Ask® Teacher Guide: November/December 2024

Make It!

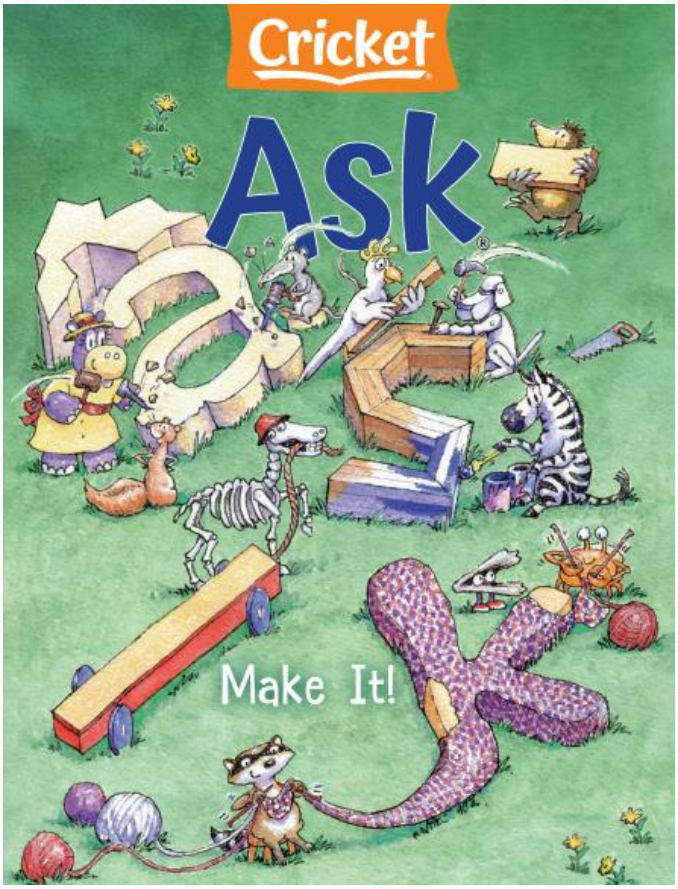
Makers include people from ancient artisans crafting items from natural resources to today's inventors using the latest technology. This issue of ASK magazine examines a wide range of makers and their creations responsible for keeping societies functioning and people comfortable.

CONVERSATION QUESTION

How do makers enrich our world?

TEACHING OBJECTIVES

- **Students will learn about author and illustrator, Meghan McCarthy.**
- **Students will learn about 3D printing procedures.**
- **Students will learn about the materials used in ancient times to make everyday objects.**
- **Students will construct explanations and questions.**
- **Students will sequence and explain a studied process.**
- **Students will classify information.**
- **Students will write a fictional story.**
- **Students will use a mathematical formula to calculate the area of a cube.**
- **Students will disclose how to make a particular object using only natural resources.**



In addition to supplemental materials focused on core STEAM skills, this flexible teaching tool offers vocabulary-building activities, questions for discussion, and cross-curricular activities.

SELECTIONS

- **Making Books**
  Nonfiction Interview
- **Three Cheers for 3D Printing**
  Expository Nonfiction
- **Handmade History**
  Expository Nonfiction, ~870L

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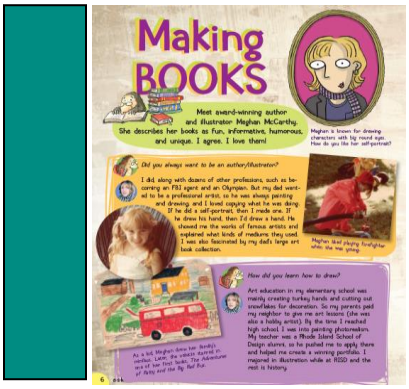
Making Books

pp. 6–9, Nonfiction Interview

Described as informative and humorous, the books of children's author and illustrator Meghan McCarthy cover a wide range of topics. Readers will gain first-hand knowledge about her creative strategies, as well as learn about the publication process.



RESOURCES

Construct Explanations: Book Look

OBJECTIVES

- Students will learn about author and illustrator, Meghan McCarthy.
- Students will construct explanations and questions.
- Students will write a fictional story.

KEY VOCABULARY

- ***mediums* (p. 6)** the materials and techniques used to create a work of art
- ***photorealism* (p. 6)** a style of art that attempts to achieve the same level of detail and realism as a photograph
- ***annex* (p. 9)** a building joined to or associated with a main building, providing additional space or accommodations
- ***plethora* (p. 9)** a large or excessive amount of something

ENGAGE

Conversation Question: How do makers enrich our world?

Distribute the article "Making Books," and have students focus on the drawing in the oval on the top of page six. Read aloud the caption that states, "Meghan is known for drawing characters with big round eyes." Give students a few moments to draw a self-portrait or sketch a random character using this technique. Upon completion, allow students to do an art walk to view their classmates' creations.

INTRODUCE VOCABULARY

Introduce this as a ***Jeopardy!***-style learning activity. Provide the class with only the definitions of the key vocabulary terms. Have them read and discuss. Inform students that they will revisit these definitions after reading and pose the proper question using words from the vocabulary-rich article. (*What are mediums? What is photorealism? What is an annex? What is a plethora?*) Have them formulate 16 more answers needing questions, for a total of twenty, and share with other classes as a post-reading activity.

READ & DISCUSS

Reinforce comprehension of the concepts presented in the article by using the following questions to direct discussion.

1. What are some of the other professions that author and illustrator Meghan McCarthy was interested in as a child?
2. Why didn't Meghan's first book last very long on the shelves?
3. How does Meghan decide what to write?
4. In what ways does Meghan research a topic for her books?
5. Why doesn't Meghan usually read her books once they are published?

SKILL FOCUS: Construct Explanations & Questions

INSTRUCT: Students will use information from the article to construct explanations that answer the two questions at the top of the *Book Look* organizer. Then they will construct five questions that they would ask their favorite author/illustrator if they had the opportunity to interview them.

ASSESS: Allow students to turn and talk with a partner to discuss their answers to the two questions. Compile a master list of interview questions on the board.

EXTEND

Language Arts: On page nine, the interview discusses how Meghan McCarthy wrote a nonfiction book about Chester Greenwood's invention of earmuffs. Review with students that nonfiction is based on reality and actual experiences and fiction is usually driven by creativity and imagination. (If possible, have a copy of McCarthy's, "Earmuffs for Everyone" available.) Challenge students to write their own fictional story of a book with the same title. Invite volunteers to share their stories.

Book Look

Construct Explanations: Reread the article and construct explanations for the questions below using information from the text.

Question #1	Question #2
Why did Meghan McCarthy want to be an author and illustrator? **1.** **2.** **3.**	*How does Meghan McCarthy decide what to write?*

Construct Questions: Imagine that you had the opportunity to interview your favorite author/illustrator. Construct five questions that you would ask.

My favorite author/illustrator is _____.

1. _____

2. _____

3. _____

4. _____

5. _____

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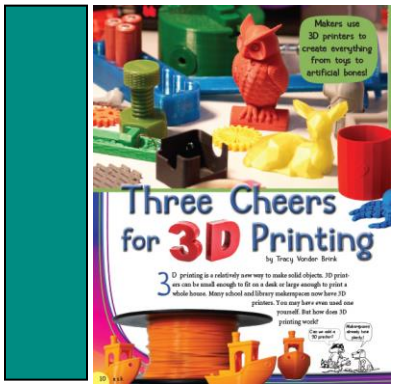
Three Cheers for 3D Printing

pp. 10–13, Expository Nonfiction

From toys to artificial bones, 3D printing is quickly becoming a new way to make solid objects. This article guides students through the process and discusses the current and future applications for 3D printing technology.



RESOURCES

Sequence a Process: Printing Procedures

OBJECTIVES

- Students will learn about 3D printing procedures.
- Students will sequence and explain a studied process.
- Students will use a mathematical formula to calculate the area of a cube.

KEY VOCABULARY

- ***makerspaces* (p. 10)** places in which people with shared interests can gather to work on projects while sharing ideas, equipment, and knowledge
- ***prosthetic* (p. 11)** an artificial body part
- ***spools* (p. 11)** round objects that are made to have something wrapped around them; reels

ENGAGE

Conversation Question: How do makers enrich our world?

Construct a K-W-L chart (Know-Want to Know-Learned) to record students' prior knowledge about 3D printing, as well as what they would like to know about this new technology. Return to the chart after completion of the reading and activities in this guide and have students add details about what they have learned. If there are remaining curiosities about the subject, allow the class to use books and the internet during a free period to find more information.

INTRODUCE VOCABULARY

Display the following statements and underline the key vocabulary terms. Review how to infer the meanings of new words by using context clues and background knowledge. Then have partners work together to determine the meaning of each word. Reveal definitions.

- The second floor houses a library, an art room, and a makerspace.
- Vic wears a prosthetic arm because his own was amputated after an accident.
- The cable lines are transported using large wooden spools made by the utility company.

READ & DISCUSS

Reinforce comprehension of the concepts presented in the article by using the following questions to direct discussion.

1. What kinds of objects can be made with a 3D printer?
2. What different materials can the layers of a 3D object be made of?
3. How does the filament create the maker's design?
4. Why are some objects unable to be used as soon as they come off the printer?
5. Why doesn't 3D printing always work the first time?

SKILL FOCUS: Sequence a Process

INSTRUCT: Review the article and guide students to notice that there is a specific process involved in creating a 3D object. Distribute the *Printing Procedures* graphic organizer and instruct students to condense the process into four important steps that detail the 3D printing process from filament to finished product.

ASSESS: Circulate as students are working and have them retell the process in their own words. Collect and evaluate charts for accuracy.

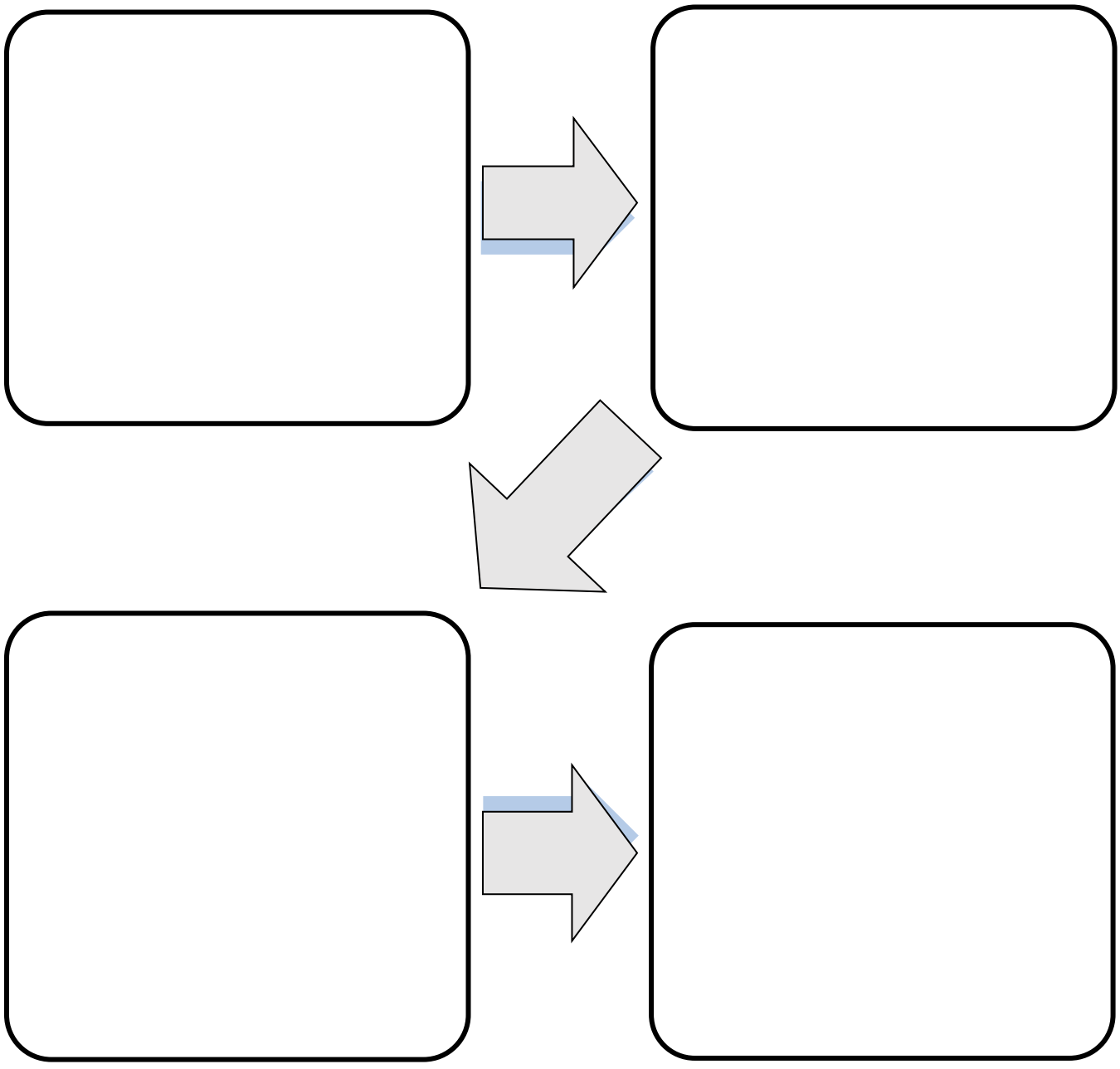
EXTEND

Mathematics: Remind students that 3D, or three dimensional, refers to the three spatial dimensions of width, height, and depth. In mathematics, 3D shapes are called solid shapes. In geometry, formulas for volume can determine how much a solid object can hold. Use the formula, $V = l \times w \times h$, to calculate the volume of a lunchbox (rectangular prism) with the following measurements: l = 9 in. w = 7 in. h = 5 in.

(**Answer** = 9 x 7 x 5 = 315 cubic inches)

Printing Procedures

Sequence a Process: Reread the article and highlight sentences that detail the steps of the 3D printing process. Condense the procedure into four steps and explain each step in the correct order. Include details.



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Handmade History

pp. 18–23, Expository Nonfiction

Throughout time, people have relied on natural resources to make things that could help them survive and enjoy life. Travel back in time to discover how certain natural resources were used to make an amazing variety of objects.

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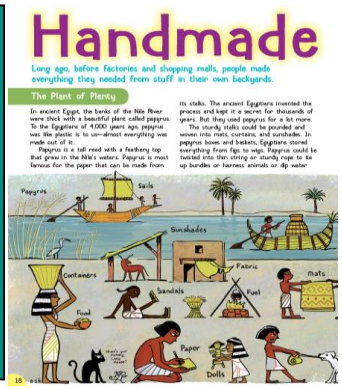

RESOURCES

Classify Information: Helping Hands

OBJECTIVES

- Students will learn about the materials used in ancient times to make everyday items.
- Students will classify information.
- Students will disclose how to make a particular object using only natural resources.

KEY VOCABULARY

- ***versatile* (p. 19)** having many different uses
- ***ointment* (p. 20)** a thick liquid that has a soothing and moisturizing effect when applied to the skin
- ***baffled* (p. 23)** confused or perplexed

ENGAGE

Conversation Question: How do makers enrich our world?

Have students take a close look at their shoes and identify the different materials that were used to make them. Ask students to consider how their shoes would be different if they could only be constructed using materials found in nature. Ask: *How could you make suitable footwear using only natural resources?* Introduce the article "Handmade History" and tell students that they will be reading about how three available natural materials were used to make many important objects.

INTRODUCE VOCABULARY

Post the key words and discuss the meanings of the terms. Then display the following prompts and have students discuss responses with a partner.

- Why might **versatile** actors get more roles?
- Why would the doctor recommend an **ointment**?
- What situations have left you **baffled**?

READ & DISCUSS

As a post-reading activity, lead a discussion based on the following questions:

1. Why do you think the Egyptians kept the process for making paper a secret for thousands of years?
2. How was papyrus used in the burial of King Tutankhamun?
3. How do bees build a wax comb to put their honey in?
4. What uses did children have for beeswax?
5. What happened to the buffalo that once roamed the American countryside?

SKILL FOCUS: Classify Information

INSTRUCT: The main idea of the article is to provide readers with information about how three particular resources were used to create a variety of objects. Present the graphic organizer *Helping Hands* and tell students that they will be using information from the article to correctly classify the resource origin of the item listed.

ASSESS: As students are working independently, circulate and discuss the information in the article.

EXTEND

Social Studies: Define natural resources as follows: resources that occur in nature and are used with few modifications for economic benefit or to satisfy human needs. Have students work together to create a list of natural resources that can be found in their region and then discuss objects that can be made the resources. Examples might be a clay bowl, cornhusk doll, or a game made from sticks and acorns. Instruct students to choose one item made from a natural resource and to illustrate and describe the item. Then have them write clear directions for making it. Ask students to share the directions, so that others can duplicate it.

Helping Hands

Classify Information: Use information from the article to determine if the sentence pertains to papyrus **(P)**, honey/beeswax **(H)**, or buffalo **(B).** Mark each sentence accordingly.

_____ 1. Rawhide was used for moccasin soles.

_____ 2. It could be pounded and woven into curtains.

_____ 3. It was used as an ointment for skinned knees.

_____ 4. It could be twisted into thin string or sturdy rope.

_____ 5. It was used to seal envelopes.

_____ 6. It was used to make a sled for snowy days.

_____ 7. It was used to make boats and sails.

_____ 8. It was used by the Sioux cook for a variety of things.

_____ 9. Ladies stiffened thread for sewing using this.

_____ 10. Students wrote on tablets covered in this.

_____ 11. It is most famous for the paper that can be made from it.

_____ 12. Its chips were burned for fuel in cooking fires.