

Academic Core Level A



Teacher's Guide





National Institute for Direct Instruction

Academic Core: A direct approach to teaching fundamental Science and Social Studies concepts

Enclosed is Level A of the Academic Core. This teacher-directed instructional program teaches students important information from four domains—earth sciences, life sciences, physical sciences, and measurement. Each unit's coversheet is colored coded to indicate the domain for that unit. They are as follows:

Earth Sciences	Yellow
Life Sciences	Green
Physical Science	Blue
Measurement	Lavender

The program is broken into 11 units. Each unit has 4 to 24 lessons. The lessons are to be presented daily to the whole class and take approximately 20 minutes to teach. The program is sequenced so that information does not overlap and become confusing. Information needed to understand some complex concepts is presented over time in several different units. Units can be used separately as long as students know the basic information taught in earlier units or the earlier units are pre-taught.

If you have questions concerning the program or implementation, contact info@nifdi.org.

Academic Core Level A

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Overview of NIFDI Academic Core

Academic Core is a highly structured four-level program (A through D) developed by the National Institute for Direct Instruction (NIFDI) to teach students important science facts and information. The program ensures mastery of sophisticated information and includes a built-in rewards system to motivate and reinforce students. Measurement, time, the solar system, rocks, body systems, and United States geography are just a few of the units included in Academic Core Levels A through D.

Academic Core is intended for students in grades 2 and above. Each level is divided into units. Each unit is focused on one specific topic. There are 4 to 24 lessons in each unit in Level A. The lessons take approximately 20 minutes to teach and should be scheduled daily. Each lesson is designed to be presented to the entire class but can also be presented to small groups.

Academic Core is primarily a verbal program directed by the teacher. The teacher presents lessons from a script and students respond verbally. Once brought to verbal mastery, students respond to questions in writing. Many units include reference charts, maps, or displays. This material is on a PowerPoint display contained on a CD. (For teachers who do not have access to the equipment necessary to use the PowerPoint displays, a separate display booklet is included with the material.) Most units stand alone; however, some units are dependent upon information from earlier ones. This overlap of information requires the teacher to either follow the exact sequence of each level or to make sure the students know the prerequisite information.

Review

Academic Core does not have a built-in review component; however, the information must be continually reviewed if the students are to remember it. An efficient way to accomplish this is with Review Fridays.

Each Friday, review information is presented. The teacher presents the last two lessons of any unit previously taught. For example, if units 1, 2, 4, and 5 have been taught, the teacher may select any one of these four units to review. The review lessons — the final two lessons in the unit — are marked with the following banner:

REGULAR LESSON/MASTERY TEST • FRIDAY REVIEW

All students should be at least 90% accurate on Friday Review lessons. If they are not at mastery, the unit or the material missed should be repeated.



Evaluation

Mastery Tests

The last two lessons of each unit are Mastery Tests. The lessons are a series of questions on the material that was presented during the unit. Students produce written responses to teacher questions and check their work upon completion. Approximate spellings for complex vocabulary or labels are acceptable. At least 90% of students must be at 90% accuracy or above on information before the next unit is started.

Mastery Over Time

Challenge Rounds

Challenge Rounds are assessments of retention over time. Challenge Rounds are different than the end of unit Mastery Tests. Students take Challenge Round tests from any unit presented up to that point. Challenge Rounds may not include the 15 lessons most recently taught. The challenges ask students to both recall specific information and to use information that they have learned to solve problems. Students who pass the tests earn stickers on a certificate of achievement.

Challenge Rounds are scheduled during the year to provide opportunities to celebrate students' academic achievement in learning difficult information. Challenge Rounds should begin approximately 30 lessons after Academic Core has started and are held the last full week of each month.

Challenge Awards

A student earns a seal on a certificate of achievement every time he/she passes a Challenge Round. Passing five Challenge Rounds earns a certificate. Special recognition such as a medal, letter home, or being honored by the principal should be given after the student earns the second certificate. The number of stickers required for each award level is summarized below.

5 stickers	Certificate
10 stickers (cumulative)	Certificate + Special Recognition (Silver medal, letter home, or award assembly.)
15 stickers (cumulative)	Certificate + Special Recognition (Gold medal, letter home, or award assembly.)



Pass Criteria for Challenge Rounds

Each student must perform at 90% accuracy or above to pass a Challenge Round. Any student who fails may retake a Challenge, but must wait at least three full instructional days before retaking it. The passing criterion is still 90%. Students may retake Challenges until they pass.

Examples:

- If Gary fails the Vertebrate Challenge on Monday, the first day he can retake the Vertebrate challenge is Thursday.
- If Maria fails the Temperature Challenge on Thursday, she may not retake it until the following Tuesday.

Getting Started

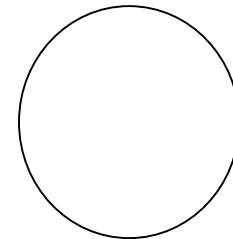
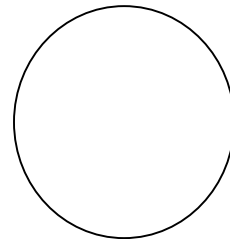
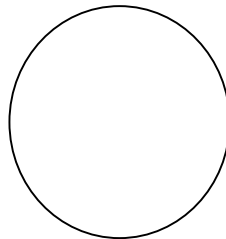
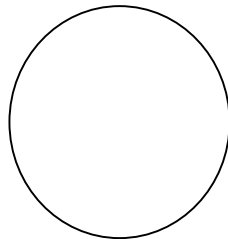
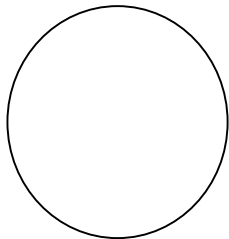
Academic Core should start with a motivating kickoff event. Tell the students a few interesting facts about the information they will learn during the year. Emphasize that the material is difficult and that even many adults do not know all the things that they are going to learn. Show them the certificate of achievement and describe the silver and gold medals or the special recognition that they will earn. Teach students that the harder they work, the smarter they'll get. Follow this introductory routine for several days.

Achievement Excellence Award

Presented to

For Meeting Challenges of Skill and Knowledge

Challenges:



By: _____

Date: _____

SUMMARY of Information Taught in Level A

Unit 1. MEASUREMENT OF LENGTH

Basic conversions:

There are 12 **inches** in a **foot**.

There are 3 **feet** in a **yard**.

There are 36 **inches** in a **yard**.

There are 5,280 **feet** in a **mile**.

There are approximately 2 ½ **centimeters** in an **inch**.

A **meter** is about 39 **inches** long.

There are 100 **centimeters** in a **meter**.

Unit 2. VERTEBRATES

If it's a **living thing**, it's either a **plant** or an **animal**.

Vertebrates are **animals** with **backbones**.

There are 5 classes of animals with backbones.

1. Mammals
2. Birds
3. Fish
4. Reptiles
5. Amphibians

Facts about **mammals**:

- feed their babies milk

- have a steady body temperature

- have hair

Facts about **birds**:

- lay eggs

- have a steady body temperature

- have feathers

Facts about **fish**, **amphibians** and **reptiles**:

- don't have a steady body temperature

- lay eggs

Facts about **fish**:

- lay eggs
- don't have a steady body temperature
- don't breathe air—have gills

Facts about **amphibians**:

- usually lay eggs
- don't have a steady body temperature
- babies live in the water

Unit 3. TEMPERATURE

Temperature is measured in **degrees**.

We usually use **Fahrenheit**.

Facts about Fahrenheit:

- Water freezes at 32 degrees Fahrenheit.
- Water boils at 212 degrees Fahrenheit.
- Normal room temperature is 70 degrees Fahrenheit.
- Normal body temperature is 98.6 degrees Fahrenheit.
- The melting temperature of glass is 2,500 degrees Fahrenheit.
- The lowest temperature ever recorded on earth was 129 degrees below zero. It was at Vostok, Antarctica, July, 1983.

A different scale of measuring temperature is **Celsius**.

Facts about Celsius:

- Water freezes at zero degrees Celsius.
- Water boils at 100 degrees Celsius.
- Normal body temperature is 37 degrees Celsius.

Unit 4. PHASES OF MATTER: SOLID, LIQUID, GAS

All things that you can see or touch are **matter**.

Facts about matter:

Matter has 3 phases: **solid**, **liquid** and **gas**.

The solid phase is the coldest.

Liquid is the next hottest.

The gas phase is the hottest.

Each substance has a melting temperature.

Each substance has a boiling temperature.

Melting temperature — changing from a **solid** to a **liquid**.

Boiling temperature — changing from a **liquid** to a **gas**.

Facts about the **sun**:

The surface is 11,000 degrees Fahrenheit.

It is so hot that everything is a gas.

Fact about some **planets** far from the sun:

It is so cold that everything is a solid.

Nitrogen melts at 346 degrees below 0.

Nitrogen boils at 320 degrees below 0.

Copper melts at 1,981 degrees Fahrenheit.

Copper boils at 4,172 degrees Fahrenheit.

Glass melts at 2,500 degrees Fahrenheit.

Glass boils at a much, much higher temperature.

Facts about **heating things**:

When solids are heated, they **expand**.

When solids are cooled, they **contract**.

Unit 5. LIFE CYCLES

All insects are born from eggs.

Baby form — **larva**

Fly form — **maggot**

Butterfly larva — **caterpillar**

Metamorphosis is the change larva undergoes to become an adult insect.

Stage between larva and adult — **pupa**

Amphibians change as they grow.

They start out as eggs.

The little animals live in water.

They have gills.

They grow legs and the tail disappears.

As adults, they have lungs.

Baby stage of frogs and toads — **tadpole**

Unit 6. TIME: CALENDAR

There are 12 **months** in a **year**.

January, February, March, April, May, June, July, August,
September, October, November, December

There are 7 **days** in a **week**.

Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday

There are 365 **days** in a **year**.

There are 24 **hours** in a **day**.

Each day is divided into 2 parts.

Each part is 12 hours long.

The **morning hours** are **A.M.** hours.

The **afternoon** and **evening hours** are **P.M.** hours.

There are 60 **minutes** in an **hour**.
There are 60 **seconds** in a **minute**.
There are 52 **weeks** in a **year**.
There are 4 **seasons** in a **year**. Winter, Spring, Summer, Fall
There are 100 **years** in a **century**.
There are 30 **years** in a **generation**.
There are 10 **years** in a **decade**.

B.C. years are the years that came before Christ.
A.D. years started after the birth of Christ.

The Great **Pyramids** of Egypt were built in **2700 B.C.**
Columbus discovered America in **1492**.
The United States became a nation in **1776**.

To figure out how long ago B.C. years were, you add 2,000 years to the B.C. number shown.
To figure out how long ago A.D. years occurred, you subtract the number from 2,000.

Unit 7. MEASUREMENT OF LENGTH: CONVERSION

There are 12 **inches** in a **foot**.
There are 36 **inches** in a **yard**.
There are 39 **inches** in a **meter**.
There are 3 **feet** in a **yard**.
There are 5280 **feet** in a **mile**.
There are 2.5 **centimeters** in an **inch**.
There are 100 **centimeters** in a **meter**.
There are 100 **meters** in a **kilometer**.
There are $1\frac{6}{10}$ **kilometers** in a **mile**. A kilometer is not as long as a mile.

To figure out how many centimeters are in 1 inch, 2 inches, 3 inches, or 4 inches you count by $2\frac{1}{2}$. Listen: $2\frac{1}{2}$, 5, $7\frac{1}{2}$, 10.

Unit 8. ARTHROPODS

Facts about **insects**:

Insects have 3 main parts: **head**, **thorax**, and **abdomen**.

Insects are cold-blooded.

All insects have 6 legs.

Spiders are not insects.

Insects are members of a large group of animals called arthropods.

Facts about **spiders**:

Spiders have 2 body parts.

Spiders are arachnids.

Spiders are members of a large group of animals called arthropods.

Facts about **arthropods**:

All arthropods are cold-blooded.

Arthropods have legs with joints.

Arthropods have an **exoskeleton**.

Unit 9. MEASUREMENT OF WEIGHT

Basic conversions:

There are 16 **ounces** in a **pound**.

There are 2000 **pounds** in a **ton**.

There are about 28 **grams** in an **ounce**.

There are about 2.2 **pounds** in one **kilogram**.

Unit 10. SOLAR SYSTEM

The **solar system** is made up of the **sun**, eight **planets**, and a **dwarf planet**.

The sun is in the middle.

All planets **revolve** around the sun.

Facts about the **sun**:

The sun is matter in the gas phase.

The surface temperature is 11,000 degrees Fahrenheit.

The inside is much hotter.

The sun is actually a **star**.

The diameter is 100 times the diameter of the earth.

Facts about the **planets**:

All planets have solid matter.

The closer the planets are to the sun, the more heat and light they receive.

The path the planets follow as they go around the sun is called an **orbit**.

The four planets closest to the sun are Mercury, Venus, Earth and Mars.

Mercury

closest planet to the sun

36 million miles from the sun

the hottest planet

temperature is 800 degrees Fahrenheit

diameter is 3,000 miles

Venus

67 million miles from the sun

called the evening or morning star

temperature is 600 degrees Fahrenheit

diameter is almost 8,000 miles

Earth

- the third planet from the sun
- 93 million miles from the sun
- takes 365 days to go around the sun one time
- diameter is 8,000 miles
- can support living things
- atmosphere contains oxygen
- has a moon

Mars

- 142 million miles from the sun
- takes 2 years to go orbit the sun
- temperature is 27 degrees below 0 Fahrenheit
- diameter is 4,000 miles

The other four planets are Jupiter, Saturn, Uranus, and Neptune.

Jupiter

- largest of the planets
- is 5 times as far from the sun as Earth
- orbits the sun in 12 years
- diameter is 88,000 miles
- has at least 56 moons

Saturn

- has beautiful rings
- the rings are made of rocks
- takes 30 years to orbit the sun
- diameter is 71,000 miles
- has over 60 moons

Uranus

- four times as large as Earth
- 2 billion miles from the sun
- takes 84 years to orbit the sun
- has 27 moons

Neptune

takes 165 years to orbit the sun

The dwarf planet is Pluto.

Pluto

takes 248 years to orbit the sun

Unit 11. BODY: SKELETON

Cranium — skull bone

Femur — biggest bone in the upper leg

Spine — backbone

Ribs — you have 24 ribs . . . 12 on each side

Clavicle — collarbone

Pelvis — hipbone

Phalanges — finger and toes

you have 56 phalanges . . . 14 for each hand and foot

Humerus — upper arm

Patella — knee cap

Ulna — forearm bone . . . comes out of the elbow

Vertebrae — bones of the spine

a baby has 33 bones . . . an adult has 26 bones.

Radius — forearm bone . . . can feel by your thumb

Sternum — goes down the middle of the rib cage

Tarsals — seven bones in each ankle

Scapula — shoulder blade

Tibia — lower leg . . . outside of shinbone

Mandible — jawbone

Carpals — eight bones in each wrist

Metabones — metacarpals . . . hand metatarsals . . . foot



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