**Your Local Water Cycle**

|  |  |  |
| --- | --- | --- |
| **Grade(s):** *6,7,8* | **Topic:** Water Cycle | **Lesson #** 2 **in a series of** 3 **lessons** |
| **Brief Lesson Description**: *Students will gain an appreciation of their local watershed/nearby water sources through an interactive exercise utilizing Google Maps.* |
| **Learning Outcome(s):** *Students are able to identify their local watershed and local water sources.**Students are able to apply knowledge of the water cycle in interpreting real-life settings.*  |
| **Background Information**  |
| *Students should have a basic appreciation of the water cycle and its stages (see attached water cycle vocabulary), ideally having completed the first lesson of this module (Water Cycle Jeopardy).*  |
| **Science & Engineering Practices:** *List up to three Science & Engineering Practices that students will engage in during this lesson.**Developing and using models* | **Disciplinary Core Ideas:** *List up to three Disciplinary Core Ideas that are addressed in this lesson.**(PS1) Matter and its interactions**(ESS2) Earth’s systems**(ESS3) Earth and Human Activity* | **Crosscutting Concepts:** *List up to three Crosscutting Concepts that are addressed in this lesson.**Energy and matter**Systems and system models**Scale, proportion, and quantity* |
| **Possible Preconceptions/Misconceptions:** The amount of water on the planet is declining due to climate change. This statement is false. Climate change impacts the water cycle (precipitation patterns, temperature, etc.), but does not impact the amount of water on earth. |
| **LESSON PLAN** *This template uses the “5E” model to help with planning: Engage, Explore, Explain, Elaborate and Evaluate* |
| **ENGAGE** Students will warm up with a brief Kahoot (link below, same as warm-up exercise for first lesson) as a refresher on the phases of the water cycle.  |
| **EXPLORE Lesson Description** Explore your local watershed!Students will use Google Maps to explore their local watershed, specifically how water moves throughout their local watershed, and how water enters and exits their local watershed. Students will apply knowledge of the water cycle to local contexts.After the warm-up activity, the class will transition to the worksheet titled: “Your Local Water Cycle.” Students will need computers or tablets to access Google Maps during this exercise. Students can complete the worksheet electronically or teachers can provide students with hard copies. In this activity, students will pick local bodies of water (preferably within the state that they live), and characterize inputs and outputs to their system. The first page of the worksheet contains an example for students (San Pablo Bay located near San Francisco, California) that teachers will walk students through. In this particular example, there are several creeks and rivers that feed into San Pablo Bay (which are examples of runoff). Rainfall (precipitation) can also contribute water to San Pablo Bay. San Pablo Bay is essentially part of the Pacific Ocean, and the main way for water to leave the Pacific Ocean is through evaporation.After walking students through the San Pablo Bay example, teachers should select a waterbody and walk through the activity with the entire class. Teachers should select a local water body (lake, reservoir, river, etc.) that will be familiar to most students in the class. For teachers in the Salt Lake City Area, the Great Salt Lake is a strong example to select. As a whole class activity, teachers should prompt their students to identify sources (major tributaries, rain, snow, etc.) of water feeding the water body, as well as examine how water is leaving (outlets, evaporation, etc.). Teachers should also show students how to obtain site coordinates on Google Maps (which students will list on their worksheet) as well as screenshots of their map to include (if students are working on hard copies of worksheets, a simple sketch of their map/water body will suffice).After the two examples, students will work in pairs to identify 3 additional local water bodies on Google Maps and characterize inputs and outputs on the worksheet (along with the associated phases of the water cycle). During this time, teachers should walk around the classroom (or visit breakout rooms if lesson is being taught virtually) to monitor student progress and answer any student questions.The lesson will culminate with the students picking one of their sites and drawing a simple model. The model will show how water enters and exits their chosen water body (essentially, this will be a model of a natural open system). They should label features on their model with names (e.g., names of rivers and lakes) as well as phases of the water cycle (e.g., runoff, evaporation, transpiration, precipitation, etc.). Teachers should do a walkthrough example with the first site. The final question asks students about links between their sites (e.g. is there a common river that connects chosen waterbodies?), and students should complete the model and final question for HW if there is not enough time in class. |
| **EXPLAIN** **Vocabulary: (also provided on separate sheet)****Evaporation:** the change of water from a liquid state to a gas state due to an increase in temperature**Transpiration:** the release of water vapor into the atmosphere by plant leaves**Runoff:** excess water, not absorbed by the soil, that flows downhill**Storage:** water that is stored in a location for a long period of time and is not actively moving through the water cycle (ex: snowpack)**Precipitation:** water that falls from clouds in the form of rain, snow, sleet, or hail**Infiltration:** the flow of surface water into the subsurface (ground)**Condensation:** the process by which water changes from a gas to a liquid state |
| **ELABORATE:** Reservoirs will likely be commonly selected water sources for this activity. Teachers could have students further explore the concept of reservoirs (human constructed lakes that often store water for municipal and agricultural use). This could be in the form of a miniature follow-up lesson or homework assignment. Focusing on human modifications to watersheds (like dams) will also provide a nice transition into the third and final lesson of the water cycle module.  |
| **EVALUATE:** **Formative Assessment:** Teachers will walk around the classroom (or move between different breakout groups on zoom if virtual) to monitor group progress. This will help determine whether learning outcomes are being met, and it also provides opportunities for teachers to clarify any points that students may be struggling with. **Summative Assessment:** The report that the students will turn in at the end of the activity will help the teacher assess whether the learning outcomes were met, particularly the model portion of the activity. |

|  |
| --- |
| **Materials Required for This Lesson/Activity** |
| *Insert any diagrams, handouts, pictures, or other materials that aren’t available online HERE.**Include any hyperlinks to online videos, maps and other resources in the “Explore” part of the lesson.**List any other materials, including quantity, potential supplier and price if it is significant.*Kahoot link: <https://create.kahoot.it/share/water-cycle/ce9e8558-80ea-4fc3-ad1d-4dfc1276e50c> Google Maps: [Google Maps](https://www.google.com/maps)Lesson worksheet link: see word document on lesson webpageVocab sheet link: see word document on lesson webpage |