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CAL Webinar
Kitchen Chemistry and Backyard Biology:
Language and Science in the Home
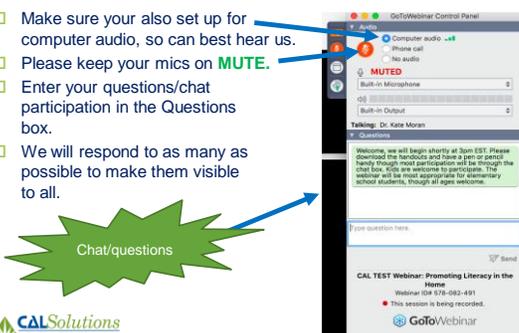
Webinar

April 17, 2020

CAL Professional Development Team
solutions@cal.org
@CAL_Linguistics
#languageapplied

CAL CENTER FOR APPLIED LINGUISTICS

Participation in Today's Webinar

- ☐ Make sure your also set up for computer audio, so can best hear us.
- ☐ Please keep your mics on **MUTE.**
- ☐ Enter your questions/chat participation in the Questions box.
- ☐ We will respond to as many as possible to make them visible to all.

Chat/questions

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Webinar Activities/Registration

http://cal.org/resource-center/freeresources

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Ed Policy One-Takes

http://cal.org/resource-center/freeresources

Ed Policy One-Takes

This policy-focused mini-series examines the real-time implementation of state and federal policies enacted in response to COVID-19 across the U.S. education system. We focus on how these new laws, regulations, waivers, etc. are and will affect State Education Agencies (SEAs) and Local Education Agencies (LEAs).

WATCH NOW:

- The Impact of Assessment Waivers & the Future of the U.S. Education System

UP NEXT: Click to Register

- **Funding Opportunities** (April 23 @ 1:00 PM EDT)
- **Virtual Instruction** (May 7th @ 1:00 PM EDT)

Stay tuned for a 3-part series of webinars for Dual language program educators.

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Poll #1

- ☐ Where are you on this rollercoaster *today*?
  1) Just getting buckled in, uncertain of the overall ride.
  2) Rattling up the hill, gathering up energy and resources for this journey
  3) On the plateau, some dips and turns, but overall comfortable in a "new normal"
  4) In freefall, hoping a safe landing is coming soon
  5) All of the above
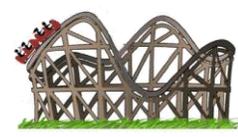
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Introductions

- ☐ Resilient people respond resourcefully to even the most unexpected twists and turns in life.
- ☐ One way to be more resilient is to take care of your body and mind.
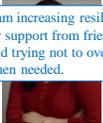- ☐ Since we last met, name two ways that you are increasing your resilience.

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Introductions

2 ways I am increasing resiliency is by asking for support from friends & family, and trying not to overdo and resting when needed.

Marybelle Marrero-Colón

1. Going for walks with our dogs.
2. Arranging for extended family "parties" online.

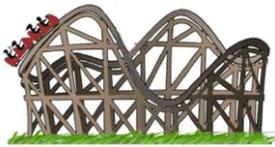Annie Duguay

1. Meditating
2. Playing with my kids

Dr. Kate Moran

Two ways I am increasing resilience:
1. Cooking every meal at home
2. Reconnecting with family and friends on a daily basis

Maria Cieslak

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Introductions

☐ Since we last met, name two ways that you are increasing your resilience.

Chat

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Agenda

☐ Introductions
☐ Educator Voices
☐ The language of science
☐ Science activities
☐ Brainstorming session

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Goals and Objectives

☐ Content objectives
  ■ We will present and brainstorm resources and activities that promote interactive science concepts and language.

☐ Language objectives
  ■ We will talk and chat about how to promote science skills and language development in the home.

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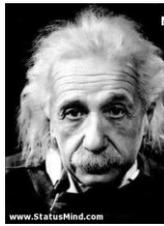

EDUCATOR VOICES

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What does this quote mean to you?

Most of the fundamental ideas of science are simple and can usually be expressed in a language comprehensible to everyone

~ Albert Einstein ~

www.StatusMind.com

Chat

Einstein on the Common Language of Science (1941)

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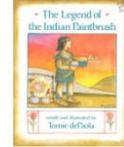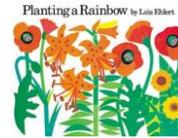
Our World of Color

- ☐ **Purpose: Students will observe and learn how different natural compounds can affect chemical changes on fibers.**
- ☐ **Connecting to the NGSS: 2-PS1-2**
- ☐ **Engineering, Technology, and Applications of Science**
  - ■ **Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world.**
- ☐ **Literature Connections:**
  - ■ *Hello Red Fox* **by Eric Carle**
  - ■ *A Color of His Own* **by Leo Lionni**
  - ■ *Planting a Rainbow* **by Lois Ehlert**
  - ■ *Legend of the Indian Paintbrush* **by Tomie De Paola**

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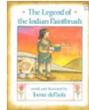
Our World of Color

Resources:
- ☐ **Making Natural Dyes from Plants**
  - ■ http://pioneerthinking.com/natural-dyes
  - ■ **Dyes From Plants: Learn More About Using Natural Plant Dyes**
  - ■ https://www.gardeningknowhow.com/special/children/natural-plant-dyes.htm

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Our World of Color

- ☐ **Allow students time to ask lots of questions. These will become the basis for further inquiry and research. Questions also help cement vocabulary.**
  - ■ **Where does color come from?**
  - ■ **How did people discover that plants could create color?**
  - ■ **Do all leaves make green dye?**
  - ■ **When were the first plants used to dye clothes?**
  - ■ **Do man made fibers, like nylon dye as well as natural fibers, like cotton? If no, then why not?**
  - ■ **Does it matter when the plant material is harvested?**
  - ■ **Does one mordant work better than the rest?**

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Objective: Students will investigate various plant materials as a natural dye.

1. Record the name of your plant, the color and what you think the color of dye that it will produce.
2. Prepare a mordant bath of salt or vinegar in a crock pot. Place you fabric swatch or yarn in the mordant bath for at least 20 min. Then allow fabric or yarn to dry.
3. Cut or tear the plant material into small pieces and place it in a clean crock pot.
4. Add just enough water to cover the material. This is the dye bath.
5. Boil for one hour or more until the water reaches the color intensity you want.
6. Strain the dye bath using a strainer or colander.

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Did you know? Different mordants will change the color of the dye.

7. Reheat the dye bath.
8. Add the fabric swatch to the dye bath. The longer it stays in the dye bath, the deeper the color.
9. Remove the cloth from the dye, and rinse with cold water.
10. Spread out the cloth to dry or hang to dry.
11. Record actual color of the dye in your science log.
12. Run fabric under cold water to help "set" the color.

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Science is a language. We should teach it that way. To solve the problems of science education, we should study how language education solves the same problems.

THE LANGUAGE OF SCIENCE

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Science Language is just as complex as English

CHOCOLATE   CAFFEINE

Chemical Formulas for Chocolate and Caffeine

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Take into consideration…

❑ Our science education system pays some attention to the idea that science is a language.

❑ Many science teachers have their students do journaling on the science learning and science use experiences.

❑ Some science teachers make use of cooperative learning-- an environment that encourages students to communicate scientific and engineering ideas.

❑ Some science assessment instruments require that students explain what it is they are doing as they solve the scientific and engineering problems in the assessment.

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Authentic Science Talk in Action

The solution for this problem is…

What caused that reaction?

The data shows that…

An example of this is …

Science Talk

Changes in temperature should…

Let's do a survey to investigate how …

Let's check the density and mass…

Let's chart the changes over time
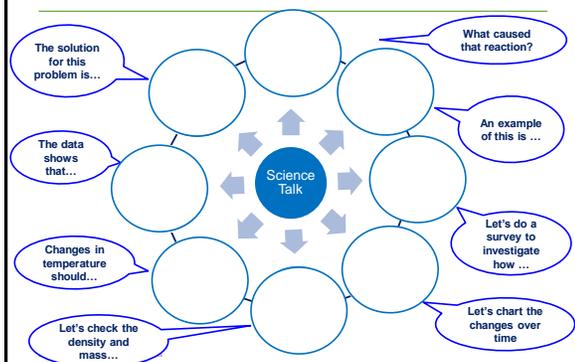
Next Generation Science Standards & ELs

❑ The Next Generation Science Standards sets higher expectations in science for all students, and teachers of English language learners must employ effective strategies to deepen understanding of science while learning English.

❑ The NGSS indicates 5 areas where teachers can support both science & language development.
  1. Incorporation of literacy strategies for all students
  2. Language support strategies with English language learners
  3. Discourse strategies with English language learners
  4. Home language support
  5. Home culture connections

NGSS (2013). English Language Learners and the Next Generation Science Standards – Press Release Document. Retrieved: https://www.nextgenscience.org/sites/default/files/%284%29%20Case%20Study%20ELL%206-14-13.pdf


Language of Science

❑ **passive voice:** *is shown, was found, has been explained, etc.*

❑ **modals (or auxiliary verbs):** *could, might be, would, etc.*

❑ **embedded clauses:** *The latest research, developed from laboratories on three continents, indicates that…*

❑ **nominalization (changing verbs to nouns):** *rotate to rotation*

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Grammar of Science

❑ **complex sentences:** *A growing number of research studies suggests, however, that such an increase in temperature could have a large impact on life, especially in coastal regions of North America and sub-Saharan Africa.*

❑ **steps of a process:** *Following evaporation, water vapor cools and falls to the earth as rain or snow.*

❑ **cause and effect:** *As a result of auto emissions, nitric oxide and sulfur dioxide combine with water in the air.*

❑ **main idea and details:** *The biomes in this area consist of grasslands, scrublands, deserts, and deciduous forests.*

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Question

- How do we make science language comprehensible?

STATES OF MATTER:

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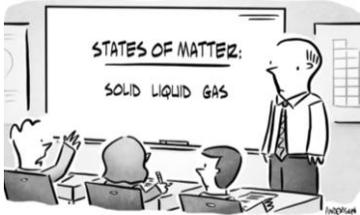
"Do we have to memorize the capitals for these too?"

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Poll #2

- How much science are you adding to your home lessons?
  - A great deal, through hands-on activities and reading
  - Some, though hands-on activities and reading
  - Mostly through online videos or apps.
  - I've added a little science to our lessons and discussions
  - Not really adding science into our lessons and discussions

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SCIENCE AND LANGUAGE ACTIVITIES

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Digital Escape Room

- **Purpose** - some type of mystery to solve. or goal to reach
- **Clues** - a series of puzzles or questions to solve, one puzzle at a time, eventually leading to the goal
- **Something to Unlock** – a combination lock or access code. The answers are provided by the clues that students solve along the way.
- **A Time Limit (Optional)** – students must complete the puzzles, open the locks, and reach the goal in a set amount of time. The choice to use a timer depends on your group of students. A time limit can drive motivation and focus, or it can add to much stress.

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Digital Escape Room – The Clues

- **Multiple Choice questions** For example, your first clue can consist of five multiple choice questions. The correct answers may be – A-C-D-A-B. The key code that opens the lock-ACDAB
- **Series of True/False questions** TFTFF
- **Fill in the blank or questions** that have a very specific single word/phrase answer are also easy to use.

What organelle holds the cell's DNA?
n u c l e u s
What organelle is the Powerhouse of the cell?
m i t o c h o n d r i a
Lock key! - e c a

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Digital Escape Room – The Clues

- **Math questions** ask students to calculate numbers
- **Diagrams** - ask students to label it. The key code can be the first letter of each label in the order the labels are numbered.

frontal 1
parietal 4
occipital 3
temporal 2
Key Code: f t p o
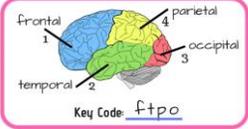
The only question type that can not be used to make a key code is an open-ended question.

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Digital Escape Room

☐ **Google Site, Google Form, Google Docs, Tutorial**

Penguin's Food Adventure

Digital Escape Room
https://bit.ly/2Xu7lx6

Digital Escape Room Tutorial
https://bit.ly/2xrBtij

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ThingLink

☐ Visual learning platform- easy to embed images, videos, audio files, links, and virtual tours

☐ All text descriptions in image or video hotspots can be read with Immersive Reader in over 60 languages

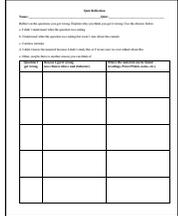☐ Can be used for presentations or lesson plan

Student Created Sample
https://bit.ly/34vMqLu

Teacher Lesson Plan Sample
https://bit.ly/2xoI4K5

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Reflection Journals

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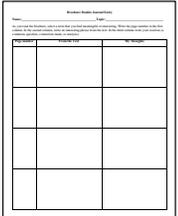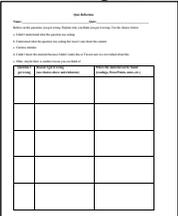
Backyard Botany

☐ Activity to get learners outside and exploring plants at a deeper level

☐ Adaptable for different grade levels and language proficiency

☐ Could be done on a walk, in a park, or in the backyard

☐ Learners create field notes for 10 different plants

☐ Then could use an app to learn more

☐ Preview vocabulary before starting

☐ Afterward, learners could compare specimens with sentence frames

☐ Write about plants in their area with paragraph frames

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Descriptive Vocabulary brainstorm

Types	Parts	Texture	Physical Attributes	Habitat Attributes
plant	leaf	smooth	narrow	dry
tree	stem	jagged	wide	wet
grass	trunk	waxy	hard	field
blossom	roots	rough	soft	forest
shrub	petals	bumpy	flexible	marshy
bush	veins	thin	rigid	rocky
flower	stamen	thick	shallow	

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Backyard Botany

Specimen	Rubbing/ sample	Description	Habitat	Notes
Plant 1				
Plant 2				
Plant 3				
Plant 4				
Plant 5				
Plant 6				
Plant 7				
Plant 8				
Plant 9				
Plant 10				

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Garden or Park Plot

Fun New Apps

- ☐ There are some really great apps out there that help make basic earth science fun.
  - ■ PictureThis
  - ■ PlantSnapp. ...
  - ■ LikeThat Garden. ...
  - ■ FlowerChecker. ...
  - ■ Plantifier. ...
  - ■ Leafsnap. ...
  - ■ NatureGate. ...
- ☐ Just snap a picture of a plant or flower, and you will be able to identify its name, family, plant story, characteristics, and care.

Fun Home Demonstrations

- ☐ **Make a tornado or whirlpool**
- ☐ **Materials**
  - ■ 2 – 2 liter plastic bottles
  - ■ 1 roll of packaging tape or duct tape.
  - ■ Dish soap – clear is preferable, but not required.
  - ■ Blue glitter
- ☐ **Directions**
  - ■ Fill one of the bottles 2/3rd full with water.
  - ■ Add 2 squirts of liquid soap.
  - ■ Add about 1 teaspoon of glitter.
  - ■ Place the other bottle on top and seal tightly using tape. Packaging tape works well because it is see through.

Fun Home Demonstrations

- ■ **Flip the bottles upside-down.** Turn the bottle upside down and tilt to give the water the chance to flow from the top to the bottom.
- ■ Think of it like the motion of flipping an hourglass. The bottom bottle should now be filling with water, and the top bottle should be emptying of water. **Hold the bottles for support**.
- ■ Do this 2 or 3 times. This is distributing the air pressure. There should be less air pressure in the top than the bottom.
- ■ Now shake up the water in the bottle in a circular motion. It might take a few tries.
- ■ When you stop, the water should empty in a circular cone-like format that mimics a tornado or whirlpool.
- ■ The glitter attaches itself to the soap for a clearer view.
- ■ Discussion: Why does this happen?

Science Memory

- ☐ Easy game, lots of learning.
- ☐ This is an activity where the students use their memory skills to review vocabulary or content concepts.
- ☐ Parents or teachers create some cards (can use small index cards). The create cards for words, definitions, and pictures.
- ☐ Students lay out cards on a table and turn them to match the word/concept and their definition. As a challenge you may add a visual representation (i.e. picture, formula, symbol, etc.).
- ☐ As students make their matches, they must restate the definition in their own words or they may not collect their cards. Students may work in teams.
- ☐ The one who matches the most wins.

Samples

Window Weather Reporting
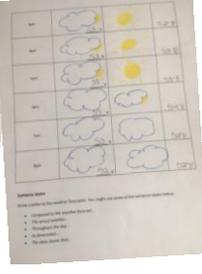
☐ Compare and contrast the weather forecast with the actual weather.

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Window Weather Reporting

☐ Compared to the weather forecast…
☐ The actual weather…
☐ Whereas…
☐ Throughout the day…
☐ As forecasted…
☐ The data shows that…

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Your Turn

☐ Which activities would you like to adapt and use from home?
☐ What science activities or resources have you been engaging in with your students or kids?

chat

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Upcoming Topics

Date	Topic
April 24, 2020	*Engaging Culturally and Linguistically Diverse Students and their Families: Social-emotional Wellness in the Home*

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http://cal.org/resource-center/freeresources

Other Online Learning Opportunities

☐ CAL's self-paced asynchronous courses:
   ■ Academic Literacy Development for English Learners
   ■ Foundations of Literacy: The Nature of Reading
   ■ Fundamentals of Sheltered Instruction: Featuring the SIOP Model
   ■ **Coming soon! Building Background and Comprehensible Input: CAL SIOP Essentials**

   http://www.cal.org/what-we-do/online-courses

   ■ All courses are ~ 5 hours of course time
   ■ After completion, participants receive a *CAL Certificate of Completion* that can often be used to obtain continuing educational credits from your school or district.

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Thank You

☐ View this webinar and download the handouts on our CAL Resources page: http://www.cal.org/resource-center/freeresources
☐ Join us next week, Friday, April 24, 3-4pm EST
   ■ Next week's topic: *Engaging Culturally and Linguistically Diverse Students and Families: Social-emotional Wellness in the Home*
   ■ https://attendee.gotowebinar.com/register/7057764445466330893

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