



Rapid Brainstorming

How Can We Conserve Our Water Resources?

In this lesson, students will practice rapid ideation—an important step in design thinking—by brainstorming solutions to issues surrounding global water use and conservation. The purpose of rapid ideation is to produce an abundance of ideas in a short amount of time unconstrained by judgements or perceived limitations. Rapid ideation promotes out-of-the-box thinking and creativity, and can lead to highly innovative and perhaps unanticipated solutions to complex problems.

In this activity, students will **not** proceed beyond the rapid ideation stage to the actual implementation of a solution, as the goal of this lesson is not to lead students through a full design process. However, this lesson is part of a larger unit, **Flipside Science: Fresh Solutions: Water Use and Conservation**. In the final activity of this unit, your students can participate in a design thinking challenge to develop solutions for a water conservation issue at home or school.

Grade levels: 6-8

Essential questions

1. What are some of the water use and conservation issues we are facing in the world today, and how might we design solutions for them?
2. What are some advantages of rapid brainstorming?
3. Why is brainstorming an important step in designing solutions?

Objectives

Students will

1. Discover some of the water use and conservation issues people are currently dealing with around the world.
2. Practice rapid and creative ideation in the context of designing solutions for global water issues.

Materials needed

- Computer with Internet access
- Projector
- **Flipside Science video: *How Do We Meet the Growing Need for Water?***
- **Student Worksheets** (1 per student)

Grade levels: 6-8

Total activity time: 60 minutes

Materials needed:

- Computer
- Projector
- Flipside Science video
- Student Worksheets
- Stopwatches or timers





- Stopwatches or timers (1 per group of 2 students)

Pre-activity

If you are using this activity within the **Fresh Solutions: Water Use and Conservation** unit, it is recommended you progress through the **Your Hidden Water Footprint: Defining a Problem to Find a Solution** and **Exploring Our Growing Need for Water** activities before continuing with this one. You can also use this lesson independently.

Activity Procedure

Total Activity Time: 60 minutes

Part I: Ideation warm-up (10 min.)

1. Divide students up into pairs. You (the teacher) will challenge students with a question to which the students will be asked to brainstorm solutions. Their goal is to brainstorm (individually) **as many solutions as they can in two minutes**. Challenge them to try to come up with 10-15 solutions. They should write these solutions down in their notebooks or on a piece of paper.

Challenge question options (or make up your own!):

- How could you find a needle in a haystack?
 - How could you heat up a bowl of soup without a stove or microwave?
 - How could you open a jar without touching it directly with your hands?
 - How could you move water up a hill?
2. Remind students that the goal is to try to think of **as many solutions as they can** without worrying about how 'good' the solutions might be.
 3. After the two minutes are up, the students will stop writing and compare lists with their partners.
 4. **Briefly** discuss the exercise.
 - a. *Did you find it easy or difficult to brainstorm solutions?*
 - b. *Did you think any of your ideas were silly or wacky? Would you have included those ideas in the list if you were asked to only write down ideas that you thought were 'good'?*
 - c. *Do you think there is an advantage to brainstorming as many ideas as you can and not worrying about how good, bad, silly, or strange they might seem?*

Part II: Practicing rapid brainstorming of water conservation solutions (35-45 min.)

Teacher note: If you preceded this activity with the **Exploring Our Growing Need for Water** activity, you can skip steps 1 and 3 below.



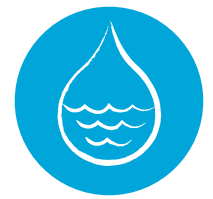


1. Hand out to students or write on the board a list of questions for them to think about while they watch the **Flipside Science: How Do We Meet the Growing Need for Water** video (see below).
2. Show students the **Flipside Science: How Do We Meet the Growing Need for Water?** video.
3. Ask students to jot down some of their thoughts about the questions that they were asked to consider while watching the video. Give them about 10 minutes to do this. You might want to play the video another time through for students. Briefly discuss these questions as a class after students have had a chance to reflect individually.
 - a. *What kinds of water issues were raised in the video?*
 - b. *Where can we find freshwater on Earth? What are freshwater reservoirs? Where else is water stored?*
 - c. *Why is a growing population a concern for our water resources?*
 - d. *Who/what uses water? Who/what is the largest user of water?*
 - e. *In what ways is water wasted?*
4. Ask students to choose one of the water issues introduced in the video to focus on (groundwater overuse, water waste, high water demand of agriculture, and access to clean freshwater sources) and to find a partner who chose the same issue. *Note: To expedite this process or if you would like to ensure that all water issues are represented, you can also have students pick water issues out of a hat and pair up that way too.*
5. Hand out one **Student Worksheet** to each student. Instruct students to work with their partners to figure out a way to express the water issue they chose **in the form of a question** and to write their question on their worksheet. Give students about 5-10 minutes to work on this, helping to facilitate the process where needed. Here are some examples of questions students might consider:
 - ***How can we keep underground aquifers from drying up?***
 - ***How could we decrease the amount of water wasted in our homes or on farms?***
 - ***How can we grow more food with less water?***
 - ***How can we provide easier access to clean, fresh water for people who don't have it?***
6. Hand out one stopwatch or timer to each pair, and briefly show students how to use them if needed. At this point, students will guide themselves through the next few steps of the activity, which include working through the process of facilitating their own rapid brainstorming sessions with their partners and comparing their ideas. Give students about 20 minutes for this part of the activity, reminding them when they have 10 minutes and 5 minutes left.

Wrapping up (10 min.)

1. Come back together as a class, and ask for volunteers to share some of their questions and brainstorms.
2. Ask students to reflect on their experience.





- Why do you think we tried to brainstorm as many ideas as we could instead of just trying to think of one or two 'good' ideas?*
- Are there easy solutions to the water issues you learned about in the video? Is there only one solution to each issue?*
- When thinking about which of your solutions might be the 'best,' what was your criteria? For example, did you think about the potential environmental impacts of the solution, or how expensive the solution would be to carry out?*

Next steps

Explore the pros and cons of some of the solutions that have been proposed for issues surrounding water use and conservation in the next activity in this **Flipside Science** unit, **Sustainable Water Solutions: Weighing the Pros and Cons**.

Fresh Solutions: Water Use and Conservation



Your Hidden Water Footprint:
Defining a Problem to Find a Solution



Sustainable Water Solutions:
Weighing the Pros and Cons



Exploring Our Growing Need for Water

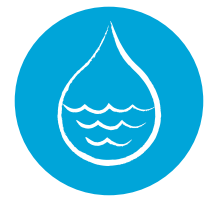


Fresh Solutions:
Design Thinking Challenge



Rapid Brainstorming:
How Can We Conserve Our Water
Resources?





About Flipside Science

Flipside Science is a youth-powered series that tackles complex environmental topics and empowers viewers to make a difference. This engaging and upbeat collection of videos, hosted by Academy youth, explores how local communities are addressing environmental problems with solutions ranging from vertical farming to greywater recycling.

Head to [Flipside Science](#) to find the complete list of videos and activities in this series.

Next Generation Science Standards (6-8)

Engineering Design in the NGSS: *At the middle school level, students learn to sharpen the focus of problems by precisely specifying criteria and constraints of successful solutions, taking into account not only what needs the problem is intended to meet, but also the larger context within which the problem is defined, including limits to possible solutions.*

California's Environmental Principles and Concepts

- **Principle V:** Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes. As a basis for understanding this principle:
 - **Concept a:** Students need to know the spectrum of what is considered in making decisions about resources and natural systems and how those factors influence decisions.

Additional resources

- [Design for Change design thinking for students: Feel-Imagine-Do-Share](#)
- [Designing with creativity for sustainability: Explore the efficient building design of the California Academy of Sciences](#)

