

I.D.E.A. (*Invention, Design & Exploration Adventure*)

OUTREACH PRE-VISIT PAGE (GRADES 3-8) 60 minutes

Arizona Science Center will be arriving no later than 15 minutes before the start of your program(s). **I.D.E.A.** is intended to be a hands-on program that covers:

- The goal of an invention or design (i.e. does it make something faster, smaller, easier)
- Working by trial and error (what improvements can be made)
- Forces in motion; inclined planes, gravity, friction, acceleration

PROGRAM NEEDS

- **The Arizona Science Center's instructor is a guest in your classroom. Class teacher/instructor must remain in room for duration of program for liability reasons. We cannot be responsible for your students.**
- One instructor table at front of room
- Requires a level surface for students to work on (flat desks or tables)
- If multiple programs are scheduled at your location, it is ideal that the instructor be set up in one room and participants be brought in, otherwise allow 15 minutes between programs
- An available whiteboard or chalkboard is preferred
- Limited to 30 participants who will be split into groups of 3 students per group

SCIENCE STANDARDS

Grade 3:

S1C1PO1: Formulate relevant questions about the properties of objects, organisms, and events of the environment using observations and prior knowledge.

S1C1PO2: Predict the results of an investigation based on observed patterns, not random guessing.

Grade 4:

S1C2PO1: Explain the role of experimentation in scientific inquiry.

S1C2PO3: Explain various ways scientists generate ideas (e.g., observation, experiment, collaboration, theoretical and mathematical models).

Grade 5:

S1C1PO1: Formulate a relevant question through observations that can be tested by an investigation.

S1C1PO2: Formulate predictions in the realm of science based on observed cause and effect relationships.

S2C2PO1: Provide examples that support the premise that science is an ongoing process that changes in response to new information and discoveries (e.g., space exploration, medical advances).

S2C2PO3: Describe how scientific knowledge is subject to modification and/or change as new information/technology challenges prevailing theories.

S5C1PO1: Describe the various effects forces can have on an object (e.g., cause motion, halt motion, change direction of motion, cause deformation).

S5C2PO1: Describe the following forces: gravity and friction.

S5C2PO3: Examine forces and motion through investigations using simple machines (e.g., wedge, plane, wheel and axle, pulley, lever).

S5C2PO4: Demonstrate effects of variables on an object's motion (e.g., incline angle, friction, applied forces).

Grade 6:

S2C2PO1: Describe how science is an ongoing process that changes in response to new information and discoveries.

S2C2PO3 Apply the following scientific processes to other problem solving or decision making situations:

- observing
- questioning
- communicating
- comparing
- measuring
- classifying
- predicting
- organizing data
- inferring
- generating hypotheses
- identifying variables

Grade 7:

S2C2PO1: Describe how science is an ongoing process that changes in response to new information and discoveries.

S2C2PO3: Apply the following scientific processes to other problem solving or decision making situations:

- observing
- questioning
- communicating
- comparing

- measuring
- classifying
- predicting
- organizing data
- inferring
- generating hypotheses
- identifying variables

Grade 8:

S2C2PO1: Apply the following scientific processes to other problem solving or decision making situations:

- observing
- questioning
- communicating
- comparing
- measuring
- classifying
- predicting
- organizing data
- inferring
- generating hypotheses
- identifying variables

S5C2PO1: Demonstrate velocity as the rate of change of position over time.

S5C2PO2: Identify the conditions under which an object will continue in its state of motion (Newton’s 1st Law of Motion).

S5C2PO4: Describe forces as interactions between bodies (Newton’s 3rd Law of Motion).

MATH STANDARDS

Grade 3:

M5C2PO3: Select and use one or more strategies to efficiently solve the problem and justify the selection.

Grade 4:

M5C2PO3: Select and use one or more strategies to efficiently solve the problem and justify the selection.

Grade 5:

M5C2PO3: Select and use one or more strategies to efficiently solve the problem and justify the selection.

Grade 6:

M5C2PO3: Select and use one or more strategies to efficiently solve the problem and justify the selection.

