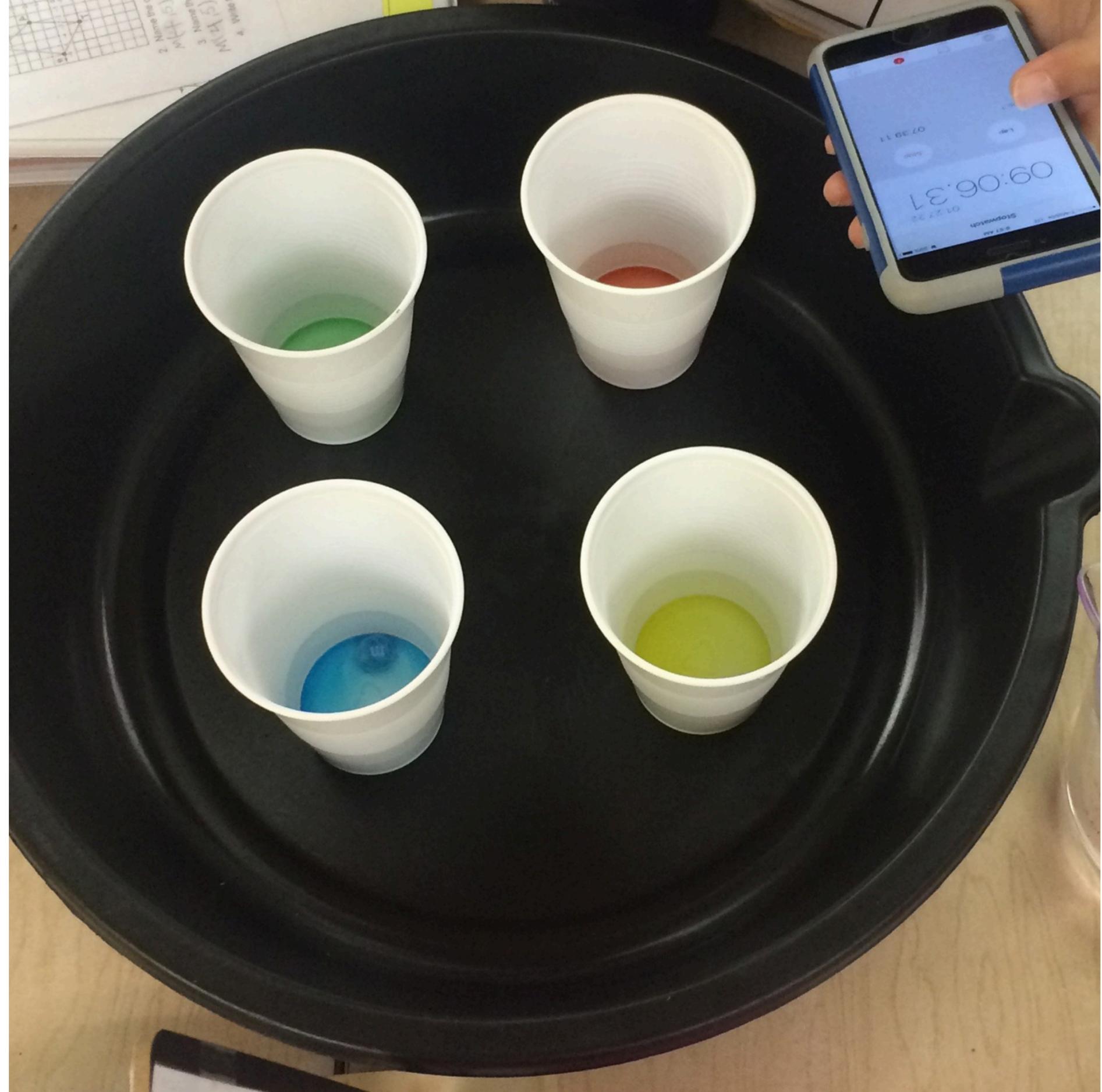
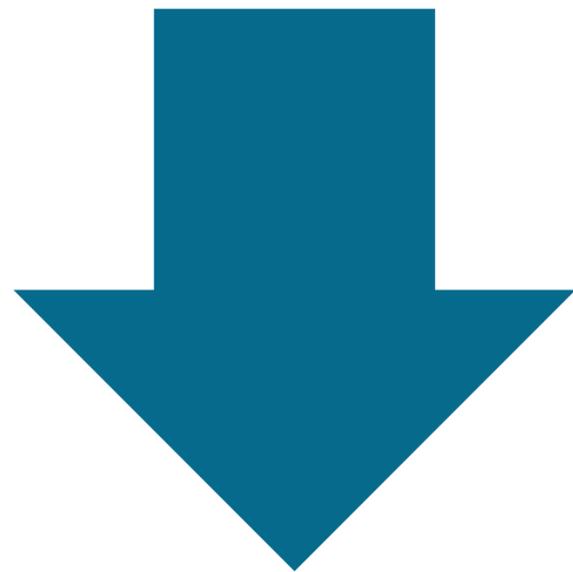
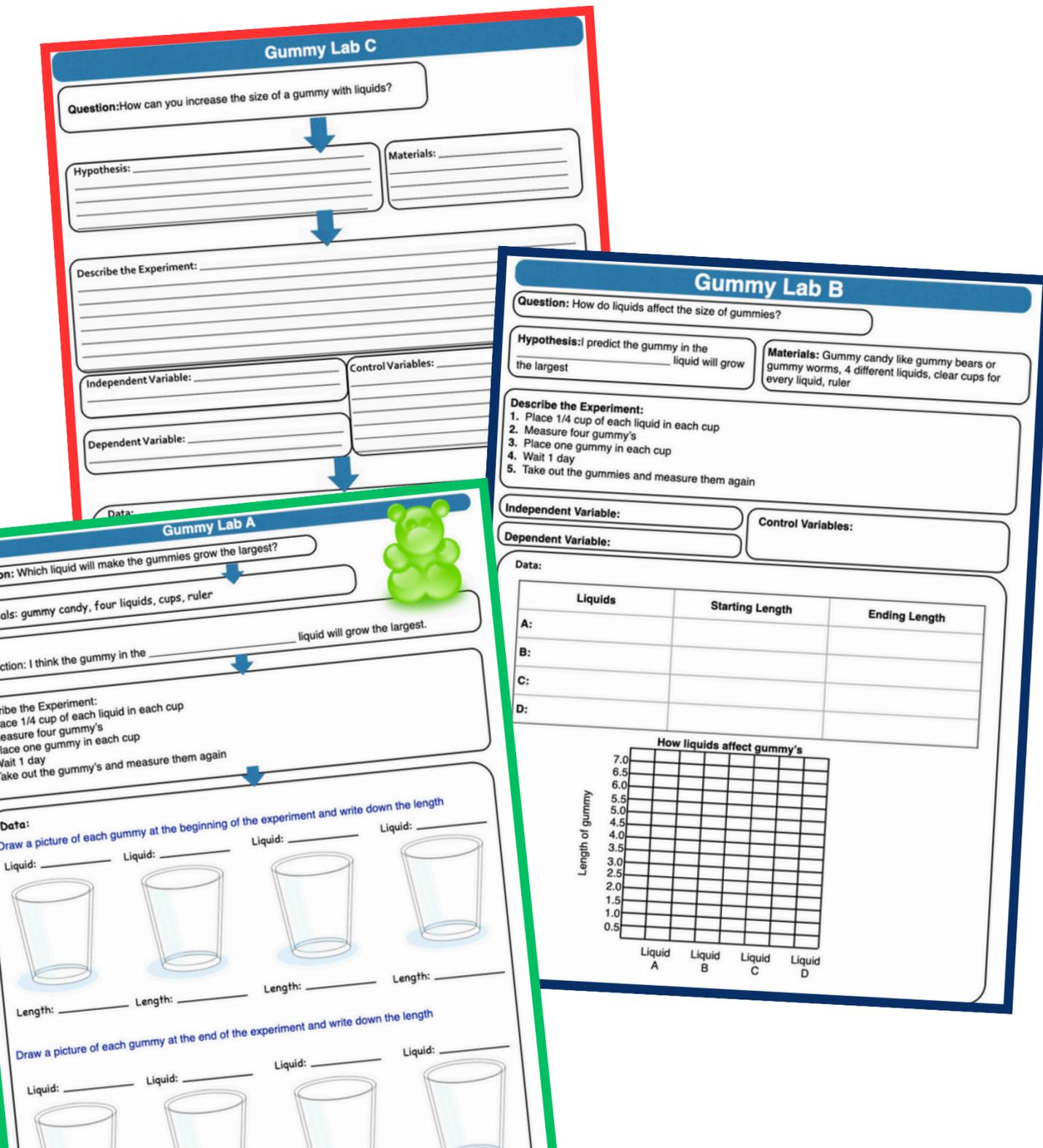


**Looking for
engaging lab
activities you can
use multiple
times throughout
the year?**

**Take a
look
inside!**



WOULDN'T IT BE GREAT IF...



You could have students do similar labs that challenge them as their level of understanding changes.



You were able to have one set of materials with different sets of instructions and guidance based on the students ability?

This is perfect for you



3 different labs



Each lab has 3 different levels



Grading Rubric



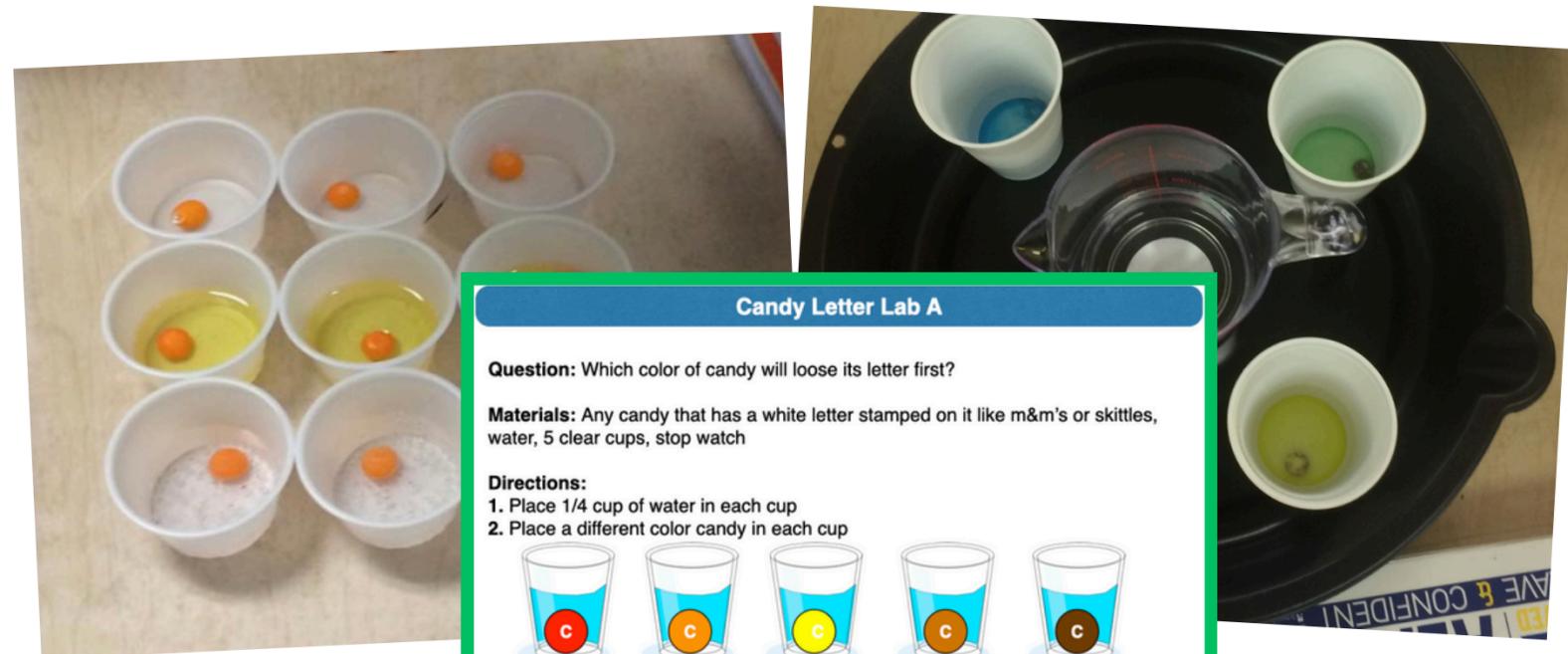
Example Expected results



Highly engaging



Use at the beginning, middle, and end of your scientific method unit



Candy Letter Lab A

Question: Which color of candy will lose its letter first?

Materials: Any candy that has a white letter stamped on it like m&m's or skittles, water, 5 clear cups, stop watch

Directions:

1. Place 1/4 cup of water in each cup
2. Place a different color candy in each cup



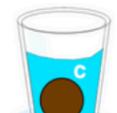
3. Start the stop watch



4. Record how long it takes for the letters on each color to float



5. Draw a picture of what you see in each cup



6. Create a bar graph of your results
7. Answer the questions

Candy Lab #1 Gummy Lab



Discover which liquid will make the gummy grow the largest



Three different levels of directions

Gummy Lab A

Question: Which liquid will make the gummies grow the largest?

Materials: Gummy candy like gummy bears or gummy worms, water, vinegar, lemon-lime, oil, salt water, 4 clear cups, ruler

Prediction: I think the gummy in the _____ liquid will grow the largest.

Describe the Experiment:

- Place 1/4 cup of each liquid in each cup
- Measure four gummy's
- Place one gummy in each cup
- Wait 1 day
- Take out the gummy's and measure them again

Data:

Draw a picture of each gummy at the beginning of the experiment and write down the length

1. Wait 1 day

2. Draw a picture of what the gummies now look like.

13. Take out the gummies and measure them again

14. Create a bar graph of your results

15. Answer the questions



Gummy Lab A

Question: Which liquid will make the gummies grow the largest?

Materials: gummy candy, four liquids, cups, ruler

Prediction: I think the gummy in the _____ liquid will grow the largest.

Describe the Experiment:

- Place 1/4 cup of each liquid in each cup
- Measure four gummy's
- Place one gummy in each cup
- Wait 1 day
- Take out the gummy's and measure them again

Data:

Draw a picture of each gummy at the beginning of the experiment and write down the length

Liquid: _____

Liquid: _____

Liquid: _____

Liquid: _____

Gummy Lab B

Question: How do liquids affect the size of gummies?

Hypothesis: predict the gummy in the _____ liquid will grow the largest

Materials: Gummy candy like gummy bears or gummy worms, 4 different liquids, clear cups for every liquid, ruler

Describe the Experiment:

- Place 1/4 cup of each liquid in each cup
- Measure four gummy's
- Place one gummy in each cup
- Wait 1 day
- Take out the gummies and measure them again

Independent Variable: _____

Control Variables: _____

Dependent Variable: _____

Liquids	Starting Length	Ending Length
A:		
B:		
C:		
D:		

How liquids affect gummy's

7.0	
6.5	
6.0	
5.5	
5.0	
4.5	
4.0	
3.5	
3.0	
2.5	
2.0	
1.5	

Gummy Lab B

Question: How do liquids affect the size of gummies?

Materials: Gummy candy like gummy bears or gummy worms, 4 different liquids, clear cups for every liquid, ruler

Describe the Experiment:

- Place 1/4 cup of each liquid in each cup
- Measure four gummy's
- Place one gummy in each cup and draw a picture of what you see
- Wait 1 day
- Take out the gummies and measure them again
- Draw a bar graph of your results
- Answer the questions



Gummy Lab C

Question: How can you increase the size of a gummy with liquids?

Materials: Gummy candy like gummy bears or gummy worms, 4-6 different liquids (examples: water, oil, vinegar, lemon-lime soda, salt water, orange juice, or any other child safe liquids you may have), clear cups for every liquid, ruler

Directions:

- Identify your independent variable. (Think about what you are going to change in this experiment to answer the question?)
- Identify your dependent variable. (Think about what are you going to measure to answer the question?)
- Create your hypothesis. If (what are you going to change?), then (what do you predict the outcome will be?)
- Give a basic description of how you will test your hypothesis
- Perform your experiment and record your observations
- Graph your data
- Analyze your data and draw conclusions




Gummy Lab C

Question: How can you increase the size of a gummy with liquids?

Hypothesis: _____

Materials: _____

Experiment: _____

Control Variables: _____

Trial 1	Trial 2	Trial 3	Average

Effect of _____

I.V. _____

I.V. _____

I.V. _____



Candy Lab #2: Candy Letters



Discover which liquid will make dissolve the letter off of the candy the fastest.



Three different levels of directions

Candy Letter Lab A

Question: Which color of candy will lose its letter first?

Materials: Any candy that has a white letter stamped on it like m&m's or skittles, 5 clear cups, stop watch

Hypothesis: I think the _____ color will lose its letter first.

Directions: I think the _____ color will lose its letter first.

Procedure:

- Place 1/4 cup of water in each cup
- Place a different colored candy in each cup
- Start the stop watch
- Record how long it takes for the letters on each color to float
- Draw a picture of what you see in each cup
- Create a bar graph of your results
- Answer the questions

Candy Letter Lab A

Question: Which color of candy will lose its letter first?

Materials: Any candy that has a white letter stamped on it like m&m's or skittles, 5 clear cups, stop watch

Hypothesis: I think the _____ color will lose its letter first.

Directions: I think the _____ color will lose its letter first.

Procedure:

- Place 1/4 cup of water in each cup
- Place a different colored candy in each cup
- Start the stop watch
- Record how long it takes for the letters on each color to float
- Draw a picture of what you see in each cup
- Create a bar graph of your results
- Answer the questions

Candy Dissolve Lab B

Question: How do liquids affect how fast the candy coating will dissolve?

Hypothesis: I predict the candy in the _____ liquid will dissolve _____

Materials: Any candy that has a white letter stamped on it like m&m's or skittles, 4 different liquids (examples: water, oil, vinegar, lemon-lime soda, salt water, apple juice, or any other child safe liquids you may have), 4 clear cups, stop watch

Control Variables: _____

Procedure:

- Place 1/4 cup of each liquid in a cup
- Place the same color candy in each cup
- Start the stop watch
- Record how long it takes for the candy to dissolve
- Draw a picture of what you see in each cup
- Create a bar graph of your results
- Answer the questions

Candy Dissolve Lab B

Question: How do liquids affect how fast the candy coating will dissolve?

Hypothesis: I predict the candy in the _____ liquid will dissolve _____

Materials: Any candy that has a white letter stamped on it like m&m's or skittles, 4 different liquids, 4 clear cups, stop watch

Control Variables: _____

Liquids	Time to dissolve

How liquids how fast a candy will dissolve

Candy Dissolve Lab C

Question: What is the fastest way to dissolve the candy coating off candies?

Materials: Any candy that has a white letter stamped on it like m&m's or skittles, 4 different liquids (examples: water, oil, vinegar, lemon-lime soda, salt water, orange juice, or any other child safe liquids you may have), 4 clear cups, stop watch

Directions:

- Identify your independent variable. (Think about what you are going to change in this experiment to answer the question?)
- Identify your dependent variable. (Think about what are you going to measure to answer the question?)
- Create your hypothesis. If (what are you going to change?), then (what do you predict the outcome will be?)
- Give a basic description of how you will test your hypothesis
- Perform your experiment and record your observations
- Graph your data
- Analyze your data and draw conclusions

Candy Dissolve Lab C

Question: What is the fastest way to dissolve the candy coating off candies?

Materials: _____

Control Variables: _____

Trial 1	Trial 2	Trial 3	Average

Effect of _____



Candy Lab #3: Candy cane



Discover how temperature affects a candy cane



Three different levels of directions

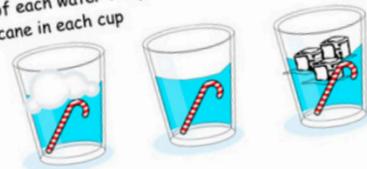
Candy Cane Lab A

Question: Which temperature will remove the strips on a candy cane faster?

Materials: Three candy canes, hot water (use caution), room temperature water, ice water, 3 clear cups, stop watch

Directions:

- Place 1/4 cup of each water temperature in each cup
- Place a candy cane in each cup
- Start the stop watch
- Record how long it takes for the color to disappear from the candy cane
- Draw a picture of what you see in each cup
- Create a bar graph of your results
- Answer the questions




Candy Cane Lab A

Question: Which temperature will remove the strips on a candy cane faster?

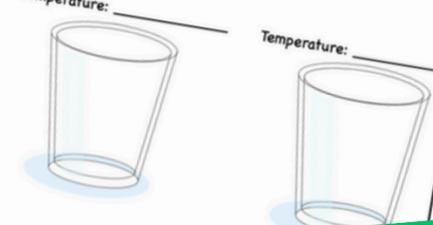
Materials: Three candy canes, hot water (use caution), room temperature water, ice water, 3 clear cups, stop watch

Hypothesis: I think the _____ water will cause the candy to lose its color faster.

Directions:

- Place 1/4 cup of each water temperature in each cup
- Place a candy cane in each cup
- Start the stop watch
- Record how long it takes for the candy cane to lose its color
- Draw a picture of each candy cane at the beginning of the experiment
- Draw a picture of each candy cane at the end of the experiment

Temperature: _____ Temperature: _____



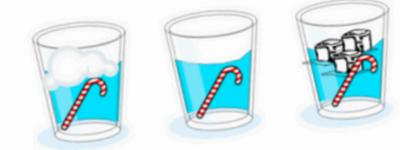
Candy Cane Lab B

Question: How does temperature affect candy canes?

Materials: Three candy canes, hot water (use caution), room temperature water, ice cold water, 3 clear cups, stop watch

Directions:

- Place 1/4 cup of each water temperature in each cup
- Place a candy cane in each cup
- Start the stop watch
- Record how long it takes for the color to disappear from the candy cane
- Draw a picture of what you see in each cup
- Create a bar graph of your results
- Answer the questions



Candy Cane Lab B

Question: How does temperature affect candy canes?

Hypothesis: I predict that the _____ water will cause the candy to lose its color faster.

Materials: Three candy canes, hot water (use caution), room temperature water, ice cold water, 3 clear cups, stop watch

Experiment: _____

Control Variables: _____

Temperature	Time to dissolve
Hot Water	
Room temperature	
Cold Water	

How Temperature affects Candy Canes



Temperature Temperature Temperature

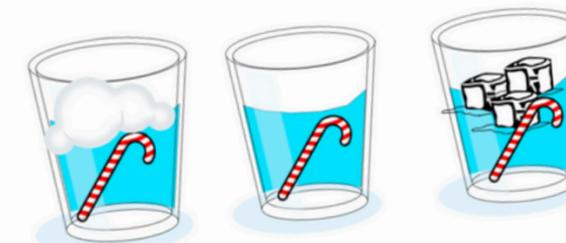
Candy Cane Lab C

Question: How does temperature affect candy canes?

Materials: Three candy canes, hot water (use caution), room temperature water, ice cold water, 3 clear cups, stop watch

Directions:

- Identify your independent variable. (Think about what you are going to change in this experiment to answer the question?)
- Identify your dependent variable. (Think about what are you going to measure to answer the question?)
- Create your hypothesis. If (what are you going to change?), then (what do you predict the outcome will be?)
- Give a basic description of how you will test your hypothesis
- Perform your experiment and record your observations
- Graph your data
- Analyze your data and draw conclusions



Candy Cane Lab C

Question: How does temperature affect candy canes?

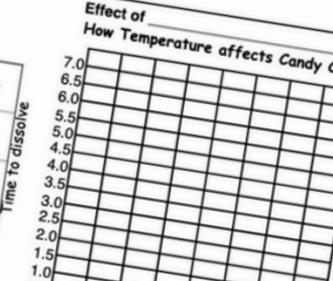
Hypothesis: _____

Materials: _____

Experiment: _____

Control Variables: _____

Effect of _____ How Temperature affects Candy Canes



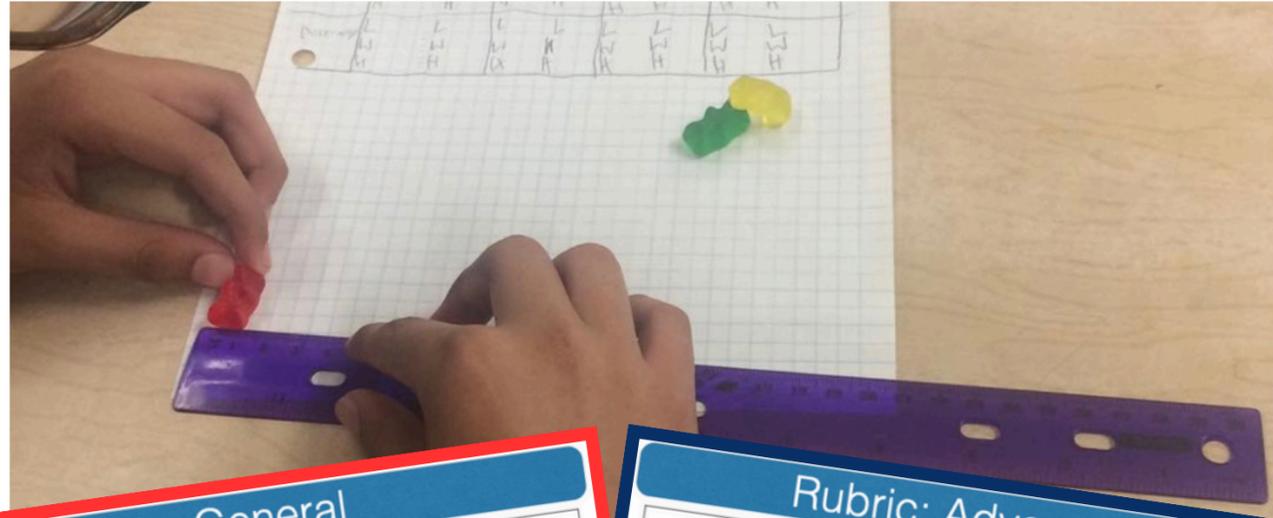
Time to dissolve

Temperature Temperature Temperature



Rave Reviews

from Happy Teachers!



“ We did the M & M candy experiment today in class. My students LOVED it! They were very engaged , watching closely to see which M & M color would loose its letter first. I plan on doing the gummy bear experiment also. thank you! - Kristine ”

“ Great lab to do at the beginning of the year to introduce the scientific method and variables. Thank you!- Olivia D. ”

“ I used the gummy bear lab as a school year intro lab. The three different levels is awesome. I was able to use the same lab with my lower level physical science students and my higher level honors chemistry. One lab all day = Easier clean up for me! Well written and easy to follow.- Karis ”

Rubric: General				
	4	3	2	1
Question/ Hypothesis	Question is clearly stated. The hypothesis is testable and includes the independent and dependent variables	Question is clearly stated. The hypothesis is testable but is missing one or more variables	Question is stated but the hypothesis is not testable	Question or hypothesis is missing
Controlled Experiment	There is one independent variable that tests the hypothesis. The dependent variable and variables that need to be controlled are listed. The description of the experiment is clear and covers the main points of the experiment	There is one independent variable that tests the hypothesis. The dependent variable and most variables that need to be controlled are listed. The description of the experiment covers most of the key points of the experiment	There is more than one independent variable or it doesn't test the hypothesis. The dependent variable and some variables that need to be controlled are listed. The description of the experiment covers some of the key points of the experiment	There is more than one independent variable or it doesn't test the hypothesis. The dependent variable and some variables that need to be controlled are listed. The description of the experiment covers some of the key points of the experiment
data and graphs	Data table is well organized. Graphs are of the correct type and all titles, axes, and increments are correct	Data table is organized. Graphs are of the correct type and there are only small errors in graphing	Data tables are incomplete or contain several errors. The graphs are incomplete or contain several errors	Data tables are incomplete or inaccurate. Graphs are incomplete or inaccurate
Conclusion	The conclusion incorporates the claim, evidence, and reasoning and has no grammatical or spelling errors	The conclusion incorporates the claim, evidence, and reasoning and has some grammatical or spelling errors	The conclusion incorporates most of the claim, evidence, and reasoning and has some grammatical or spelling errors	The conclusion incorporates most of the claim, evidence, and reasoning and has a lot of grammatical or spelling errors
Comments				Total Score
				Overall Grade

Rubric: Advanced				
	4	3	2	1
Question/ Hypothesis	Question is clearly stated. The hypothesis is testable and includes the independent and dependent variables	Question is clearly stated. The hypothesis is testable but is missing one or more variables	Question is stated but the hypothesis is not testable	Question or hypothesis is missing
Controlled Experiment	There is one independent variable that tests the hypothesis. The dependent variable and variables that need to be controlled are listed. The description of the experiment is clear and covers the main points of the experiment	There is one independent variable that tests the hypothesis. The dependent variable and most variables that need to be controlled are listed. The description of the experiment covers the main points of the experiment	There is more than one independent variable or it doesn't test the hypothesis. The dependent variable and some variables that need to be controlled are listed. The description of the experiment covers some of the key points of the experiment	There is more than one independent variable or it doesn't test the hypothesis. The dependent variable and some variables that need to be controlled are listed. The description of the experiment covers some of the key points of the experiment
data and graphs	Data table is well organized. Graphs are of the correct type and all titles, axes, and increments are correct	Data table is organized. Graphs are of the correct type and there are only small errors in graphing	Data tables are incomplete or contain several errors. The graphs are incomplete or contain several errors	Data tables are incomplete or inaccurate. Graphs are incomplete or inaccurate
Conclusion	The claim restates the hypothesis and states if it is supported or not. Evidence supports the claim and gives detailed descriptions with elaboration. Reasoning links the claim to the evidence and is true.	The claim restates the hypothesis and states if it is supported or not. Evidence supports the claim and gives descriptions. Reasoning links the claim to the evidence and is true.	The claim restates the hypothesis and states if it is supported or not. Evidence supports the claim. Reasoning links the claim to the reasoning but is not true.	The claim restates the hypothesis or states if it is supported or not. Evidence does not support the claim. Reasoning links the claim to the reasoning but is not true.
Comments				Total Score
				Overall Grade

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Scientific Method Unit

Engage your students and help them learn about the scientific method, including controls and variables, through this 5E, 4-week inquiry investigation into the scientific method.

“ I used this to kick off science with a blast. Some of the projects are an easy fit for the Engineering Design Cycle.- Block Buster Tutoring ”

SCIENTIFIC METHOD

Science Investigation: Example

Question: How does music affect the height of plants?

Hypothesis: If music is played to plants, then the plants listening to classical music will grow highest.

Materials: 15 plants of the same type and size, water, 5 grow lamps, music player

Describe the Experiment: Place the plants into groups of three. Put the plants in different areas of the house and under a grow lamp. Measure the initial heights of the plants. Play music for 6 hours a day. Group A gets no music, group B gets classical music, group C gets heavy metal, group D gets country, and group E gets rap music played to them. After 30 days measure the height of the plants in centimeters.

Independent Variable: type of music

Control Variables: type of plant, initial plant height, amount of water, amount of time the grow lamp, amount of time music is played

Dependent Variable: plant height in centimeters

Data:	Group A No Music		Group B Classical Music		Group C Heavy Metal Music		Group D Country Music		Group E Rap Music
	Day 0	Day 30	Day 0	Day 30	Day 0	Day 30	Day 0	Day 30	
Total 1	5 cm	8cm	5 cm	14cm	5 cm	8cm	5 cm	12cm	
Total 2	5 cm	8.5cm	5 cm	14.5cm	5 cm	7.5cm	5 cm	11cm	
Total 3	5 cm	8cm	5 cm	13.5cm	5 cm	7cm	5 cm	12cm	
Average	5 cm	8.5cm	5 cm	14cm	5 cm	7.5cm	5 cm	12cm	

Effect of music on plants (height at 30 days)

Variable and Controls

Big Idea Question: What is a controlled experiment?

When scientists conduct experiments to test a hypothesis they have to make sure their experiments are controlled. What is a controlled experiment? A controlled experiment is an experiment where all variables are kept the same except one. A variable is any factor that can change or influence an experiment. The one variable that is changed in an experiment is called the independent or manipulated variable. It is based on the question you are asking. For instance, if you want to know how fertilizer affects plant growth the variable you would change is fertilizer. The variable that changes as a result is the dependent or responding variable. This is the variable that would observe and measure. For instance, when you change the fertilizer the variable you would observe and measure would be the height of the plants. For the experiment to be controlled all the other variables need to be kept the same. For instance, when changing the fertilizer you would need to make sure that you start with the same type and height of plants, that you give them the same amount of water and sun.

A controlled experiment: How does fertilizer affect plant growth?

5E Model

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