**Week Two Day One**

**Lesson Plan: "Waste in the Modern Era: Understanding Consumer Trends"**

**Grade Level:** Middle School
**Time:** 40-45 minutes

---

**Objective**

This lesson helps students to reflect on the impact and benefits of waste-related advertisements from historical eras. They will then investigate how consumer waste generation has evolved in the modern era, and understand the role of developments like fast food, fast fashion, disposable lifestyles, and online shopping in shaping modern waste trends.

---

**Potential Standard Alignment**

**Literacy**

- **Reading Informational Text**
  - **RI.6-8.1**: Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
  - **RI.6-8.2**: Determine a central idea of a text and analyze its development over the course of the text.
  - **RI.6-8.7**: Integrate information presented in different media or formats to develop a coherent understanding of a topic.
- **Writing**
  - **W.6-8.1**: Write arguments to support claims with clear reasons and relevant evidence.
  - **W.6-8.4**: Produce clear and coherent writing appropriate to task, purpose, and audience.
- **Speaking and Listening**
  - **SL.6-8.1**: Engage effectively in collaborative discussions on grade-level topics, building on others' ideas and expressing their own clearly.
  - **SL.6-8.4**: Present claims and findings, emphasizing salient points in a focused manner.

**Social Studies**

- **SS.6-8.E.1**: Understand the role of scarcity and economic trade-offs and how economic conditions impact people's lives.
- **SS.6-8.E.5**: Analyze the role of innovation and entrepreneurship in a market economy.
- **SS.6-8.G.2**: Explain how human-environment interactions shape people's lives and the environment.
- **SS.6-8.H.1**: Analyze connections among historical events and developments in broader historical contexts.

**Next Generation Science Standards (NGSS)**

- **MS-ESS3-3**: Apply scientific principles to design a method for monitoring and minimizing human impact on the environment.
- **MS-ESS3-4**: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
- **MS-ETS1-1**: Define the criteria and constraints of a design problem to ensure a successful solution.

---

**Materials**

- **Whiteboard or projector to list key topics and questions**
- **"Waste trends" articles for groups**
- **Internet to research further (optional)**
- **Notebooks (optional)**

---

**Lesson Activities**

**1. Introduction and Reflection on Previous Lesson (10 minutes)**

- **Review of Previous Lesson**
  Begin by reminding students of their previous lesson, where they created an advertisement to promote waste management in a historical era.
- **Individual Reflection**
  Ask students to reflect on why their advertisement would have been impactful in the era they researched. Have them write responses to each of these questions on the back of their advertisement:
    - **Why would the message resonate with people in that era?**
    - **How would the practices they promoted have benefited society at the time?**
    - **What was the problem they were addressing, and why was it important to solve?**

**2. Investigating Consumer Waste in the Modern Era (10 minutes)**

- **Discussion Introduction**
  Introduce the topic of modern consumer waste generation. Explain that in the present day, waste generation has changed drastically due to new consumer trends. These trends, along with population growth, have made waste a bigger challenge than ever before.
- **Introduce Overview of Key Topics**
  Introduce the following modern trends to the class, and as you move through the list ask for volunteers to share quick thoughts about this question: *At what point in history do you think this issue began to be problematic?*
    - **Fast Food and Take Out**
    - **Fast Fashion**
    - **Disposable Lifestyle** *(single use materials)*
    - **Online Shopping**
    - **Pandemic Response**
    - **Rapid Tech Development**

**3. Group Activity: Analyzing Modern Consumer Waste (10 minutes)**

- **Small Group Discussion**
  Divide students into small groups and assign each group one of the modern trends listed above (fast food, fast fashion, disposable lifestyle, online shopping, tech development, or pandemic response).
    - Have each group discuss how the trend they're given contributes to waste generation.
    - Ask groups to consider *(or optionally, record in notebooks)*
        - **What types of waste does this trend create?**
        - **How does this waste impact the environment?**
        - **What are possible solutions or changes people could make to reduce waste in this area?**
- After the discussion, have each group summarize their findings to share with the class.

**4. Wrap-Up: Reflection on Modern Waste and Future Solutions (5-10 minutes)**

- **Class Discussion**
  Have a whole-class discussion to reflect on the findings from the group presentations.

    - Ask questions like
        - **What surprised you about modern waste generation?**
        - **Do you think any of these trends can be changed or reversed?**
        - **Who is most responsible for these trends: manufacturers for making the products, consumers for buying the products, scientists for creating the materials, other?**
- **Final Reflection**
  For the last 3-5 minutes of the lesson, ask students to write a short reflection on what they learned about modern consumer waste. Have them consider
    - **How does waste generation today compare to what it was like in historical eras?**
    - **Why is it important for people today to be more aware of the waste they produce?**

---

**Assessment**

- Student participation in the group discussion and class sharing.
- The quality and depth of reflections on the impact of their advertisement and modern waste practices.
- Group presentations about modern consumer waste.

**Week Two, Day Two**

**Lesson Plan: Bridging the Gap: Managing  Waste After Disposal**

**Grade Level:** Middle School
**Time:** 40-45 minutes

---

**Objective**

This lesson bridges the gap between modern waste generation and disposal, fostering critical thinking about how waste is managed and encouraging students to see the larger system at work. It also brings students up-to-date with current disposal practices, helping them to understand the processes involved in managing waste after disposal and explore the functions of recycling facilities and landfills.

---

**Potential Standard Alignment**

**Literacy**

- **Reading Informational Text**
    - **RI.6-8.1** – Cite textual evidence to support analysis of what the text says explicitly and inferences drawn from the text.
    - **RI.6-8.7** – Integrate information presented in different media or formats to develop a coherent understanding of a topic or issue.
- **Writing**
    - **W.6-8.2** – Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
- **Speaking and Listening**
    - **SL.6-8.1** – Engage effectively in a range of collaborative discussions, building on others' ideas and expressing their own clearly.
    - **SL.6-8.4** – Present claims and findings, emphasizing main points in a focused, coherent manner.

**Social Studies**

- **SS.6-8.G.1:** Use geographic tools to analyze the impact of human activity on the environment and the movement of goods, people, and ideas.
- **SS.6-8.G.2:**  Explain how human-environment interactions shape people's lives and the environment.
- **SS.6-8.CG.2:** Explain how rules, laws, and public policies are made to address public problems and issues.
- **SS.6-8.E.5:** Analyze how economic choices and government policies impact sustainability and environmental issues.

**Next Generation Science Standards (NGSS)**

- **MS-ESS3-3**: Apply scientific principles to design a method for monitoring and minimizing human impact on the environment.
- **MS-ESS3-4**: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
- **MS-ETS1-1**: Define the criteria and constraints of a design problem to ensure a successful solution that accounts for societal and environmental considerations.

---

**Materials**

- **Computers or tablets with internet access**
- **Access instructions for virtual tours of Metro Recycling Facility and Metro Park East Landfill**
- **Pre-designed graphic organizers for:**
    - **Metro Recycling Facility**
    - **Metro Park East Landfill**
- **Projector or smartboard for whole-class discussion**
- **Whiteboard or chart paper for brainstorming**

---

**Lesson Activities**

**1. Introduction (5-7 minutes)**

1. **Review Prior Learning**
    - Begin by revisiting what students have learned about waste generation and its impact on the waste stream.
    - Pose the question: "We know what happened with waste during some eras in history, but what do you know about what happens to waste after it leaves our homes or businesses today?"
    - Facilitate a brief discussion to activate prior knowledge.
2. **Introduce the Day's Focus**
    - Share that the lesson will focus on what happens to waste once it is disposed of, specifically looking at recycling facilities, landfills, and hazardous waste sites.
    - Explain that students will take virtual tours of these facilities and complete graphic organizers to record their observations.

---

**2. Virtual Exploration and Graphic Organizer Completion (25-30 minutes)**

1. **Assign Virtual Tours**
    - Direct students to the interactive virtual tours for the following locations:
        - Metro Recycling Facility
        - Metro Park East Landfill
    - Provide links or access instructions for the tours.
2. **Graphic Organizer Instructions**
    - Explain that students should use their follow-along documents to create a record of learning as they explore each facility
3. **Independent or Paired Work**
    - Allow students to explore the tours individually or in pairs.
    - Encourage students to take notes to complete their graphic organizers.

**Note: alternatively, this could be managed as a whole-group lesson with the tour projected, or could be divided to allow half of the class to explore Metro Recycling Facility while the other explores Metro Park East Landfill.*

---

**3. Wrap-Up and Reflection (8-10 minutes)**

1. **Whole-Class Discussion**
    - Bring students back together to discuss their observations.

- Use guiding questions
    - What surprised you about the processes at these facilities?
    - What challenges do you think these facilities face in managing waste?
    - How do these processes impact the environment and society?

2. **Reflection Prompt**
    - Ask students to share: “What is one thing you learned today that changes the way you think about waste disposal?”

---

**Assessment**

- Completion and accuracy of graphic organizers.
- Participation in group discussion.

**Week Two, Day Three**

**Lesson Plan: Waste Management Simulation - Pre-Test Experience**

**Grade Level:** Middle School
**Time:** 40-45 minutes

---

**Objective**

In this lesson, students will engage in a waste simulation game that helps to explore the challenges of overseeing a solid waste agency. This provides an interactive and reflective way for students to apply their current knowledge and identify gaps in knowledge, laying the foundation for deeper understanding the next time they play the simulation.

*Note: this game is reading-heavy. Prep students to take their time to make thoughtful decisions.*

---

**Potential Standard Alignment**

**Literacy**

- **Reading Informational Text**
  - **RI.6-8.1**: Cite textual evidence to support analysis of what the text says explicitly and inferences drawn from the text.
  - **RI.6-8.7**: Integrate information presented in different media or formats to develop a coherent understanding of a topic or issue.
- **Writing**
  - **W.6-8.10**: Write routinely over extended and shorter time frames for a range of discipline-specific tasks, purposes, and audiences.
- **Speaking and Listening**
  - **SL.6-8.1**: Engage effectively in a range of collaborative discussions, building on others' ideas and expressing their own clearly.
  - **SL.6-8.4**: Present claims and findings, emphasizing key points with logical reasoning and relevant evidence.

**Social Studies**

- **SS.6-8.CG.2**: Explain how rules, laws, and public policies are made to address public problems and issues.
- **SS.6-8.CG.3**: Analyze the role of individuals and groups in influencing public policy.
- **SS.6-8.E.2**: Explain how economic decisions affect individuals, businesses, and society.
- **SS.6-8.E.5**: Analyze how economic choices impact sustainability and environmental issues.
- **SS.6-8.G.1**: Use geographic tools to analyze the impact of human activity on the environment.
- **SS.6-8.G.3**: Analyze how human-environment interactions influence history, society, and policy.

**Next Generation Science Standards (NGSS)**

- **MS-ESS3-3**: Apply scientific principles to design a method for monitoring and minimizing human impact on the environment.
- **MS-ESS3-4**: Construct an argument supported by evidence for how increases in human population and per-capita consumption impact Earth's systems.
- **MS-ETS1-1**: Define criteria and constraints of a design problem to ensure a successful solution that accounts for societal and environmental considerations.

- **MS-ETS1-3**: Analyze data from tests to determine similarities and differences among solutions to identify the best characteristics of each.

---

**Materials**

- **Computers or tablets with internet access (phones are not sufficient for a high quality simulation experience)**
- **Access to Metro Waste Authority's Ecoville simulation game**
- **Notebooks for journaling observations and decisions (optional)**
- **Projector or smartboard for introductory instructions**
- **Teacher Resource: Teacher Guide to Ecoville Simulation**

---

**Lesson Activities**

**1. Introduction (5-7 minutes)**

1. **Set the Stage**
    - Begin by reminding students of the previous day's exploration of waste facilities and management processes.
    - Explain that today, they will take on the role of decision-makers for a solid waste agency in a simulation game.
2. **Explain the Simulation**
    - Highlight that this is their "pre-test" round, meaning they should approach it with curiosity and not worry about perfection.
    - Briefly outline the goal of the game: to manage waste responsibly while balancing environmental, economic, and social factors.
3. **Discuss Key Concepts**
    - Review a few key considerations they'll encounter, such as:
        - Where to place a landfill.
        - How to respond to the public.
        - What rules and guidelines are followed.
    - Encourage students to draw on what they've learned to inform their decisions, and to pay attention to things that are unfamiliar or surprising.

**Note: it may be helpful to project the simulation for the class and move through the tutorial steps, and/or model the first few decisions.*

---

**2. Simulation Game Play (25-30 minutes)**

*Note: Students can play the games multiple times during this window. If they reach "Game Over" stage, they should replay to try to make it further.*

1. **Game Setup**
    - Distribute devices and have students access the simulation game.
    - Ensure students understand how to navigate the game and make decisions.
2. **Independent or Pair Play**
    - Students can play individually or in pairs, depending on available resources.
    - Encourage students to take notes on their decisions and outcomes, especially areas they find challenging or surprising.
    - Alternatively, the simulation can be played as a whole-group exercise in which the game is projected and the class gives suggestions or feedback before decisions are made.
3. **Teacher Facilitation**

- Circulate to answer questions, provide support, and observe how students are engaging with the game.

---

**3. Reflection and Discussion (8-10 minutes)**

1. **Reflection Activity**
   - Ask students to talk with a partner about these prompts:
     - What was your biggest challenge in managing the solid waste agency?
     - What was something new you learned about the solid waste industry?
     - What is one decision you made that had a negative impact on your environmental score?
2. **Whole-Class Discussion**
   - Facilitate a brief discussion, inviting students to share their experiences and thoughts.
   - Highlight patterns in their responses, such as common challenges or creative solutions.
3. **Preview Next Steps**
   - Let students know they will play the game again in a future class, using strategies and insights gained from today's experience to improve their performance.

---

**Assessment**

- Informal observation of students' engagement with the game.
- Contributions to the class discussion.

---

**Week Two, Day Four**

**Lesson Plan: Exploring Real Challenges in Waste Disposal**

**Grade Level:** Middle School
**Time:** 40-45 minutes

---

**Objective**

This lesson encourages students to delve deeper into the complexities of managing waste. By engaging with learning at 6 different stations, they will synthesize information to understand the environmental and societal impacts of waste management practices.

---

**Potential Standard Alignment**

**Literacy**

- **Reading Informational Text**
  - **RI.6-8.1**: Cite textual evidence to support analysis of what the text says explicitly and inferences drawn from the text.
  - **RI.6-8.7**: Integrate information presented in different media or formats to develop a coherent understanding of a topic or issue.
- **Writing**
  - **W.6-8.2**: Write informative/explanatory texts to examine a topic and convey ideas through analysis of relevant content.
  - **W.6-8.10**: Write routinely over extended and shorter time frames for a range of discipline-specific tasks, purposes, and audiences.
- **Speaking and Listening**
  - **SL.6-8.1**: Engage effectively in a range of collaborative discussions, building on others' ideas and expressing their own clearly.
  - **SL.6-8.4**: Present claims and findings, emphasizing key points with logical reasoning and relevant evidence.

**Social Studies**

- **SS.6-8.G.1**: Use geographic tools to analyze human-environment interactions.
- **SS.6-8.G.3**: Analyze how environmental and cultural characteristics influence waste management policies and practices.
- **SS.6-8.E.2:** Explain how economic decisions impact sustainability and environmental issues.
- **SS.6-8.E.5**: Investigate how incentives and innovation influence people’s decisions regarding environmental challenges.
- **SS.6-8.CG.2**: Explain how laws and policies address societal problems.

**Next Generation Science Standards (NGSS)**

- **MS-ESS3-3:** Apply scientific principles to design a method for monitoring and minimizing human impact on the environment.
- **MS-ESS3-4**: Construct an argument supported by evidence for how human consumption impacts Earth’s systems.
- **MS-ESS3-5**: Ask questions to clarify evidence of the factors that have caused the rise in global temperatures.
- **MS-ETS1-1**: Define criteria and constraints of a design problem to ensure a successful solution, considering societal needs.

- **MS-ETS1-3**: Analyze data from tests to determine similarities and differences among solutions to identify the best characteristics.

---

**Materials**

- **Printed station PDFs with QR codes and links to resources (see below)**
- **Stations: Managing Waste worksheet**
- **Student technology, like tablets or laptops**
- **Timer for rotations**

**Station 1: Landfilling - video**
**Station 2: Recycling - video**
**Station 3: Composting – interactive slides**
**Station 4: Demanufacturing - video**
**Station 5: Hazardous Waste – interactive tour**
**Station 6: Recycling Guidelines – play Recycling Rumble**

---

**Lesson Activities**

**1. Introduction (5 minutes)**

**Overview of Stations**

- Briefly describe the six stations: landfilling, recycling, composting, demanufacturing, hazardous waste, and recycling guidelines.
- Emphasize that they'll rotate through stations to learn, documenting on their work page as they go.

---

**2. Station Rotations (35-40 minutes)**

1. **Logistics**
    - Divide students into six groups and assign them to starting stations.
    - Rotate every **5-6 minutes**, allowing time for transitions.
2. **Station Activities**

**Station 1: Landfilling - video**

- How are landfills different from dumps?
- A good landfill site should be…
- What is a tip fee?

**Station 2: Recycling - video**

- How do recycling facilities decide what materials to accept?
- Why is it important for materials to be well sorted before manufacturers buy them?
- What are two examples of materials that should never be placed in your recycling cart because they are dangerous fire hazards?

**Station 3: Composting – interactive slides**

- What are some of the elements that are required to create compost?
- What are some examples of "greens"?
- What are some examples of "browns"?
- Based on what you know, why is it good to keep yard waste out of the landfill?

**Station 4: Demanufacturing - video**

- Why should appliances be demanufactured instead of landfilled?

- What kind of materials are saved from appliances to be recycled?
- Why do appliance demanufacturers require special training to do their work?

**Station 5: Hazardous Waste – interactive tour**

- Click through Metro Hazardous Waste Drop-Off and jot down any notes about hazardous waste or the processes followed by staff there.

**Station 6: Recycling Guidelines – play Recycling Rumble**

- Play a few rounds of Recycling Rumble and track your scores.
    - Round 1 Score
    - Round 2 Score
    - Round 3 Score
- What are some examples of materials that can be recycled according to Metro Waste Authority's guidelines?

---

**3. Whole-Class Synthesis and Reflection (8-10 minutes)**

1. **Debrief Discussion**
    - Gather students and ask:
        - "Which station surprised you the most, and why?"
        - "What do these challenges tell us about waste management today?"
2. **Class Brainstorm**
    - Use chart paper or a whiteboard to connect ideas from each station.
    - Create a flowchart showing how different waste types require different solutions.
3. **Written Reflection**
    - Prompt: "If you were in charge of designing a waste management system, which challenge would you prioritize solving and how?"

---

**Assessment**

- Completion and thoughtfulness of station handouts.
- Participation in group discussions.
- Quality of written reflections.

---

**Extension (Optional)**

- Assign students to research how different countries approach one of these challenges (ex, Sweden's incineration practices, hazardous waste handling in the U.S.).
- Have students present their findings in a follow-up class.

**Week Two, Day Five**

**Lesson Plan: Ecoville Waste Simulation Part II – Strategic Play & Documentation**

**Grade Level:** Middle School
**Time:** 40-45 minutes

---

**Objective**

This lesson builds on students' initial experience with Metro Waste Authority's Ecoville waste simulation and station work by having them play the simulation again, this time engaging in more thoughtful, strategic decision-making. Students will document their play on a structured worksheet, track their choices, and reflect on how their decisions impact environmental, economic, and social outcomes.

---

**Potential Standard Alignment**

**Literacy**

- **Reading Informational Text**
  - **RI.6-8.1**: Cite textual evidence to support analysis of what the text says explicitly and inferences drawn from it.
  - **RI.6-8.7**: Integrate information presented in different media or formats to develop a coherent understanding of a topic or issue.
- **Writing**
  - **W.6-8.2**: Write informative/explanatory texts to examine a topic and convey ideas through analysis of relevant content.
  - **W.6-8.10**: Write routinely over extended and shorter time frames for a range of discipline-specific tasks, purposes, and audiences.
- **Speaking and Listening**
  - **SL.6-8.1**: Engage effectively in collaborative discussions, building on others' ideas and expressing their own clearly
  - **SL.6-8.4**: Present claims and findings, emphasizing key points with logical reasoning and relevant evidence.

**Social Studies**

- **SS.6-8.E.2**: Explain how economic decisions impact sustainability and environmental issues.
- **SS.6-8.E.5**: Investigate how incentives and innovation influence people's decisions.
- **SS.6-8.CG.2**: Explain how laws and policies address societal problems.

**Next Generation Science Standards (NGSS)**

- **MS-ESS3-3**: Apply scientific principles to design a method for monitoring and minimizing human impact on the environment.
- **MS-ESS3-4:** Construct an argument supported by evidence for how human consumption impacts Earth's systems.
- **MS-ESS3-5**: Ask questions to clarify evidence of the factors that have caused the rise in global temperatures.
- **MS-ETS1-1**: Define criteria and constraints of a design problem to ensure a successful solution, considering societal needs.
- **MS-ETS1-3**: Analyze data from tests to determine similarities and differences among solutions to identify the best characteristics.

---

**Materials**

- **Computers or tablets with internet access (phones are not sufficient for a high-quality simulation experience)**
- **Access to the waste management simulation game**
- **"Metro Waste Authority's Ecoville Waste Simulation" Worksheet**
- **Projector or smartboard for review and discussion**
- **Teacher Resource: Teacher Guide to Ecoville Simulation**

---

**Lesson Activities**

**1. Introduction & Strategy Discussion (5-7 minutes)**

1. **Recap Previous Lessons**
    - Ask students to briefly recall their experiences in the first round of play.
    - Discuss some of the biggest challenges they faced when managing waste.
    - Discuss what they learned in the previous day's stations that could impact their approach today.
2. **Introduce Today's Goal**
    - Today, they will replay the simulation but with a focus on making better, more strategic decisions.
    - They will **document** each major decision they make using the provided worksheet.
3. **Strategic Thinking Questions**
    - What challenges did you face last time?
    - How will you balance environmental, social, and economic concerns more effectively?
    - What changes will you make this time to improve your results?

---

**2. Simulation Game Play with Documentation (25-30 minutes)**

1. **Game Setup**
    - Students access the simulation game and receive their **Metro Waste Authority's Ecoville Waste Simulation worksheet.**
    - Review how to fill out the worksheet, emphasizing tracking decisions and their consequences during play – not just at the end.
2. **Independent or Pair Play with Documentation**
3. **Teacher Facilitation**
    - Circulate the room, check in on students' strategy adjustments, and provide guidance as needed.
    - Encourage students to think critically about **why** certain decisions lead to success or failure.

---

**3. Reflection, Discussion, and Comparison (8-10 minutes)**

1. **Small Group Reflection**
    - In pairs or small groups, students discuss their worksheet responses:
        - **What was the most difficult decision you had to make?**
        - **What strategies worked better this time?**
        - **Did you see improvement in your results? Why or why not?**
2. **Whole-Class Discussion**
    - Students share key takeaways from their playthroughs.

    - Teacher facilitates discussion on **cause-and-effect relationships** in managing waste.
    - Highlight patterns in student experiences, focusing on what strategies led to success.
3. **Preview Next Steps**
    - Briefly discuss the idea that **real-world waste management involves long-term planning and trade-offs**, just like in the game.

---

**Assessment**

- **Worksheet Completion:** Students' **Metro Waste Authority's Ecoville Simulation** worksheets will be reviewed to assess their thought process and learning.
- **Participation:** Informal observation of engagement in the simulation and discussion.
- **Self-Reflection:** Student responses during discussions will show their understanding of strategic waste management decisions.

References

UNEP. (2020). "The pandemic: A global plastic waste challenge."
EPA. (2020). "Advancing sustainable materials management: Facts and figures."
World Health Organization. (2020). "Environmental impact of COVID-19."
Ellen MacArthur Foundation. (2017). "A new textiles economy: Redesigning fashion’s future."
McKinsey & Company. (2021). "The future of packaging: Growth opportunities and challenges."
International Telecommunication Union. (2021). "E-waste statistics."
Basel Action Network. (2021). "The global e-waste crisis."