DO YOU KNOW...

Where we get our water?
Where we store our water?
How much water our city uses per year?
What programs we offer?
How much water we have saved over the years?
Colorado is a headwaters state, with the majority of the state’s rivers beginning high in the Rocky Mountains as snowmelt. One of the benefits of living in a state that relies primarily on surface water is that unlike groundwater, surface water is a renewable water source.

One of the drawbacks is that precipitation levels vary greatly from year-to-year making the majority of the state’s water supply relatively unpredictable – and highly prone to drought.

Do you know...
Aurora’s water system starts nearly 180 miles away and includes the use of reservoirs, the natural river system, pipes, tunnels and pumps, all of which help us pull the water we own from our three river basins and deliver it to Aurora.

Aurora receives 25% of its water supply from the Colorado, 25% from the Arkansas and 50% from the South Platte river basins.

Homestake, Turquoise, Twin, Spinney Mountain, Jefferson, Strontia Springs, Rampart Quincy, Pueblo, Aurora, Meredith, Henry

Do you know how much water the city uses?
The average annual distribution for the past three years is 16.6 billion gallons annually. About half of that water is used outdoors. Aurora has a semi-arid climate, and our snow and rain levels are about half of the average annual precipitation for the United States, so it’s important that we all do our part to help conserve water.

Do you know that we offer programs to help conserve water?
Do you know how much water the conservation division has saved?

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...we offer programs to help you save water and money?
Combined water savings for 2016, 2017, 2018

Be sure to check out our fliers at the end of class to see how Aurora Water can help you save water and money.
Rainwater Diversion
A Working Definition

Rainwater diversion is the process of intercepting storm water runoff and putting it to beneficial use as landscape irrigation.
Historically, in urban and suburban areas we build infrastructure move rainfall quickly off our property and into storm drains.
The water used for watering landscapes accounts for a significant percentage of total water demand. Every year, Aurora citizens use about 40% of their potable water for irrigating lawns and gardens.

Water is very expensive to collect, clean and distribute. Aurora Water is responsible for 3 treatment facilities, 1,864 miles of pipe, 12 reservoirs and all of the sewer pipes and storm drains in Aurora.

Water service in Aurora is not cheap. It costs a homeowner about $5.45 per 1,000 gallons of water used plus sewer and storm drain fees. An average water bill ranges from $50-100 per month depending on water use.

So why go to so much expense when free, plant-friendly water falls out of the sky? Why funnel all of this precious resource down storm drains? There’s got to be a better way.
We can slow the movement of rainwater and put it to good use in the landscape to reduce the need to turn on the sprinkler system.
Landscapes can be designed to capture and use this water from the sky, helping homeowners save money on their water bills. Rainwater diversions also prevent erosion and reduce the burden on storm drain and water treatment systems.

Water diversion landforms encourage water to slow down and percolate into the ground. If the ground is highly permeable, this can help refill underground water tables. This process also takes advantage of the soil’s natural filtration properties.
Water running off sealed surfaces collects pollutants, oil, animal feces, heavy metal, dust and bacteria. Rainwater moving through the soil is taken up by vegetation helping to clean up contaminated soils and wastes.

Diverting rainwater makes good stewardship sense for the citizens of Aurora. It is a sustainable practice that contributes to a healthy future for generations to come. In the process of using rainwater for our landscapes, we gain more water awareness and savvy.
In our state, we are allowed to divert water, channel it, force it to infiltrate the soil and otherwise put it to beneficial use in the landscape. And as of 2016, we can collect water using two 55-gallon rain barrels.

Senate Bill 09-080 was passed in 2009 to allow residents on private wells to collect rain with a permit from the Colorado Division of Water Resources. This mostly effects people on the plains east of Aurora. To more information about SB 80, go to: http://water.state.co.us/dwripub/documents/dwr_rainwaterflyer.pdf

House Bill 1005 was passed in 2016 to allow for residents to collect water in two 55-gallon rain barrels.
Rainwater diversion can reduce the use of drinking water for landscape irrigation. Coupled with efficient irrigation and native plants, it is an effective water conservation tool because it provides water that is not from the treated water supply.
Simplicity is best!

Simple rainwater harvesting systems usually consist of two parts: a structure or area to slow the water coming off of impervious surfaces (like roofs and paved areas) and a distribution system that allows direct water flow. These systems use gravity to assist in moving water to where it can be used.
When preparing to use rainwater diversion on your property, the first step is to observe your landscape during a rain. Take note of drainage patterns, for they will be intentionally used to move water to the plant material in the landscape.
Always call before you dig to locate utility lines and any other lines that are buried below ground. You can call 811 or here are the direct numbers:

For Water and Sewer: 303-326-8645  
For Utility, Gas and Electric: 1-800-895-4999

When planning your design to divert rain water, according to the International Building Code (2000, section 1803.3), these features should be 10 feet from the home foundation.
Methods

There are numerous ways to divert rainwater to the landscape. Many are simple and require little in the way of materials. They can involve as little as a shovel and a rake to contour the ground and sculpt it to your and the plants’ advantage. The next series of slides discusses the most common landform techniques.
A swale is a shallow, vegetated water channel used to slow and divert water. They are usually placed on a hillside and include a gently sloped bottom basin. They are not deep like drainage ditches and are usually not filled with gravel.
In the above photographs, you see first a shallow swale dug into a gently sloping area. The swale ends in a shallow bowl – also known as a catchment basin - around a newly planted tree. In the next photo, a hose has been turned on and you can see the water following the swale down to the tree. Finally, the water rings the tree and fills in the shallow bowl, giving the tree roots a higher volume.
A particular kind of swale, these basins are lower than the ground level in a landscape and designed to catch water runoff and direct it toward the center. As a result, plants located in the bottom of these basins receive a great deal of water during a rain event. It is common to build a series of basins moving down a slope from one to the next so that excess water can flow downward to the next basin.
Berms

This feature is designed to slow and redirect water flow, forcing some to infiltrate into the soil nearby. Unlike swales, berms are more localized. A berm might be a semi-circular ridge of soil a few feet away from the downstream side of a tree, helping trap water above its roots. Berms are meant to form a shallow dam and often contribute to visual interest in the landscape.
This is a means of making flat, level garden beds on a slope. Vertical retaining walls made of soil, wood or rock hold horizontal terraces together at different elevations on the same hillside or slope. Terraces allow plants to grow in a flat area free of rushing, erosive water. Instead of moving quickly, horizontal terraces allow water to stop and infiltrate downward.
These structures act as underground gutters to collect runoff from long features, such as a driveway. They usually consist of a permeable pipe, laid in the bottom of a ditch and covered with gravel. Landscape fabric can be laid over the gravel to act as a barrier between the rocks and a layer of soil above.

Another option is to wrap landscape fabric around some gravel, creating a “tube” with gravel in the center, then placing this in a trench and covering with dirt.
Permeable paving is the use of driveway or sidewalk materials to allow some water to seep downward into the soil. Even a simple two-track driveway, rather than a wide, full-slab driveway, will allow water to penetrate into the ground instead of running off into the storm drain.
This is a fairly level piece of land filled with evenly sized square indentations arranged in a grid pattern. These waffles are meant to capture the water that reaches them for the use of the plants within. They act as miniature catchment basins. It is common for edible crops to be planted in waffles and this was done historically by Pueblo tribes in the Southwest.
Finally...

Be careful when reviewing books and online information for rainwater harvesting. States like Arizona and New Mexico have laws governing water harvesting that are more lenient than Colorado. Albuquerque and Tucson (9" and 12" annual rainfall respectively) are leading the way in this field.
Thank You

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