

Thank you for purchasing college-prep materials from DreamCatcher Curriculum, LLC. We appreciate your business and hope that our products meet your needs for assisting students prepare for college. Although our materials can stand alone as a handout for students, the program guide will offer additional information and activities to share with students in a classroom or workshop setting.

The program guide is intended as a rough outline for the topic and can be adapted as you see fit to meet the needs of your program, school, or situation. The guide also includes copy-permissible pages for use in activities as a supplement to instruction. **Please note that color handouts are copyright-protected and duplication in any form is strictly prohibited.** See our website www.dreamcatchercurriculum.com for additional info, resources, and new curriculum topics.

➔ **BEFORE YOU BEGIN:** This workshop requires minimal prep, however, it is strongly recommended that you read and review the program guide along with the handout before meeting with students.

STEAM OBJECTIVE & INCLUDED TOPICS

To provide middle (and/or high) school students with information about STEAM (Science, Technology, Engineering, Art, and Math), skills associated with studying STEAM subjects, as well as provide featured careers and additional information about each element of STEAM; *STEAM By the Numbers, STEAM Careers and Study Tips, STEAM Skills, Not into STEAM?*

BEFORE THE WORKSHOP/SESSION:

This workshop is appropriate middle school through high school students. Prep the workshop activities (Tower Challenge and the Art Puzzle) before the workshop for seamless transitions. Preview the following videos (and ensure there's technology to view in the workshop) that correspond to the careers on the inside of the handout: [Physician's Assistant](#), [Computer and Information Research Scientist](#), [Environmental Engineering Technician](#), [Broadcast and Sound Engineering Technician](#), [Actuary](#). Consider cueing up the videos in your internet browser prior to the workshop to save time.

STEP ONE TIME: 10 MINUTES

Introduce the topic of **STEAM** (Science, Technology, Engineering, Art, and Math) and explain that not only will the workshop cover the skills that studying STEAM can strengthen, but those skills will be put into practice with two activities relating to STEAM. Students may have heard of STEM at school and perhaps they have heard of STEAM, as well; discuss what each letter stands for. Distribute the *STEAM* handout and begin on the front page by discussing the skills that STEAM can help sharpen: critical thinking, reasoning, collaboration, creativity, and investigative skills. Mention that a degree in a STEAM-related subject could make applicants more competitive: the number of jobs in STEM grow at a faster rate, have more job openings, and tend to pay higher than jobs in other fields. State that up to 73% of jobs will require a college degree and that STEAM degree holders are more likely to be chosen over non-STEAM or STEAM degree holders. Mention that 99% of STEAM jobs require some type of training or education beyond high school and 7 out of 10 jobs in STEM are related to computers. Review the "By the Numbers" section and ask if any of the figures were surprising.

STEP TWO TIME: 20 MINUTES

Put students into groups of 4-5 for a STEAM activity. Ask groups to select a leader, then ask the leader from each group to stand. Inform the leaders that they have been "fired" from their group and that they need to find a new group immediately. This will come as a shock to the leader and once the new groups have formed, ask the "fired" individuals to share how they felt when they were let go. State that in their future jobs, unexpected events might impact their employment and they'll have to be flexible and find a new job/place of employment. Ask groups to select a new leader (promise they won't be fired!) and ask the new leaders to come forward to receive the activity instructions. Let them know that they will have to share the instructions with their groups and communication is important. Read the following instructions and provide the supplies needed for the activity:

Activity instructions: *You will have 10 minutes to build a tower using only 50 straws and clay. At the end of the work time, groups will place a cup on top of the tower and then see how many marbles it can hold before collapsing. Groups will be expected to work together to use the skills discussed in the beginning of the workshop to complete their towers.*

Activity supplies needed: the included instructional activity half-sheet, 50 straws for each group, a portion of clay for each group, 1 paper cup, a bag or two of marbles to use as the weights

Make sure to recognize the group with the highest tower and the group whose tower held the most marbles. *Activity adapted from [PBS Learning Media](#). If reusing materials group-to-group, be sure to sanitize everything due to COVID-19.*

STEAM Program Guide



STEP THREE TIME: 15 MINUTES

After the activity, turn to the inside of the handout. Each element of STEAM has been broken into its individual components; guide students through each element and have them answer the prompt associated with each topic. Discuss the definitions and quotes associated with each topic (found in the circles); promote discussion by asking if they agree or have additional information to add.

Next, talk about the growing career highlighted within each topic. Each career requires a different level of education (associate degree, bachelor's degree, etc.); make sure to discuss the amount of time after high school each level of education requires. Lastly, discuss the "tips" associated with each individual topic. These tips are meant to assist students during their middle school or high school studies of STEAM subjects.

DreamCatcher Extra: If time allows, show the videos from the Career One Stop website links (included in this guide) in the *Before the Workshop/Session* section after each career is discussed. Each video is a little over a minute long.

STEP FOUR TIME: 10 MINUTES

Turn to the back of the handout to discuss *STEAM Skills*, stressing that there are many valuable skills to gain from STEAM in addition to the knowledge gained while studying. Start with **critical thinking** and discuss the importance of being informed and unbiased. Ask students where they could apply critical thinking and how it was applied while participating in the STEAM Mobile activity. Discuss **collaboration**. Mention that working in teams or groups will be required in high school, during college, and in their careers, and that harmonious interactions are important. Compromising and negotiating are important skills to learn from groupwork and collaboration as well. Next, discuss the **creativity** section. Ask how creativity was involved during the activity. Move to investigative skills, and review being imaginative and innovative. Lastly, cover **reasoning** and using **logic**. Ask if they had to consider consequences of their decisions during the tower activity since supplies were limited.

Move to the *Not into STEAM?* section. Discuss why applying the skills gained from STEAM subjects in liberal arts, as well as the importance of being innovative in the subjects of interest, is important. Conclude with the idea that being a well-rounded student is all about mixing subjects and ideas together to form new ideas or to gain better understanding. Also, many of the STEAM skills gained from studying those subjects are the skills that future employers will be looking for.

(OPTIONAL) STEP FIVE TIME: 20-30 MINUTES

ART PUZZLE Activity: Trace the grid over the top of a selected picture; the picture can be your school/college or program logo or any other picture that isn't too complicated (preferably in black and white). You can also use 2-3 different pictures, depending on group size or students can decorate multiple squares.

Number the backs of the squares (to be able to put the picture back together) and then cut them out; participants can decide which square they'd like to fill in with color, different kinds of paper, beads, foam objects, glitter, etc. For a more challenging activity, don't let students know the numbers or the picture before they create their own art square and let them put the picture together themselves using the STEAM skills learned.

Activity supplies needed: Copy or copies of the grid with a selected picture on the reverse side (or precut squares of a picture for a greater challenge!), colored pencils or pens, and any other art supplies to decorate the squares (such as seed beads, glitter, construction paper, foam pieces, cardboard, raffia, scissors, glue, etc.)

DreamCatcher Extra: Use the included grid to trace onto the back of your picture. Use different pictures with different groups and have an "art walk" for groups to see the different creations upon completion.

LAST STEP & ASSESSMENT TIME REMAINING

At the conclusion of the workshop, ask a few students to complete the STEAM program assessment and collect.

LEARNING OUTCOME

At the end of the workshop, students will name one skill that can be gained by the study of STEAM related subjects, a way to use skills learned while studying STEAM in other areas, and one STEAM tip learned that will be used in the future.

STEAM PROGRAM ASSESSMENT:

Name one skill that can be gained from studying STEAM-related subjects:

Name a way you can use skills learned while studying STEAM subjects in other areas:

Name one STEAM tip you learned in today that you'll use in the future:

STEAM PROGRAM ASSESSMENT:

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STEAM Tower Challenge

Who can build the tallest, strongest tower?

Use these tips in addition to the other materials and instructions your group leader provides to build a tower that is strong enough to hold the most marbles. Bonus points for being the tallest tower!

Test your tower before the competition starts and make necessary adjustments. How many marbles will your tower support?



Some STEAM tips:

Think about the base of your tower and whether it will support the weight of the marbles. Consider widening the base before going to height. Consider the shapes of the straws; will squares or triangles be more supportive?

Some things to consider:

What happens when you change the height of the tower?

Do you need to use all the provided materials or could you use less?

How much clay will it take to keep the straw "joints" together?

Activity adapted from PBS Learning Media.

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