

MEGA MOLECULES



TEACHER GUIDE



PLANNING

Here's a suggested schedule for this kit! The activities should be completed in order, but you can choose when the lessons take place over time.

ACTIVITY INFORMATION	SECTION (S)	TIME REQUIRED	DAY/ LESSON
ACTIVITY 1: MAKING SOMETHING NEW Make a new toy with a few simple ingredients! Total time: 45 min	<input type="checkbox"/> Bouncy Balls	45 minutes	Day 1
ACTIVITY 2: LINKED TOGETHER Polymers are everywhere. What are they, and how are they made? Total time: 2 h 45 min	<input type="checkbox"/> Making Chains	30 minutes	Day 2
	<input type="checkbox"/> Almost Everything	30 minutes	Day 3
	<input type="checkbox"/> Catching the Sun	45 minutes	Day 4
	<input type="checkbox"/> Made from...		Day 5
ACTIVITY 3: FUELING YOUR BODY			

Full schedule available with purchase

8+ hours

? **Question 3: Did the water, borax, and glue make a new substance? How do you know?**

Answer: Yes! A new material formed and the three original materials could not be separated back out.

? **Question 4: What are two things you observed about the mixtures or the bouncy ball?**

Answer: Answers will vary.

How to Help: Encourage your student to think about what made the bouncy ball mixture different from the other two mixtures. You can also encourage them to think about the properties of the ball.

? **Question 5: What are two questions you have about the mixtures or the bouncy ball?**

Answer: Answers will vary.

How to Help: Students may wonder about the ball's properties or if the items that made the ball had the same properties. Encourage your student to think about what they don't already know about the bouncy ball or how it was made.

activity 2

LINKED TOGETHER

In Activity 1, your student found that mixing borax and water, or glue and water didn't result in a new substance. However, when they mixed borax, glue, and water something special happened: a new, bouncy substance formed. In this activity, students will categorize physical and chemical changes and discover the world of polymers

LEARNING GOALS:

- ✓ I can use evidence about properties before and after a change to decide if the change was a chemical reaction.
- ✓ I can use evidence to show that synthetic materials are made from natural resources and affect society today.

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MAKING CHAINS

CONTENT

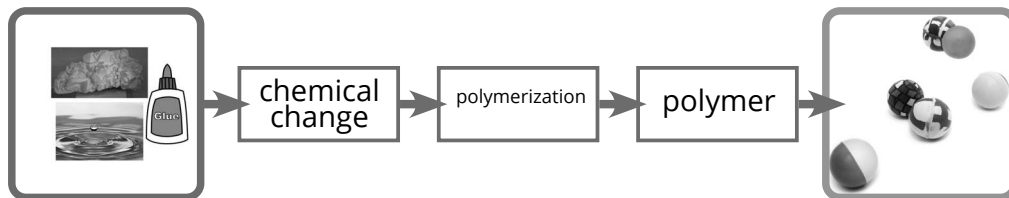
- In this reading section, your student will learn these vocabulary terms: chemical change, monomer, physical change, polymer, and polymerization.



THINK ABOUT IT!

? **Question: Fill in the chart with the correct vocabulary terms to show how the borax, glue, and water became a bouncy ball. Terms: chemical change, polymer, polymerization**

Answer:



Carbohydrates

- In this reading sub-section, your student will learn these vocabulary terms: carbohydrate, disaccharide, glycosidic bond, isomer, monosaccharide, and polysaccharide.

? (In Your Food) Question: Three of the four essential macromolecules are obtained through digestion. Can you guess what they are?

Answer: Lipids, carbohydrates, and proteins are found in the foods we eat.

How to Help: The answer is provided in the student text, so they may see the answer before thinking through this question. However, make sure they are clear that their DNA isn't consumable through the foods they eat and that the DNA of the foods they're eating won't change to alter their own DNA.

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LOOKING AT LABELS

CONTENT

- In this reading section, your student will learn the following vocabulary terms: calorie, kilocalorie, and nutrition.

☒ PREPARATION AND SUPERVISION

Nutrition Facts	
8 servings per container	
Serving size	2/3 cup (55g)
Amount per serving	
Calories	230
% Daily Value*	
Total Fat 8g	10%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 160mg	7%
Total Carbohydrate 37g	13%
Dietary Fiber 4g	14%
Total Sugars 12g	
Includes 10g Added Sugars	20%
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

- Help your student to find foods they regularly eat, or even typical snacks they enjoy. Having foods that are consumed frequently can make the material more relatable for your student.

- Your student's responses in the table will vary based on the items they choose, however, here are the correct responses for this nutrition label example.

Amount you would typically eat	2 cups
Recommended serving	2/3 cup
How many grams of lipids per serving?	8 grams
How many grams of carbohydrates in a serving?	37 grams
How much protein in a serving?	3 grams
How many servings for 100% of your daily in-take of fat?	10 servings
How many servings for 50% of your daily in-take of carbohydrates?	At least 4 servings
Calories per serving	230 calories
Calories per container	1840 calories

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HAVE YOU TAKEN IT ALL IN?

Nutrition Facts	Macaroni and Cheese
8 servings per container	
Serving size	2/3 cup (55g)
Amount per serving	
Calories	230
% Daily Value*	
Total Fat 8g	10%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 160mg	7%
Total Carbohydrate 37g	13%
Dietary Fiber 4g	14%
Total Sugars 12g	
Includes 10g Added Sugars	20%
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%



? Question 1: Match the nutrition label to the correct food. Explain how you know.

Answer: The nutrition label is for the macaroni and cheese because of the amount of lipids listed on the label. Apples, like many other fruits, do not contain that much fat.

How to Help: All responses provided for which food item the label belongs are accurate for all parts of this question. However, responses for how your student made their decision will vary from those provided for all parts of this question. Do ensure responses are justified.

Question 4: In your own words, explain the types of chemical bonds that occur in macromolecules.

Answer: Answers will vary.

How to Help: There are two chemical bonds your student has learned about – hydrogen and covalent bonds. If your student begins to describe peptide bonds, ester bonds, and glycosidic bonds, ensure they recognize these are all types of covalent bonds.

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activity

BREAKING IT DOWN

Ingredients are used to “build” the molecules found in our food through chemical changes like polymerization. Those food molecules are not only built by chemical reactions, but must be broken down by them too. In this activity, your student will explore the process by which the human body breaks these molecules down.

LEARNING GOALS:

- ✓ I can use evidence about properties of substances before and after a change to decide if the change was a chemical reaction.
- ✓ I can develop a model showing how chemical reactions make new molecules from food for organisms to grow.

II

HOW DO THINGS BREAK DOWN?

CONTENT

- In this reading section, your student will learn the vocabulary terms: anabolic process, catabolic process, enzyme, kinetic energy, metabolism, and potential energy.
- Your student will learn about these vocabulary terms using carbohydrates, a macromolecule polymer, as an example.
- Thermal energy, or heat energy, is lost during the chemical reactions of digestion, but not discussed in the Student Workbook as it is not crucial to their understanding of polymers.

I2

AT YOUR OWN SPEED

CONTENT

- In this reading section, your student will learn the vocabulary term basal metabolic rate.

MULTIPLE AGES AND ABILITIES:

If you are working with multiple students, have each complete the following activities independently. Then, have them compare their results to determine who has the highest BMR or who burns the most calories.



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Kit	SU-MEGMOL
Instructions	IN-MEGMOLT
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