



# Application of Psychometrics in Early Childhood Education

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Psychometrics Lab, MIMOS Berhad  
June 13, 2013

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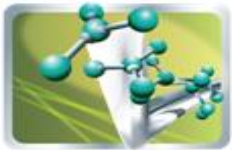


# MIMOS' Technology Clusters



SECURITY

MICRO  
ELECTRONICS



INFORMATICS

KNOWLEDGE  
TECHNOLOGY



MICRO  
ENERGY

NANO  
ELECTRONICS



WIRELESS

ADVANCED  
COMPUTING



PSYCHOMETRICS

ADV ANALYSIS  
& MODELLING





# CORE APPLICATION



**Education**



**Agriculture**



**Communication**



**Government**



**Public Safety  
and Security**



**Healthcare**



# Psychometrics

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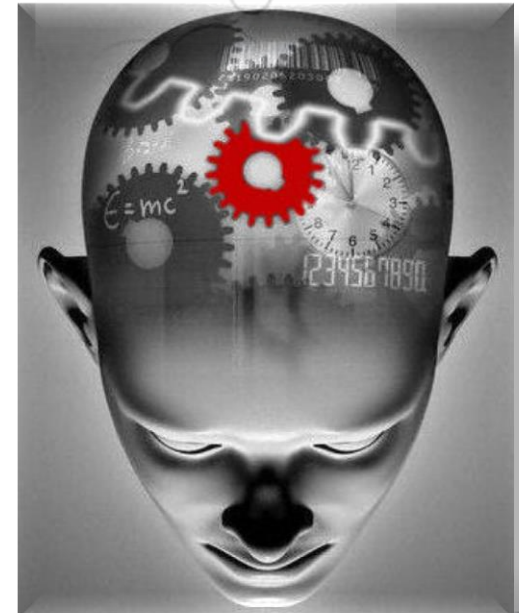
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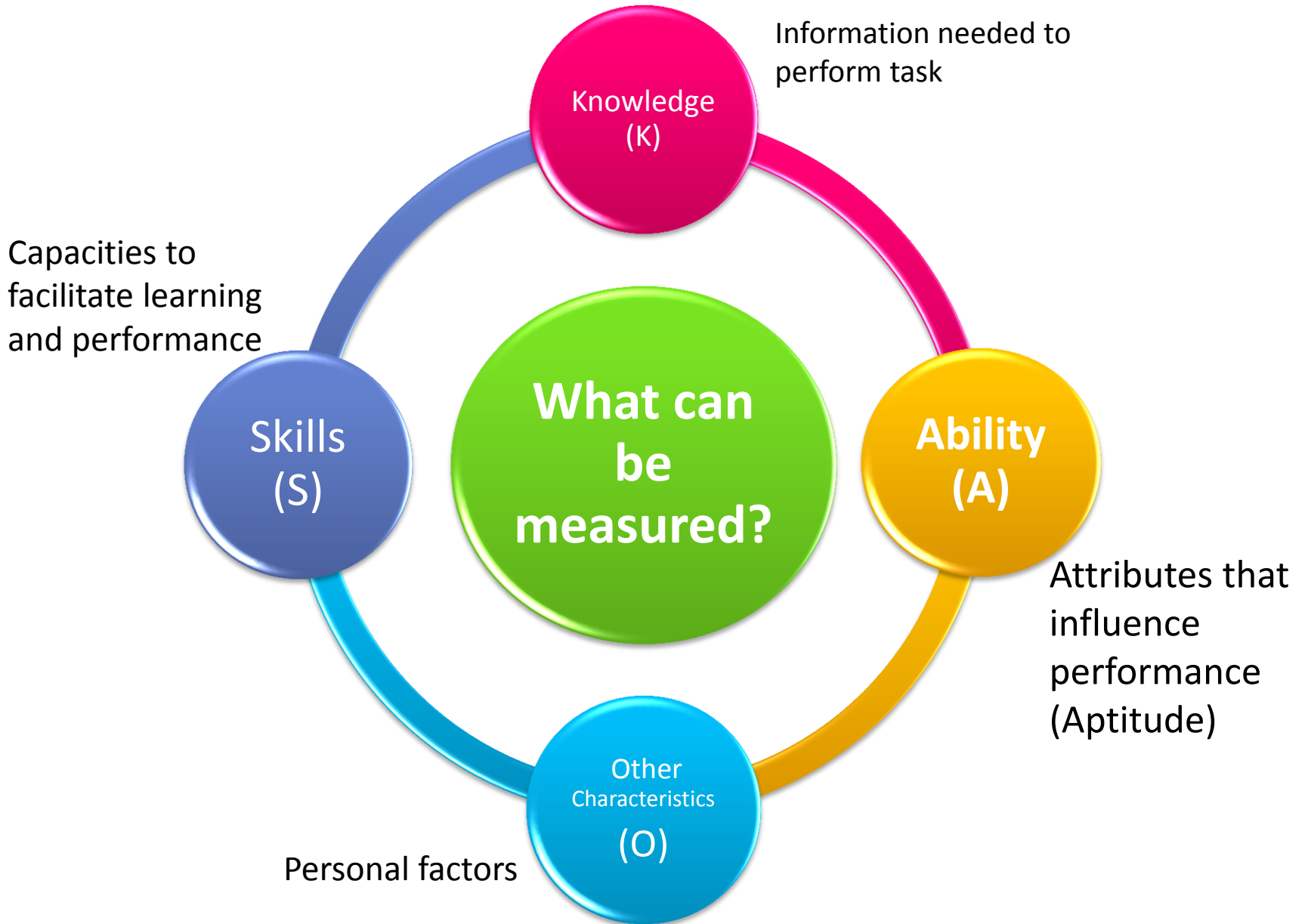
# What is Psychometrics ?

Psyche

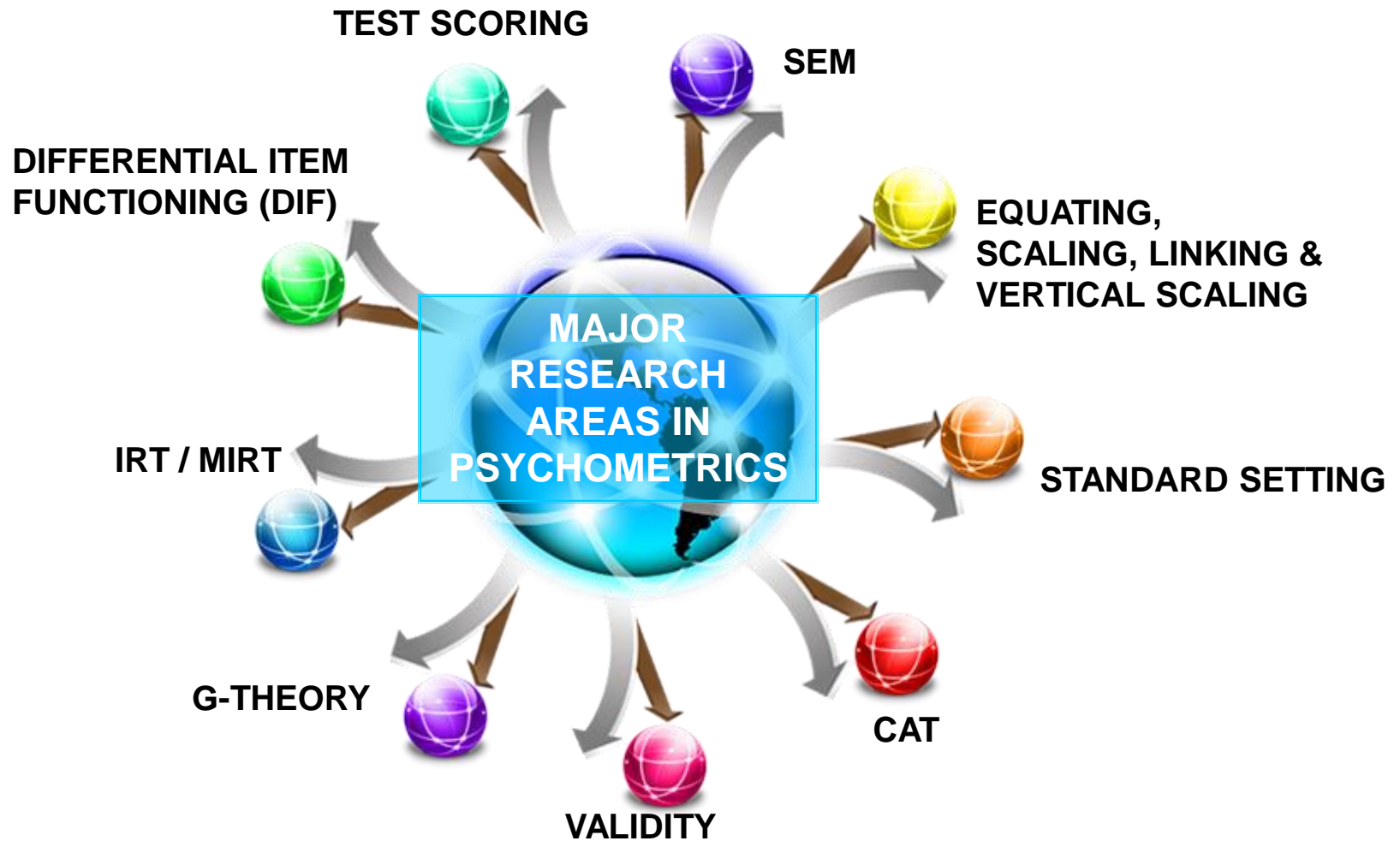


Metron





# Major Research Areas in Psychometrics





# Application of Psychometrics in Early Childhood Education

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## Challenges for Kindergarten/Early Childhood Assessment

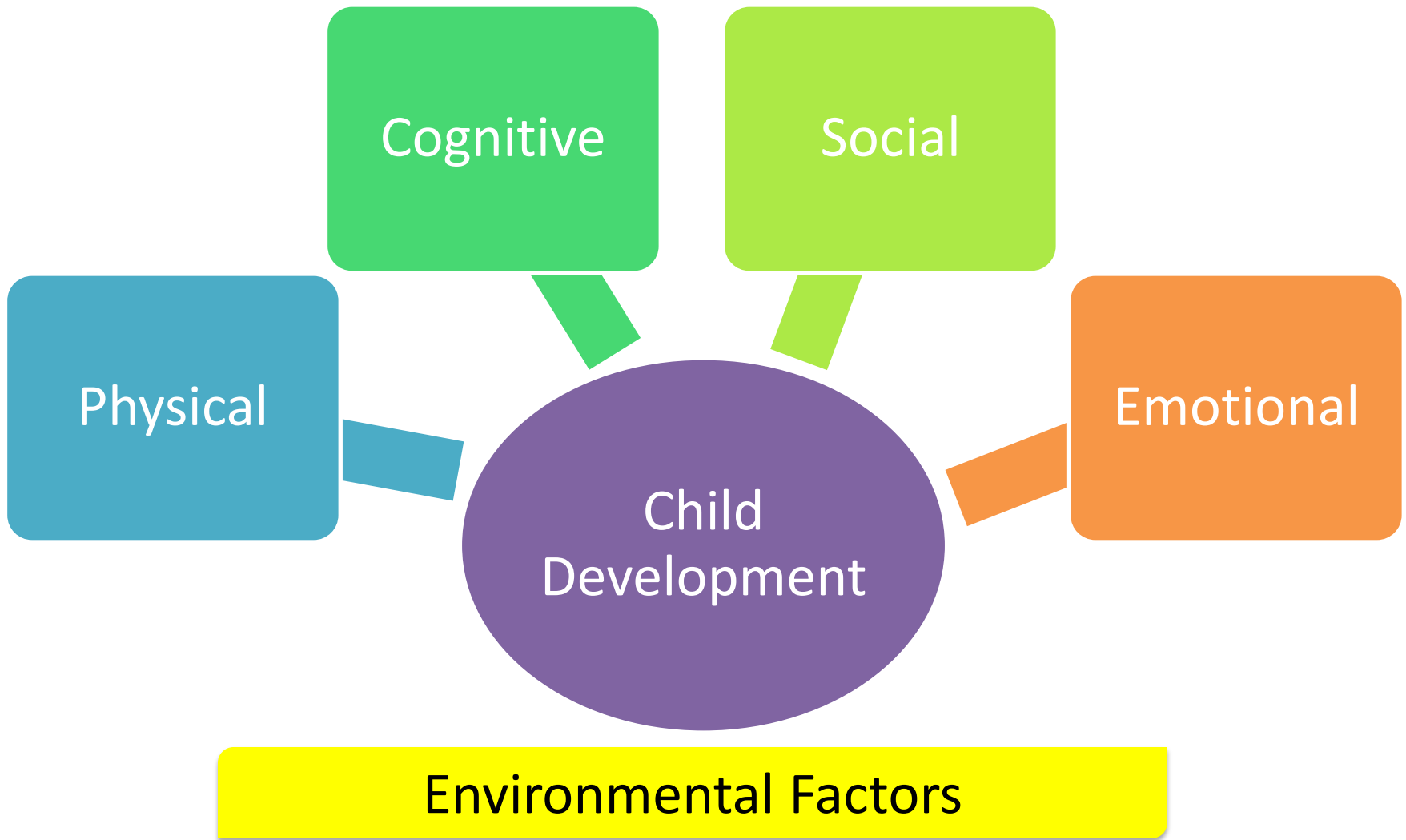
- Children cannot complete traditional standardized tests;
- Children's development is rapid;
- Children are better able to show what they know than what they can do.

(Scott-Little & Niemeyer, 2001).



# Assessment Purposes

- Performance measures
- Overview of child status
- Identification of special needs
- Program effectiveness evaluation
- High-stake accountability
- Trends monitoring (e.g.growth)
- Support learning (e.g. readiness)
- Context (e.g. demographic, economic)





# Areas Assessed by Early Childhood Assessments

Approaches to Learning	Cognitive	Creative Arts	Creative Representation	Early Math	Fine Motor
Gross Motor	Immunization review	Language	Literacy	Mathematics & Science	Nature
Numbers/counting	Phonological Awareness	Physical Health and Development	Pre-writing	Recalling Sentences	Receptive Language
Semantic Relationships	Sentence Assembly	Sentence Structure	Shapes	Sizes/Comparisons	Social and Emotional Development
Thinking ability	Verbal and visual working memory	Vision and hearing check	Visual Reception	Visual recognition and matching	Word Associations
	Word Classes	Word Definitions	Word Structure		



# Assessment Standards

- Should **benefit** children
- Should be **reliable, valid, and fair** for the purpose to which the test been prepared;
- Should be **age-appropriate** in both **content** (the main constructs—cognitive, social, emotional, and physical domains) and the method of data collection (traditional PPT are not suitable);
- Should be **linguistically appropriate**



# Type of Assessment Tools

## Observation & Checklists

- Observation of child behaviors

## Anecdotal Records

- Narrative descriptions of child behaviors

## Running Records

- Objective detailed narrative records, i.e. Social Skill development

## Portfolios

- Work examples

## Home Inventories

- Behaviors and skills demonstrate at home

## Developmental Screenings

- Short age & content appropriate performance items based on developmental continuum

## Diagnostic Assessments

- Identifies strengths & weaknesses and suggest remedial actions

## Standardized Assessments

- Direct measures of children's outcomes

## Sample

### Matches pictures

Point to the tree in the upper half of the page and say, This is a tree. Use a Sweeping motion of your hand across the lower half of the page and say, Show me another tree down here.

If the child points to more than one picture on a page, ask, which one is it? If the child still points to more than one picture, consider the response incorrect.

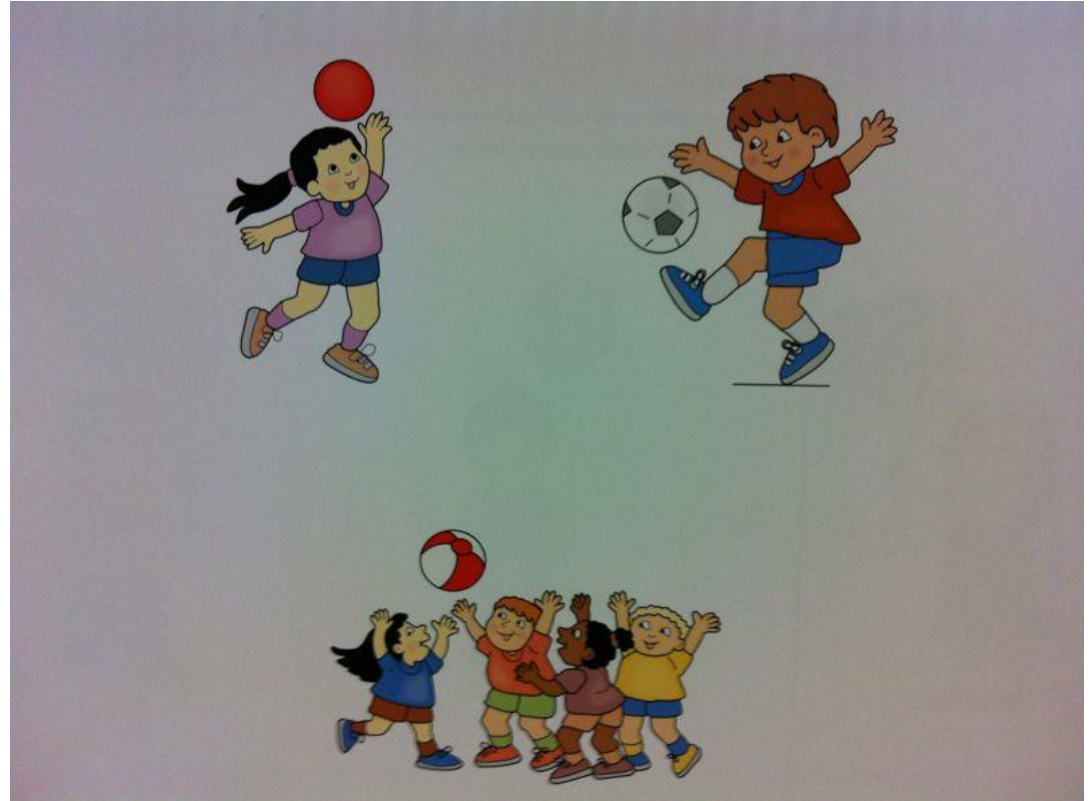




## Sample

### Understands Pronouns

Say, Show me \_\_\_\_\_, or  
Point to \_\_\_\_\_. They are  
playing.







# KINDERGARTEN ASSESSMENT

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# Kindergarten Assessment : Purposes

**Assessment provides parents, teachers, school administrators, and policymakers a comprehensive and reliable information to:**

Family	Understand each child's particular strengths and skills that might need additional attention;
	Identify children with suspected disabilities who require additional evaluations;
	Understand if children will be ready for school;
Kindergarten	Evaluate if kindergarten's learning activities match children's skills and abilities;
	Plan for learning activities that match children's skills and abilities;
	Evaluate if kindergartens are providing children the right programs and services;
	Understand the characteristics of cohorts of children in a kindergarten;
Policy makers	Understand characteristics of cohorts of children across kindergartens;
	Determine how successful kindergarten programs have been in preparing children for school

(The National Education Goals Panel Early Childhood Assessment Resource Group, 1998; Scott-Little & Niemeyer, 2001).



# Kindergarten Assessment: Measurement Types and Goals

**Table 1. Appropriate Purposes of Kindergarten Assessments, Measurement Types, and Goals**

Assessment Purpose	Measurement Types	Goals
➤ To identify groups of students who may have developmental or health needs	➤ <b>Screening</b>	<ul style="list-style-type: none"> <li>➤ Collect information with large number of students</li> <li>➤ Identify need for additional diagnostics</li> </ul>
➤ To identify children in need of specialized services or interventions	➤ <b>Diagnostic</b>	<ul style="list-style-type: none"> <li>➤ Determine developmental or medical needs</li> <li>➤ Determine specific intervention needs</li> <li>➤ Establish student eligibility for services</li> </ul>
➤ To track students across programs, schools, districts, and states for comparisons and social benchmarking	➤ <b>Norm-referenced</b>	<ul style="list-style-type: none"> <li>➤ Provide point-in-time snapshot of a student's knowledge compared with other students</li> <li>➤ Compare students from different programs, schools, and communities against a norm</li> <li>➤ Provide student-level performance in comparison with a population norm or other students of the same age/situation</li> </ul>
➤ To determine whether students meet specified academic standards or defined performance levels	➤ <b>Criterion-referenced</b>	<ul style="list-style-type: none"> <li>➤ Provide a point-in-time snapshot of a student's knowledge compared with defined standards or specified criteria</li> <li>➤ Track student's progress against specified standards over time</li> </ul>
➤ To guide program-, classroom-, or student-level instruction	➤ <b>Formative</b>	<ul style="list-style-type: none"> <li>➤ Document individual student learning and knowledge, probing student understanding and competencies</li> <li>➤ Identify student strengths and weaknesses</li> <li>➤ Monitor individual student learning progress over time</li> </ul>
➤ To evaluate programs	<ul style="list-style-type: none"> <li>➤ <b>Summative</b></li> <li>➤ <b>Norm-referenced</b></li> <li>➤ <b>Criterion-referenced</b></li> <li>➤ <b>Descriptive</b></li> </ul>	<ul style="list-style-type: none"> <li>➤ Collect information on a sample of students</li> <li>➤ Determine and explain the impact of a program or service on defined outcomes</li> <li>➤ Address questions about programmatic investments</li> <li>➤ Get information about structural and process characteristics of children, families, teachers, programs, and other learning environment variables</li> </ul>



## Empirical Evidence of Relationship Between Kindergarten Skills and Later Academic Achievement

- A cross national-study (n=36000 kindergarten children) from Canada, the UK, and the US indicates that children's skills in **Math**, and **Reading**, were the **most powerful predictors of later primary school achievement.**
- Interestingly, **Math** skills predicted **Reading** performance better than Reading skill itself (Duncan et al., 2007).



## Empirical Evidence of Relationship Between Kindergarten Skills and Later Academic Achievement

- **Behavioral** (e.g. aggression) and **emotional adjustment** as well as **social skills** in kindergarten **had no significant influence on later achievement** (Lemelin & Boivin, 2007).



# Diagnostic Assessment for MIMOS' Kindergarten Children

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(Menjalankan Kurikulum Prasekolah Kebangsaan)

**Tel : 603-89956867**











# Sample item



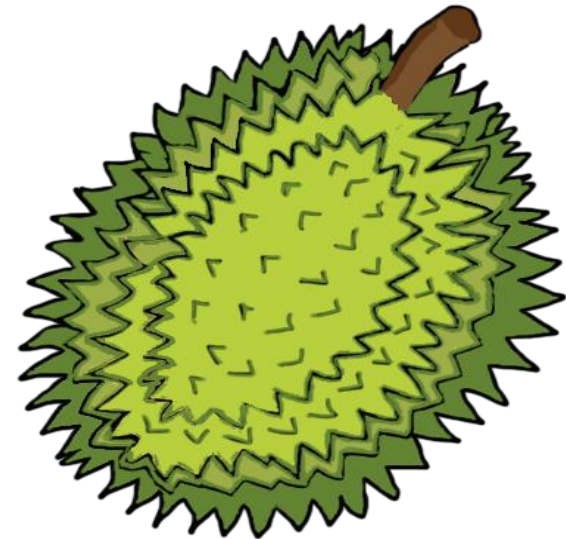
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# Sample items



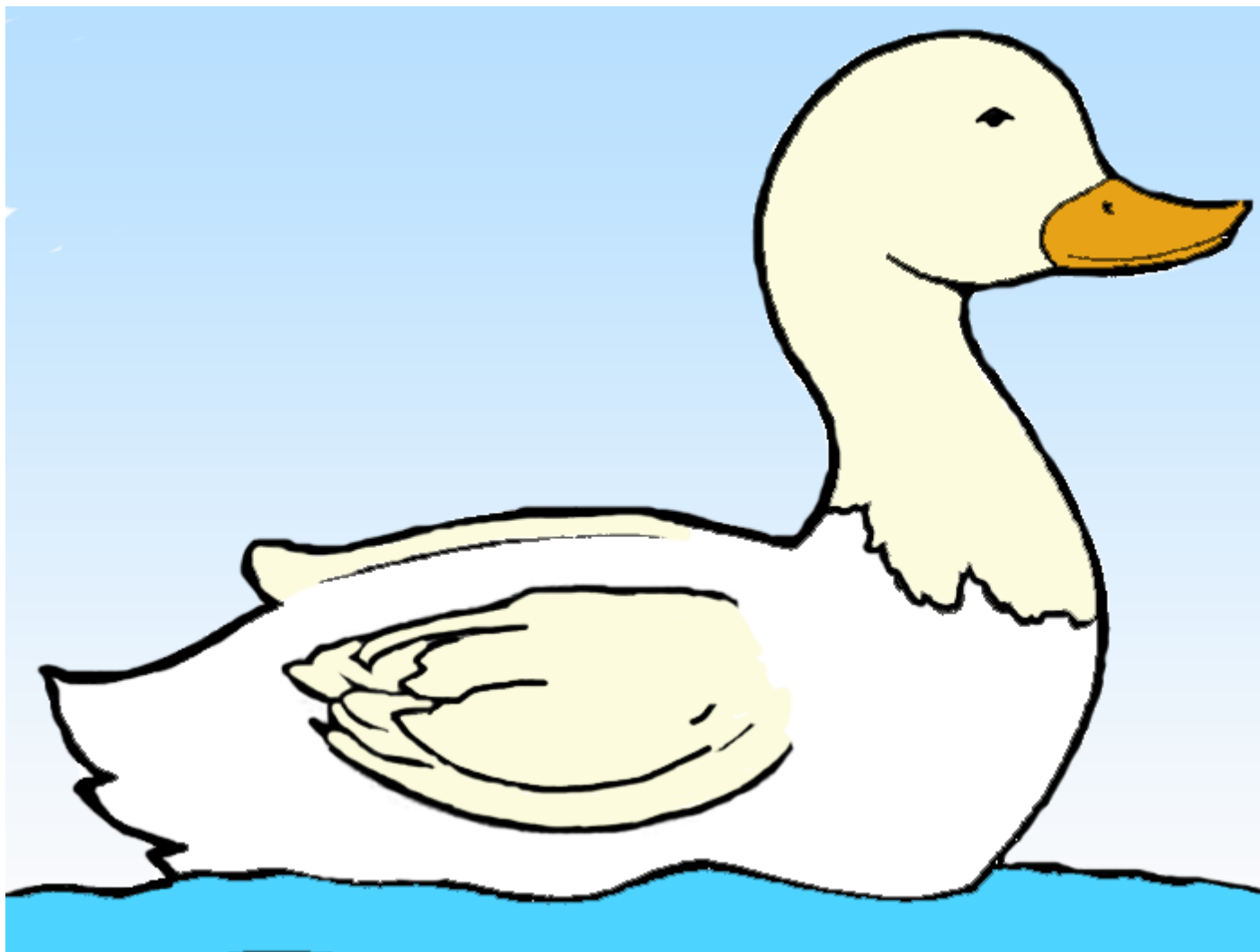
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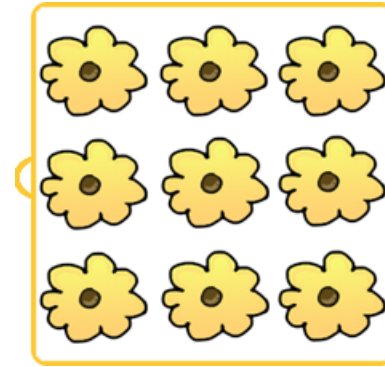


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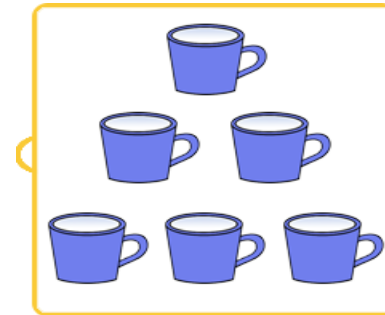


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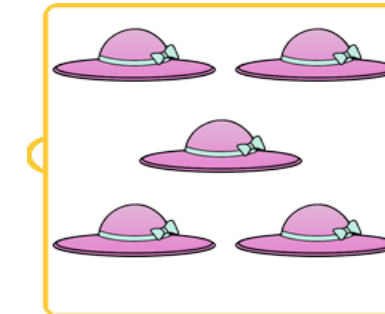
a.



b.

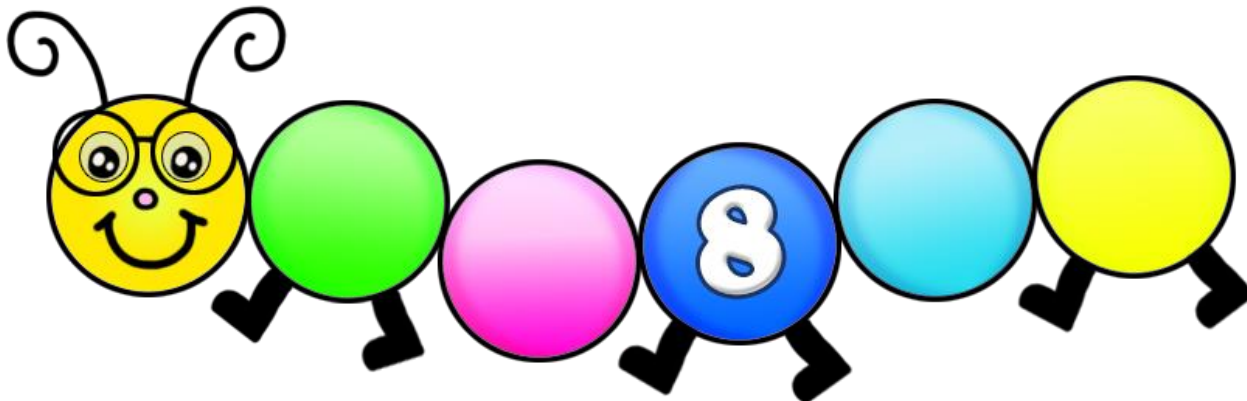
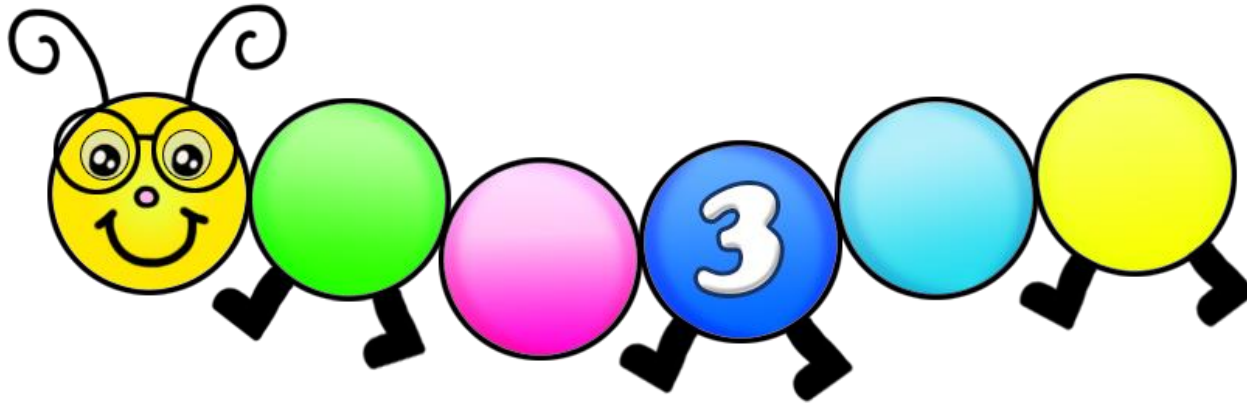


c.





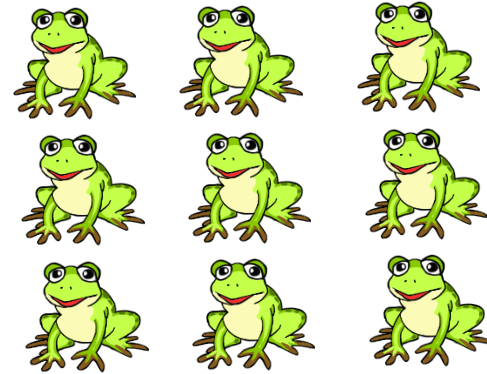
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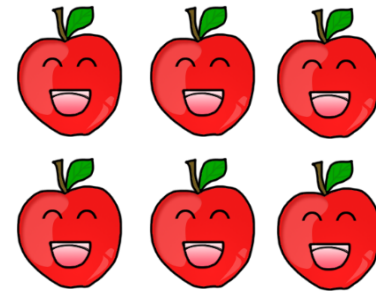


# Sample item

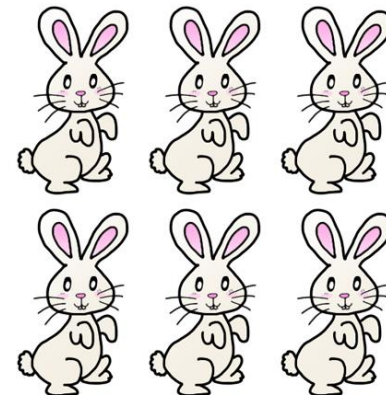
a. Bulatkan 6 katak.



b. Bulatkan 3 epal.



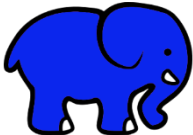
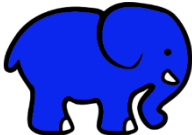
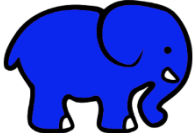
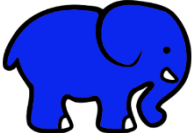
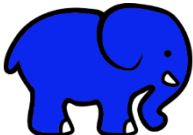
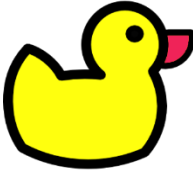
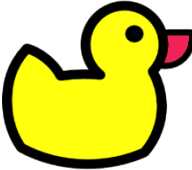
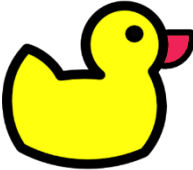
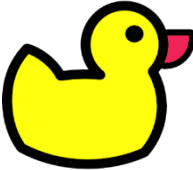



c. Bulatkan 4 arnab.







# Sample item

Haiwan					
Gajah					
Itik					
Kucing					
	1	2	3	4	5

Berapa ekor gajah?

Berapa ekor itik?

Berapa ekor kucing?



# Demo on Interactive Assessment for Kindergarten Children

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# MIMOS Psychometric Assessment System (MPAS)

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**TERIMA KASIH**  
THANK YOU

[www.mimos.my](http://www.mimos.my)

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