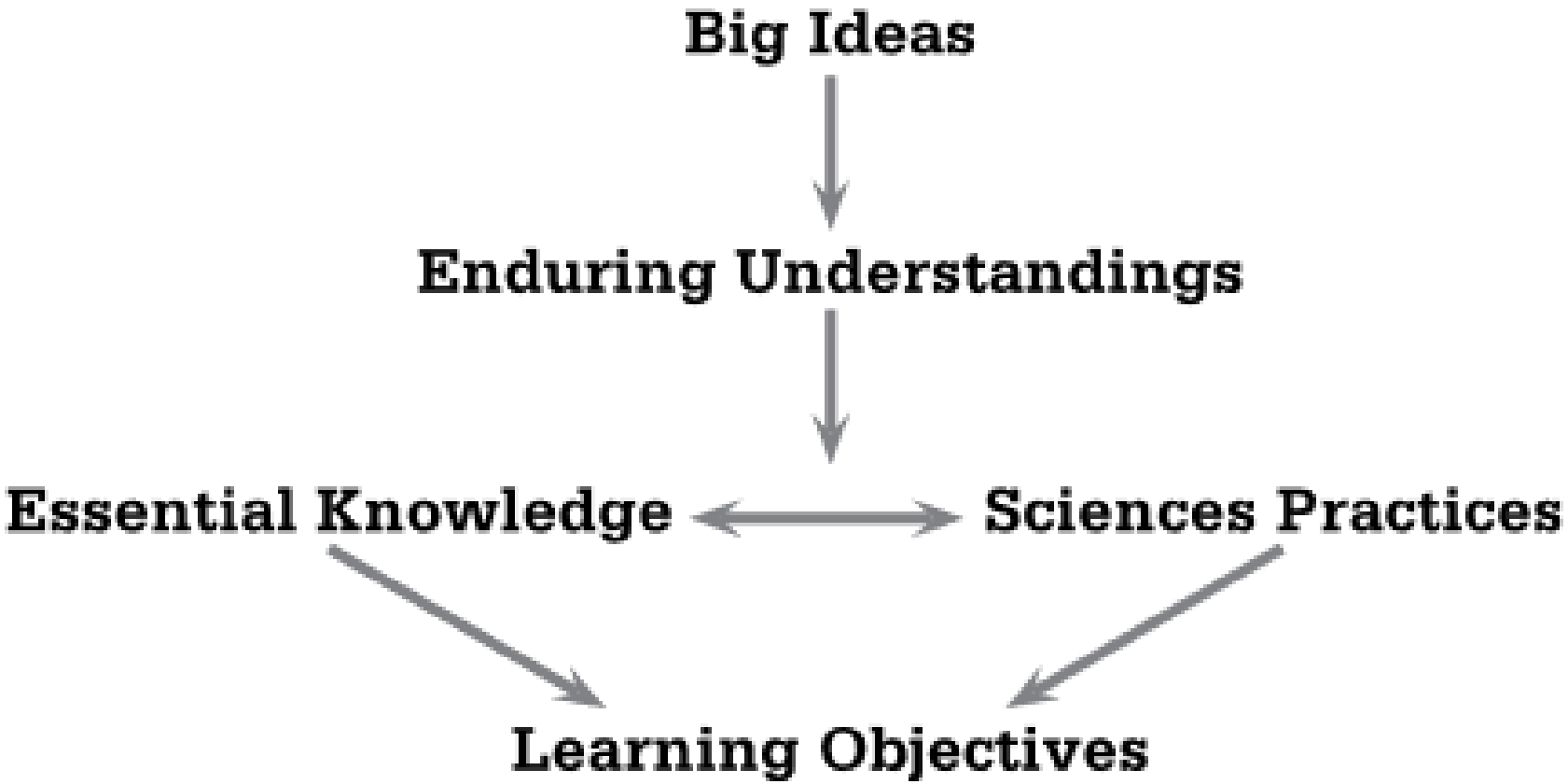
Science Practice 6

The student can work with scientific explanations and theories.

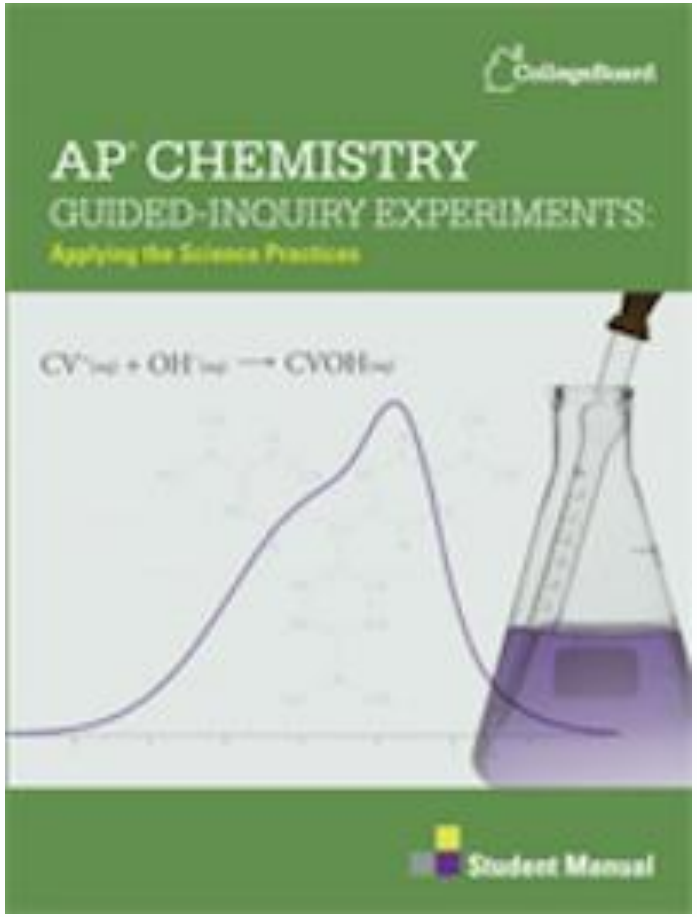
Science Practice 7

The student can connect and relate knowledge across various scales, concepts, and representation in and across domains.




Big Ideas
Enduring Understandings
Essential Knowledge
Sciences Practices
Learning Objectives

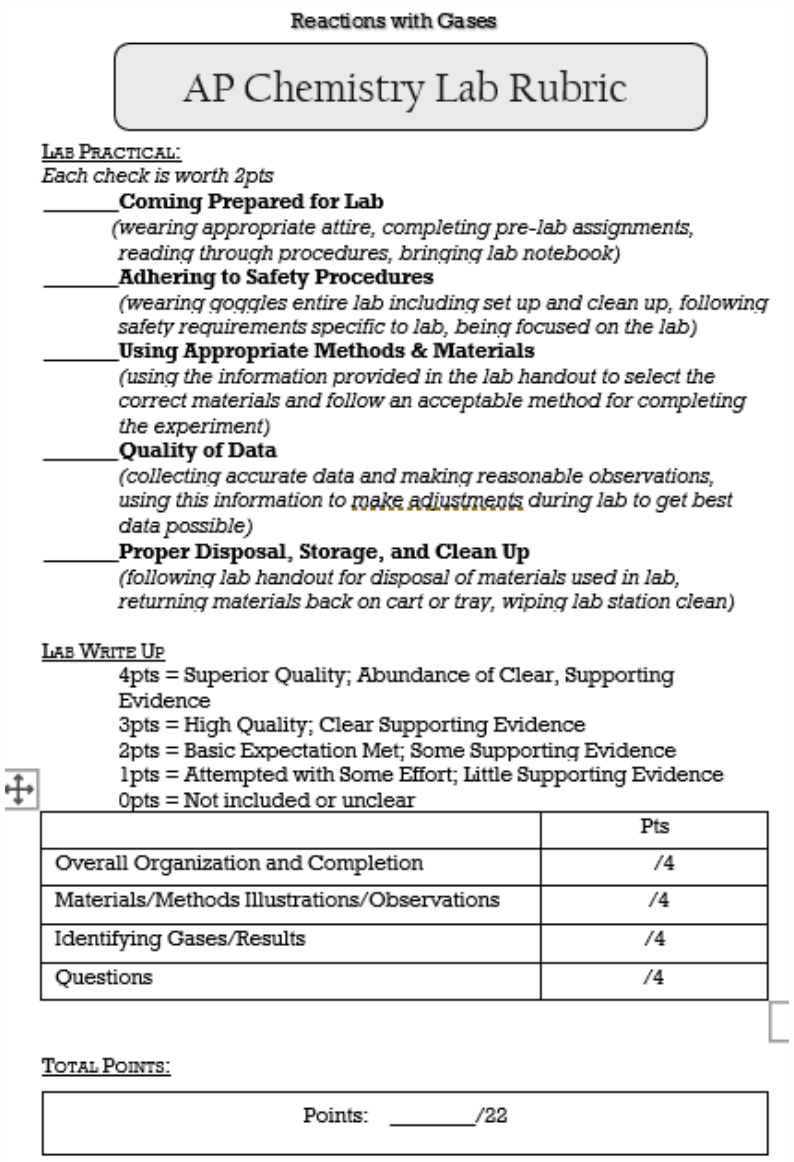
AP Recommended Labs



- 18 Recommended Labs
- Teachers are not required to do these labs, but should substitute labs with similar skills/concepts
- 6 Labs must be inquiry based
  - Students must design some aspect of the lab (procedure, data collection, calculations)

Lab Notebooks

- Supports literacy
- AP exam questions often include experimental design
- Models college chemistry course
- Some college require students to provided example lab reports and syllabus with list of labs or lab notebooks before they receive credit for AP Chemistry



Reactions with Gases

AP Chemistry Lab Rubric

LAB PRACTICAL:

Each check is worth 2pts

_____**Coming Prepared for Lab**
(wearing appropriate attire, completing pre-lab assignments, reading through procedures, bringing lab notebook)

_____**Adhering to Safety Procedures**
(wearing goggles entire lab including set up and clean up, following safety requirements specific to lab, being focused on the lab)

_____**Using Appropriate Methods & Materials**
(using the information provided in the lab handout to select the correct materials and follow an acceptable method for completing the experiment)

_____**Quality of Data**
(collecting accurate data and making reasonable observations, using this information to make adjustments during lab to get best data possible)

_____**Proper Disposal, Storage, and Clean Up**
(following lab handout for disposal of materials used in lab, returning materials back on cart or tray, wiping lab station clean)

LAB WRITE UP

4pts = Superior Quality; Abundance of Clear, Supporting Evidence
3pts = High Quality; Clear Supporting Evidence
2pts = Basic Expectation Met; Some Supporting Evidence
1pts = Attempted with Some Effort; Little Supporting Evidence
0pts = Not included or unclear

	Pts
Overall Organization and Completion	/4
Materials/Methods Illustrations/Observations	/4
Identifying Gases/Results	/4
Questions	/4

TOTAL POINTS:

Points: _____/22

External Assessments

- AP Exam: May 7th, 2020
- 50% Multiple Choice: 60 Questions in 90 Minutes
  - No Calculator
- 50% Free Response: 7 Questions in 105 minutes
  - 3 Long FRQ (10pts each)
  - 4 Short FRQ (4pts each)
- Students need a lot of practice with mock exams, released questions
  - Right now only teachers have access to MC
  - Released Free Response
  - Next year students should have access with early registration

Sample Short Free Response:

7. Aluminum metal can be recycled from scrap metal by melting the metal to evaporate impurities.

   (a) Calculate the amount of heat needed to purify 1.00 mole of Al originally at 298 K by melting it. The melting point of Al is 933 K. The molar heat capacity of Al is 24 J/(mol·K), and the heat of fusion of Al is 10.7 kJ/mol.

   (b) The equation for the overall process of extracting Al from Al_2O_3 is shown below. Which requires less energy, recycling existing Al or extracting Al from Al_2O_3 ? Justify your answer with a calculation.

$$Al_2O_3(s) \rightarrow 2\,Al(s) + \frac{3}{2}O_2(g) \qquad \Delta H^\circ = 1675\ \text{kJ/mol}_{rxn}$$

Scoring guidelines are also provided by College Board online

AP Exam Scores

- 3 and above is passing
- Each college has their own rules for awarding credit
- From UMD's Website:

			BSCI171	1
Chemistry	**Chemistry** *(25)*	4	CHEM131 *and* CHEM132	3 1
		5	CHEM131 *and* CHEM132 *and* CHEM271	3 1 2

CHEM131/CHEM132 and CHEM271 fulfills requirements in all Biological Sciences, Biochemistry, and Chemistry majors.

Questions?

Index Card:

please include your contact info

Online form:

Type the link in your browser or scan the QR code

bit.ly/SciNight19

For more information on enrolling your student in this course, please contact the Counselor and/or the Science Department Resource Teacher at your high school.