Asombro Institute

Asombro Anywhere: Teacher's Guide
Let it Blow: Wind Erosion in the Desert
4th Grade

Program Summary
Students learn about wind erosion in the desert and use a model to test the effects of three different types of ground cover on dust created by wind erosion. They then design and test their own engineering solution to reduce soil erosion by wind.

Phenomenon: How do changes to the ground cover in the Chihuahuan Desert affect the amount of dust created from wind erosion?

Oklahoma Academic Standards for Science

4.ESS2.1 Plan and conduct investigations on the effects of water, ice, wind, and vegetation on the relative rate of weathering and erosion.
3.ESS3.1 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concept
Planning and Carrying Out Investigations Developing and Using Models Asking Questions and Defining Problems Constructing Explanations and Designing Solutions	ESS2.A Earth Materials and Systems ESS2.E Biogeology	Cause and Effect

Common Core State Standards
ELA-Literacy.RI.4.4 - Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a *grade 4 topic or subject area.*
ELA-Literacy.W.4.7 - Conduct short research projects that build knowledge through investigation of different aspects of a topic.
MATH.4.NBT.A.2 - Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
MATH. 4.NBT.A.3 - Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Delivery:
This program can be delivered 3 different ways:

- Synchronous, in class activity
- Asynchronous Canvas assignment
- Asynchronous Google Classroom Assignment

Please coordinate with Asombro for digital materials for asynchronous learning,

Students Need:

Asynchronous	Synchronous
• Computer with internet access • Access to Canvas or Google Classroom materials	• Ability to watch videos as a class • In-class student worksheet • Asombro science supply kit:

• Asombro science supply kit: a plastic container and lid hole-punched paper pieces pipe cleaners dust collector straw • Pencil	a plastic container and lid hole-punched paper pieces pipe cleaners dust collector (box on popsicle stick) • One balloon pump for every 4-5 students.

All links in the document can also be found at www.asombro.org/wind

Teacher Preparation:

1) Ensure that science supply kits are distributed to your students before the lesson start date.
2) Read this guide to familiarize yourself with the lesson content.
3) Print student worksheets

Before You Start:

- All videos are found on EdPuzzle, which pauses the video to give students time to think, discuss questions, or perform an experiment before continuing.
- If needed, vocabulary lists are available in English and Spanish.

Program Overview (45-minute interactive video lesson)

Video: 17 minutes plus pauses for students to answer questions and complete the experiment.

- Introduction to wind erosion and a scientist who studies wind erosion in the desert.
- ***Instructions on how to conduct three experimental trials, comparing wind erosion under three different types of ground cover. Students will
  - Make a hypothesis and conduct the experiment with provided science kit supplies.
  - Record results and answer questions on their worksheet or in the EdPuzzle Video.
- Students are challenged to design and test an erosion engineering solution to reduce the rate of wind erosion. They will use their science supply kits and any household materials they have available.
- Students should share their solution, this can be done as an online discussion (Canvas or Google Classroom) or through small group or class discussion (in the classroom).

Video Link: Edpuzzle YouTube	Student In-class Worksheet	Video Transcript: English Spanish

***If you are doing this activity in the classroom, we have provided balloon pumps, so that students to not need to remove their masks to blow into the model. Please explain to students that instead of using a straw and blowing into the model, they will share the balloon pumps to blow air into their model for 5 pumps. You may need to demonstrate this.

Additional Resources Available at asombro.org/wind (Optional)

- Vocabulary lists in English and Spanish
- Transcripts of the video in English and Spanish

- Edpuzzle Answer Key
- In-class Worksheet
- In-class Worksheet Answer key

Questions? Contact Kelly Steinberg, Education Director, kelly@asombro.org, or information@asombro.org, or leave a voicemail at 575-524-3334.

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Name _____ Date _____

Let it Blow

1. What is wind erosion?

   A. Soil being worn away or moved by wind.

   B. Something that provides shelter from the wind.

   C. Something that creates wind.

Key

 Grass

 Shrub

Experiment

2. Trial 1: Grassland 

My dust collector collected _____ dust pieces in the grassland desert trial.

3. Trial 2: Shrubland 

My dust collector collected _____ dust pieces in the shrubland desert trial.

4. Compare the results in Trial 1: Grassland and Trial 2: Shrubland

Which trial collected more dust in the dust collector? (circle one)

Trial 1: Grassland 

Trial 2: Shrubland 

Experiment

5. Trial 3: Human-Cleared Ground (no pipe cleaners on top of paper pieces)

My dust collector collected _____ dust pieces in the human-cleared ground trial.

6. Which trial collected the most dust? (Circle one)

Grassland Trial **Shrubland Trial** **Human-cleared Trial**

Engineering Design Challenge:

Design a solution to reduce erosion. You can use the space below to brainstorm your solution before you test it.