Students explore substance and chemical changes including gas, bubbles, temperature change, formation of a precipitate or color change. Here’s how:

1. Divide students into small groups.
2. Assign each group a lab experiment.
3. Each group performs their lab experiment, discusses and writes their findings in their science journals.
4. When students are finished, they rotate to the next station to perform the next lab.
5. After all lab stations, students return to their original station. The students then discuss their findings and present to the class.

**3-2-1**

In 3-2-1, students synthesize their learning from the lab experiments. After the Gallery Walk Stations, students respond to the following prompt: What are 3 things you learned, 2 things you found interesting and 1 question you still have?

TO ACCESS INSTRUCTIONS FOR EACH OF THE LAB STATIONS, [CLICK HERE](#).
THE CHALLENGE

Design one single fixed and one single moveable pulley system. Determine which requires less effort to lift a load of 2.5N.

THE PROCESS

1. Students compare and contrast images of various pulleys and discuss their similarities and differences.
2. Students design two pulleys – one single fixed and one single moveable – and label the effort and the load.
3. Students collect and record data for the amount of force for each pulley using a spring scale.
4. Students compare data collected and determine which pulley requires less effort to lift the load.

CLICK HERE FOR THE LESSON PLAN!
The Common Instructional Framework, “gives students a variety of ways to acquire new knowledge. It’s not your regular paper and pencil lesson. Students can interact and collaborate with each other, which helps them in the bigger world.”

ENGAGING STUDENTS WITH RESOURCES

To help students acquire new knowledge, Mr. Fraire uses engaging resources like case studies and cartoons. He provides opportunities for students to use these resources to access and engage with new information. Students work in groups to explore case studies provided by the National Center for Case Study Teaching in Science. Mr. Fraire also uses cartoons – like the Amoeba Sisters – to pique student interest and make learning relevant.

I always tried to be a discovery-type teacher, but [the Common Instructional Framework] has provided the keys I need to make that happen. It helps the kids to learn without the teacher at all times.”
“The students were having trouble comprehending, imagining and explaining the process and the functions of the digestive system. This lesson was born out of a necessity to target specific words, sounds and functions using visuals, models and situations that also involve a great sense of humor.”

DIGESTIVE SYSTEM ALIVE!
In Mr. Rivera’s classroom, the digestive system comes alive with the Common Instructional Framework and materials including saltine crackers, a ping pong ball, Hershey’s kisses, styling gel and a bottle of lemon juice.

“This lesson allows for complete engagement since all students are participating and working collaboratively. . . The first group will begin a sequence of actions that will trigger reactions by the next group of students after. Each student must learn their specific role, as an organ would in the digestive system.”

“Using Common Instructional Framework strategies, particularly in this lesson, engages every student with little to no effort. Verbalizing, writing, interacting and collaborating ensures that every student understands how vital their role is to perform the body’s system seamlessly.”
Ms. Garcia facilitates a card sort activity to structure Collaborative Group Work and Classroom Talk. During this activity, students work in pairs to sort a set of cards onto a content attainment placemat. Cards are sorted on the placemat according to the type of change indicated by the descriptor – physical change or chemical change. Once students have completed their work in pairs, they rotate to new partners to compare work, discuss any discrepancies and learn from one another.

With the Common Instructional Framework, I hear, “students clarifying, sharing and teaching other students the knowledge through classroom talk. . . Students are self-evaluating, and there is more of a one-on-one collaboration between students and teachers. There is application of the knowledge in writing samples, conversations [and] exit tickets.” – Theresa De La Garza

CLICK HERE FOR A POWERPOINT AND LESSON PLAN FOR THIS ACTIVITY.
Ms. Gonzalez and Ms. Salinas both use the plate tectonics lab with Common Instructional Framework strategies to engage students in studying the impact of plate movement on the earth’s geological events. During the lab, students use crackers and frosting to simulate divergent and convergent plate boundaries. Students begin by making predictions, and then questions guide them through processing their findings with their groups.

“\textit{The plate tectonics lab was a great way to review the types of boundaries that students need to know. It allowed them to model the different types of motions and land features created by each type of boundary. Students were able to communicate with each other within their groups to help clarify any misconceptions. I was able to walk around the room and ask them questions about their models as they answered questions pertaining to the lab.}” – E. Salinas

PLATE TECTONICS LAB

Ms. Gonzalez and Ms. Salinas both use the plate tectonics lab with Common Instructional Framework strategies to engage students in studying the impact of plate movement on the earth’s geological events. During the lab, students use crackers and frosting to simulate divergent and convergent plate boundaries. Students begin by making predictions, and then questions guide them through processing their findings with their groups.

CLICK HERE FOR THE LAB AND OTHER RESOURCES.

SUBJECT
6TH GRADE SCIENCE

TOPIC
PLATE TECTONICS

CIF STRATEGIES
COLLABORATIVE GROUP WORK AND WRITING TO LEARN
“I enjoyed seeing my students have fun while engaged in the lesson. The subject of mitosis can be a bit tricky, and sometimes difficult, to learn, so I loved how they were able to use different Common Instructional Framework strategies to master the topic. . . In this lesson, they used Writing-to-learn, Scaffolding, Classroom Talk, and Collaborative Group Work. Getting them up to discuss vocabulary with their classmates gets them moving and learning, while having to talk and work together.”

**QUIZ, QUIZ, TRADE**

During this activity, which Ms. Garza used to get the lesson started, students chose a vocabulary word related to mitosis and wrote the word and definition on an index card. Then, each student found a partner, and each partner quizzed each other. Partner 1 shared his or her word and asked Partner 2 to define it, and vice versa. Finally, once both partners had been quizzed, they traded index cards and separated to find new partners. The process was repeats continuously with students quizzing one another, trading cards and finding new partners so that they become familiar with all the keywords necessary for the mitosis lesson.

TEACHING MITOSIS? [CLICK HERE](#) FOR A RELATED BELL-RINGER!
Ms. Diaz combines Collaborative Group Work and literacy strategies in her biology class to facilitate student learning through authentic texts. As students read a text about microorganisms, they take on literacy and poster roles to analyze the text, make connections to other subjects and teach and learn from each other.

**THE LITERACY ROLES**

**Summarizer:** Prepare a short summary, and complete the ELA poster role.

**Discussion Director:** Develop questions for the group’s summary, and complete the HISTORY poster role.

**Connector:** Connect the reading to real-world applications, and complete the ART poster role.

**Vocabulary connector:** List interesting, science-related words, and complete the SCIENCE poster role.

**THE POSTER ROLES**

**ELA:** Describe in a paragraph the advantages and disadvantages of microorganisms.

**HISTORY:** Describe based on the article any history of microorganisms in our lives.

**ART:** Draw an illustration of the life of bacteria.

**SCIENCE:** Include science vocabulary words that impact you the most, and define them.

FOR A LINK TO THE ROLES, A GRAPHIC ORGANIZER FOR STUDENTS AND A TEXT ABOUT MICROBES, CLICK HERE!
THE CHALLENGE:

Use meteorological data on a weather map, including a variety of weather map symbols, to predict weather events and produce a mock forecast.

THE PROCESS

1. Analyze a national weather report to discover its parts.
2. Use weather mapping techniques to analyze weather data for your assigned state.
3. Create a map based on your assigned state.
4. Present a mock forecast based on your findings and your map.

Resources:
Science book, science composition notebook, daily newspaper and internet

Materials:
Local newspaper, butcher paper, markers, construction paper and scissors
Mr. Ogletree uses Gallery Walks in his classroom to ensure students understand key vocabulary words, as well as other core components of his curriculum.

1. Students work in small groups.

2. Students visually represent the content knowledge with their groups.

3. Visuals are posted on the wall, and groups walk around the room to view, discuss and provide constructive feedback on each other’s work.

“We have found that vocabulary is most important when teaching any subject. An easy way to [teach vocabulary] is by utilizing the gallery walk. . . This Common Instructional Framework strategy helps students remember vocabulary by allowing students to draw a picture, or embellish the actual word, and make it their own. They also get to use others’ pictures to help them remember.”
Students are given basic information on the phases of the cell cycle through teacher notes and videos. Next, students are paired up to conduct detailed research on the events that take place during each of the phases of the cell cycle. Each pair decides on the materials they will use (clay, pipe cleaners, candy, etc.) to make their models and then uses a free app - Stop Motion – to create their masterpiece. Partners take a series of photographs (up to 30) of every movement made during each phase. They direct their own work, making changes where necessary.

“Collaborative group work is one of my staples because I see who needs further assistance. In addition, students are able to help one another. Students take ownership of their own learning and are proud of their abilities.”
TEACHER SPOTLIGHT: GILBERTO MARTINEZ
VELA MIDDLE SCHOOL

“I think the strategy that has helped me, and will help me in the future, is working together with a partner or a group. I feel I learn better when I can talk to my friends about what we are learning. If they don’t understand, I can help them also. When we work together, we also practice communicating better and learning to listen to others and their ideas. This helps me learn more.” - J. V. 8th Grade

THE CHALLENGE

Identify, plan for and build a model that will project an object. Test your model to determine average projectile distance, and graph your results.

THE PROCESS

Working in groups with assigned roles, students explore model designs found at http://www.instructables.com/id/Project-Based-Engineering-for-Kids/. Groups identify a desired model, create a materials list and begin building. Once the model is built and working properly, groups conduct an experiment to determine an average distance their model is able to project an object. For each of five trials, students record distance, time and direction, and then they calculate and record speed and velocity. Students analyze their results and submit a final written report.

CLICK HERE FOR PROJECT DESCRIPTION AND RUBRIC!

SUBJECT

SCIENCE

TOPIC

ENGINEERING

CIF STRATEGIES

COLLABORATIVE GROUP WORK AND WRITING TO LEARN
During the Natural Selection in Goldfish lab, Ms. Molina-Figueroa supports her students in their thinking through Writing-to-Learn activities including a K-W-L chart to start the lesson.

**K-W-L**

K-W-L charts can be used to help scaffold learning for students. Prior to beginning a new lesson, students identify and write down everything they already **K**now about the topic, as well as what they **W**ant to know about the topic. At the end of the lesson, students **L**earn by writing about what they **L**earned.

Other Writing-to-Learn opportunities during the lab include recording an initial hypothesis, answering data analysis questions and summarizing the lab procedure and results.

**CLICK HERE** FOR LAB INSTRUCTIONS FOR STUDENTS.
Using only the materials listed, design a new, and improved, sewage system that meets community needs while conserving water.

At the end of the design challenge, students engage in a 3-2-1 to reflect on their designs. As an exit ticket, they write the 3 main priorities they kept in mind while designing their sewage plan, 2 problems they encountered and 1 way their design would save water.
“I believe that implementing the Common Instructional Framework strategies has helped me create the right classroom climate. The strategies have helped me foster student involvement and collaboration in classroom activities.”

**ROTATION STATION: THE PROCESS**

1. Group students into groups of 3-4 students.
2. Assign each member a job – recorder, researcher, tester, etc.
3. Each group gets one handout with all the activities from each station.
4. Assign each group a different station. Give students three minutes to respond to the question or work out the problem.
5. When the timer goes off, students rotate clockwise to the next station.
6. Review responses with the whole class once everyone has visited and responded to each station.

**FOR STATION ACTIVITIES WORKSHEET AND ADDITIONAL RESOURCES, [CLICK HERE]**!
To teach her students about Darwin’s theory of natural selection, Ms. Thakker utilizes Collaborative Group Work strategies to engage her students in lab investigations. To ensure Collaborative Group Work is effective, Ms. Thakker purposefully groups her students and assigns and alternates student roles (see below).

**PURPOSEFUL GROUPING STRATEGY**

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**SAMPLE ROLES**

- Time keeper
- Manager
- Recorder
- Reporter
- Data gatherer
- Researcher

"Collaborative group work has helped my students with accountability in contributing to group work and keeping [them] engaged in learning."

— S. Thakker

"We have a higher chance of learning when everyone in the group is involved in the discussion. We also have the opportunity to learn more because we question each other."

— H. G. 7th Grade