Lesson 03: Headbandz - Guess What's On Your Card (Low-Inquiry Version)

Lesson Title: Headbandz: Asking Yes/No Questions
Intended Grade Level(s): Grades 3-12 (adaptable)

I. Planning

Lesson Focus / Goals

The lesson aims to provide the following for students: - Practice asking yes/no questions following a provided sequence - Learn to narrow possibilities systematically using the teacher's question categories - Understand how to eliminate options through binary choices

Learning Objectives

By the end of the lesson, students will be able to: - Ask yes/no questions following the teacher-provided question categories in order - Use the elimination chart to narrow down possibilities - Identify their card within 15 questions using the systematic approach - Explain why asking category questions before specific guesses is more efficient

Standards Alignment

Standards for Mathematical Practice (Common Core): - **MP7** – Look for and make use of structure. - **MP8** – Look for and express regularity in repeated reasoning.

NGSS Science and Engineering Practices: - **Asking Questions and Defining Problems** – Students formulate yes/no questions to gather information systematically. - **Analyzing and Interpreting Data** – Students use responses to narrow down possibilities through logical elimination.

Materials Needed

The following materials are used in the lesson: - **Headbands** (one per student) - can be made from cardstock strips with elastic or paper bands - **Pre-made cards** (30-40 cards total) with one item per card from 4 categories: Animals, Food, Objects, Jobs - **Question category poster** showing the systematic questioning sequence - **Student tracking sheets** to record questions asked and answers received - **Timer** to keep game moving (optional) - **Teacher list** of all possible cards organized by category

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II. Implementation

Lesson Flow

Before: (Launch – 5 min)

1. Show a headband with a card (e.g., "dog") facing outward
2. Explain: "You can't see your own card, but everyone else can see it. Your job is to figure out what you are by asking yes/no questions."
3. Model incorrect approach: "If I ask 'Am I a dog?' right away, I might get lucky, but probably not. That's not efficient."
4. Display **Question Category Poster:**

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   Step 1: Identify Category (Animal? Food? Object? Job?)
   Step 2: Narrow Traits (Big/small? Common/rare? etc.)
   Step 3: Specific guesses (only after narrowing)
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5. Model correct approach: "Watch me guess my card systematically:"
   - "Am I an animal?" (Yes)
   - "Am I bigger than a cat?" (Yes)
   - "Do people keep me as a pet?" (Yes)
   - "Am I a dog?" (Yes!)
6. Emphasize: "We'll follow this same pattern today. Categories first, then traits, then guesses."

During: (Explore – 15 min)

- Distribute headbands and place one card on each student's headband (without them seeing it)
- Students work in pairs, taking turns asking questions
- Teacher circulates and enforces the questioning sequence:
  - If student jumps to specific guess without narrowing, redirect: "Have you asked about category yet?"
  - If student asks an open-ended question, redirect: "Make that a yes/no question"
- Students use tracking sheets to record:
  - Questions they asked
  - Yes/No answers received
  - Category narrowed down
  - Final guess
- After each student guesses correctly (or reaches 15 questions), teacher gives them a new card
- Goal: Figure out 2-3 cards each during the 15-minute period

After: (Discuss – 5 min)

- Ask: "How many cards did you successfully guess?"
- Discuss: "Which types of questions were most helpful?"
- Teacher emphasizes: "Category questions eliminate the most possibilities. If you have 40 cards (10 animals, 10 foods, 10 objects, 10 jobs), asking 'Am I an animal?' eliminates 30 cards instantly!"
- Connect to real inquiry: "Scientists narrow possibilities the same way—broad categories first, then specific tests."
- If time: Students share funniest/trickiest cards they had

III. Assessment

Formative: During the lesson, monitor if students: - Are following the question category sequence (category → traits → specific guesses) - Are asking yes/no questions rather than open-ended questions - Are recording their questions and eliminations on tracking sheets - Can explain why category questions are more efficient

Exit Ticket: Students write a short response: "Explain why asking 'Am I an animal?' is better than asking 'Am I a dog?' as your first question. Use the word 'eliminate' in your answer."

Peer/Self-Assessment: Students review their tracking sheets and count: (1) How many cards they guessed, (2) How many category questions they asked, (3) Whether they followed the sequence.

Student Tracking Sheet

Name: _____ **Date:** _____

Headbandz - Question Tracking Sheet

For each card you try to guess, record your questions and the answers you receive.

Card #1

Question Category Sequence: 1. First, ask about CATEGORY (Animal? Food? Object? Job?) 2. Then, ask about TRAITS (Big? Small? Common? Rare? Color? etc.) 3. Finally, make SPECIFIC GUESSES

Question #	My Question	Answer (Y/N)	What I Eliminated
1			
2			
3			

Question #	My Question	Answer (Y/N)	What I Eliminated
4			
5			
6			
7			
8			

My card was: _____
Number of questions it took: _____

_____

Card #2

Question #	My Question	Answer (Y/N)	What I Eliminated
1			
2			
3			
4			
5			

My card was: _____
Number of questions it took: _____

_____

Exit Ticket

Explain why asking "Am I an animal?" is better than asking "Am I a dog?" as your first question. Use the word "eliminate" in your answer.

_____

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If you could design your own questioning strategy, would you change anything about this decision tree? Why or why not?

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