

# Teacher Syllabus and Notes

## Day 2

### How the Internet Works, Binary Code, Bits and Bytes

Estimated time: 2 hours, 25 minutes

#### AGENDA

- Reminder of classroom management (5 minutes)
  - Sign in to Gmail
  - Hand out syllabus
  - Reminder about the vocab wall and bonus work
- Watch the video “[The Internet: Wires, Cables, and Wi-Fi](#)” (15 minutes).
  - Discussion
  - Understand that at the microscopic level, computers use “switches” that translate into ones and zeros (called bits) to work. Computers use binary numbers and therefore use binary digits in place of decimal digits. The word “bit” is a shortening of the words “binary digit.”
- Binary handouts and counting (30 minutes)
  - Good review documents for your reference: [binary info](#) and a [binary teaching guide](#)
  - Play [this video](#) as an intro to the game
  - Have groups of 5 students each take turns holding the binary cards. Ask them to count to 31. You can have a competition to see which group can count the most quickly.
  - Students can also come up with short messages to send to each other across the room using binary cards and the alphabet key.
- [Binary game](#) (10 minutes)
  - Students can work individually.
- Binary bracelets (20 minutes)
  - You’ll need two colors of beads, pipe cleaner, and string
  - For teacher background, you can watch [this video](#)
  - Have the students use the A–Z key on the binary numbers handout to pick their first initial and represent it in binary on their bracelets. Students will need to use the decimal number that corresponds to each letter and use that to express the letter in binary code. For example, if your name starts with H and you’re using blue beads for zeros and white for ones, your bracelet would be blue, blue, white, blue, blue, blue (H corresponds with the decimal 8 on the key, which in binary is 001000). If they want to add more initials, they can add the corresponding binary codes and use pipe cleaners to mark the end of each letter.
  - Detailed directions for a paper-and-tape version [are available here](#).
- Break (5 minutes)
- Watch the video “[The Internet: IP Addresses and DNS](#)” (15 minutes).
  - How is a DNS acquired? Take them through the steps on [GoDaddy.com](#).
  - [This exercise](#) is a great resource for a deeper understanding of IP addresses and DNS.
- Watch the video “[The Internet: Packets, Routing, and Reliability](#)” (10 minutes).
  - Check for understanding
  - What keeps the internet running?
  - How is information broken down into packets?
- Watch the video “[The Internet: HTTP and HTML](#)” (10 minutes).
  - Check for understanding

- What does HTTP stand for? How does it work?
- What does HTML stand for? How does it work?
- Why are Secure Sockets Layer and Transport Layer Security important?
- Research and debate (20 minutes)
  - Remind students about objectives and expectations. See previous day's instructions.
  - Assist those who need help using Google Presentation.
- Review cyber security vocabulary wall (5 minutes)
- Bonus work
  - [Hour of Code](#)
  - [Beyond Hour of Code](#)
  - [Codecademy](#)
  - [Cyber Security Lab](#)